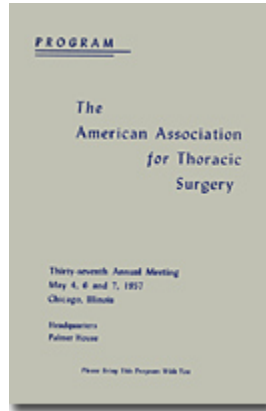


1957 ANNUAL MEETING PROGRAM



THE AMERICAN ASSOCIATION *For* THORACIC SURGERY 1956-1957

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Saturday Morning, May 4, 1957

8:30 A.M. Business Meeting-Grand Ballroom

9:00 A.M. Presentation of Presidential Badge and Chain of Office by the *Society of Thoracic Surgeons of Great Britain and Ireland.*
Scientific Session: REGULAR PROGRAM

1. A Roentgen Study of the Evolution of Carcinoma of the Lung.

LEO G. RIGLER, Minneapolis, Minn.

A retrospective study of fortuitously made roentgenograms of the chest of patients eventually proved to have carcinoma of the lung, will produce much valuable information as to the evolution of this tumor from its early beginnings. Such observations support the following conclusions:

1. A considerable percentage of such tumors arise in small bronchi and extend centrally if not interrupted in their course.
2. There are marked differences in the rapidity of growth at various times.
3. Obstructive emphysema of a whole lobe or even of a whole lung may occur concomitantly with segmental atelectasis.
4. Cavitation may occur very early in the course of peripheral lesions.
5. Inflammatory manifestations may appear and disappear during the life of the tumor.
6. There are differences in the symptomatology of peripheral as compared to central lesions; likewise changes in symptoms occur in those lesions which originate in the periphery and extend centrally.

A reconstruction of the anatomical situation and of the development of carcinoma of the lung, based upon serial roentgenograms of the chest in untreated cases, will be presented especially to illustrate the behavior of the various types of this tumor.

2. Intraepithelial Carcinoma in the Tracheobronchial Tree of Lung Cancer Cases.

OSCAR AUERBACH, J. BREWSTER GERE (*by invitation*), JOSEPH M. PAWLOWSKI (*by invitation*) and ARTHUR PURDY STOUT (*by invitation*), East Orange, New Jersey.

The increase in the incidence of carcinoma arising in the lung during the past 30 years has given rise to much effort directed at early detection and surgical extirpation of these lesions. To date the results of such efforts have been characterized by discouragingly low five year survival rates.

It is the purpose of this paper to attempt to shed some light on this dismal picture, based on anatomic studies of the tracheobronchial tree.

During our investigation of the changes in the bronchial mucosa by the step section technique several pertinent observations have been recorded. Among these was the large number of foci of carcinoma in-situ present in the mucosa of the tracheobronchial tree in patients who died of carcinoma of the lung.

Over 40 cases of white men who have died and were autopsied at the VA Hospital, East Orange, N. J., were used in this study. The tracheobronchial trees were dissected from the lungs and cut into 208 comparable 4.0 mm. sections, except for the portions destroyed by the disease process. Approximately 6000 slides were prepared, examined and the findings of basal cell hyperplasia, squamous metaplasia, and carcinoma-in-situ recorded.

The percentage of slides showing carcinoma-in-situ was calculated. The distribution of these slides from a representative case was plotted on a schematic diagram.

The incidence and distribution of intramucosal carcinoma is discussed in relation to the pathogenesis of bronchogenic carcinoma. The data obtained by this multiple section technique is then examined in relation to the clinical experience of early detection and surgical resection of primary lung cancer.

3. Bilateral Therapy for Unilateral Spontaneous Pneumothorax.

IVAN D. BARONOFSKY, HORACE G. WARDEN (*by invitation*), JAMES L. KAUFMAN (*by invitation*), JOSEPH WHATLEY (*by invitation*) and JOSEPH M. HANNER (*by invitation*), San Diego, Calif.

The relative frequency of spontaneous pneumothorax in apparently healthy young individuals has been attested to by numerous publications. This problem is all the more acute in military establishments because of the age of the population. The most commonly suggested therapy has been needle aspiration and/or catheter drainage with water trap decompression with a first episode, and more radical procedures such as induction or artificial pleuritis, open thoracotomy with the introduction of irritating substances or pleurectomy, following recurrences. During the convalescence of one of our patients following open thoracotomy for recurrent spontaneous

pneumothorax on one side, a spontaneous pneumothorax developed on the opposite side. This occurrence coupled with the fact that bilateral pneumothorax occurs in about 10 to 15% of patients with spontaneous pneumothorax and recurrences are quite common with unilateral spontaneous pneumothorax has led us to adopt an investigative policy of bilateral thoracotomy for all patients admitted with a diagnosis of spontaneous pneumothorax. To date 25 consecutive patients have undergone this type of therapy. The great majority were performed as a one stage procedure and have included simultaneous segmental resection on occasion. There has been no mortality. The technique of bilateral anterior thoracotomy utilizing a muscle splitting incision will be presented, as well as pre and postoperative function studies, plamgraphy findings, a comparison of various methods of producing pleural symphysis and complications. The findings at surgery will be presented and show that the etiological factors which can cause spontaneous pneumothorax are present bilaterally and suggest therefore that therapy should be bilateral.

4. The Surgical Treatment of Chronic Progressive Pulmonary Histoplasmosis.

JOHN W. POLK (*by invitation*), JOSE CUBILES (*by invitation*), Mt. Vernon, Mo.
and W. W. BUCKINGHAM, Kansas City, Mo.

Nineteen cases of chronic progressive pulmonary histoplasmosis, all having some type of surgical procedure, form the basis of this report. Seven cases have previously been reported before this Association. Of these cases, one represented a histoplascoma, the other six progressive cavitory lesions. It has now become increasingly clear that a wide variety of pathological lesions may occur with the organism, *Histoplasma capsulatum*, as its sole etiological agent. This additional series includes definite pathological entities. Slides showing cases of bronchiectasis, giant tension cysts, acute abscess, middle lobe syndrome, one destroyed lung with tuberculosis complicating the picture, and one empyema necessitatis in which the organism, *Histoplasma capsulatum*, was cultured both from the sputum and the empyema fluid. These cases will show that chronic progressive histoplasmosis mimics all types and forms of acute and chronic inflammatory pulmonary diseases with pathological variations.

Further observations concerning the serological studies in these cases will be given and emphasis will be placed on the diagnosis of this disease from the clinical, radiological and pathological viewpoint. A followup on the seven cases previously reported will also be included. A comment regarding the treatment of this disease with amebacide and amphotericin will be included.

5. A Study of the Role of Drug Resistance in the Surgical Treatment of Pulmonary Tuberculosis (Period January 1947- June 1956).

WILLIAM R. SWEETMAN (*by invitation*) and JOHN M. SALYER, Denver, Colo.

The importance of drug resistance in the treatment of pulmonary tuberculosis is well established. Its role in the surgical treatment is, however, not so well documented. In an effort to furnish further data and help clarify this problem, 1061 consecutive pulmonary resections done at Fitzsimmons Army Hospital during the period January, 1947 to June, 1956 have been reviewed. Of this group, 46 resections in 44 patients were performed in the face of known drug resistance and were positive prior to operation. This group has been analyzed and compared to the total in respect to complication and mortality rates. Our study shows a major complication rate of 7.6% following the 1061 resections. 44 patients who harbored resistant tubercle bacilli had 46 resections with a major complication incidence of 32.6%. Of this group 13 patients had pneumonectomies with a major complication rate of 46.2% and mortality of 15.4%. Morbidity and mortality rates will be given for those patients undergoing lobectomy, segmental and wedge resections. The total surgical mortality during the 9½ a year period was 1.4%. This has been reduced to .97% during the past 3½ years. Resistant cases resulted in a mortality of 13%.

6. The Value of Routine Pulmonary Function Studies in Thoracic Surgical Cases.

HURST B. HATCH, JR. (*by invitation*), JOSEPH K. BRADFORD (*by invitation*)
and ALTON OCHSNER, New Orleans, La.

There is little doubt that over the preceding years and prior to the advent of methods of objectively evaluating pulmonary function, the medical profession and particularly the thoracic

surgeons were quite adept in assessing this very important aspect of a patient's ability to withstand a thoracic procedure.

This paper is a report of the analysis of the preoperative study of pulmonary function of two hundred patients with various intrathoracic lesions. The routine and accepted methods of measuring both ventilatory and respiratory aspects of pulmonary function were utilized. In addition, one observer through the utilization of history and physical findings attempted to predict the adequacy of a patient's ventilatory and respiratory reserve and whether or not the patient could withstand the thoracic procedure. No attempt was made to grade these as to severity, but only as to whether or not the patient's pulmonary function was adequate. Comparative studies utilizing the observer's prediction and objective findings on pulmonary function tests were then compared.

From such a comparative study it became quite apparent that in about 85% of the patients one can predict fairly well the adequacy or inadequacy of the patient's ability to withstand a procedure. However, the most important group is the remaining 15% in which there is no direct or linear relationship between a patient's pulmonary disability and his pulmonary insufficiency. It is therefore felt that this study indicated that routine pulmonary function studies should be done on all patients who are being considered for a thoracic operative procedure and that it should be an integral part of the workup of all patients of this category.

Saturday Afternoon, May 4, 1957

2:00 P.M. Scientific Session: REGULAR PROGRAM-Grand Ballroom.

7. Rigid Plastic Prostheses in Vascular Surgery.

F. X. BYRON, JOSH FIELDS (*by invitation*), AUGUSTUS FOSTER (*by invitation*)
and RICHARD HOOD (*by invitation*), Beverly Hills, Calif.

Our interest in the use of rigid plastic prostheses in vascular reconstruction was stimulated by Hufnagel's demonstration that such prostheses can be tolerated for a period of years and his multiple point method of fixation has made their use practical, investigating these rigid plastic tubes we have found numerous situations in which they are applicable. They permit restoration of flow within a very short time minimizing the period of cross-clamping. When used as shunts continuity may be restored rapidly permitting leisurely anastomosis, eliminating multiple time consuming sutured shunts. These techniques, together with their several modifications, will be presented and a new method of treating dissecting aneurysms will be demonstrated. Clinical cases showing the application of these techniques will be presented, including a case of reconstruction of the aortic arch. A short motion picture will demonstrate the versatility and rapidity with which these prostheses may be employed.

8. Diagnostic and Physiologic Measurements Using Left Heart Catheterization.

W. S. BLAKEMORE (*by invitation*), T. G. SCHNABEL (*by invitation*)
P. T. Kuo (*by invitation*) and H. B. CONN (*by invitation*), Philadelphia, Pa.

The original technique of left heart catheterization of Bjork, Blakemore, and Malmstrom, has been modified to permit: 1. simultaneous pressure readings from the left atrium, ventricle, and ascending aorta; 2. the estimation of cardiac output determination of central mixing volumes, and quantitative estimates of mitral re-gurgitation by the use of radioactive potassium dilution curves; and 3- correlation of phonocardiographic and electrocardiographic recordings with the changing intra-cardiac pressures. This preoperative study permits: 1. quantification of the degree of mitral and aortic stenosis and mitral insufficiency; 2. calculation of the left ventricular work load with instantaneous and peak ventricular ejection rates, and 3- interpretation of the mechanism of production of the changing quality of the first heart sound, the opening snap, and gallop sounds in patients with mitral valvular disease. The data have been supplemented by animal studies and intracardiac measurements at the time of operation for which especially designed explosion-proof equipment has been built, including a new stable sensitive manometer which can measure the differential pressure across the valve. Criteria for selecting patients for preoperative study have

been established and during more than two years of its use the test has been found to be a valuable diagnostic aid in forty seriously ill patients with atypical or multivalvular rheumatic lesions. The complications are few but may be fatal and the indiscriminatory use of this test solely for the purpose of obtaining data should be discouraged.

