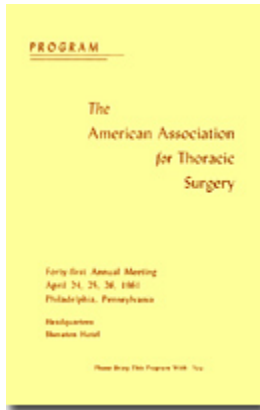


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COMMITTEES

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1960-61

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MONDAY MORNING, APRIL 24, 1961

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Monday Morning, April 24, 1961

8:30 A.M. Business Session (Limited to Members)

Grand Ballroom

8:45 A.M. Scientific Session: REGULAR PROGRAM

Grand Ballroom

1. Traumatic Tracheal Rupture

ROBERT R. SHAW, DONALD L. PAULSON, and JOHN L. KEE, JR.,
Dallas, Tex.

Traumatic tracheal rupture due chiefly to sharply localized blunt trauma to the upper anterior chest and neck is being recognized with increasing frequency. Experience with 13 such patients is reported. The problems presented by reconstruction of the airway when stenosis of the trachea results from faulty healing or delayed reconstruction of an unrepaired tracheal rupture are discussed. The advantages of immediate surgical repair of the torn trachea in preventing stenosis, preserving a normal voice, and eliminating a prolonged period of invalidism are stressed.

2. The Surgical Management of Metastatic Neoplasms in the Lung

EARLE W. WILKINS, JR., JOHN F. BURKE (*by invitation*),
and JOHN M. HEAD (*by invitation*), Boston, Mass.

In the years between 1933-1960, 67 patients have undergone surgical excision of metastatic pulmonary disease. The majority of these have been primary in the colon or kidney, but origins in various other organs are recognized. Survival figures for 100% of these patients indicate a cumulative survival curve not unlike that for primary carcinoma of the lung. The various factors affecting survival are discussed, along with symptomatology, methods of diagnosis, selection of candidates for operation, morbidity, and mortality.

3. Bronchiolar Cell Carcinoma of the Lung: A Review of 33 Patients

HUGH F. FITZPATRICK, ROBERT E. MILLER (*by invitation*),
MALCOLM S. EDGAR, JR. (*by invitation*), and CHARLES F. BEGG
(*by invitation*), New York, N. Y.

Since 1953 we have seen 33 patients with bronchiolar cell carcinoma - 11 of them in the past ten months. 60% were asymptomatic. There were no consistent physical findings. A chest x-ray is the key to diagnosis. This is not necessarily a diffuse bilateral disease and often there is significant association of chronic inflammation and fibrosis with it. We have 5 patients who are living following lobectomy for 10 to 40 months. Experience with this series will stress the practical aspects of the problem.

4. Routine Use of the Carlens Double-Lumen Endobronchial Catheter: An Experimental and Clinical Study

ROBERT W. NEWMAN, GEORGE E. FINER (*by invitation*), and
JAMES E. DOWNS (*by invitation*), Knoxville, Tenn.

The Carlens double-lumen endobronchial catheter has been used for all adult pulmonary resections (200 consecutive patients) and certain other intrapleural procedures for the past two years. Laboratory data from experiments on dogs and from 20 clinical cases studied during pulmonary resection are available. The technique employed in the placement of the catheter and in maintenance of ventilation and anesthesia is given. The routine use of the Carlens tube for pulmonary resections offers definite advantages.

5. Complete Functional Restitution of the Food Passage in Extensive Stenosing Caustic Burns

JOSEPH H. OGURA (*by invitation*), CHARLES L. ROPER
(*by invitation*), and THOMAS H. BURFORD, St. Louis, Mo.

Caustic burns involving the upper food passage have long posed insuperable surgical problems. Stenosis of the hypopharynx, cricopharyngeus pinchcock, and esophagus, have usually resulted in the tragedy of permanent gastrostomy. Involvement of the supraglottic structures, by caustic burns, has occasioned serious airway problems, and destruction of the cricopharyngeal pinchcock has limited the superior margin of anastomosis for any type of reconstruction below. Principles in the management of supraglottic and pharyngeal malignancy which preserve laryngeal function and deglutition have been applied to severe burns of the hypopharynx and esophagus. The right colon has been brought up to the pharynx with eminently satisfactory results in a significant series of cases. The technique, cineradiographic studies, and functional results will be presented.

