Cardiac Surgery: Past, Present, And A Look At The Future

The development of the Mid-America Heart Institute was a long and trying period for us because a number of hurdles had to be overcome. Not just the professional ones, but also gaining the approval of the health planning agency and whether or not we could justify the development of such a center in the light of great concern for the cost of medical care today. Through the generosity of Kitty and Bob Wagstaff, who made a major donation at a critical time, and with health planning agency approval, the Heart Institute will be dedicated on December 13, and we’ll move into the Institute on January 4, 1982.

It is not possible for me to let these events pass without making two or three comments about the development of the center. The developments in cardiac surgery didn’t occur in isolation from the development of techniques in cardiology, the development of coronary angiography, the developments in cellular biology and other areas of physiology, the utilization of engineers and their knowledge in the development of mechanical devices that we are so dependent upon, and the developments in antimicrobial therapy. Many fields have helped cardiac surgery develop to the point where it is today.

I think that though the cardiac surgeons have been innovators in many ways, the things that really happen in a program happen because of the people. Five years ago when Ben McCallister was here talking to this audience, he expressed the hope that there would be a heart center at St. Luke’s Hospital. I would say without hesitation that it is through Ben’s efforts more than anyone else’s that the new center is going to be realized.

I am reminded of a little book my wife Mary brought home a week or so ago. It’s called When Bad Things Happen to Good People. It was written by a rabbi by the name of Harold Kushner, and he is talking about prayer and how prayer should be utilized. He suggests that prayer shouldn’t be wasted on something that has already taken place, nor should it be utilized to ask for negative things. As an example of that, he relates the story of two merchants who are friends and have businesses across the street from each other. They stand out in front and watch as customers come and go from their businesses. They are feeling terribly competitive. One day one of the merchants has a visit from God during a prayer and God promises the merchant more business. But the merchant has to understand that the competitor across the street will get twice as much; that God will double the merchant’s profits this year but twice as much will be given to the friend across the street. God gives the merchant one wish to be fulfilled but adds the reminder that whatever it is that the merchant receives, the friend across the street will receive twice as
much. God finally asks for the decision on the wish, and the merchant asks to be blind in one eye. So we mustn’t ask for negative things; we must be positive in our approach.

I am reminded when I think of cardiac surgery that it’s always exciting to me – and will be exciting as long as I am doing this kind of work – to see the miracle of the heart. That the heart can be quiet and lifeless one moment, apparently unable to do anything, and then when blood flow is restored to it, away it goes. Usually when we are doing a heart operation, we have to cross-clamp the main artery of the heart. The heart isn’t receiving its fuel supply, so it stops. It looks almost lifeless during that period of time. Thirty seconds after the blood supply has been restored it is vigorously contracting and carrying out its mission. It never fails to excite me that after I have been working there for an hour or hour and a half and then restore its fuel supply, all of a sudden away it goes.

Paul Brand, a hand surgeon who spent a number of years in India at a leprosarium, and Philip Yancey have written a book called *Fearfully and Wonderfully Made*. In the front of it they quote a phrase out of Psalms 139 which I think is very appropriate: “You created my inmost being. You knit me together in my mother’s womb. I praise you because I am fearfully and wonderfully made.” You cannot help but be terribly impressed when you see the heart there in front of you and the way it works.

I would like to go, then, from this little preamble to a review of the developments of cardiac surgery. We might go back to 1912, at which time there was already a history of operations being done on the heart. Alexis Carrel received the Nobel Prize that year for transplantation, blood vessel, and valve operations. (We think of our science as being relatively new!) Then in 1925, an Englishman by the name of Soutar and another surgeon by the name of Eliot Cutler did the first mitral valvulotomy, opening the narrow mitral valve. They were severely criticized for that because it was thought, at the time, that one should not attempt such crazy and wild things. As a result, there was no further progress to amount to anything until the late 1930’s.

In 1939, Dr. Gross from Harvard did the first closure of ductus arteriosclerosis, an abnormal communication between the pulmonary artery, the artery to the lungs, and the aorta. His patient, a child, had been born with this condition. Interestingly, at the same time, Dr. John Gibbons, who was professor of surgery at Jefferson Medical College in Philadelphia, and his wife, who was a laboratory technician, were working on a means for oxygenating the blood with an artificial heart and lung. That also proved to be a very important development.