9. Effect of Exercise on the Diastolic Atrio-Ventricular Gradient in Mitral Stenosis.

ROBERT S. LITWAK (*by invitation*), PHILIP SAMET (*by invitation*), W. H. BERNSTEIN (*by invitation*), LEONARD SILVERMAN (*by invitation*), HYMAN TURKEWITZ (*by invitation*) and MILTON E. LESSER (*by invitation*), Miami, Fla.

Three factors determine the magnitude of the diastolic atrio-ventricular gradient across the stenotic mitral valve. These are (1) severity of the stenosis, (2) flow across the valve, and (3) cardiac rate. These data can best be obtained by simultaneous combined left and right heart catheterization in the supine position. The purpose of this report is to present data relative to these three parameters both at rest and during exercise.

Fifty-two simultaneous combined left and right heart catheterizations have been performed to date. In 15 of these, the effect of exercise on the diastolic atrio-ventricular gradient, pulmonary artery pressure, cardiac rate and calculated flow across the valve (cardiac output) was studied.

Right heart catheterization is performed by the standard technique. Left heart catheterization is performed by a modification of the Fisher technique in which two No. 17 thin-walled 7-inch needles are inserted into the left atrium. A polyethylene catheter is then passed through each needle into the left atrium and left ventricle. The needles are then removed leaving the catheters in situ. Following this the patient is rotated back into the supine position and steady-state pressure, flow and cardiac rate determinations are made at rest and exercise.

Preoperative mean diastolic gradients at rest varied from 7 to 25 mm. mercury. On exercise, these gradients uniformly rose. Postoperatively, there was either a marked reduction or total obliteration of the gradient at rest. In those cases where a measurable resting gradient could not be demonstrated after surgery, exercise still resulted in the production of small gradients. In the postoperative group where only a reduction in gradient had been achieved, exercise was almost invariably accompanied by expansion of the gradient.

The significance of these data will be discussed with reference to (a) selection of patients for commissurotomy, and (b) physiological evaluation of the results of the surgery.

10. Surgical Treatment of Transposition of the Aorta and Pulmonary Artery.

THOMAS G. BAFFES (*by invitation*), WILLIAM L. RIKER (*by invitation*), ARTHUR DEBOER (*by invitation*) and WILLIS J. POTTS, Chicago, Ill.

About a year ago, a new method for partially correcting transposition of the aorta and the pulmonary artery was described, and successful application of this method to one patient was reported. This method involved redirection of blood from the right pulmonary veins to the right atrium and, by means of a homologous aortic graft, simultaneous redirection of blood from the inferior vena cava to the left atrium.

Since that initial report, the method has been applied to thirty-two clinical cases, with fourteen immediate postoperative deaths and eighteen survivors. Two of the survivors died after leaving the hospital, of causes unrelated to the operative procedure. The remaining survivors have shown satisfactory clinical improvement. Their oximetric readings have risen from 35%-60% preoperatively, to 75%-91% postoperatively. Generally, a rise of 30%-50% oxygen saturation has been recorded after operation. In addition, the patients have shown significant alleviation of clinical symptoms.

In order to illustrate the various types of transposition encountered, a study of seventy-five autopsy specimens of this anomaly is also presented. It is pointed out that "transposition" represents a basic type of heart, on which may be superimposed almost any other well-known congenital cardiac anomaly. Comments are made regarding the operability of the various types of transposition described.

Finally, the causes of immediate operative mortality following this procedure are discussed. These deaths have emphasized a number of unusual physiological aspects of transposition of the great vessels, which create operative hazards not encountered with other forms of cyanotic

congenital heart disease. A number of changes have been made in the originally described operative procedure in order to avoid these unusual operative hazards. These changes are described.

11. The Use of a Mechanical Bypass during Cross-Clamping of the Aorta.

HAROLD KING (*by invitation*) and HARRIS B. SHUMACKER, JR., Indianapolis, Ind.

The experimental work was performed on mongrel dogs. The thoracic aorta was simultaneously occluded just distal to the left subclavian and at the level of the diaphragmatic hiatus. In a control group of 11 dogs with aortic occlusion for one hour there were 2 instances of paraplegia, 8 deaths, and only one normal survival.

In 23 animals, blood was shunted from the superior vena cava to the distal aorta during an hour's interval of aortic clamping. Plastic catheters were inserted through the jugular vein and femoral artery and connected with plastic tubes running through one pumping head of a sigmamotor pump. No blood reservoir was used. No blood was needed to "prime the pump". No oxygenator was used. Preliminary observations indicate that under the conditions of the experiment, the superior vena caval blood is well oxygenated. Of these 23 animals, 22 survived without paraplegia and one died. An additional animal in which the aorta was clamped for 90 minutes survived without difficulty.

The usefulness of the method in clinical cases will be illustrated by 4 experiences. The catheterization of the jugular vein and femoral artery is easily performed prior to thoracotomy. The shunt appears to protect from paraplegia.

12. Elective Cardiac Arrest: An Adjunct to Open Heart Surgery.

DONALD B. EFFLER, LAURENCE K. GROVES (*by invitation*), HAROLD F. KNIGHT, JR.,
(*by invitation*), WILHELM J. KOLFF (*by invitation*) and F. MASON SONES, JR.,
(*by invitation*), Cleveland, Ohio

Open heart surgery that employs the now conventional by-pass technique does not provide the ideal surgical field. There is an appreciable blood return to the right side of the heart from the coronary sinus, the thebesian veins, and retrograde flow from the pulmonary arteries, the left heart receives blood from bronchial vessels and any collaterals that might be present. The total blood loss in a so-called heart by-pass may be measured in liters under certain conditions. In addition to the imperfect hemostasis, the beating heart may also impair surgical exposure and hamper operative technique.

The adjunct of elective cardiac arrest coupled with the now conventional by-pass technique approaches the ideal in open heart surgery. It offers the surgeon a field that is relatively dry (although bleeding from collaterals is still present), free of motion and easily visualized. With elective cardiac arrest there is no coronary circulation; the paralyzed heart muscle has minimal metabolic needs and for this reason requires no perfusion even for prolonged periods. In the authors series the longest period of induced cardiac arrest has been 58 minutes without interruption.

The Melrose technique of inducing elective cardiac arrest utilizes potassium citrate solution. Details of this method will be presented. In 1956, the authors have employed elective cardiac arrest in 51 of 55 open heart procedures employing extracorporeal circulation. A detailed report of the results and the physiologic observations will be presented.

Advantages of the Melrose technique are readily apparent. True cardiac arrest is obtained; as yet no time limit for safe arrest has been established; no supplementary drugs or techniques (e.g. hypothermia) are used; the method is basically simple and quickly reversible. In the cases presented the shortest period of arrest has been ten minutes and the longest fifty-eight minutes. A satisfactory heart rhythm has been reestablished in every case to date.

13. Experiences with the Use of Cardioplegia (Induced Cardiac Arrest) in the Repair of Interventricular Septal Defects.

CONRAD R. LAM, THOMAS GEOGHEGAN (*by invitation*), CHARLES K. SERGEANT
(*by invitation*) and EDWARD GREEN (*by invitation*), Detroit, Mich.

The advantages of a quiet heart in addition to a relatively bloodless field during certain intracardiac operations are obvious. Such a situation is most nearly obtained if the heart is stopped during the cardiectomy. After a series of experiments using the agents potassium chloride and acetylcholine, we elected to use the latter in operations for the closure of interventricular septal

defects in humans. A pump-oxygenator of the bubble type has been used during the cardiac by-pass. Following the closure of the caval snares around their cannulas, the aorta has been clamped and 10 mg. per kilogram of body weight has been injected into the aorta and thence into the coronaries. Prompt cessation of the heart results. Following the intracardiac procedures, resuscitation is obtained by removing the aortic clamp which results in a washing out of the drug.

At the time of submission of this abstract, 30 patients having interventricular septal defects have had surgical repair under induced cardiac arrest. The resumption of the heartbeat has been of regular occurrence. Ventricular fibrillation occurred in one patient both before and after the repair. There have been two instances of permanent and fatal atnoventricular block.

The possible cause of this complication will be discussed.

**6:30 P.M.-8:30 P.M. COCKTAIL PARTY-INFORMAL
PALMER HOUSE-RED LACQUER ROOM**

Monday Morning, May 6, 1957

8:30 A.M. Scientific Session: THORACIC SURGERY FORUM-Grand Ballroom

14. The Effects Produced by Various Types of Pump Oxygenators During Two Hour Partial Perfusions in Dogs.

MARIAN E. MOLTHAN (*by invitation*), STANLEY GIANELLI (*by invitation*)
RICHARD J. BEST (*by invitation*), JAMES A. DULL (*by invitation*)
and CHARLES K. KIRBY, Philadelphia, Pa.

The careful use of a large bubble oxygenator for whole body perfusion produces no apparent ill effects for periods up to about thirty minutes. We have found evidence, however, that prolonged bubbling of oxygen through blood may cause irreversible changes, particularly as manifested by permanent brain damage.

Blood was withdrawn from the superior and inferior cavae through jugular and femoral vein cannulae and returned to the thoracic aorta through a carotid cannula inserted in the neck at a rate of 40 cc/Kg. of body weight per minute (a rate commonly used for whole body perfusion). No incisions were made except for those in the neck and groin. When a bubble oxygenator was used, neurologic evidence of brain damage was almost invariably present. Some animals showed only minimal transitory changes, whereas others had severe impairment with ensuing death or prolonged disability, usually without complete recovery. The degree of brain damage appeared to be greater when the oxygen flow rate was increased. When blood from a femoral artery was passed through the same extra-corporeal circuit without bubbling oxygen through the blood, there was no neurologic evidence of brain damage.

Multiple small infarcts were found in the brain of the animals showing permanent damage. We hope to be able to learn the cause of these infarcts.

The cause of the brain damage resulting from these two hour perfusions is under investigation. The experiments are being repeated with the use of a film oxygenator and a biologic oxygenator.

15. Acid-Base Balance During Prolonged Cardio-Respiratory By-Pass.

MATTHIAS PANETH, Traveling Fellow of the Association, 1956-57
(*by invitation*), London, England, M. NAZIH ZUHDI (*by invitation*)
and WILLIAM WEIRICH (*by invitation*), Minneapolis, Minn.

The perfusion rate in most pump-oxygenator systems for complete cardio-respiratory by-pass is usually a portion of the normal resting cardiac output. This means that an elevation of fixed acids and fall in alkaline reserve may develop during the period of by-pass presumably because of reduced blood flow and/or diminished renal function. Since it might be supposed that the degree of metabolic acidosis is related to the perfusion rate as well as duration of perfusion, a series of dogs have been perfused for one hour at varying rates using the Sigmamotor pump and the bubble oxygenator. The acid-base alterations after an hour's perfusion have been measured in these animals

and the results are presented. The acid-base alterations in human perfusions lasting one hour or more will also be presented.