6. Incompetence of the Gastric Cardia without Radiological Evidence of Hiatus Hernia

CLEMENT A. HIEBERT (*by invitation*), and RONALD BELSEY
(*by invitation*), Bristol, England.

A clinical and pathological entity consisting of gastroesophageal reflux in the absence of a radiologically demonstrable hiatus hernia is presented. The symptoms are high epigastric discomfort, regurgitation, dysphagia, heartburn, and back pain. A pathognomonic feature is postural aggravation of symptoms on bending or lying down. Diagnosis is established by the history, plus the finding of a characteristically patulous cardia at esophago-goscopy. Since 1951, 71 cases of this syndrome

have been uncovered. 62 have been operated on, with improvement in 58 (93%). The follow-up period ranged from two months to eight years. Only 4% are unaccounted for. The complications of the untreated condition are those of gastroesophageal reflux. Surgical treatment consists of restoring competency to the hiatal closing mechanism. Since chronic gastrointestinal symptoms not explained by x-rays or blood chemistries are apt to be labelled "functional", awareness of the existence of this lesion is of importance.

MONDAY AFTERNOON, APRIL 24, 1961

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Monday Afternoon, April 24, 1961

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

7. Tumors of the Thymus Gland

PHILIP E. BERNATZ, O. THERON CLAGETT, and
EDGAR G. HARRISON, JR. (*by invitation*), Rochester, Minn.

Review of the histories of approximately 150 patients whose thymic tumors have been available for study reveals a relatively ominous prognosis, particularly when associated with myasthenia gravis (48% of the series). An interesting comparison is drawn with patients undergoing thymectomy for myasthenia gravis but without a thymic tumor. Available classifications of thymic tumors have been of little clinical value. Re-evaluation of the pathologic characteristics of this group of thymomas permits a practical working classification of prognostic value. The perplexing associations of thymic tumors and disturbances in serum proteins, as well as with refractory anemia caused by agenesis of erythrocytes and alterations in adrenal cortical function, will be reviewed.

8. The Etiology of Acute Respiratory Acidosis

RICHARD M. PETERS, THOMAS B. BARNETT (*by invitation*), and
ROBERT ZEPPA (*by invitation*), Chapel Hill, N. C.

Our experience in the correction of acute respiratory acidosis by hyper-ventilation in 12 patients, one-third traumatic, one-third with degenerative pulmonary disease, and one-third following open heart surgery will be presented. The mechanism of the progressive increase in acute respiratory acidosis will be analyzed and correlated with experimental studies on the work of breathing. These studies demonstrate: (1) Hypercapnia markedly increases the non-elastic work of breathing (Principally the work needed to overcome airway resistance); (2) a given rise in arterial pCO₂ elicits an increase in respiratory work which may not necessarily lead to a level of alveolar ventilation adequate to maintain a normal level of arterial pCO₂. The metabolic acidosis following open heart surgery will be discussed as a possible etiologic factor in the acute respiratory insufficiency these patients develop.

9. Perfusion Hypothermia and Ventricular Fibrillation

WILLIAM J. KERTH (*by invitation*), JOHN J. OSBORN (*by invitation*),
FRANK GERBODE, J. BRUCE JOHNSTON (*by invitation*),
and TAKESHI OGATA (*by invitation*), San Francisco, Calif.

In 56 patients perfused with a heat-exchanging oxygenator, blood temperature was lowered to between 15° and 25° C. The temperature at onset of ventricular fibrillation during cooling and the incidence of spontaneous reversion to sinus rhythm during rewarming were studied in relation to acid base balance and other blood chemical parameters. A direct relation was found between blood temperature at onset of fibrillation and blood pH, regardless of how the pH was lowered. The incidence of spontaneous reversion from ventricular fibrillation during rewarming was highest in those patients who had been rendered most acidotic during cooling. Deep hypothermia was usually associated with loss of potassium from the serum, rewarming with return of serum potassium to normal levels. The clinical condition of patients who had been rendered acidotic during cooling was better postoperatively and their gross mortality was lower than in patients cooled at normal pH. Possible explanations for these findings will be discussed.

