The President arrived in the Emergency Room at exactly 12:43 p.m. in his limousine. He was in the back seat, Gov. Connally was in the front seat of the same car, President was brought out first and was put in room two. Dr. Clark pronounced the President dead at 1 p.m. exactly. All of the President's belongings except his watch were given to the Secret Service. His watch was given to Mr. O. P. Wright. T hen left the Emergency Room, the President, at about 2 p.m. in an O'Neal ambulance. He was put in a bronze colored plastic casket after being wrapped in a blanket and was taken out of the hospital. He was removed from the hospital, The Gov. was taken from the Emergency Room to the Operating Room.

The President's wife refused to take off her bloody gloves, clothes. She did take a towel and wipe her face. She took her wedding ring off and placed it on one of the President's fingers.
The President arrived at the Emergency Room at 12:43 P.M., the 22nd of November, 1963. He was in the back seat of his limousine. Governor Connally of Texas was also in this car. The first physician to see the President was Dr. James Carrico, a Resident in General Surgery.

Dr. Carrico noted the President to have slow, agonal respiratory efforts. He could hear a heartbeat but found no pulse or blood pressure to be present. Two external wounds, one in the lower third of the anterior neck, the other in the occipital region of the skull, were noted. Through the head wound, blood and brain were extruding. Dr. Carrico inserted a cuffed endotracheal tube. While doing so, he noted a ragged wound of the trachea immediately below the larynx.

At this time, Dr. Malcolm Perry, Attending Surgeon, Dr. Charles Baxter, Attending Surgeon, and Dr. Ronald Jones, another Resident in General Surgery, arrived. Immediately thereafter, Dr. M. T. Jenkins, Director of the Department of Anesthesia, and Doctors Gieseking and Hunt, two other Staff Anesthesiologists, arrived. The endotracheal tube had been connected to a Bennett respirator to assist the President's breathing. An Anesthesia machine was substituted for this by Dr. Jenkins. Only 100% oxygen was administered.

A cutdown was performed in the right ankle, and a polyethylene catheter inserted in the vein. An infusion of lactated Ringer’s solution was begun. Blood was drawn for type and crossmatch, but unmatched type "C" RH negative blood was immediately obtained and begun. Hydrocortisone 300 mgms was added to the intravenous fluids.

Dr. Robert McClelland, Attending Surgeon, arrived to help in the President’s care. Doctors Perry, Baxter, and McClelland began a tracheostomy, as considerable quantities of blood were present from the President’s oral pharynx. At this time, Dr. Paul Peters, Attending Urological Surgeon, and Dr. Kemp Clark, Director of Neurological Surgery, arrived. Because of the lacerated
tracks, anterior chest tubes were placed in both pleural spaces. These were connected to sealed underwater drainage.

Neurological examination revealed the President's pupils to be widely dilated and fixed to light. His eyes were divergent, being deviated outward; a skew deviation from the horizontal was present. No deep tendon reflexes or spontaneous movements were found.

There was a large wound in the right occipito-parietal region, from which profuse bleeding was occurring. 1500 cc. of blood were estimated on the drapes and floor of the Emergency Operating Room. There was considerable loss of scalp and bone tissue. Both cerebral and cerebellar tissue were extruding from the wound.

Further examination was not possible as cardiac arrest occurred at this point. Closed chest cardiac massage was begun by Dr. Clark. A pulse palpable in both the carotid and femoral arteries was obtained. Dr. Perry relieved on the cardiac massage while a cardiocachioscope was connected. Dr. Fouad Bashour, Attending Physician, arrived as this was being connected. There was electrical silence of the President's heart.

President Kennedy was pronounced dead at 1300 hours by Dr. Clark.

Kemp Clark, M.D.
Director
Service of Neurological Surgery

cc to Dean's Office, Southwestern Medical School
cc to Medical Records, Parkland Memorial Hospital

COMMISSION EXHIBIT 392—Continued
DATE AND HOUR: 11/22/63 1620

When patient entered emergency room on ambulance, average blood pressure could not be obtained. Efforts to obtain blood pressure were futile. Two external wounds were noted. One small penetrating wound of entrance in lower lip. The other wound had resulted in laceration and lacerated brain tissue present in middle cranial. There was no blood pressure present. Respiration shallow and rapid. A cuffed and beled endotracheal tube was inserted and through the endotracheal tube an ice pack was inserted immediately below the larynx. The tube was passed past the larynx and the cuff inflated. Administration of sterile suction was instituted. On current admission an infusion of lactated Ringer solution was begun via catheter placed in the right blood drawn for type and crossmatch. Type O. The negative blood was administered as well as for oxygenation.