16. Coronary Perfusion as an Aid to Open Heart Surgery under Hypothermia in Man.

J. V. MALONEY, JR. (*by invitation*), S. A. MARABLE (*by invitation*)
and W. P. LONGMIRE, JR., Los Angeles, Calif.

Open heart surgery during circulatory occlusion under hypothermia has been demonstrated to be a feasible method for operations of brief duration. The major deterrent to the use of this method has been the frequent occurrence of arrhythmias, myocardial cyanosis and flaccidity, and ventricular fibrillation. The present report deals with 12 patients in whom this technique was employed. Of the first six patients, four showed poor myocardial tone and developed arrhythmias, including two instances of ventricular fibrillation. All six patients developed myocardial cyanosis and required cardiac massage to restore effective heart action.

In the second group of six patients, the heart was perfused with freshly-drawn, heparinized arterialized blood during the period of circulatory interruption. Perfusion was carried out by cross-clamping the ascending aorta and delivering blood from a pressurized bottle through a needle inserted into the aorta just above the coronary ostia. The perfusion rate was 3 ml. per Kg., body weight per minute. Of these six patients, one showed poor myocardial tone and one other developed a transient arrhythmia. None showed myocardial cyanosis, and only one patient required cardiac massage. Ventricular fibrillation did not occur. Continuous tracings of the electrocardiogram and arterial pressure show that the circulation recovers spontaneously within several heart beats after inflow occlusion is released.

Although all 12 patients did well following surgery, the reduction in complications in the perfused group suggests that coronary perfusion greatly enhances the safety of open heart surgery under hypothermia.

17. Alterations in Renal Hemodynamics During and Following Resection of the Thoracic Aorta for Aneurysm.

GEORGE C. MORRIS, JR. (*by invitation*), RAYMOND R. WITT (*by invitation*),
DENTON A. COOLEY, JOHN M. MOYER (*by invitation*)
and MICHAEL E. DEBAKEY, Houston, Texas.

Temporary occlusion of the thoracic aorta during resection and grafting for aortic aneurysm may produce ischemic changes in organs located distally. Damage to the central nervous system may occur after relatively brief periods of aortic occlusion unless means of protecting the brain or spinal cord are employed. We have employed cardio-pulmonary by-pass and total body perfusion for resection of the ascending aorta thus providing protection for the brain, spinal cord, and other vital organs. For aneurysms of the descending thoracic aorta we have used aortic by-pass shunts, general body hypothermia, and recently controlled extracorporeal circulation shunting blood from left auricle to abdominal aorta. The purpose of this presentation is to compare the effects of these various procedures upon renal function using inulin to determine glomerular filtration rate and para-amino hippurate to determine renal blood flow.

These studies indicate that none of the methods employed cause permanent deleterious effects on the kidney. Of particular physiological interest, however, was the measurement of renal blood flow and glomerular filtration rate during the period of aortic occlusion with and without artificial maintenance of circulation. In the absence of by-pass there was no measurable renal function, but with the by-pass mean blood pressure in abdominal aortic segment varied from 35 to 50 millimeters of mercury and renal blood flow ranged from 15 to 130 cubic centimeters per minute. These observations indicate that controlled temporary extra-corporeal circulation exerts an important protective effect upon the kidneys during periods of occlusion of the thoracic aorta.

18. Physiological and Pharmacological Studies of Collateral Pulmonary Flow.

DAVID STATE (*by invitation*), PETER F. SALISBURY (*by invitation*)
and PETER WEIL (*by invitation*), Los Angeles, Calif.

Increased collateral blood flow to the lungs via dilatation of the bronchial vessels may play an important role in certain types of cardiac and pulmonary disease. Direct measurements of the collateral blood flow to both lungs in animals with intact reflexes have not been reported before.

The use of a pump-oxygenator has afforded us the opportunity for total by-pass of the heart and lungs for separate perfusion of the pulmonary circulation with known volumes of blood.

In the method used, all venous blood was diverted from the right ventricle to a pump-oxygenator and returned to the arterial tree through a femoral artery. Blood was prevented from reaching the lungs by a tie placed at the origin of the pulmonary artery. A plastic tube placed in the left atrium or ventricle, collected blood returning from the lung into a reservoir. By means of a separate pump, the blood collected from the reservoir was returned to the pulmonary artery by a catheter inserted distal to the tie about the pulmonary artery. The quantity of blood circulated through the isolated pulmonary circuit was kept at known volume. Any increments above this could be directly read from changes of blood level in the reservoir and represented collateral pulmonary flow originating in the systemic circulation.

The effect of the following factors on collateral pulmonary flow will be reported: (1) systemic blood flow, (2) systemic arterial pressure, (3) systemic venous pressure, (4) pulmonary artery flow, (5) ventilation volumes of the lungs, (6) systemic anoxia, (7) systemic respiratory acidosis and (8) administration of various drugs (i.e., adrenalin, serotonin).

19. An Experimental Appraisal of the Finney Pyloroplasty in the Prevention of Esophagitis Following the Heller Myotomy.

PAUL W. HERRON (*by invitation*), GEORGE I. THOMAS (*by invitation*)
and K. ALVIN MERENDINO, Seattle, Wash.

It has been observed, both clinically and experimentally, that operative procedures which compromise the sphincter action of the esophagogastric junction, are attended by a significant incidence of post-operative esophagitis.

In the laboratory, esophagogastronomy, Grondahl cardioplasty, and to a lesser extent, Heller myotomy, have all been shown to contribute to a high incidence of esophagitis in dogs stimulated with histamine. Vagotomy has been shown to complement the severity of the esophagitis, but vagotomy and Finney pyloroplasty reduce it.

This study was undertaken to evaluate the effect of Finney pyloroplasty alone in histamine stimulated dogs following Heller myotomy. Two groups of dogs were developed. Group I consisted of dogs subjected to Heller myotomy. Group II consisted of dogs subjected to Heller myotomy and Finney pyloroplasty. After a 30-day recovery period, all dogs were given histamine for 45 days, or until death. They were autopsied and appropriate histologic studies done. The incidence of esophagitis in Group I was about 70%; in Group II it was 9%, in spite of abundant evidence of ulcerative disease in the stomach and duodenum in these dogs.

It is felt that under the conditions of these experiments, Finney pyloroplasty markedly reduces the incidence of esophagitis in dogs following Heller myotomy.

20. Esophageal Motility in Achalasia (Cardiospasm) After Treatment.

BRIAN CREAMER (*by invitation*), ARTHUR M. OLSEN, COLIN B. HOLMAN
(*by invitation*) and CHARLES F. CODE (*by invitation*), Rochester, Minn.

Measurements of esophageal pressures have been made in our laboratory by use of minute electromagnetic transducers and a photokymographic system. Butin and his associates demonstrated patterns of motility in healthy individuals and showed that peristaltic contractions were either absent or ineffective in achalasia. Hightower and co-workers confirmed the observation of Kramer and Ingelnnger that methacholine chloride (mecholy) produces sustained elevation of pressure in achalasia. Creamer and associates showed that the resting pressures at the cardia in cardiospasm are similar to those of healthy persons. Although there is increased tone at the gastroesophageal sphincter, there is no more spasm in the patient with cardiospasm than in the normal person. However, clinically successful treatment of cardiospasm either by dilatation or cardiomyotomy significantly alters the pressures at the gastroesophageal sphincter.

The intraluminal pressures of the esophagus and the gastroesophageal sphincter have been measured following hydrostatic dilatation of the sphincter in 17 patients with achalasia and following operative procedures in 13 patients with achalasia. The motility in the body of the esophagus after dilatation was found to be identical to that seen in untreated patients with achalasia. In a few patients in whom the studies were made both before and after treatment the abnormal pattern of motility in the esophagus was usually unchanged, and the normal peristaltic wave of

deglutition was never observed to return following treatment. The resting tone of the gastroesophageal sphincter was, however, almost always reduced following a successful clinical result of either dilatation or operation. The abnormally high pressures, developed in the esophagus in response to methacholine chloride (mecholy) in achalasia, were still present following treatment.

21. Postoperative Sodium Excretion Following Administration of Hypertonic Sodium Chloride Solution.

JOSEPH L. KOVARIK (*by invitation*) and JOHN F. LAWS (*by invitation*).

Sponsored by HIRAM T. LANGSTON, Chicago, Ill.

Postoperative hyponatremia and decreased urinary sodium excretion have been accepted as a normal sequel to surgical trauma. Numerous studies have been reported which attempt to elucidate the physiologic processes which contribute to the observed sodium retaining properties of the kidney after operation. Hormonal influence, particularly aldosterone, translocation of the sodium ion from the serum to the intra-cellular and/or extracellular space, and altered renal tubular function have all been implicated with regard to this phenomenon. It has been generally agreed that the ability of the normal kidney to excrete sodium is impaired early postoperatively and because of this, it is advisable to restrict sodium intake during this period.

Because this postoperative sodium retention occurs concomitantly with a decrease in the serum sodium level, it was felt that the renal sodium retention might be a reflection of a need to conserve sodium early postoperatively in an effort to return the serum sodium level toward a normal concentration.

Studies of serum electrolytes (notably sodium) and urinary electrolyte excretion have been carried out in thoracic surgical patients divided into two groups-

1. Those receiving "routine" management i.e. sodium restriction during the early postoperative period.
2. Those receiving hypertonic sodium chloride solution postoperatively. Thoracic surgical patients were chosen for this study because of minimal alteration of gastrointestinal tract function with only short-term dependence on parenteral feeding postoperatively.

The results indicate that the postoperative kidney can and does excrete sodium when serum sodium levels are maintained by the administration of hypertonic sodium chloride solution.

22. Anatomic and Pathologic Studies of the Thoracic Duct.

HARVEY W. KAUSEL (*by invitation*), THOMAS S. REEVE (*by invitation*),

ARTHUR A. STEIN (*by invitation*), RALPH D. ALLEY and

ALLAN STRANAHAN, Albany, N. Y.

Surgical intervention for the treatment of chylous effusion has been a development of the past decade and has of necessity stimulated further investigation of the thoracic duct system. Since previous anatomic descriptions appeared to be at variance, and because little information concerning the pathology of the thoracic duct was to be found, the present project was undertaken.

Sixty fresh cadavers were utilized. In fifty, the thoracic duct was cannulated above the diaphragm. After injecting radiopaque dye proximally and distally appropriate radiographic exposures were made. Methylene blue (1% solution) was similarly injected. Following evisceration the duct system and cysterna chyli were dissected. Sections from various levels of the duct and cysterna were removed for histologic examination. Thus, radiographic, gross and histologic observations on each case were available for study, as well as the overall morbid processes found at autopsy.

In ten additional instances, cervical cannulation of the duct with caudad injection was performed.

From these preparations we observed: (1) Five separate duct systems are suggested. (2) Two or more channels were found in approximately one-third of the cases at the level of the tenth dorsal vertebra. (3) Retrograde injection from the neck is usually unsuccessful because of unidirectional valves. (4) The details of histologic structure vary with the level in the duct system. (5) No primary pathology of the duct itself was found although related morbid changes will be discussed.

23. The Study of Ventricular Fibrillation by Threshold Determinations.

NORMAN E. SHUMWAY (*by invitation*), JOHN A. JOHNSON (*by invitation*)
and RICHARD J. STISH (*by invitation*), Minneapolis, Minn.

Sponsored by F. JOHN LEWIS, Chicago, Ill.

Electronic implementation of the Wiggers technique for determining ventricular fibrillation thresholds provides a much needed quantitative method for the examination of fibrillatory and anti-fibrillatory agents, physical or chemical.