In 1945, Dr. Dwight Harkin returned from his work in the Pacific war and described some of his experiences. I saw a film Dr. Harkin made about fishing foreign bodies out of the hearts of the soldiers who had been shot. He did this surgery without the help of a heart and lung machine. You talk about being calm; he was really calm. It was inspirational to see the endeavor. Dr. Harkin later did the second successful mitral valvulotomy in this country, following the initial successful effort of Dr. Charles Bailey by only a few days.

In the early 1950’s, it became possible to operate inside the heart. The first open heart operations were done by a technique we called profound hypothermia. An old bathtub would be filled with ice and the patient would be anesthetized and placed in the ice bath until the body temperature was reduced to about 30 °C. The patient would then be taken out of the ice, put on the operating table, and operated on, quickly, before rewarming occurred. Using this technique, one could repair only the simplest kinds of intracardiac defects, such as an atrial septal defect,
the defect between the collecting chambers of the heart. The purpose of the cooling, of course, was to give the brain a longer period of time during which it could be without blood flow. At normal temperatures, this interval is about two minutes. At 80°F (about 30°C) one has about seven or eight minutes. At a given signal, the surgeon clamped off all the circulation, opened the heart, sewed up the hole in the heart, removed the air from the heart, and restarted the heart. The surgeon had six to eight minutes in which to do the corrective procedure. You can imagine how operations today seem relatively unhurried after having gone through a period in which time was such a limiting factor.

When I was a resident surgeon in training, I remember watching a doctor open a valve without cooling the patient, so that he had to do the entire intracardiac part of the operation in two minutes. It was a time, in the development of cardiac surgery, when we were searching for new and better ways of doing things. It was about then, in 1953, that at Jefferson Medical College, the first atrial septal defect was closed using a machine to both pump and oxygenate the blood. The patient had an atrial septal defect which was successfully closed. Following that event there was a rapid development of this technique.

Dr. Kirklin at the Mayo Clinic, using the first screen oxygenator, which cost about $500,000, repaired many types of complicated cardiac defects that others had not successfully repaired using older techniques.

In 1954, Dick DeWall, a resident in surgery at the University of Minnesota, assembled a bunch of plastic tubing in such a manner as to function as a blood oxygenator. We had a breakthrough in terms of the practical application, something within the reach of hundreds of other institutions in the country: a heart and lung machine made out of pieces of plastic tubing stuck together with laboratory stoppers and utilizing a mechanical pump. This was the type of oxygenator that I worked with in the laboratory, where you sort of made your own, and it was the one that we used to repair the first ventricular septal defect at the University of Kansas in 1956. I moved it over to the hospital operating room from the experimental laboratories and we went from there. Those were exciting times.

Another technique used in 1952 and 1953 at the University of Minnesota was cross-circulation. They didn’t have a heart and lung machine but they had the parent of the child, the child being the patient and the parent being the heart and lung machine. They took the adult to the operating room, hooked the artery of the adult to the artery of the child, and drained the blood from the adult into the child and vice versa. They successfully utilized the parent for cross-circulation in about 40 patients.

In the 1960's we had the development of the first successful major valve replacement. There had been successful attempts to open the narrowed valves, but in early 1960, Dr. Albert Starr, in conjunction with a Mr. Edwards, an engineer, developed the first good prosthetic heart valve. One could take out the old valve and put in the new valve and expect a reasonable result. The valves have changed a lot in subsequent years, and I want to show you slides of just a few of these. Dr. Harkin has indicated that something like 875 valves have been described in the medical literature in the past 20 years.