In view of head wound injury, a CT scan was performed last. The CT scan and blood crossmatch indicated.

COMMISSION EXHIBIT 392—Continued
Concurrently, various attempts were made to control the infection. In addition, the patient was given deep antibiotics and fluids. Despite these measures, the infection did not improve, and the patient's condition deteriorated.
DATE AND HOUR:  22 Nov 1963  DOCTOR:  GERRY

At the time of initial examination, the
patient was noted to be non-responsive. There were
dilated pupils and a considerable quantity of blood was noted on the patient, the
carriage and the floor. A small wound was
noted in the middle of the neck, in the lower-
third anteriorly. It was suspected that
a large wound the right posterior cervical
region, causing severe deceleration trauma.
Brain tissue was noted in the floor of the
head of the carriage.

There was no heart rate or pulse detectable,
but slow apneic respirations were noted and
indwelled tube was inserted and respiration was
being assisted. An inhaler was used and
being placed on the leg.

At this point I noted that respiration was
immediately and while additional resuscitation
was done to administer fluids + blood, a tracheostomy
was effected. A bilateral incision to the trachea was
made, the tracheostomy tube was put in place and
the cuff inflated and resuscitation assisted. Chest
maneuvers were continued after
placement of sealed-draw air chest tube, but

COMMISSION EXHIBIT 392—Continued
Without benefit. Electrocardiographic indications revealed that an undetected electrical activity existed in the heart. Representative attempts were abandoned after the team of physicians determined that the patient had expired.

Malcolm A. Keys, M.D.
1630k. 22 Nov. 1962
COMMISSION EXHIBIT 392—Continued
Commission Exhibit No. 392

Commission Exhibit 392—Continued
COMMISSION EXHIBIT 392—Continued
Statement Regarding Assassination of
President Kennedy

At approximately 12:45 P.M. on November 22, I was called from the second floor of
Parkland Hospital and went immediately to the Emergency Smoking Room. Colonel O'Donnell,
Presidential Assistant, was being attended to by Dr. Malcolm Perry, Dr. Charles Best, Dr. James E. maneuver
and Dr. Arnold Love. The President was in a profound
comatose state with a massive gunshot wound of the
head with a fragment wound of the thorax.

An immediate surgical and artificial respiration
was started immediately by Dr. Carver and Dr.
Lee. Dr. Lee and I then performed a brain autopsy
for a mass lesion and turned over the mental
contents of the President to the mental health
authorities. Dr. Lee and I pronounced the President dead and asked that an
immediate surgical intervention be performed and we presented it.

At 12:45 P.M. he was pronounced dead by Dr. Lee,
and at 12:45 P.M. he was pronounced dead by Dr. Lee,
who arrived immediately. The President

COMMISSION EXHIBIT 392—Continued
Admission Note

Cause of death was due to massive head and brain injury from a gunshot wound of the left temple. The was pronounced dead after external cardiac massage failed. EKG noted flat line.

John Doe

Asst. Prof. of Surgery
Southwestern Med.
School of Law of Tex.
Dallas, Texas

Commission Exhibit 392—Continued
DISTANT REMARKS

Statement Regarding Assassination of J.F. Kennedy

At 12:30 PM on Nov. 22, 1963, I was called from the 1st Flr. of Parkland Hospital and told that President Kennedy was shot. I went there with myself to the emergency room of Parkland. Upon examination, the patient had no palpable or blood pressure. The patient was declared dead at 1:00 PM.