Accurately measured shocks of 10 milliseconds duration were applied to the hearts of dogs during the vulnerable period late in systole. The current in milliamperes just adequate to provoke ventricular fibrillation was considered to have threshold strength. Oscilloscopes used to monitor stimulus position in the cardiac cycle and to measure the current during stimulation were connected to a Sanborn Twin-Viso recorder so that stimulus amplitude and the electrocardiogram were simultaneously inscribed. The stimulus was delivered at any desired delay after the R wave of the electrocardiogram by means of a signal-synchronization circuit. As many as 50 determinations were obtained in some preparations: defibrillation by countershock was invariably effective.

Two sets of experiments were performed to evaluate the precision of this method. After acute coronary artery occlusion, thresholds to ventricular fibrillation with test stimuli delivered directly on the infarct were one-half the control. Thresholds in adjacent non-infarcted myocardium were not diminished. The second study revealed a consistent geographic pattern for ventricular fibrillation with the right ventricle significantly more susceptible to fibrillation than the left ventricle.

Wherever possible, techniques of measurement should be used to examine biological phenomena: ventricular fibrillation can be studied by this precise, quantitative method.

24. Direct Surgical Procedures on the Coronary Arteries- Experimental Studies.

ORMOND C. JULIAN, M. LOPEZ-BELIO (*by invitation*)
and DONALD MOOREHEAD (*by invitation*), Chicago, Ill.

It is predictable that future surgical approaches to coronary heart disease will include direct anastomoses between systemic arteries and the coronary arteries distal to the site of obstructive lesions.

In order to test techniques for these vascular procedures end-to-end anastomoses between the internal mammary artery and the circumflex coronary artery have been accomplished in mongrel dogs. Seven such procedures have been done under sterile conditions to date. Four have survived in an up to six month period of observation.

Two techniques, one utilizing temporary polyethylene shunts and, the second, potassium cardiac arrest during extracorporeal circulation will be described and compared.

25. Ligation of the Internal Mammary Arteries as a Means of Increasing Blood Supply to the Myocardium.

ROBERT P. GLOVER and JULIO C. DAVILA (*by invitation*), Philadelphia, Pa.

Recent reports by European workers indicating that ligation of the internal mammary arteries has resulted in dramatic relief of angina have aroused the authors' interest.

Studies to ascertain the anatomic basis for these claims have been carried out. Tracer substances injected into the proximal segment of the internal mammary arteries after ligation at the second intercostal space have been recovered in the coronary sinus indicating a substantial contribution to myocardial circulation from this extracardiac source.

The detailed results of these experiments as well as of determinations of retrograde coronary flow will be presented. The initial clinical application of this approach will be discussed.

26. The Gradual Closure of Interatrial Defects.

ROBERT B. BENJAMIN (*by invitation*), ROBERT S. FLOM (*by invitation*),
St. Paul, Minn., and F. JOHN LEWIS, Chicago, Ill.

Most interatrial defects can be closed surgically with few complications and with excellent long term results. However, there remains one group of patients-those having long-standing interatrial defects with an associated pulmonary hypertension- in which conventional methods of closure have resulted in a high mortality due to right heart failure. The authors have felt that if a

method for gradual closure of interatrial defects could be developed, it would be suitable for treatment of this group of cardiac patients inasmuch as the dynamics of blood flow would then be changed rather slowly.

Large interatrial defects were created in 80 mongrel dogs, and the defects were then partially closed by suturing the edges of the defect to an ivalon patch having one or more holes of varying size. Most of the animals had an elevated right atrial pressure-produced by excising one-fourth to one-third of the tricuspid valve.

It was found that partially closing the interatrial defect with an ivalon patch containing a single hole 8 mm. in diameter produced gradual closure over a period of one to two weeks following surgery. All dogs sacrificed within one week after surgery

had a large defect still present. In all dogs sacrificed between 7 and 13 days post surgery the defect was at least half closed, and in all dogs sacrificed after 13 days the defect was completely closed. The ivalon sponge is first covered and invaded by fibrin. This is replaced by fibrous tissue and the defect is then bridged by strands of fibrin and connective tissue. After 3 weeks the defect is filled in with fibrous tissue and covered with endothelium. Defects in control dogs have all remained open.

At the present time this method of closing interatrial defects is being evaluated in dogs having pulmonary hypertension and a right to left shunt in addition to their interatrial defects.

27. Physiological Considerations of Intracardiac Pressures Following Closure of Atrial Septal Defects.

HENRY T. BAHNSON and G. RAINEY WILLIAMS (*by invitation*), Baltimore, Md.

Of the several physiological data obtained on patients undergoing closure of atrial septal defect, measurements of intra-atrial pressure taken directly during operation before and after closure of the defect have been given special study. To date, information sufficiently complete for analysis has been obtained on 14 patients. There has often been a striking, and sometimes alarming, increase in left atrial pressure following closure. The increase in left atrial pressure is correlated with the size of the left to right shunt through the defect as measured preoperatively. These data agree with the concept of Dow and Maloney and indicate that the size of the shunt through an atrial septal defect is determined by the relative resistance to filling of the two ventricles. With a large preoperative shunt one may expect to find an increase of left atrial pressure after closure; this increment will be greater with an increased blood volume. The therapeutic significance of these data will be discussed in relation to selection of patients for operation and their surgical handling.

28. Transplantation of the Homologous Canine Heart.

SALEM F. SAYEGH (*by invitation*), MAX HALLEY (*by invitation*)
and OSCAR CREECH, JR., New Orleans, La.

This is a report of a study to determine: (1) factors influencing survival of the transplanted homologous heart, and (2) the electrocardiographic and vectocardiographic patterns of the denervated cardiac transplant.

The method of transplantation is essentially that described by Markowitz and his associates and consists in removal of the transplant, ligation of the superior and inferior vena cavae, and reimplantation in either the neck or the groin. The aorta is anastomosed to the common carotid or femoral artery, and the pulmonary artery to the external jugular or femoral vein.

Preliminary experiments consisted of transplantation of puppy hearts to the neck or groin of adult animals and resulted in a survival time of six hours to eight days. With these experiments as a background additional studies were undertaken in an attempt to prolong the survival of the transplanted hearts. In one group of animals the heart was encased in an envelop of "millipore" (which is a membranous filter made of cellulose esters and designed for surface screening of particles in the sub-micronrange). In another group of animals transplantation was done using fetal hearts removed during the last two weeks of gestation and transplanted into the neck of the mother. Finally, in a group of adult animals, cardiac transplantation has been preceded by about six weeks by transplantation of the spleen of the donor with vascular implantation of the splenic pedicle in an effort to produce immune paralysis.

The second phase of this study is concerned with the electrocardiographic and vectocardiographic patterns observed in the transplanted homologous heart. These studies are

performed immediately after transplantation and daily thereafter for the life of the transplant in an attempt to determine the mechanism of failure of the grafted heart.

Monday Afternoon, May 6, 1957

2:00 P.M. Executive Session. (Limited to Active and Senior Members). Grand Ballroom.

3:00 P.M. Scientific Session: REGULAR PROGRAM-Grand Ballroom.

Address by the President, Cameron Haight, Ann Arbor, Michigan
*"Some Observations on Esophageal Atresias
and Fistulas of Congenital Origin"*

29. Intrapericardial Bronchogenic Cysts-Report of Two Cases and Probable Embryological Explanation.

C. HARWELL DABBS (*by invitation*), E. CONVERSE PEIRCE, II (*by invitation*),
Knoxville, Tenn. and RALPH BERG, JR., Spokane, Wash.

Bronchogenic cyst or "teratoma", as many of these are diagnosed, occurring within an intact pericardium is unusual. To date a review of the literature reveals twelve previously reported cases. The present report details two additional cases, both quite large and both removed successfully in a single stage. The correct diagnosis was made pre-operatively in a twenty year old girl with a 650 gram tumor, after clinical study including angiocardiography.

The case histories are documented with x-rays, angiocardiograms, operative photographs, photomicrographs, and a short film strip showing the removal of one tumor.

Although these tumors have frequently been called "teratomas" in the past, the elements present are respiratory epithelium, mucosal glands, smooth muscle, cartilage and lymphoid follicles, structures usually found in bronchogenic cysts. Since the lung buds are in close proximity to the pericardial coelom for several days during the rapidly developing twenty-eight to thirty-six day period, fusion of the pleuropericardial folds may trap tissue of respiratory tract potential within the pericardium. It appears logical to assume that these tumors lying amidst the great vessels and auricles of the heart, and covered with intact pericardium, represent fetal lung bud rests "trapped" within the pericardium as the pleuropericardial folds close.

30. Primary Repair of Traumatic Rupture of the Thoracic Aorta.

ROBERT G. PONTIUS (*by invitation*), Boston, Mass, and
OSCAR CREECH, JR., New Orleans, La.

Traumatic rupture of the thoracic aorta from non-penetrating forces is becoming more widely recognized as a clinical entity. While many patients expire promptly from their injury, those who eventually survive frequently develop an aneurysm which requires surgical therapy. Between these two extremes of the clinical spectrum is a region in which prompt recognition and definitive surgical intervention may remove the threats of death from secondary hemorrhage and the sequelae accompanying aneurysm formation.

Such a case is reported in which the victim of an automobile accident developed secondary hemorrhage from a tear in the thoracic aorta while undergoing abdominal surgery for associated injuries. Hemorrhage from the aorta was controlled and a homo-graft used to restore continuity. However, blood loss, aortic occlusion and massive transfusions of citrated blood including use of the intra-arterial route contributed to repeated episodes of cardiac arrest from which the patient expired.

In the past, clinical attention has usually been directed away from the nuances of this injury by other areas of more obvious trauma. A discussion of the clinical aspects and roentgenologic features of this condition, together with proper selection of established techniques of aortic surgery points to the consideration that this condition may soon be treated successfully by primary surgical intervention.

31. The Electro-Encephalogram in Patients Undergoing open Intracardiac Surgery with the Aid of Extracorporeal Circulation.

RICHARD A. THEYE (*by invitation*), ROBERT T. PATRICK (*by invitation*)
and JOHN W. KIRKLIN, Rochester, Minn.

The electro-encephalogram has been continuously monitored in all patients undergoing open intracardiac surgery with the aid of extracorporeal circulation at the Mayo Clinic. This paper reports the electro-encephalographic changes, other than those associated with alterations in the depth of anesthesia, which occurred in the first 100 patients in whom technically satisfactory electro-encephalograms were obtained.

A normal electro-encephalogram predominated in all patients before, during, and after perfusion. However, in 60 patients a change in the electro-encephalogram occurred which was not associated with an alteration in the depth of anesthesia. In these patients the small, fast waves characteristic of light ether anesthesia were temporarily replaced by large, slow waves or even a flat line. In some patients this change occurred more than once.

These large, slow waves were associated with surgical compression of the superior vena cava on 13 occasions. In each instance a normal pattern reappeared with resumption of blood flow through this vessel.

Similar large, slow waves appeared in the electro-encephalogram during a period of reduced cardiac output in 13 instances. These were not associated with the perfusion except in one case of a technical failure.

A similar transient electro-encephalographic change was observed to occur 45 times with the initiation of perfusion. In all cases the normal pattern spontaneously reappeared within a few minutes.

The electro-encephalogram has proved to be a useful monitoring device during the performance of open intracardiac surgery with the aid of extracorporeal circulation at the Mayo Clinic.

7:00 P.M. Cocktails, Banquet and Dancing, Palmer House-Red Lacquer Room.