10. Alterations in Blood Volume Following "Normovolemic" Total Body Perfusion

ROBERT S. LITWAK (*by invitation*), ALBERT J. GILSON (*by invitation*),
RALPH J. SLONIM (*by invitation*), CASPAR G. MCCUNE (*by invitation*),
and HOWARD L. GADBOYS (*by invitation*), Coral Gables, Fla.

This study attempts to evaluate our ability to maintain a normovolemic state in 25 consecutive cases undergoing open heart surgery with a pump-oxygenator. Plasma (PV), red cell (RCV), and total blood volumes (TBV), were determined directly by isotopic means using iodinated human serum albumin (RISA) and Crsi labeled red cells, (a) with the patients lightly anesthetized prior to thoracotomy and (b) two hours following the perfusion. During surgery, an assiduous attempt was made to measure and immediately replace all blood losses. The patients were weighed on a metabolic scale at the end of the operation. The results of this study indicate significant errors (mean net TBV loss of 14.35 ml./kg., net PV loss of 7.33 ml/kg, and a RCV loss of 6.18 ml./kg. as compared to preoperative measurements) in the quantitative replacement of blood loss in these patients. Factors affecting the magnitude of these errors and the relative merit and dangers inherent in the use of venous and arterial pressures as a determinant of blood volume before, during and after perfusion will be discussed.

11. A Study of the Causes of 60 Deaths Following Total Cardio-pulmonary Bypass

JEAN P. DESPRES (*by invitation*), RICCARDO BENVENUTO (*by invitation*),
and JOHN C. CALLAGHAN, Edmonton, Canada

The responsibility of numerous factors in production of death is analyzed in this series of patients. These include: (a) Patient selection - highest mortality was in cases of acquired mitral regurgitation and tetralogy of Fallot (only one death out

of 76 cases of atrial septal defect and pulmonic stenosis); (b) adequacy of perfusion - a bubble oxygenator was used for the first 80 cases yielding 27 deaths. The 155 succeeding cases utilized a disc oxygenator yielding 43 deaths. However, a higher percentage of these latter cases included acquired disease; (c) proper understanding of the anatomical lesions as well as valve function; (d) technical aspects in the conduct of surgery as well as improved attention to postoperative care. The former include the matter of heart block, the type of cardiac arrest, coronary perfusion, decompression of the auricle, etc.

12. Coordinated Postsystolic Myocardial Augmentation Combined with Systolic Neutralization: Development and Clinical Application to the Failing Heart

DAVID H. WATKINS, E. R. DUCHESNE (*by invitation*),
and BYRON E. POLLOCK (*by invitation*), Denver, Colo.

The experimental and clinical effects of a vascular pump on coordinated postsystolic myocardial augmentation and systolic neutralization of the proximal aortic pulse and the effect of these phenomena on the cardiac output and the work load of the myocardium will be shown. The action of this electronically coordinated electrohydropneumatic pump, and the mode of its automatic regulation by the form of the electrocardiogram or pulse wave will be described.

13. Clinical Results in Open Mitral Valvuloplasty

JOE D. MORRIS and HERBERT SLOAN, Ann Arbor, Mich.

Thirty-two patients (all clinically in class III and IV) underwent mitral valvuloplasty by open cardiotomy through the right chest in the past two years. Indications for open mitral valvuloplasty were: (1) Recurrent mitral stenosis or unsatisfactory valvuloplasty by the closed technique; (2) mitral insufficiency, pure or in combination with stenosis; (3) multivalvular disease; and (4) atrial thrombosis, embolic history, or heavy valvular calcification. There were four deaths in this series, all in class IV patients suffering refractory congestive failure. All patients surviving operation and convalescence were clinically improved, many dramatically. The technique of leaflet reconstruction and annular plication will be discussed. Problems related to exposure and the complication of air embolism will be reviewed.