F. Cushman, M.D.

Attending Professor of Surgery

Southwestern Medical School

Dallas, Texas
To: Mr. C. J. Price, Administrator
Parkland Memorial Hospital

From: M. T. Jenkins, M.D., Professor and Chairman
Department of Anesthesiology

Subject: Statement concerning resuscitative efforts for
President John F. Kennedy

November 22, 1963
1630

Upon receiving a stat alarm that this distinguished patient was being brought to
the emergency room at Parkland Memorial Hospital, I dispatched Doctors A. H.
Giesecke and Jackie H. Hunt with an anesthesia machine and resuscitative equipment
to the major surgical emergency room area, and I ran down the stairs. On my
arrival in the emergency operating room at approximately 1230 I found that Doctors
Carrico and/or Delaney had begun resuscitative efforts by introducing an orotracheal
tube, connecting it for controlled ventilation to a Bennett intermittent positive
pressure breathing apparatus. Doctors Charles Baxter, Malcolm Perry, and Robert
McClelland arrived at the same time and began a tracheostomy and started the
insertion of a right chest tube, since there was also obvious tracheal and chest
damage. Doctors Paul Peters and Kemp Clark arrived simultaneously and immediately
thereafter assisted respectively with the insertion of the right chest tube and
with manual closed chest cardiac compression to assure circulation.

For better control of artificial ventilation, I exchanged the intermittent positive
pressure breathing apparatus for an anesthesia machine and continued artificial
ventilation. Doctors Gene Akin and A. H. Giesecke assisted with the respiratory
problems incident to changing from the orotracheal tube to a tracheostomy tube, and
Doctors Hunt and Giesecke connected a cardioscope to determine cardiac activity.

During the progress of these activities, the emergency room cart was elevated at the
feet in order to provide a Trendelenburg position, a venous cutdown was performed on
the right saphenous vein, and additional fluids were begun in a vein in the left
forearm while blood was ordered from the blood bank. All of these activities were
completed by approximately 1245, at which time external cardiac massage was still
being carried out effectively by Doctor Clark as judged by a palpable peripheral
pulse. Despite these measures there was no electrocardiographic evidence of cardiac
activity.

Commission Exhibit 392—Continued
These described resuscitative activities were indicated as of first importance, and after they were carried out attention was turned to all other evidences of injury. There was a great laceration on the right side of the head (temporal and occipital), causing a great defect in the skull plate so that there was herniation and laceration of great areas of the brain, even to the extent that the cerebellum had protruded from the wound. There were also fragmented sections of brain on the drapes of the emergency room cart. With the institution of adequate cardiac compression, there was a great flow of blood from the cranial cavity, indicating that there was much vascular damage as well as brain tissue damage.

It is my personal feeling that all methods of resuscitation were instituted expeditiously and efficiently. However, this cranial and intracranial damage was of such magnitude as to cause the irreversible damage. President Kennedy was pronounced dead at 1300.

Sincerely,

M. T. Jenkins, M.D.

Commission Exhibit 392—Continued
Clinical Evaluation: The patient was brought to the OR from the ED. In the ED a sucking wound of the right chest was partially controlled by an occlusive dressing supported by manual pressure. A tube was placed through the second interspace in the mid-clavicular line connected to a water-seal bottle to evacuate the right pneumothorax and hemathorax. An IV infusion of Ringer's solution had already been started. As soon as the patient was positioned on the OR table the anesthesia was induced by Dr. Giesecke and an endotracheal tube was in place. As soon as it was possible to control respiration with positive pressure the occlusive dressing was taken from the right chest and the extent of the wound more carefully determined. It was found that the wound of entrance was just lateral to the right scapula close to the axilla yet had passed through the latissimus dorsi muscle shattered approximately 3 cm in its longest diameter and the wound of exit was a ragged wound approximately 5 cm in its greatest diameter. The skin and subcutaneous tissue over the path of the missile moved in a paradoxical manner with respiration indicating softening of the chest. The skin of the whole area was carefully cleansed with Phisohex and Iodine. The entire area including the wound of entrance and wound of exit was draped partially excluding the wound of entrance for the first part of the operation. An elliptical incision was made around the wound of exit removing the torn edges of the skin and the damaged subcutaneous tissue. The incision was then carried in a downward curve upward to the right axilla so as not to have the skin incision over the actual path of the missile but through the chest wall. This incision was carried down through the subcutaneous tissue to expose the Serratus anterior muscle and the anterior border of the latissimus dorsi muscle. The fragmented and damaged portions of the Serratus anterior muscle were excised. Small rib fragments that were adhering to periosteal tags were carefully removed preserving as much periosteum as possible. The fourth intercostal muscle bundle and fifth intercostal muscle bundle were not appreciably damaged.