**Attendance limited to Members of the Association and
their ladies, Invited Speakers and their ladies.
Dinner dress preferred.**

TUESDAY MORNING, MAY 7, 1957

9:00 A.M. Scientific Session: REGULAR PROGRAM-Grand Ballroom

32. Cine-Fluorography in the Evaluation of Neuromuscular Diseases of the Esophagus.

FREDERICK S. CROSS, EARLE B. KAY and GEORGE F. JOHNSON

(by invitation), Cleveland, Ohio

It was the purpose of the present study to evaluate cine-fluorography as a technique in the diagnosis and investigation of certain neuromuscular disorders of the esophagus.

A total of 55 patients with the following categories of esophageal disorders have been studied by means of cine-fluorography, as well as intra-esophageal pressure studies, routine fluoroscopic and x-ray examinations, and esophagoscopy when indicated-

1. Neuromuscular failure
2. Segmentation
3. Achalasia
4. Diverticula
5. Hiatal hernias

Cine-fluorographic and intraluminal pressure studies have been found to be of great aid in evaluating dysphagia caused by any of the above mechanisms. The dynamic changes occurring during the mechanism of swallowing are permanently recorded in a dynamic manner rather than as static x-ray films which frequently miss or inadequately record the important events.

This study has emphasized the fact that the various types of neuromuscular imbalance existing in the esophagus are not necessarily distinct entities but rather gradations or variations of the same basic problem. They may be primary with no apparent underlying etiology or they may be secondary to the presence of a primary lesion, such as gastric or duodenal ulcer, obstruction at the esophagogastric junction, or a hiatal hernia. The various types of neuromuscular imbalance may exist in combination with each other and frequently have been found to be the underlying etiological factor in the development of such secondary manifestations as diverticula of the esophagus.

The techniques used in the study will be discussed and motion pictures of normal and abnormal esophageal function as demonstrated by cinefluorographic studies correlated with intraluminal pressure studies will be shown. Special emphasis will be placed on the underlying neuromuscular in-coordination frequently found associated with diverticula and hiatal hernias.

33. Esophageal Hiatus Hernia of the Diaphragm-An Analysis of Surgical Results.

GEORGE H. HUMPHREYS II, JOSE M. FERRER, JR. (by invitation) and

PHILIP D. WIEDEL (by invitation), New York, N. Y.

This is a study of 99 cases of esophageal hiatus hernia which were surgically repaired at Columbia-Presbyterian Medical Center from 1940 through 1954. There has been a post-operative follow-up of 2 to 9 years. Pre-operative symptoms and indications for surgical repair are analyzed and correlated with post-operative clinical and roentgenological results.

39 of the 99 cases were over 60 years of age, and 12 of the 99 were over 70 years old. 13 of the 39 cases over 60 years of age were classified pre-operatively as poor risks.

The post-operative clinical results are:

55%-Good

26%-Satisfactory

14%-Poor

5%-Operative or early post-operative deaths

Post-operative roentgenological results are:

47%-No recurrence or persistence

31%-Insignificant small recurrence or persistence

22%-Large recurrence or persistence

A comparison of clinical with roentgenological results is made, deaths are analyzed, and the results are correlated with technique of repair in order to bring out causes of surgical failure. A technique is described which has now been used in a group of these cases over a sufficiently long period to demonstrate its superiority in long term results over other methods used.

34. An Operation for Hiatus Hernia with Short Esophagus.

J. LEIGH COLLIS (by invitation), Birmingham, England.

The operation described has been developed as a result of a series of anatomical and physiological investigations into the problem of hiatus hernia. The first result of these was a re-fashioning of standard operative technique for this condition. These investigations and the re-fashioned operation have already been described in *Thorax* of September 1954. The essential part of this operation was to obtain an acute angle of implantation between the esophagus and the fundus of the stomach. Experience with it has demonstrated that the valvular mechanism obtained is very effective and that it can even work despite gastric tissue being left above the diaphragm. Technically it is impossible to produce a satisfactory angulation if there is a bulk of stomach tissue passing through the esophageal hiatus. From this point it is a short step to the development of a technique which will reduce the size of the stomach tube and allow an acute angle of implantation between the tube in the chest and the fundus of the stomach below the diaphragm. This operation has been used to meet the problem of short esophagus in nine patients and the experience of this is described.

35. Traumatic Rupture of the Diaphragm-Clinical Manifestations and Surgical Treatment.

GERARD DESFORGES (by invitation), JOHN W. STRIEDER, JOSEPH P. LYNCH

and IRVING M. MADOFF, Boston, Mass.

Traumatic rupture of the diaphragm is becoming a more frequent problem apparently as the result of an increasing number of accidents associated with rapid deceleration. The diagnosis has not been made easily, usually, as evidenced by the number of late diaphragmatic ruptures one is called upon to repair. However, if the possibility of this entity is considered, the diagnosis can be suspected quickly, and prolonged disability can be avoided. Early diagnosis assumes additional importance in terms of its medico-legal aspects.

The clinical picture of diaphragmatic rupture may be conveniently divided into three phases: An immediate phase, a chronic phase, and an intermediate, or dramatic phase. In the immediate phase, the diagnosis understandably is often obscured by associated serious injury. In the chronic phase, the diagnosis may be confused with vague chronic gastro-intestinal disease. In the intermediate phase, the diagnosis concerns strangulation or obstruction of abdominal viscera. Emergency surgical therapy may occur under less than ideal circumstances at this time.

An analysis of the histories of sixteen patients with ruptured diaphragm treated by the authors forms the basis of this report. It is the purpose of this communication to review the etiological mechanism, to elaborate on the

clinical syndromes aforementioned, to point out the radiological aspects and to outline the surgical therapy of this disease entity. The pertinent surgical literature is reviewed.

36. Reconstruction of the Esophagus with Segments of the Colon.

WILLIAM E. NEVILLE (by invitation)

and GEORGE H. A. CLOWES, JR., Cleveland, Ohio

To evaluate the reconstruction of the esophagus by implanted colon, not a new concept, a series of dogs were submitted to this operation. In none of the survivors has ulceration of the colon or remaining esophagus been demonstrated despite consumption of normal diet. This is in contrast to dogs with a portion of the stomach in the chest, some of which develop esophagitis.

Eighteen patients were subjected to intrathoracic replacement of the esophagus by a colonic segment for both benign and malignant esophageal lesions. Of these, thirteen survive now. All gained weight postoperatively and showed improvement in their nutritional state as measured by hemoglobin, total protein, and strength. There has been no evidence of esophagitis or ulceration of the colon segment by x-ray and esophagoscopy.

This paper will present the follow up data on these patients which will range in period of from one to three years. Certain suggestions for operative technique which have come from this experience will be discussed.

37. Primary Tumors of the Heart: A Surgical Problem.

J. GORDON SCANNELL and HERMES C. GRILLO (by invitation), Boston, Mass

The authors present 2 successful excisions of primary tumors of the heart. One, a myxoma of the left atrium was removed intact by cardiotomy under hypothermia. The patient, a man of 32, is living and well 18 months post-operatively. The second, a low-grade fibro-sarcoma of the right atrium was removed nine months ago. The patient, a girl of 7, is presently well without evidence of recurrence.

An additional patient, aged 9, thought to have rheumatic heart disease, died of a cerebral embolus while awaiting diagnostic studies. Autopsy disclosed a removable myxoma within the left atrium.

With increasing numbers of cardiac operations, primary tumors of the heart are certain to be encountered with greater frequency. Their diagnosis and management, therefore, assume great clinical significance. The authors propose to review briefly the clinical features and natural history of this group of tumors.

The American Association for Thoracic Surgery 1956-1957

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CARR, DUANE.....899 Madison Ave., Memphis, Tenn.
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DAILEY, JAMES E..... 4109 Montrose Blvd., Houston 6, Texas
DANIEL, ROLLIN A.410 Medical Arts Bldg., Nashville, Tenn.
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DAVIS, EDGAR W... 1150 Connecticut Ave., Washington, D. C.
DAY, J. CLAUDE..307 David Whitney Bldg., Detroit 26, Mich.
DE BAKEY, MICHAEL E.Baylor University, Dept. of Surgery, Houston, Texas
DECAMP, FAULT..... 3503 Prytama Street, New Orleans 15, La.
DECKER, HARRY R..... 730 The Park Bldg., 355-5th Ave., Pittsburgh 22, Pa.
DENNIS, CLARENCE E.989 Edgewood Ave., Pelham Manor, N. Y.
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DODRILL, FOREST D..... 621 David Whitney Bldg., Detroit, Mich.
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EVANS, BYRON H..... 2940 Fresno St., Fresno, Calif.
FALOR, WILLIAM H..... 623 Second National Bldg., Akron 8, Ohio
FELL, EGBERT H.... 122 So. Michigan Ave., Chicago 3, Ill.
FISCHER, WALTER W... 170 East 78th St., New York, N. Y.
FORSEE, JAMES H., COL., MC, U.S.A..... 5207 Falmouth Road, Washington 16, D. C.
FRANK, HOWARD A..... 330 Brookline Ave., Boston 15, Mass.
FREELANDER, SAMUEL O... 2460 Fairmount Blvd., Cleveland Heights 6, Ohio
GAENSLER, EDWARD A.... 229 Dudley Rd., Newton Centre 59, Mass.
GAGNON, EDOUARD D.. 902 Est., Rue Sherbrooke, Montreal, Que.
GALE, JOSEPH. Wisconsin General Hospital, Madison 6, Wis.
GARLOCK, JOHN H..3 E. 73rd St., New York, N. Y.
GEARY, PAUL.....909 Park Ave., Plainfield, N. J.
GEBAUER, PAULLeahi Hospital, 649 Pokole St., Honolulu, T.H.
GERBODE, FRANK L.... Stanford Univ., Hospital, San Francisco, Calif.
GIBBON, JOHN H., JR.1025 Walnut St., Philadelphia, Pa.
GLOVER, ROBERT P.... 269 South 19th St., Philadelphia, Pa.
GORDON, JOSEPH..106 Girard Blvd., S. E., Albuquerque, N. M.
GRACE, ARCHIBALD J.530 Wellington St., London, Ontario