TUESDAY MORNING, APRIL 25, 1961

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Tuesday Morning, April 25, 1961

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

14. Profound Hypothermia with Simplified Equipment: A Disposable Stainless Steel Blood Heat Exchanger of High Efficiency

WILLIAM G. ESMOND (*by invitation*), JOHN STRAM (*by invitation*),

SAFUH ATTAR (*by invitation*), and R ADAMS COWLEY, Baltimore, Md.

Experience with a blood heat exchanger of the usual parallel tube type has indicated that priming volumes are excessively high, efficiency based on size and weight relationships is relatively low, the units are difficult to clean properly, and the design does not incorporate "fail safe" features. We have succeeded in producing a heat exchanger that incorporates the following features: (1) Low priming volume (60 cc); (2) lightweight (8 ounces); (3) "fail safe" features (blood and water can only leak externally and cannot mix together should a leak develop); (4) construction - stainless steel; (5) improved efficiency; (6) can be installed in the pump-oxygenator line in less than 30 seconds.

15. Gas Chromatography: A Simple, Rapid, Reliable Method for Blood Gas Analysis

RUSSELL H. WILSON (*by invitation*), BRUCE JAY (*by invitation*),

and ROBERT H. HOLLAND, Dallas, Tex.

Gas chromatography utilizes two unique properties of each gas; namely, the adsorption coefficient and the thermal conductivity. Simplified diagrams will be used to illustrate how the apparatus employs these properties for the separation and detection of the gases after they are liberated from the blood. The original apparatus was modified in our laboratory to facilitate repeated analyses and to deliver a larger, more accurately measured volume of blood to the mixing chamber. These features will be illustrated and discussed.

16. A New Reflection Oximeter

P. F. WARE, M. L. POLANYI (*by invitation*), R. M. HEHIR

(*by invitation*), J. F. STAPLETON (*by invitation*), J. I. SANDERS

(*by invitation*), and S L. KOCOT (*by invitation*), Worcester, Mass.

A new type reflection oximeter has been developed and used experimentally and clinically by us in the past two years. It provides: (1) Absolute values for oxygen saturation at all points of the dissociation curve, (2) results that are rapidly or continuously obtained and are reproducible; (3) values that are independent of hemoglobin level and temperature. Blood samples analyzed with this reflection oximeter have been cross checked against Van Slyke and Beckman determinations and more recently by gas chromatography.

17. The Repair of Circumferential Defects of the Trachea by Direct Anastomosis: Experimental Evaluation

JAMES R. CANTRELL (*by invitation*), Seattle, Wash., and

J. ROLAND FOLSE (*by invitation*), Bethesda, Md.

End-to-end anastomosis of the trachea has been shown to be feasible, and it appears important to determine its limits of feasibility. Thirty-three dogs were subjected to resection of lengths of cervical trachea that ranged from 8 to 27 rings. Reconstruction was accomplished by end-to-end suture. Suture-line tension was measured and varied from 400 to 3100 grams. All anastomoses performed under a tension less than 1700 grams (18-22 rings) proved successful; the healing of anastomoses performed under tensions greater than 1700 grams was unpredictable. When tension was not too great, anastomotic healing was remarkably satisfactory and only minimal stenosis was observed. A case of congenital stenosis of the thoracic trachea successfully treated by this technique will be presented.

18. The Pulmonary Arterial Blood Flow Through an Acutely Atelectatic Lung

RUDOLPH C. CAMISHION (*by invitation*), YOSHINORI OTA (*by invitation*),

VINCENT D. CUDDY (*by invitation*), and

JOHN H. GIBBON, JR., Philadelphia, Pa.