This is the heterograft valve taken from a pig, a technique that is currently used (Figure 1). The pig aorta is taken at the time the pig is sacrificed, and the tissue and muscle are trimmed from the valve. It is preserved in a buffered solution of glyceraldehyde. This is one of the techniques that I worked with in 1967 when my wife Mary and I and the children were at the
Royal Infirmary in Edinburgh, Scotland. Glutaraldehyde converts the elastic tissue to an inert material. The valve is then mounted in a framework for insertion (Figure 2). The elastic carbon linkages are changed. The pericardial xenograft (Figure 3) is constructed from scratch and is similar to the porcine valve. As you can see, the bottom part – the translucent little parachutes – serves as the valve mechanism (Figure 4). The tissue of the host is sutured to the frame of the prosthesis. The rim of the outside is the part utilized to sew to the inside of the heart, and the little valve in the center is the valve mechanism itself. Valves are made in different sizes in order to accommodate the particular size a patient may require. One must have a range of sizes on hand prior to the procedure. This is a pulse duplicator picture of the valve (Figure 5) demonstrating the valve opening as fluid is forced through (top of figure) and it opens and closes. In the middle frames one can see it as it is beginning to close. The valve leaflets themselves work like little parachutes.

Another type of valve commonly used is the flat valve developed by Dr. Bjork (Figure 6). It is a little disk, rather like a Lifesaver, that pops up. There is a little depression in the center of the disk which is held in position by a metal wire. The poppet is made out of Pyrolite, a compressed carbon, which is very durable. The major advantage of this valve, compared to the others described, is its better durability. The tissue valve seems to wear in the opening and closing parts. There have been some changes in the design of the disk and the opening angle so as to improve the dynamics of flow.

One of the older valves, the McGovern valve, was a very interesting one (Figure 7). Small metal prongs were constructed around the rim of the valve. The surgeon placed the valve in the heart and turned it with a special inserter handle, and the teeth would project into the heart and attach itself in the heart. It was used in an emergency for rapid valve replacement.

The last type of valve I will discuss is the ball valve. This is the one I mentioned that was developed in 1960 by Dr. Starr and Mr. Edwards. The valve went through several stages of development. This is a picture of the early ball valve (Figure 8). The rubber silicone ball is in the center, and the sewing rim is on the periphery. The ball bounces up and down during each heart cycle. This valve developed problems because the poppet wore as it went up and down on the little struts. Modifications were introduced over the years to eliminate various problems. In later models the struts were covered with cloth, and the ball was made of a different material, Stellite 21, a hard metal alloy.

We’ve briefly gone through the changes in heart valves that have occurred over the years. These changes have occurred after a great deal of study in the experimental laboratory, with laboratory animals, and after careful study of our experience in patients.

In the late 1960’s and early 1970’s, the first pacemakers were implanted. There have been tremendous advances in this technology since the initial devices were introduced. In late 1960, the coronary bypass operation was introduced. Also, the first heart transplants were done. You may not know that the first heart transplant in a human actually was done in Jackson, Mississippi, by Dr. Jim Hardy. He implanted a chimp heart into a patient. Of course, the patient violently rejected the newly implanted heart within a few hours. Dr. Barnard and Dr. Shumway developed their techniques of heart transplantation in the laboratory and then introduced the procedure in humans. Through the 1970’s, the primary objective was to prevent or control rejection of the implanted organ. If one could take the DNA from all of the body cells and string the strands end to end, the chain would extend from the earth to the sun and back 50 times. You
can thus imagine the difficulty in matching one person with another; there are billions of possible combinations. I don’t mean to be discouraging, but it does create a bit of a problem when you begin to think of the chances for a perfect match.

In the 1970’s we saw more success in solving the problems with the heart valves. In coronary bypass, too, we began to develop banks of information on how long and to whom this procedure would be applied, to which groups of patients, and which ones could benefit the most from it. I want to show three or four slides about the data that we are collecting now and that we will continue to collect on heart revascularization, the bypass operation. Most of this data was collected by Dr. Arnold Killen, one of my associates.

Patients who have heart blood vessel disease normally have one or more vessels involved. Three main arteries supply blood to the heart. If one vessel is involved, the outlook is quite good (3% mortality per year); if two vessels are involved, the outlook isn’t quite so good (5 to 6% mortality per year); and if three vessels are involved, the outlook is worse (9 to 10% mortality per year), as one might imagine.