GRIMES, ORVILLE F..... University of California Hosp., San Francisco 22, Calif.
 GROSS, ROBERT E..... 300 Longwood Ave., Brookline, Mass.
 GROW, JOHN B..... 3705 E. Colfax, Denver, Colo.
 HAIGHT, CAMERON University Hospital, Ann Arbor, Mich.
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 HARKEN, DWIGFIT E. 67 Bay State Road, Boston 15, Mass.
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 HARRISON, HARLON W.... U.S. Naval Hospital, San Diego, Calif.
 HARTER, JOHN S.... 212 Brown Bldg., Louisville 2, Ky.
 HEAD, JEROME R.. .53 E. Washington St., Chicago, Ill.
 HELMSWORTH, JAMES A. Cincinnati General Hospital, Cincinnati 29, Ohio
 HIGGINSON, JOHN F..... 2455 N. W. Marshall St., Portland, Ore.
 HIMMELSTEIN, AARON.... .70 East 96th St., New York 28, N. Y.
 HOCHBERG, LEW A..... 135 Eastern Parkway, Brooklyn 17, N. Y.
 HOLINGER, PAUL H. 700 N. Michigan Ave., Chicago, Ill.
 HOLMAN, CRANSTON W. 862 Fifth Ave., New York 21, N. Y.
 HOPKINS, WILLIAM A... 710 Peachtree Street, Atlanta, Ga.
 HUGHES, FELIX A., JR..... Kennedy Hospital, Memphis, Tenn.
 HUMPHREYS, GEORGE H. 180 Ft. Washington Ave., New York, N. Y.
 HURWITZ, ALFRED Maimomdes Hosp., 4802 Tenth Ave., Brooklyn, N. Y.
 JACKSON, CHEVALIER L.. 3401 N. Broad St., Philadelphia 40, Pa.
 JANES, ERNEST C..... 250 Main St., Hamilton, Ontario
 JOHNSON, ELGIE K..... 230 Hilton St. Hempstead, N. Y.
 JOHNSON, HOLLIS E.... 2122 West End Ave., Nashville, Tenn.
 JOHNSON, JULIAN..... 3400 Spruce St., Philadelphia, Pa.
 JONES, JOHN C.. 1136 West 6th St., Los Angeles, Calif.
 JOYNT, G. H. C..... 399 Bathurst St., Toronto, Ont.
 KAY, EARLE B..... 10465 Carnegie Ave., Cleveland, Ohio
 KENT, EDWARD M. 3500 Fifth Ave., Pittsburgh 13, Pa.
 KERGIN, FREDERICK G.. Medical Arts Bldg., Toronto 5, Ont.
 KESSLER, CHARLES R.. 1027 Woodward Bldg., Birmingham 3, Ala.
 KING, RICHARD... 814 Doctors Bldg., Atlanta, Ga.
 KINSELLA, THOMAS J... . 1251 Medical Arts Bldg., Minneapolis, Minn.
 KIPP, HAROLD A.... .. Mercy Hospital, Pittsburgh 15, Pa.
 KIRBY, CHARLES K..... 3400 Spruce Street, Philadelphia, Pa.
 KIRKLIN, JOHN W..... Mayo Clinic, Rochester, Minn.
 KLASSEN, KARL P..... Ohio State University, Columbus, Ohio
 KLEPSEY, ROY G..... 1835 Eye St., N. W., Washington, D. C.
 KLOPSTOCK, ROBERT.. Veterans Adm. Hospital, Brooklyn 9, N. Y.
 KNOEPP, Louis F..... Veterans Adm. Hospital, Alexandria, La.
 LAIRD, ROBERT..... 399 Bathurst St., Toronto, Ont.
 LAM, CONRAD R..... Henry Ford Hospital, Detroit, Mich.
 LAMBERT, ADRIAN. 768 Park Ave., New York, N. Y.
 LAMPSON, RUTLEDGE S.... 85 Jefferson St., Hartford, Conn.
 LANGSTON, HIRAM T..... 1919 West Taylor St., Chicago 12, Ill.
 LEAHY, LEON J.. . 105 Medical Arts Bldg., Buffalo, N. Y.
 LEES, WILLIAM M. 7000 Kenton St., Lincolnwood 30, Ill.
 LESTER, CHARLES W. 70 East 80th St., New York, N. Y.
 LEVEN, N. LOGAN 1464 Lowry Medical Arts Bldg., St. Paul, Minn.
 LEWIS, F. JOHN Northwestern Univ. Med. Sch., Chicago 11, Ill.
 LILLEHEI, CLARENCE W..... University Hospitals, Minneapolis 14, Minn.
 LINDSKOG, GUSTAF E..... 50 Marvel Road, New Haven, Conn.
 LYNCH, JOSEPH P..... 1180 Beacon St., Brookline, Mass.
 MACKLER, SAUL A.. 104 S. Michigan Ave., Chicago 3, Ill.

MACMANUS, JOSEPH..... 491 Delaware, Buffalo, N. Y.
 MAIER, HERBERT C.... 3 East 71st St., New York, N. Y.
 MAJOR, ROBERT C..... .University Hospital, Augusta, Ga.
 MANNIX, EDGAR P., JR..... 12 Forest Turn, Manhasset, Long Island, New York
 MAURER, ELMER P. R..... 827 Union Central Bldg., Cincinnati, Ohio
 MAUTZ, F. R..... .10515 Carnegie Ave., Cleveland 6, Ohio
 MAYER, JOHN H., JR..... 503 Plaza Parkway Bldg., Kansas City, Mo.
 MCDONALD, JOHN R..... ..Mayo Clinic, Rochester, Minn.
 MCINTOSH, CLARENCE A.1390 Sherbrooke St., W., Montreal, Que.
 MELTZER, HERBERT..... 505 Medical Arts Bldg., Edmonton, Alberta, Canada
 MERENDINO, K. ALVIN..University of Washington, Seattle, Wash.
 MERKEL, CARL G..... 8 Church St., Saranac Lake, N. Y.
 MEYER, HERBERT WILLY... Box 507, Rancho Santa Fe, Calif.
 MINOR, GEORGE F...Univ. of Virginia Hospital, Charlottesville, Va.
 MISCALL, LAURENCE..... .11 East 68th St., New York, N. Y.
 MOORE, RICHMOND L..180 Ft. Washington Ave., New York, N. Y.
 MUDD, JAMES L..... ..634 N. Grand Blvd., St. Louis 3, Mo.
 MULLER, WM. H., JR..Univ. of Virginia Hospital, Charlottesville, Va.
 MULVIHILL, DANIEL A.15 East 77th St., New York, N. Y.
 OATWAY, WILLIAM H., JR..... ..La Vina Sanatorium, Altadena, Calif.
 OCHSNER, ALTON..... ..Tulane Univ. School of Medicine, New Orleans, La.
 OLSEN, ARTHUR M.. 102-2nd Ave., S. W., Rochester, Minn.
 O'NEILL, THOMAS J.... .269 South 19th St., Philadelphia 3, Pa.
 O'ROURKE, PAUL V..... ..307 David Whitney Bldg., Detroit, Mich.
 OVERHOLT, RICHARD H.... 135 Francis St., Boston 15, Mass.
 PAINE, JOHN R.The Buffalo General Hosp., 100 High St , Buffalo, N. Y.
 PARKER, EDWARD F..... 86 Hasell St., Charleston, S. C.
 PAULSON, DONALD L...3810 Swiss Ave., Dallas, Texas
 POOL, JOHN L.755 Park Ave., New York 21, N. Y.
 POPPE, J. KARL..... ..1130 S. W. Morrison St , Portland, Ore.
 POTTS, WILLIS J.707 Fullerton Ave., Chicago 14, Ill.
 PROCTOR, OSCAR S..... .. Box 126, University P.O., Seattle, Wash.
 RAINE, FORRESTER.425 E. Wisconsin Ave., Milwaukee, Wis.
 RASMUSSEN, RICHARD A.... Blodgett Medical Bldg., Grand Rapids, Mich.
 RAVITCH, MARK M.... .Johns Hopkins Hospital, Baltimore, Md.
 RICHARDS, VICTOR... Stanford-Lane Hospital, San Francisco 15, Calif.
 RIGGINS, H. McLsoo.... 140 East 54th St., New York, N. Y.
 RIPSTEIN, CHARLES B54 Rose Ave., Great Neck, L. I., N. Y.
 ROBERTSON, Ross.. 925 West Georgia St., Vancouver 1, B. C.
 ROGERS, W. L.490 Post St., San Francisco, Calif.
 ROSEMOND, GEORGE P.... 3401 Broad St., N., Philadelphia, Pa.
 RUMEL, WILLIAM R.807 Medical Arts Bldg., Salt Lake City, Utah
 SAMSON, PAUL C.3959 Happy Valley Road, Lafayette, Calif.
 SANGER, PAUL W..... ..Doctors Blag., Kings Drive, Charlotte, N. C.
 SCANNELL, J. GORDON..... Massachusetts General Hospital, Boston, Mass.
 SCHAFFNER, VERNON D... ..Kentville, Nova Scotia
 SCHMIDT, HERBERT WM..... Mayo Clinic, Rochester, Minn.
 SCOTT, HENRY W., JR.... Vanderbilt University Hospital, Nashville, Tenn.
 SEALY, WILL C..... Duke University Hospital, Durham, N. C.
 SELEY, GABRIEL..... .540 Park Ave., New York 21, N. Y.
 SHAW, ROBERT R.... ..3810 Swiss Ave., Dallas, Texas
 SHEFTS, LAURENCE, M.503 Moore Bldg., San Antonio, Texas
 SHUMACKER, HARRIS B., JR..... Indiana Univ. Medical Center, Indianapolis, Ind.
 SKINNER, EDWARD F..... 899 Madison Ave., Memphis, Tenn.
 SKINNER, GEORGE F... ..36 Coburg St., St. Johns, N. B.
 SLOAN, HERBERT..... ..University Hospital, Ann Arbor, Mich.

SOMMER, GEORGE N. J., JR..... 120 W. State St., Trenton, N. J.
 SOUTTER, LAMAR... ..80 East Concord St., Boston, Mass.
 STEELE, J. D..... Veterans Adm. Hospital, San Fernando, Calif.
 STEPHENS, H. BRODIE.. 384 Post St., San Francisco, Calif.
 STOREY, CLIFFORD F.1309 Medical-Dental Bldg., San Diego 1, Calif.
 STRANAHAN, ALLEN..... ..Albany Hospital, Albany, N. Y.
 STRIEDER, JOHN W..1180 Beacon St., Brookline, Mass.
 SWAN, HENRY, II4200 East 9th Ave., Denver 20, Colo.
 SWEET, RICHARD H..... 87 Chestnut Street, Boston 8, Mass.
 THOMPSON, SAMUEL A..... 850 Park Ave., New York, N. Y.
 TOUROFF, ARTHUR S. W.994 Fifth Ave., New York 28, N. Y.
 TUTTLE, WILLIAM M.. .307 David Whitney Bldg., Detroit 26, Mich.
 TYSON, M. DAWSON.. .Hitchcock Clinic, Hanover, N. H.
 VAN HAZEL, WILLARD... 224 S. Michigan Blvd., Chicago, Ill.
 VARCO, RICHARD L..... University Hospital, Minneapolis, Minn.
 VINEBERG, ARTHUR M.. 1390 Sherbrooke St., W., Montreal, Que.
 VORWALD, ARTHUR J.College of Medicine, Wayne University, Detroit 7, Mich.
 WARE, PAUL F.16 Norwich St., Worcester, Mass.
 WATERMAN, DAVID H..... 1918 West Clinch Ave., Knoxville 16, Tenn.
 WATSON, WILLIAM L.. 1088 Park Ave., New York, N. Y.
 WEINBERG, JOSEPH A.Veterans Adm. Hospital, Long Beach, Calif.
 WEISEL, WILSON... 324 E. Wisconsin Ave., Milwaukee 2, Wis.
 WHITE, MARION L., JR... Huntington Bank Bldg., Huntington, W. Va.
 WILLAUER, GEORGE..... 1930 Chestnut St., Philadelphia, Pa.
 WILLIAMS, MARK H..... 63 Front St., Binghamton, N. Y.
 WILSON, NORMAN J..... 135 Francis St., Boston 15, Mass.
 WOODRUFF, WARRINER..... 8 Church St., Saranac Lake, N. Y.
 WOODS, FRANCIS M... 135 Francis St., Boston 15, Mass.
 WRIGHT, GEORGE W..... 11311 Shaker Blvd., Cleveland 4, Ohio
 WYLIE, ROBERT H.... 903 Park Ave., New York, N. Y.