A square-wave electromagnetic flowmeter was used to measure the pulmonary arterial blood flow through the left lung of dogs at thoracotomy. The oxygen saturation of the systemic arterial blood was measured by a cuvette oximeter. After the blood flow through the pulmonary artery, and the systemic blood pressure, had remained stable for one hour, the left lung was deflated by manual compression and the bronchus ligated. With the establishment of atelectasis, the pulse rate and the peripheral arterial blood pressure both rose and the oxygen saturation of the systemic arterial blood fell. During the first 30 or 45 minutes, the blood flow through the left pulmonary artery usually increased. After one hour, the blood flow had stabilized and was approximately that existing before the lung was collapsed. During the next two hours, the blood flow diminished and the oxygen saturation of the systemic arterial blood rose. After three hours, the lung was re-expanded. The oxygen saturation of the peripheral arterial blood promptly returned to normal. At the end of one hour, the blood flow through the lung had increased but was usually less than that existing before bronchial occlusion.

19. The Effects of Positive Pressure Lung Inflation upon Pulmonary Vascular Dynamics

PAUL H. GERST (*by invitation*), New York, N. Y.

The effects of varying levels of positive pressure lung inflation ranging from complete collapse to distension at 30 cm. of water upon pulmonary vascular dynamics were determined. In the collapsed lung, flow resistance is high and vascular compliance is low. In the *open chest* lung inflation facilitates pulmonary blood flow up to levels of 15 to 20 cm. of water pressure after which it is again hindered. In the *closed chest* any increase in endotracheal pressure interferes with optimum blood flow. The clinical significance of these findings in regard to controlled ventilation and per-fusion of the lung will be discussed.

20. Bronchogenic Carcinoma Produced Experimentally in the Dog

E. J. BEATTIE, JR., E. W. STAUB (*by invitation*), N. O. CORRELL (*by invitation*),

and G. HASS (*by invitation*), Chicago, Ill.

In reversed autologous tracheal grafts in the dog the regenerated cilia retain polarity and ever after beat caudad. The cephalad anastomosis develops squamous metaplasia, but the caudad anastomosis is rich in cilia with "trapped mucus". A carcinogen (7, 12-dimethyl benzanthracene) was instilled by bronchoscopy into a lower lobe bronchus in doses varying from 0.4 to 5 milligrams at approximately weekly intervals for 6 to 14 months in 11 dogs. After 13 months one animal was found to have an invasive squamous carcinoma at the distal anastomosis, and another animal had carcinoma in situ. This is believed to be the first bronchogenic carcinoma produced experimentally in the dog.

21. Hematoporphyrin Derivative: A New Aid for the Endoscopic Detection of Malignancy

RICHARD L. LIPSON (*by invitation*), EDWARD J. BALDES (*by invitation*),

and ARTHUR M. OLSEN, Rochester, Minn

Extensive experimental investigation previously reported concluded that by utilizing an acetic acid-sulfuric acid derivative of hematoporphyrin, and proper filter systems for activating and viewing the fluorescence, malignant lesions could be detected. For clinical application, a bronchoscope or esophagoscope was especially modified to illuminate an area with either the usual white light or the wave lengths necessary to activate the hematoporphyrin derivative. Special glasses are used for viewing the red fluorescence. The procedure has been carried out on 15 patients - nine by bronchoscopy, five by esophagoscopy and one by both. In every case in which a malignant lesion was so located as to allow the activating light to reach it, the area of malignant involvement exhibited a brilliant red fluorescence as opposed to the normal tissue which ranged from grayish white to black in appearance. There were no false positive results. The various details of this experience will be given.

22. Lung Resection with Temporary Vascular and Bronchial Occlusion

F. JOHN LEWIS, NICHOLAS J. DEMOS (*by invitation*),

PETER J. CONNAUGHTON (*by invitation*), and STUART POTICHA (*by invitation*),

Chicago, Ill

Through occlusion of the lung root sub-lobar resections may be carried out in a bloodless, airless field. Experiments in 60 dogs taught us how to achieve a completely ischemic field. The dog lung can be ischemic for over an hour at normal temperature without injury; for six hours when cooled locally. A technique of closing the raw surface with electrocoagulation was developed. Fifteen patients have undergone lung resection for tuberculosis, other granulomas, or blebs using this technique.