We know that the solid line (Figure 9) is what one would expect from surgical therapy in patients who have just one vessel involved. The outlook for ten years is really quite good whether the patient is treated medically or surgically. In our series of 459 patients, over 90% survived ten years. The dotted line indicates survival of the normal U.S. population of the same age and sex (Figure 10).

The outlook for the patient with two-vessel disease who has been operated upon (Figure 10) is about the same at ten years (solid line) as that of a similar number of people the same age and sex in the normal U.S. population followed for ten years (dotted line). The outlook is very significantly improved over that in patients treated without operation (5 to 6% mortality per year). As you can see, the natural history of a group of people in the normal U.S. population, age and sex matched, is about 80% at ten years.

There is some lessening of survival in those who have the most severe form of disease (Figure 11) but still much better survival than with medical management. If one follows the total number of patients (2,627) who were studied – and these are the patients we operated upon five years or longer ago – the outlook, in general, is that over 80% of them will be alive at ten years and there does appear to be a tendency toward recurrence of mild symptoms (Figure 12). But, still, the majority of people are free of symptoms through the years, and I think this points out the need for continuing efforts toward prevention of progression of their disease. The operation is a treatment, not a cure, of their problem. They should stop smoking. They should stop doing many of the things they have been doing which have contributed to the development of their coronary artery disease.

In the 1970’s, we saw the introduction of balloon angioplasty, which is currently being evaluated throughout the country and the world. I believe it is too early to know where to apply the angioplasty technique and how much it is going to help. In acute intervention, where the patients come to the hospital with a heart attack in progress, it may be possible to help these people rather than give them something for pain and put them in intensive care and watch nature take its course. It may be possible to intervene. Dr. McCallister and his associates are actively involved in this kind of endeavor at the present time.
The artificial heart was used some in the 1970’s. The big problem with the artificial heart is not the mechanism itself, but the development of a good internal power supply. I would urge the engineers to get busy and get us an implantable power supply that will power that heart. You may know about the artificial heart developments at the University of Utah in Salt Lake City. The artificial hearts are there. They have been in calves for several months, but an external power supply is being used. I believe that there will be the perfection of an implantable power supply for the artificial heart.

Nuclear power supply for pacemakers is currently under evaluation and will make batteries last much longer. The ones that we have now will last from five to ten years. There has been an amazing development in the treatment of heart arrhythmias which is very important because the initial arrhythmia is the cause of death in many people having a heart attack. I believe that we are close to having a pacemaker that, when implanted, will read the heart rhythm, program a correction if there is an abnormal rhythm that is life threatening, and give a therapeutic shock to get it back to normal. That is not farfetched at all nowadays.

We are now developing ways to detect those who have coronary artery disease and those who have a tendency toward the disease. In the future you may go into your friendly radiologist’s office or your cardiologist’s office, get an intravenous injection, have your heart blood vessels visualized without going through a catheterization, and then take some prophylactic measures to prevent many of those things that happen now by chance.

In the area of cellular biology and transplantation, there are going to be tremendous changes in the treatment and identification of transplantation rejection phenomena. Quite a bit was done in the 1970’s, and the results now from Stanford indicate that one can expect about 65% of the patients whose hearts have been transplanted to be alive in five years, which is very comparable to the earlier days of kidney transplantation.

In the area of noninvasive angiography, the radiologists and the researchers in that area are making a lot of progress. So invasive techniques for picturing the heart and its blood vessels, brain, and so forth will be worked out so they can be more widely applied, with less expense involved.

The new valves, the new types of valve substitutes, blood vessel substitutes, heart and lung machines that can be used by patients in acute lung or heart failure for periods of several days, an implantable heart that can be put in temporarily to tide a patient over – all of these things are right now at the edge of development. Looking into the next ten years, development is going to be staggering.