ASSOCIATE MEMBERS

ACKMAN, F. DOUGLAS..... 1374 Sherbrooke St., W., Montreal, Que.
 ADELMAN, ARTHUR. 701 East 63rd St., Kansas City, Mo.
 ADLER, RICHARD H..... 100 High St., Buffalo 3, N. Y.
 AITCHISON, DAVID B.Mountain Sanatorium, Hamilton, Ont.
 ALLEY, RALPH D..... Albany Hospital, Albany, N. Y.
 ANDREWS, NEIL C.Ohio Tuberculosis Hospital, Columbus 10, Ohio
 ASHBURN, FRANKS. 1835 Eye St., N. W., Washington, D. C.
 BELL, JOHN W.. 761 Stimson Bldg., Seattle 1, Wash.
 BENOIT, HECTOR W., JR.... 503 Plaza Parkway Bldg., Kansas City, Mo.
 BERG, RALPH, JR.231 Medical Center Bldg , Spokane 4, Wash.
 BLOOMBERG, ALLAN E..... 1095 Park Ave., New York 28, N. Y.
 BORTONE, FRANK2765 Hudson Blvd., Jersey City, N. J.
 BOUSQUET, ERNESTO..... 5689 Boulevard Rosemont, Montreal, Que.
 BROWNRIGG, GARRETT M.... 47 Queens Rd., St. Johns, Newfoundland
 BRUNEAU, JACQUES..... 847 Cherrier, Montreal 24, Que.
 BRYANT, JOSEPH R..... 321 West Broadway, Louisville 2, Ky.
 BURBANK, BENJAMIN..... 244 Henry St., Brooklyn 2, N. Y.
 CHAMBERS, JOHN S., JR... 233 "A" St., Room 1205, San Diego 1, Calif.
 CHANDLER, JOHN H... 616 W. Forrest, The Jackson Clinic, Jackson, Tenn.
 CHESNEY, JOHN G..... 2615 Biscayne Blvd., Miami, Fla.
 CHODOFF, RICHARD J..... 255 South 17th St., Philadelphia, Pa.
 CHUNN, CHARLES F.442 W. Lafayette St., Tampa 6, Fla.
 CINCOTTI, JOHN J..... Veterans Adm. Hospital, Brooklyn 9, N. Y.

CLATWORTHY, H. WILLIAM, JR..... The Children's Hosp., 561 South 17th, Columbus, Ohio
CLOWES, GEORGE H. A., JR..... 3395 Scranton Road, Cleveland 9, Ohio
COOKE, FRANCIS N.... 25 S. E. Second Ave., Miami, Fla.
COOPER, DAVID A.. 1520 Spruce St., Philadelphia, Pa.
COX, WILLIAM V..... 133 Court St., Auburn, Maine
CRACOVANER, ARTHUR J..... 103 East 78th St., New York 21, N. Y.
CRASTNOPOL, PHILIP.. 1221 East 21st St., Brooklyn, N. Y.
CRECCA, ANTHONY D.. 376 Roseville Ave., Newark 7, N.J.
CREECH, OSCAR, JR..... Tulane Univ. Sch. of Medicine, New Orleans 12, La.
CROSS, FREDERICK S..... 10465 Carnegie Ave., Cleveland, Ohio
CUTLER, PRESTON R.... 807 Medical Arts Bldg., Salt Lake City 1, Utah
DAFOE, COLIN S.... 508 Medical Arts Bldg., Edmonton, Alberta
DANIELS, ALBERT C..... 490 Post St., San Francisco, Calif.
DASCH, FREDERICK W.416 West Market St , Pottsville, Pa.
DAUGHTRY, DeWITT C.... 4201 Lake Road, Bay Point, Miami, Fla.
DEATON, W. RALPH, JR.... 1027 Professional Village, Greensboro, North Carolina
DECKER, ALFRED M., JR.Sunmount, N. Y.
DELARUE, NORMAN C..... 25 Donlea Drive, Toronto 7, Ont.
DE MATTEIS, ALBERT....1216-13th Ave , Altoona, Pa.
DIVELEY, WALTER L.... .410 Medical Arts Bldg., Nashville 2, Tenn.
DODDS, G. ALFRED.....807 Broadway, Fargo, N. D.
DRAKE, EMERSON H...18 Bramhall St., Portland, Maine
EGLEE, EDWARD P.105 East 53rd St., New York, N. Y.
ELLIS, F. HENRY, JR.... .Mayo Clinic, Rochester Minn.
EMERSON, GEORGE L..... 26 Strathallan Park, Rochester 7, N. Y.
FINNERTY, JAMES..... .Brookhaven Medical Arts Bldg , Patchogue, N. Y.
FISHBACK, FREDERICK C... ..1835 Eye St., N. W., Washington, D. C.
FORD, WILLIAM B..... 3500 Fifth Avenue, Pittsburgh 13, Pa.
FOX, ROBERT.....2136 Robincrest Lane, Glenview, Ill.
FRENCH, SANFORD W., III.... Letterman Army Hospital, San Francisco, Calif.
FRIEDLANDER, RALPH. The Bronx Hospital, Bronx 56, New York
FRIESEN, STANLEY R..39th and Rainbow, Kansas City 3, Kansas
GERBASI, FRANCIS S..... 3637 Vermont, Long Beach 14, Calif.
GLENN, FRANK. .525 East 68th St , New York 21, N. Y.
GOLDMAN, ALFRED... ..416 N. Bedford Drive, Beverly Hills, Calif.
GRACE, EDWIN J..... 121 Fort Green Place, Brooklyn, N. Y.
GRAVEL, JOFFRE-ANDRE... .11 Place George Vth, Quebec City, Que.
GREER, ALLEN E.1200 North Walker, Oklahoma City, Okla.
HAMPTON, FOSTER, JR... Suite 101, Interstate Bldg , Chattanooga, Tenn.
HARDY, JAMES D..... University of Mississippi Medical Center, Jackson, Miss.
HAUSMANN, PAUL F.2212 West State St., Milwaukee 3, Wis.
HERBEN, GEORGE F...House of Rest at Sprain Ridge, Yonkers, N. Y.
HEROY, WILLIAM W..... 22 Oakwood Road, Huntington, N. Y.
HERRERA-LLERANDI, RODOLFO ECentro Medico, Guatemala City, Guatemala, C. A.
HERTZLER, JACK H..... .4377 West Maple Road, Birmingham, Mich.
HUDSON, THEODORE R.. 55 E. Washington St., Chicago, Ill.
HUN, HENRY....149 Washington Ave., Albany, N. Y.
HURLEY, G. A. PATRICK.... ..1538 Sherbrooke St., W., Montreal, Que.
HURWITT, ELLIOTT S..... .Montefiore Hospital, New York 67, N. Y.
INGRAM, IVAN N... .350 Post St., San Francisco 8, Calif.
IOVINE, VINCENT M.1150 Connecticut Ave., N. W., Washington, D. C.
JARVIS, FRED. 819 Boylston Ave., Seattle 4, Wash
JENSEN, NATHAN K..... 1629 Medical Arts Bldg., Minneapolis 2, Minn.
JOHNS, THOMAS N. P.. 6305 Towana Road, Richmond, Va.
JOHNSON, CLIVE R..... 1216 Pennsylvania Ave., Fort Worth 4, Texas

JOHNSTON, JAMES H., JR.. 710 N. State St., Jackson, Miss.
JUDD, ARCHIBALD R.304 N. Fourth St., Hamburg, Pa.
JULIAN, ORMAND C.25 E. Washington St., Chicago, Ill.
KAUNITZ, VICTOR H..... 685 Delaware Ave., Buffalo 9, N. Y.
KEELEY, JOHN L.30 North Michigan Ave., Chicago 2, Ill.
KELLEY, WINFIELD O.. Uncas on Thames, Norwich, Conn.
KEMLER, R. LEONARD..... 576 Farmington Ave., Hartford 5, Conn.
KENNEY, LEO J.... 610 Medical Arts Bldg., Grand Rapids 2, Michigan
KIRSCHNER, PAUL A..... 2 East 92nd St., New York 28, N. Y.
KITTLE, C. FREDERICK..... University of Kansas Medical Center, Kansas City, Kan.
KRAEFT, NELSON H.... 1501 Magnolia Drive, Tallahassee, Fla.
KUNDERMAN, PHILIP J..... 165 Livingston Ave., New Brunswick, N. J.
KUNSTLER, WALTER E... 1538 Sherbrooke St., W., Montreal 25, Que.
LAUREY, JAMES R... 5710-16th St., N. W., Washington, D. C.
LEEDS, SANFORD E.2211 Post St., San Francisco 15, Calif.
LEETCH, HENRY W..... 108 Main St., Saranac Lake, N. Y.
LEIBOVITZ, MARTIN..... 812 Medical Arts Bldg., Tulsa, Okla.
LEWIS, J. EUGENE, JR.. 1325 South Grand Blvd., St. Louis 4, Mo.
LEWIS, RUBIN M..... 2380 Ellsworth, Berkeley, Calif.
LONGACRE, JACOB J..... 1503 Carew Tower, Cincinnati, Ohio
LONGMIRE, WILLIAM P., JR.
UCLA School of Medicine, Dept. of Surgery, Los Angeles 24, Calif.
LUCIDO, JOSEPH L.634 North Grand, St. Louis 3, Mo.
LYON, CLAYTON..... 384 Post St., San Francisco, Calif.
MACDONALD, NEIL.. Medical Arts Bldg., Windsor, Ont.
MACPHERSON, LACHLANSt. John Tuberculosis Hospital, East St. John, N. B.
MADER, VICTOR O... 149 S. Park St., Halifax, Nova Scotia
MADOFF, IRVING M.1180 Beacon St., Brookline 46, Mass.
MANGIARDI, JOSEPH L..... 426 Pennsylvania Ave., Freeport, New York
MASON, JAMES M., III.. 1023 South 20th St., Birmingham, Ala.
MELICK, DERMONT W... 1005 Professional Bldg., Phoenix, Ariz.
MENDELSON, HARVEY J..... 2065 Adelbert Road, Cleveland, Ohio
MENDELSSOHN, EDWIN.. 255 South 17th St., Philadelphia 3, Pa.
MEYER, BERTRAND W.1136 West Sixth St., Los Angeles, Calif.
MICHELSON, ELLIOTT..... 1801 Eutaw Place, Baltimore, Md.
MILLER, CARROL C.... 304 Humphrey St., Swampscott, Mass.
MILLS, WALDO O.... 1445 Medical and Dental Bldg., Seattle 1, Wash.
MORROW, ANDREW G..... National Heart Institute, Bethesda 14, Maryland
MOUSEL, LLOYD H..... Dept. of Anesthesiology, The Swedish Hospital, Seattle, Wash.
NEMIR, PAUL, JR..... University of Pennsylvania, Philadelphia 4, Pa.
NEWMAN, MELVIN M.... State Univ. of N. Y., 450 Clarkson Ave., Brooklyn 3, N. Y.
NEWMAN, ROBERT W.. Medical Arts Bldg., Knoxville, Tenn.
O'NEILL, JAMES F.... 140 Roslyn Ave., Glenside, Pa.
PAPPER, EMMANUEL M.622 West 168th St., New York 32, N. Y.
PETERS, RICHARD M.Dept. of Surgery, Chapel Hill, N. C.
PHILLIPS, FRANCIS J.. Seward Sanatorium, Bartlett, Alaska
PINKHAM, ROLAND D.... Suite 1445, Medico-Dental Bldg., Seattle, Wash.
POLLOCK, WILLIAM C., COL., MC, U.S.A..... 1336 Cherry St., Denver 8, Colo.
POTTER, BENJAMIN P.. 821 Bergen Ave., Jersey City, N. J.
PRATT, LAWRENCE A.3919 John R. Street, Detroit, Mich.
QUINLAN, JOHN J..... Nova Scotia Sanatorium, Kentville, Nova Scotia
RAMSEY, BEATTY H... 2210 Santa Monica Blvd., Santa Monica, Calif.
READ, CHARLES T..... 550 West Thomas Road, Phoenix, Ariz.
ROBBINS, S. GWIN. 899 Madison Ave., Memphis, Tenn.
ROBINSON, JOSEPH L..... 1136 West Sixth Street, Los Angeles 17, Calif.
ROE, BENSON B..... 384 Post St., San Francisco 8, Calif.