Commission Exhibit 392—Continued
DESCRIPTION OF OPERATION (Continued): The ragged ends of the damaged fifth rib were cleaned out with the rongeur. The plural had been torn open by the secondary missiles created by the fragmented fifth rib. The wound was open widely and exposure was obtained with a self retaining retractor. The right plural cavity was then carefully inspected. Approximately 200 cc of clot and liquid blood was removed from the plural cavity. The middle lobe had a linear rent starting at its peripheral edge going down towards its hilum separating the lobe into two segments. There was an open bronchus in the depth of this wound. Since the vascularity and the bronchial connections to the lobe were intact it was decided to repair the lobe rather than to remove it. The repair was accomplished with a running suture of 000 chromic gut on atraumatic needle closing both plural surfaces as well as two running sutures approximating the tissue of the central portion of the lobe. This almost completely sealed off the air leaks which were evident in the term portion of the lobe. The lower lobe was next examined and found to be engorged with blood and at one point a laceration of the aorta. This laceration was closed with a single suture of 000 chromic gut on atraumatic needle.

The right plural cavity was now carefully examined and small rib fragments were removed, the diaphragm was found to be uninjured. There was no evidence of injury of the mediastinum and its contents. Hemostasis had been accomplished within the plural cavity with the repair of the middle lobe and the suturing of the laceration in the lower lobe. The upper lobe was found to be uninjured. The drains which had previously been placed in the second interspace in the midesophageal line was found to be longer than necessary so approximately ten cm of it was cut away and the remaining portion was demonstrated with two additional openings. An additional drain was placed through a stab wound in the eighth interspace in the posterior axillary line. Both these drains were then connected to a water seal bottle. The fourth and fifth intercostal muscles were then approximated with interrupted sutures of 0 chromic gut. The remaining portion of the Serratus anterior muscle was then approximated across the closure of the intercostal muscle. The laceration of the latissimus dorsi muscle on its internal surface was then closed with several interrupted sutures of 0 chromic gut.

The subcutaneous tissue was then closed with 0 interrupted sutures of black silk. Before closing the subcutaneous tissue one million units of Penicillin and one gram of Streptomycin in 100 cc normal saline was instilled into the wound. The stab wound was then made in the most dependent portion of the wound coming out near the angle of the scapula. A large Penrose drain was drawn out through this stab wound to allow drainage of the wound of the chest wall. The subcutaneous tissues were then closed with interrupted sutures of black silk. The skin closed with interrupted vertical mattress sutures of black silk. Drainage tubes were secured with safety pens and adhesive tape and dressings applied. As soon as the operation on the chest had been concluded Dr. Gregory and Dr. Shires started the surgery that was necessary for the wounds of the right wrist and left thigh.

* There was also a comminuted fracture of the right radius secondary to the same missile and in addition a small flesh wound of the left thigh. The operative notes concerning the management of the right arm and left thigh will be dictated by Dr. Charles H. Tom Shires.

Commission Exhibit 392—Continued
OPERATIVE RECORD

DATE: 11-22-63 Ortho

PRE-OPERATIVE DIAGNOSIS: Comminuted fracture of the right distal radius, open secondary to gunshot wound

POST-OPERATIVE DIAGNOSIS: Same

OPERATION: Debridement of gunshot wound of right wrist, BEGAN: 1600  ENDED: 1650
Reduction of fracture of the radius

ANESTHETIC: General  BEGAN: 1300  ANESTHESIOLOGIST: Giesecke

SURGEON: Dr. Charles Gregory

ASSISTANTS: Chris Osborne and Parker

SCRUB: Rutherford  CIRC. NURSE: Schroeder  CASTS/SPLINTS:

SPONGE COUNTS: 1ST  DRUGS  I.V. FLUIDS AND BLOOD
2ND

COMPLICATIONS: None

CONDITION OF PATIENT: Fair

Clinical Evaluation: While still under general anesthesia and following a thoracotomy and repair of the chest injury by Dr. Robert Shaw, the right upper extremity was thoroughly prepped in the routine fashion after shaving. He was draped in the routine fashion using stockinette, the only addition was the use of a debridement pan. The wound of entrance on the radial aspect of the right wrist over the junction of the distal fourth of the radius and shaft was approximately two cm in length and rather oblique with the loss of tissue with some considerable contusion at the margins of it. There was a wound of exit along the volar surface of the wrist about two cm above the flexion crease of the wrist and in the midline.