23. Modified Non-Suture Anastomosis of Coronary and Internal Mammary Arteries in Dogs

GEORGE J. MAGOVERN (*by invitation*), EDWARD M. KENT,

BERNARD S. LEVOWITZ (*by invitation*), RAM S. RATAN (*by invitation*),

JOHN B. LOVETTE (*by invitation*), and

SHELDON O. BURMAN (*by invitation*), Pittsburgh, Pa.

To overcome the technical problems of direct suture anastomosis in small blood vessels, particularly the coronaries, we have developed a rapid non-suture anastomotic method. The left internal mammary artery is isolated to its origin and its branches are ligated and cut. The distal end of the internal mammary artery is then threaded through a stent, and the intima everted over it, thereby forming a cuff. The cuff is fixed with single 4-0 silk suture. The edge of the vessel is sutured to the flanges of the stent. The circumflex branch of the left coronary artery is isolated for about 4 cms. and is ligated near its origin and incised transversely. The preformed cuff of the internal mammary artery is rapidly inserted and fixed with ligature, providing intima to intima approximation. Five animals so prepared have been followed 6 to 11 months. Angiograms have shown patency of the anastomosis. Temporary ligation of the internal mammary artery has resulted in serial electrocardiographic changes which indicate the myocardium to be dependent on this source of blood supply. The fate of another 31 animals utilized in the perfection of this technique is detailed.

24. Effects of Continuous Flow Through Implanted Mammary Artery and Myocardial Ischemia on Mammary-Coronary Communications

MARIANO LOPEZ-BELIO (*by invitation*), LUIS SANCHEZ (*by invitation*),

SALVADOR RODRIGUEZ (*by invitation*), and

ORMAND C. JULIAN, Chicago, Ill.

A modification of the Vineberg mammary artery implantation was devised by removing the proximal end of the internal mammary to include a small flange of subclavian artery wall. The mammary artery, freed to the fifth intercostal segment, is otherwise left intact distally. The proximal end, after having been tunnelled through the left ventricular wall, is re-implanted end-to-side in the descending aorta. This preparation was compared to the Vineberg preparation with and without the prior induction of a significant degree of myocardial ischemia. A total of 80 preparations were studied 6 and 12 months after operation. These show that (1) development of effective mammary artery - coronary artery communications are strongly favored by maintained patency of the mammary artery over a significant period of time and

by the presence of chronic myocardial ischemia; (2) the mammary artery implanted in such a fashion as to maintain its normal flow while it traverses a myocardial tunnel remains open in almost all animals in which the preparation is made, and therefore contributes to the development of desirable communications.

25. Surgical Correction of Coronary Arteriovenous Fistula

OSLER A. ABBOTT, CARLOS RIVAROLA (*by invitation*),

and R. BRUCE LOGUE (*by invitation*), Atlanta, Ga.

Arteriovenous fistula may involve any area of the coronary vascular bed. The differential diagnosis between this lesion and persistent ductus arteriosus is often difficult. The technical details contributing to successful surgical correction of a large fistulous communication between the left common coronary artery and the coronary sinus are given. A short illustrative film demonstrates the valuable diagnostic contribution of cineangiography.

26. Total Mitral Valve Replacement: The Shielded Ball Valve Prosthesis

ALBERT STARR (*by invitation*), and M. LOWELL EDWARDS

(*by invitation*), Portland, Ore.

Twenty dogs underwent mitral valve replacement with a shielded ball valve. Following implantation, removal of the shield retractor allows the silastic shield to snap into place, thereby covering the zone of injured endothelium and myocardium at the suture line. Results indicate a marked reduction in the incidence of thrombotic occlusion of the shielded prosthesis when compared to the unshielded valve. Long-term survival is possible without anticoagulant drugs. Postoperative studies of valve function by phonocardiography, cardiac catheterization, and cine techniques will be presented. Experience in 4 patients is included.

27. Prolonged Survival after Total Replacement of the Mitral Valve in Dogs

ARA. V. DOUMANIAN (*by invitation*), and F. HENRY ELLIS, JR.,

Rochester, Minn.