Ross, RALEIGH R. 2 Medical Arts Square, Austin 5, Tex.
 RYAN, BERNARD J. 375 East Main St., Bay Shore, N. Y.
 RYAN, THOMAS C. 90 Shenango St., Greenville, Pa.
 SALYER, JOHN M. Fitzsimons Hospital, Denver, Colo.
 SANBS, GILMORE M. 3500 Fifth Ave., Pittsburgh 13, Pa.
 SAROT, IRVING A. Ill East 69th St., New York 21, N. Y.
 SCHAFER, PAUL W. c/o Message Center, Walter Reed Army Hospital, Washington, D. C.
 SEILER, HAWLEY H. 442 West Lafayette Street, Tampa 6, Fla.
 SEYBOLD, WILLIAM D. Hermann Professional Bldg., Houston, Texas
 SHIPMAN, SIDNEY 490 Post St., San Francisco, Calif.
 SIMPSON, H. MURRAY. 292 Queen's Ave., London, Ont.
 SKINNER, A. M. Homer Folks Tuberculosis Hospital, Oneonta, N. Y.
 SNYDER, HOWARD E. 103½ E. Ninth Ave., Winfield, Kans.
 SNYDER, JOHN M. 1236 Moffitt Ave., Bethlehem, Pa.
 STARKEY, GEORGE W. B. 319 Longwood Ave., Boston 15, Mass.
 STAYMAN, JOSEPH. 8815 Germantown Ave., Philadelphia 18, Pa.
 STENSTROM, JOHN D. 2390 Bowker Ave., Victoria, B. C.
 STRODE, JOSEPH E. 1021 Kapliolam, Honolulu 14, T. H.
 SULLIVAN, HERBERT J. Medical Arts Bldg., Hamilton, Ontario, Canada
 SWENSON, ORVAR. 300 Longwood Ave., Boston, Mass.
 TABER, RODMAN E. Henry Ford Hospital, Detroit 2, Mich.
 TAYLOR, FREDERICK H. 1012 Kings Drive, Charlotte, N. C.
 TEMPLBTON, JOHN Y., III. 1025 Walnut St., Philadelphia 7, Pa.
 TERRILL, FRANK I. Montana State Tuberculosis Sanatorium, Deer Lodge, Mont.
 TEST, FREDERICK C., II 20252 Meyers Road, Detroit 35, Mich.
 THOMAS, GORDON W. Int. Grenfell Association, St. Anthony, Newfoundland
 TILLOU, DONALD J. 311 W. Church St., Elmira, N. Y.
 TRICERRI, FERNANDO E. 3, Chemin de Mornex, Lausanne, Switzerland
 VALLE, A. R. U.S.P.H.S. Hospital, Detroit, Mich.
 VAN FLEIT, WILLIAM E. Emory University Hospital, Emory University, Ga.
 VEAL, J. Ross 3560 Appleton St., N. W. Washington, D. C.
 WADDELL, WILLIAM R. 69 Woodland Road, Chestnut Hill, Mass.
 WALKER, GEORGE R. 5 Beach St., Sudbury, Ontario, Canada
 WALKER, JAMES H. 1123 Virginia St., E., Charleston, W. Va.
 WALKUP, HARRY E. Veterans Adm. Hospital, Oteen, N. C.
 WATKINS, ELTON, JR. 300 Longwood Ave., Boston 15, Mass.
 WEBB, WATTS R. University Hospital, Jackson, Miss.
 WHITESIDE, WILLIAM C. 415 Medical Arts Bldg., Victoria, B. C.
 WILSON, JOHN L. Dept. of Surgery, American University of Beirut, Beirut, Lebanon
 WILSON, JULIUS L. Henry Phipps Institute, Philadelphia, Pa.
 WIPER, THOMAS B. 536 Mason St., San Francisco, Calif.
 WITMER, ROBERT H. 126 East Chestnut St., Lancaster, Pa.
 WOLFF, WILLIAM I. 30 Central Park South, New York 19, N. Y.

SENIOR MEMBERS

ALLEN, DUFF S. 18 S. Kingshighway, St. Louis 8, Mo.
 AMBERSON, J. B. Bellevue Hospital, New York, N. Y.
 BALLON, DAVID. 1538 Sherbrooke St., N., Montreal 25, Que.
 BARNWELL, JOHN B. Room 866, Veterans Adm., Washington 25, D. C.
 BAZIN, A. T. 1414 Drummond St., Montreal, Que.
 BECK, CLAUDE S. 2065 Adelbert Road, Cleveland, Ohio
 BERRY, FRANK B. 4301 Massachusetts Ave., Washington 16, D. C.
 BETTMAN, RALPH B. 104 S. Michigan Ave., Chicago, Ill.
 BIRD, CLARENCE E. 64 Alfred Stone Rd., Providence 6, R. I.
 BLALOCK, ALFRED. Johns Hopkins Hospital, Baltimore, Md.

BUTLER, ETHAN FLAGG... 956 West Water Street, Elmira, N. Y.
 BYERS, H. RODDICK... Ganonoque, Ont.
 CARLSON, HERBERT A. 4241 East 14th St., Long Beach, Calif.
 CARTER, B. NOLAND Cincinnati General Hospital, Cincinnati, Ohio
 CHURCHILL, EDWARD D..... Massachusetts General Hospital, Boston, Mass.
 CLERF, Louis H.. 5575 Eighth Ave., North, St. Petersburg 2, Fla.
 COLE, DEAN B.. Professional Bldg., Richmond, Va.
 CURTIS, GEORGE M. Ohio State Univ. College of Medicine, Columbus, Ohio
 DIEFFENBACH, RICHARD H.... 570 Mt. Prospect Ave., Newark 4, N. J.
 DOLLEY, FRANK S..... 2010 Wilshire Blvd., Los Angeles 57, Calif.
 DOVELL, CHAUNCEY, COL., MC, (RET.)..... 62 South Boxwood St., Hampton, Va.
 ELKIN, DANIEL C..... Elkm Place, Lancaster, Ky.
 ELOESSER, LEO.... 490 Post St., San Francisco, Calif.
 FAULKNER, WILLIAM B., JR... 1802 Fillmore St., San Francisco, Calif.
 FERGUSON, R. G..... Balfour Apts., Regina, Sask.
 FLICK, JOHN B. 225 South Fifteenth St., Philadelphia 2, Pa.
 HARRINGTON, STUART W.. Mayo Clinic, Rochester, Minn.
 HART, DERYL..... Duke University, Durham, N. C.
 HAYES, JOHN N. 24 Church St., Saranac Lake, N. Y.
 HEINBECKER, PETER Washington University Medical School, St. Louis, Mo.
 HOLMAN, EMILE. 722 Funston Ave., San Francisco, Calif.
 HUDSON, WILLIAM A... 602 David Whitney Bldg., Detroit, Mich.
 JANES, ROBERT M..... Medical Arts Bldg., Toronto, Ont.
 JOHNS, FRANK S..... Johnston-Willis Hospital, Richmond, Va.
 KERNAN, JOHN D... 103 East 78th St., New York, N. Y.
 KING, DONALD S.... Hitchcock Clinic, Hanover, N. H.
 LEWALD, LEON T..... 1200 Fifth Avenue., New York, N.Y.
 LOCKWOOD, A. L.... 300 Bloor St., E., Toronto, Ont.
 MEADE, RICHARD H. Blodgett Medical Bldg., Grand Rapids, Mich.
 MILLER, ROBERT T., JR..... Mountain Lake, Lake Wales, Fla.
 MOERSCH, HERMAN..... 725 Tenth Ave., Rochester, Minn.
 MOORE, JULIAN A..... 404 Flatiron Bldg., Asheville, N. C.
 MURPHY, JAMES D..... U.S. Veterans Adm. Hospital, Baltimore 18, Md.
 MYERS, J. ARTHUR.... 730 La Salle Bldg., Minneapolis, Minn.
 NEUHOF, HAROLD. Box 198 Huntington Road, Stratford, Conn.
 NIXON, JAMES W..... 1121 Nix Professional Bldg., San Antonio, Tex.
 O'BRIEN, EDWARD J..... 307 David Whitney Bldg., Detroit 26, Mich.
 ORNSTEIN, GEORGE. 965 Fifth Ave., New York, N. Y.
 PACKARD, EDWARD N.... 142 Park Ave., Saranac Lake, N. Y.
 PICKHARDT, OTTO C.... 66 East 79th St., New York, N. Y.
 RIENHOFF, WILLIAM F., JR. 1201 N. Calvert St., Baltimore, Md.
 RIGLER, LEO G..... University Hospitals, Minneapolis 14, Minn.
 Ross, DUDLEY E..... St. Adolphe de Howard, P.Q. Canada
 SMITH, DAVID T..... Duke University, Durham, N. C.
 THORBURN, GRANT 1602 West Genessee St., Flint, Mich.
 TUCKER, GABRIEL 250 South 19th St., Philadelphia, Pa.
 VAN ALLEN, CHESTER M.. State Hospital, Bikaner, Rajputana, India
 WANGENSTEEN, OWEN H..... University Hospitals, Minneapolis, Minn.
 WELLES, EDWARD S..... 20 Church Street, Saranac Lake, N. Y.
 WHITTEMORE, WYMAN Boyce, Va.

MEMBERS DECEASED

CARL EGGERS
 EVARTS A. GRAHAM
 FELIX P. MILLER
 HARLAN F. NEWTON

THE AMERICAN ASSOCIATION FOR THORACIC SURGERY
Charter Members
June 7, 1917

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William Branower	Morris Manges
Harlow Brooks	Walton Martin
Lawrason Brown	Rudolph Matas
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Meetings of the American Association for Thoracic Surgery

1918-Chicago..... President, Samuel J. Meltzer
1919-Atlantic City..... President, Willy Meyer
1920-New Orleans..... President, Willy Meyer
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1928-Washington..... President, Evarts A. Graham
1929-St. Louis..... President, John L. Yates
1930-Philadelphia..... President, Wyman Whittemore
1931-San Francisco..... President, Ethan Flagg Butler
1932-Ann Arbor..... President, Frederick T. Lord
1933-Washington..... President, George P. Muller
1934-Boston..... President, George J. Heuer

1935-New York..... President, John Alexander
1936-Rochester, Minn..... President, Carl Eggers
1937-Saranac Lake..... President, Leo Eloesser
1938-Atlanta..... President, Stuart W. Harrington
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1940-Cleveland..... President, Adrian V. S. Lambert
1941-Toronto..... President, Fraser B. Gurd
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1949-New Orleans..... President, Edward D. Churchill
1950-Denver..... President, Edward J. O'Brien
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1952-Dallas..... President, Frank B. Berry
1953-San Francisco..... President, Robert M. Janes
1954-Montreal..... President, Emile Holman
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1956-Miami Beach..... President, Richard H. Meade