During the last twelve months in our program at St. Luke’s, about 2,900 patients have had heart catheterization, 250 have had pacemaker implantation, 2,600 have had noninvasive heart and blood vessel examination, and over 1,000 have had open heart procedures. Heart and blood vessel disease, ubiquitous in our society, is destructive in its effect and devastating to our nation from an economic point of view. In one of the journals a study was just reported on the incidence of chest surgery and vascular surgery. The study was done in 1976 and 1979 in Olmsted County, Minnesota. Figures from that study projected for the 1980 U.S. population would have 180,000 people requiring chest operations or vascular operations; 3,900,000 patient-days would be involved; and 6,000 operating room hours would be spent. That would be the demand.
Heart and blood vessel disease strikes commonly in the most productive years. It’s expensive to diagnose and treat, but it is far more expensive not to take an aggressive step forward.

Thank you very much.

QUESTIONS AND ANSWERS

QUESTION: Would you comment more on angioplasty.

ANSWER: This is a technique that was developed initially by Dr. Gruentzig in Switzerland in which a small balloon on a catheter is passed into the blood vessel and through to the point of narrowing, is inflated, and thus mashes the deposit in the blood vessel out against the wall of the vessel. In selected patients, it now seems to give a good initial effect in those patients in whom the catheter can be successfully manipulated across the lesion. The work that needs to be done now is to find out how long it lasts and in whom it’s best applied. Certainly, where multiple vessels are involved or where there are heavy deposits of calcium in the narrowed area, angioplasty is not technically suitable. I think that the technique is in a state of flux at present and must still be considered an experimental technique.

QUESTION: I have read different articles concerning the impact of new medicinal treatment on coronary vascular disease as being almost as successful at extending life and deleting pain as bypass surgery. If that is true, should we not be looking at less emphasis on surgery and its costs and more emphasis on medical treatment of the cardiovascular system?

ANSWER: The studies on the natural history of coronary disease and the life expectancy and the mortality each year were done in the 1960’s. Today, we don’t have good natural history studies done in patients who have the benefit of calcium inhibitors. That’s the newest kind of medication. Inderal is one, and a number of other drugs have come on the scene in the 1970’s. The big problem is that it’s very difficult to get scientific data. It’s difficult because you start out with 200 people who are going to be treated surgically and 200 who are going to be treated medically. What happens is there’s a crossover of the patients from the medically treated group. Those who don’t do well in the medical group cross over to surgery and are operated upon, and that destroys the credibility of the statistical information. I don’t know where we’re going to go in that regard. Ben, you may have some comment about that.

Comment by McCallister: The surgeon has been under tremendous fire by the Wall Street Journal and everybody else in the last ten years as to whether this operation has been a successful one in extending life or whether it is really a palliative procedure. I just came back this morning from the American Heart Annual Meeting, and the interesting thing that has happened is that now everyone accepts coronary bypass surgery and that at the end of five or ten years many more patients are alive having had bypass surgery. In the slides shown today from our program, this curve shows those people in a normal population compared with those operated upon. The patient who has very bad and serious heart disease has as good a chance of being alive in ten years, having had bypass surgery, as the normal population. If they had not been treated with bypass surgery, very few of them would be alive. The curves that Dr. Killen and Dr. Reed have gotten are now going to be used as a gold standard against which every other form of therapy will be compared – including angioplasty and medical therapy (Inderal, etc.) – because we have no data at all that even closely approximates the results of bypass surgery. So,
what caused a tremendous amount of study five to ten years ago now provides the best scientific basis we have compared to other types of therapy.

**QUESTION:** Where do all these people come from that you treat?

**ANSWER:** A little over half of the patients now come from outside metropolitan Kansas City, from Missouri, Kansas, and Nebraska. A few come from Colorado, and some come from Oklahoma.

We’re hoping that the Mid-America Heart Institute will do several things. We’re hopeful that we’ll be able to develop information, as I’ve shown you here today, about what we tell the patients – what they should have done or not done – and it’s a data base that’s terribly important to continue developing. We hope the Heart Institute will allow us to collect an attractive group of people who are interested in science and interested in studies in medicine. Certainly, we will also want to be heavily involved in community education.

**QUESTION:** What is the cost of open heart surgery?

**ANSWER:** We’re talking about, if it’s a child, spending usually five days in the hospital, something like $6,000. About a year and a half ago, the total cost to the usual bypass patient was just over $9,000, which includes physicians’ fees (cardiology, surgery, anesthesia) and hospitalization (twelve days in the hospital). It’s an expensive proposition.