The wound of entrance was carefully excised and developed through the muscles and tendons from the radial side of that bone to the bone itself where the fracture was encountered. It was noted that the tendon of the adductor palmaris was transected, only two small fragments of bone removed, one approximately one cm in length and consisted of lateral cortex which lay free in the wound and had no soft tissue connections, another much smaller fragment perhaps 3 mm in length was subsequently removed. Small bits of metal were encountered at various levels throughout the wound and these were wherever they were identified and could be picked up were picked up and have been submitted to the Pathology department for identification and examination. Throughout the wound and especially in the superficial layers and to some extent in the tendon and tendon sheaths on the radial side of the arm small fine bits of cloth consistent with fine bits of Mohair. It is our understanding that the patient was wearing a Mohair suit at the time of the injury and this accounts for the deposition of such organic material within the wound. After as careful and complete a debridement as could be carried out and with an apparent integrity of the flexor tendons and the median nerve in the volar side, and after thorough irrigation the wound of exit on the volar surface of the wrist was closed primarily with wire sutures while the wound of entrance on the radial side of the forearm was only partially closed, being left open for the purpose of drainage should any make spontaneous appearance.

Charles Gregory, M.D.

Commission Exhibit 392—Continued
DESCRIPTION OF OPERATION (Continued): This is because of the presence of Mohair and organic material deep into the wound which is prone to produce tissue reactions and to encourage infection and this precaution of not closing the wound was taken in correspondence with our experience in that regard.

In view of the urgency of the Governor's original chest injury it was impossible to definitely ascertain the status of the circulation of the nerve supply to the hand and wrist on the right side. Accordingly, it was determined as best we could at the time of operation and the radial artery was found to be intact and pulsating normally. The integrity of the median nerve and the ulnar nerve is not clearly established but it is presumed to be present. Following closure of the volar wound and partial closure of the radial wound, dry sterile dressings were applied and a long arm cast was then applied with skin tape traction, rubber band variety, attached to the thumb and index finger of the right hand. The right hand in an attitude of flexion was created at the right elbow, and postoperatively the limb was suspended from an overhead frame using tape traction. The postoperative diagnosis for the right forearm remains the same and again I suggest that you incorporate this particular dictation together with other dictations which will be given to you by the surgeons concerned with this patient.

Charles Gregory, M.D.

Commission Exhibit 392—Continued
**Pre-operative Diagnosis:**
Gunshot Wound, Right Chest, Right Wrist, Left Thigh

**Post-operative Diagnosis:**
Same

**Operation:**
Exploration and Debridement of Gunshot Wound of Left Thigh

**Anesthetics:**

**Began:** 13:00

**Anesthesiologist:** Geisecke

**Surgeon:** Dr. Shires

**Assistants:**
Drs. McClelland, Baxter and Patman

**Scrub Nurse:** Oliver

**Circ. Nurse:** Deming and Schröder

**DRAINS:**
Drs. McClelland, Baxter and Patman

**APPLIANCES:**
Deming and

**OSCRUB:**

**NURSE:** Schroeder

**CASTS/SPLINTS:**

**Sponge Counts:**
1st — Correct, PS

**DRUGS:**

**I.V. Fluids and Blood:**

**Condition of Patient:**

**Complications:**

*This portion of the operation is involved only with the operation on the left thigh. The chest injury has been dictated by Dr. Shaw, the orthopedic injury to the arm by Dr. Gregory.*

**Description of Operation:**

Following this the missile wound was excised and the bullet tract was explored. The missile wound was seen to course through the subcutaneous fat and into the vastus medialis. The necrotic fat and muscle were debrided down to the region of the femur. The direction of the missile wound was judged not to be in the course of the femoral vessel, since the wound was distal and anterior to Hunter's canal. Following complete debridement of the wound and irrigation with saline, the wound was felt to be adequately debrided enough so that three simple through-and-through, stainless steel Aloe #28 wire sutures were used encompassing skin, subcutaneous tissue, and muscle fascia on both sides. Following this a sterile dressing was applied. The dorsalis pedis and posterior tibial pulses in both legs were quite good. The thoracic procedure had been completed at this time, the debridement of the compound fracture in the arm was still in progress at the time this soft tissue injury repair was completed.