**QUESTION:** You have referred to the three bypasses. I have always understood that there were just three coronary arteries subject to bypass, but I recently was told that someone had had five bypasses and someone else, seven bypasses. What are they talking about?

**ANSWER:** Although the usual situation is that there are three, the right coronary, the left anterior descending coronary, and the circumflex, many patients have branches of these three major ones – little tributaries going off the main ones – and these may be of sufficient size to be important as to whether or not the patient will continue to have symptoms. Although they may supply a relatively small amount of heart muscle, we would still bypass them if they are obstructed. If we have a circumflex that has two side branches, for example, we may very well hook up all three, putting them in sequence with the same graft. We call these sequential grafts, the object being to completely revascularize the heart and bypass those arteries that have more than a 50% obstruction.

**QUESTION:** You were talking about surgery in a child. How early in life do you normally do surgery for heart disease?

**ANSWER:** Currently, we’re operating on children as young as two years of age. The majority of the children younger than that are being operated on at Children’s Mercy Hospital. Our training programs are interrelated.

**QUESTION:** Last week there was a short presentation on “PM Magazine” about some drug, which I believe the FDA has allowed to be used, that supposedly clears up the arteries. I believe they called it chelating therapy. Could you comment on it?

**ANSWER:** I think there is very little scientific evidence to support that it will do what it’s advertised to do.

**QUESTION:** Regarding the studies that are being done on surgery and medical treatment and survival rates, are there any studies comparing the quality of life of coronary patients treated
surgically with that of coronary patients treated medically? I’ve heard of several cases of when only medical procedures are used they are afraid, maybe, of limitations in their work.

ANSWER: Yes, there are ongoing studies, and more studies are badly needed on activities after surgery. We have the impression that most people who are operated on go back to work. Maybe they don’t. Certainly, if we’re talking about heart artery disease, about 80% of the patients are totally or significantly improved. About 70% are totally relieved of angina, and another 10 to 15% are improved. So the majority of patients who have had bypass surgery are asymptomatic and tolerate normal activity. Whether they go back to work or not is something else. Something that industry needs to face is that if you’ve had your heart operated on, you may be better able to do your job than before. Industry may, still, want you to retire. They sort of pressure you to step aside. It’s going to take a lot of reeducating to keep that from happening. In some industries, their cross-country truck drivers can drive their trucks as long as they’re not detected as having heart disease. Once they have their heart operation, they can’t drive their truck. A lot of study needs to be done in terms of deciding who can go back to work, how quickly one can go back to work, and what one can do after returning to work. We need more definitive information.

QUESTION: Going back to the first question that you answered, is angioplasty the treatment that Johnny Carson received? I think he called it the “Roto Rooter.”

ANSWER: Yes, he had an angioplasty of his iliac artery. The best possible results from angioplasty have been in the iliac artery, the blood vessel from the abdomen down to the pelvis and thigh, where there is a limited area of narrowing in a large vessel. He’s apparently had a good result.

QUESTION: Could you comment on the relative importance of family history, lack of exercise, abuse, and other factors that contribute to the onset of heart disease.

ANSWER: I heard a geneticist from Denver recently discuss the genetic factors in various kinds of disease, including coronary disease. There is a group of people who have a genetic abnormality of their fat metabolism which makes them much more likely to develop coronary arteriosclerosis, and those people can be identified easily with typing of their serum lipids. There is also a large group of people in whom it wouldn’t make any difference what they ate or what they did; they still wouldn’t develop any problem. In between these extremes is a large group in whom environmental factors may influence a genetic predisposition. So, yes, there is a fairly strong genetic predisposition to the disease.