**Commission Exhibit 392—Continued**
Operative Record

Date: 11/24/63
Age: 24 yr.
Race: W/M

Pre-operative Diagnosis: GSW of abdomen and chest with massive bleeding

Post-operative Diagnosis: Major vascular injury in abdomen and chest

Operation: To repair aorta

Exploratory laparotomy, thoracotomy, efforts

Operation began: 1142
Operation ended: 1307

Anesthetic: General

Dr. Tom Shires
Dr. John Perry
Dr. W. T. Jenkins
Dr. Curtis Spier

Operation to repair aorta, exploratory laparotomy, thoracotomy, efforts

Exploratory laparotomy, thoracotomy, efforts

Begun: 1142
End: 1307

Anesthetist: Gene Akin

Dr. Curtis Spier

Assistants: Dr. Tom Shires

Dr. John Perry
Dr. W. T. Jenkins
Dr. Curtis Spier

Scrubs: Schrader-Bell

Nurse: Schrader-Lunsford

Circ.: Schrader-Bell

Nurse: Burke-Simpson

Drugs: Co chloride - 3 vials 3-1000 cc. lactated

Fluids and Blood: Cedilanid - 12 Singer's solution

One molar lactate - 6 16-500 cc. whole blood

Isuprel - 24 6-1000 cc. 5% dextrose in water

Adrenalin 1:1000 - 3 cc. lactated Ringer's solution

Condition of Patient: Exhusted at 1307

Measured blood loss: 8,376 cc.

Clinical Evaluation: Previous inspection had revealed an entrance wound over the left lower lateral chest cage, and an exit was identified by subcutaneous palpation of the bullet over the right lower lateral chest cage. At the time he was seen preoperatively he was without blood pressure, heart beat was heard infrequently at 130 beats per minute, and preoperatively had endotracheal tube placed and was receiving oxygen by anesthesia at the time he was moved to the operating room.

Dr. Tom Shires, M.D.
a huge hematoma in the mid-line. The spleen was then mobilized, as was the left colon, and the retroperitoneal approach was made to the mid-line structures. The pancreas was seen to be shattered in its mid portion, bleeding was seen to be coming from the aorta. This was dissected free. Bleeding was controlled with finger pressure by Dr. Malcolm O. Perry. Upon identification of this injury, the superior mesenteric artery had been sheared off of the aorta, there was back bleeding from the superior mesenteric artery. This was cross-clamped with a small, curved DeBakey clamp. The aorta was then occluded with a straight DeBakey clamp above and a Potts clamp below. At this point all major bleeding was controlled, blood pressure was reported to be in the neighborhood of 100 systolic. Shortly thereafter, however, the pulse rate, which had been in the 80 to 90 range, was found to be 40 and a few seconds later found to be zero. No pulse was felt in the aorta at this time. Consequently the left chest was opened through an intercostal incision in approximately the fourth intercostal space. A Finochietto retractor was inserted, the heart was seen to be flabby and not beating at all. There was no hemopericardium. There was a hole in the diaphragm but no hemotorax. A left closed chest tube had been introduced in the Emergency Room prior to surgery, so that there was no significant pneumothorax on the left side. The pericardium was opened, cardiac massage was started, and a pulse was obtainable with massage. The heart was flabby, consequently calcium chloride followed by epinephrine-Xylocaine were injected into the left ventricle without success. However, the standstill was converted to fibrillation. Following this, defibrillation was done, using 240, 360, 500, and 750 volts and finally successful defibrillation was accomplished. However, no effective heart beat could be instituted. A pacemaker was then inserted into the wall of the right ventricle and grounded on skin, and pacemaking was started. A very feeble, small, localized muscular response was obtained with the pacemaker but still no effective beat. At this time we were informed by Dr. Jenkins that there were no signs of life in that the pupils were fixed and dilated, there was no retinal blood flow, no respiratory effort, and no effective pulse could be maintained even with cardiac massage. The patient was pronounced dead at 1:07 P.M.

Anesthesia consisted entirely of oxygen. No anesthetic agents as such were administered. The patient was never conscious from the time of his arrival in the Emergency Room until his death at 1:07 P.M. The subcutaneous bullet was extracted from the right side during the attempts at defibrillation, which were rotated among the surgeons. The cardiac massage and defibrillation attempts were carried out by Dr. Robert N. McClelland, Dr. Malcolm O. Perry, Dr. Ronald Jones. Assistance was obtained from the cardiologist, Dr. Fouad Bashour.