But the large majority of people who develop coronary disease, although they may have some genetic predisposition to it, can be influenced by what they do and the way they live. I think that you can manage those factors that cause you to have difficulty – obesity, smoking, too much alcohol, overeating, the wrong diet, tension – if you get out and run. Of course, you ought to have your doctor check you out to be sure you can do that, but most of the things that we’re talking about can be alleviated by exercise. It’s been only in the last two or three years that we’ve found that one of the things that happens in people who exercise even to a modest degree is elevation in the part of their blood fat called “HDL,” or high density lipoprotein. It has a protective effect against the development of coronary disease. So, as a consequence of even modest exercise, your heart rate will be lower, your blood pressure will be lower, you’ll sleep better, you’ll eat less, and your weight will be down. Cigarette smoking is probably the major problem.
QUESTION: You read that a great many dignitaries from not only the Eastern countries but the West visit the United States for heart procedures. Are we advanced?

ANSWER: Yes, many of the developments that I spoke of in cardiac surgery took place in a free society. Mary and I visited China this fall, and their society, as many of you know, has gone through a revolution. They fought each other during the 1920’s, they joined together in 1937 to fight the Japanese, and then they resumed their internal war until 1949 when the People’s Republic of China was established. In 1967 they closed all of the medical schools and law schools and higher education. What we found in that society, a tight, closed, restricted society, was that they were just doing their first mitral valve replacements (such a procedure was done in this country in 1960). They were putting into a child a tissue valve that we know will become calcified in two or three years. They have been isolated from Western culture; it’s unbelievably primitive for a country of almost a billion people. That’s when you never are so aware of what a tremendous advantage and privilege it is to live in a free society, where ideas can be exploited.

QUESTION: What is the incidence of repetition for open heart surgery?

ANSWER: Our experience is that we’ve operated on about 6,900 patients with coronary disease, and it’s about a 1.5% per year likelihood that they have to be operated on again. So at the end of five years, about 7 to 8% would have some reason to be reoperated on. In about half of those people, it’s a problem with the progression of their native disease; we may have done one bypass the first time and now they have another vessel that’s narrowed. In the other half there may be a problem with the conduit itself narrowing.
DR. WILLIAM A. REED is one of the principal physician architects of the Mid-America Heart Institute. Dr. Reed received his M.D. from Indiana University in 1954. Then followed a long relationship with the University of Kansas Medical Center, where he practiced and taught and was appointed professor and chief of cardiothoracic surgery. During this time Dr. Reed pursued extended professional training in Edinburgh, Scotland, where he studied under the leading European cardiovascular surgeon. Dr. Reed joined the St. Luke's hospital staff in 1971.

Widely respected throughout the international medical community, Dr. Reed is recognized foremost as a clinician with both an academic and patient care perspective. He has helped set national standards for improved care and lower mortality rates for patients with common as well as complex cardiovascular problems. He recently returned from the People's Republic of China where he served as an invited consultant to one of that country's leading medical centers. Dr. Reed has published scores of scientific papers and has been awarded fellowships in the select Societies of Vascular Surgery and Thoracic Surgery.

MIDCONTINENT PERSPECTIVES was a lecture series sponsored by the Midwest Research Institute as a public service to the midcontinent region. Its purpose was to present new viewpoints on economic, political, social, and scientific issues that affect the Midwest and the nation.

Midcontinent Perspectives was financed by the Kimball Fund, named for Charles N. Kimball, President of MRI from 1950 to 1975, Chairman of its Board of Trustees from 1975 to 1979, and President Emeritus until his death in 1994. Initiated in 1970, the Fund has been supported by annual contributions from individuals, corporations, and foundations. Today it is the primary source of endowment income for MRI. It provides “front-end” money to start high-quality projects that might generate future research contracts of importance. It also funds public-interest projects focusing on civic or regional matters of interest.

Initiated in 1974 and continuing until 1994, the sessions of the Midcontinent Perspectives were arranged and convened by Dr. Kimball at four- to six-week intervals. Attendance was by invitation, and the audience consisted of leaders in the Kansas City metropolitan area. The lectures, in monograph form, were later distributed to several thousand individuals and institutions throughout the country who were interested in MRI and in the topics addressed.

The Western Historical Manuscript Collection-Kansas City, in cooperation with MRI, has reissued the Midcontinent Perspectives Lectures in electronic format in order to make the valuable information which they contain newly accessible and to honor the creator of the series, Dr. Charles N. Kimball.