Prolonged survival after total replacement of the mitral valve of the dog with a prosthesis has been unusual because of the development of thrombosis and its complications. At the time of the submission of this abstract, however, seven dogs are alive; three for periods of 2 to 3 months, two for periods of 1 to 2 months; two other dogs are alive 3 to 4 weeks after operation. No episodes of embolism have been recognized. All have survived beyond the period in which according to our earlier experience, death from thrombosis would have occurred. An attempt is being made to determine which factor or factors have been most significant in achieving prolonged survival. Late physiologic studies of the function of prosthetic valves in vivo will now be possible and will be reported.

28. Total Excision of the Mitral Valve and Replacement with the Autologous Pulmonic Valve

RICHARD R. LOWER (*by invitation*), RAYMOND C. STOFER (*by invitation*),

and NORMAN E. SHUMWAY (*by invitation*),

San Francisco, Calif

Sponsored by EMILE HOLMAN, San Francisco, Calif.

Clinical and experimental evidence that the pulmonic valve may be expendable warrants its trial as an autologous valve transplant. In 26 animals the pulmonic valve with its annulus was excised intact and transplanted into the left atrium by suturing it to the mitral ring. In 22 others, the pulmonic valve autotransplantation was carried out, as described above, and in addition, the animal's mitral valve was completely removed. The 12 survivors in the first group (studied from 2 weeks to 6 months postoperatively) demonstrated that the free graft appeared to survive in a functional state. From the second series, eight valve grafts were studied grossly and microscopically between 7 and 66 days after operation. Ten animals are now alive and well 5 to 7 months postoperatively. Atrial pressure studies, photographs, and angiocardiograms will be presented to illustrate the functional status of these valve grafts. A movie will demonstrate the operative technique.

TUESDAY AFTERNOON, APRIL 25, 1961

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Tuesday Afternoon, April 25, 1961

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

JOHN H. GIBBON, JR., Philadelphia, Pa.

ADDRESS BY HONORED GUEST

Professor A. L. d'ABREU, O.B.E., M.B., Ch.M., F.R.C.S.

Dean of the Faculty of Medicine

University of Birmingham, England

"Thoracic Surgery in the Commonwealth of Medicine"

29. Surgical Considerations in Occlusive Disease of the Great Vessels Arising from the Aortic Arch

E. STANLEY CRAWFORD, MICHAEL E. DEBAKEY, DENTON A. COOLEY,

and GEORGE C. MORRIS, JR. (*by invitation*), Houston, Tex.

Thrombo-obliterative disease of the great vessels arising from the aortic arch is a clinical entity to which various and confusing names have been applied. This has resulted in much confusion as to the nature of the disease process, particularly since some of the proposed concepts of pathogenesis would preclude effective surgical treatment. Our analysis of 40 surgically treated cases supports the concept of the segmental nature of the process. The occlusive process may be extensive and the vessels may be involved in an inflammatory process probably incited by superimposed thrombosis, but the underlying etiologic factor in the majority of cases appears to be atherosclerosis. Some cases had associated segmental occlusive disease in other parts of the major arterial tree emphasizing the clinical patterns of multiple segmental occlusive disease of atherosclerotic origin. Surgical treatment in various modalities restored normal circulation in the distal arterial bed in all cases, including those associated with other occlusive lesions.

30. Coarctation of the Aorta: A Review of 500 Cases

SAMUEL R. SCHUSTER (*by invitation*), and ROBERT E. GROSS,

Boston, Mass.

A summary of the preoperative evaluation and operative treatment of 500 cases of coarctation of the aorta will be presented. The follow-up will emphasize the degree of long-term effectiveness of surgical excision of the coarctation. Homograft replacement as utilized in many of these cases over the past twelve years will be evaluated. In addition, the differentiating diagnostic features and operative correction of coarctation of the abdominal aorta will be presented.

TUESDAY EVENING, APRIL 25, 1961

7:00 P.M. Banquet and Dancing Grand Ballroom

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

WEDNESDAY MORNING, APRIL 26, 1961

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Wednesday Morning, April 26, 1961
9:00 A.M. Scientific Session: REGULAR
PROGRAM Grand Ballroom

31. The Anatomy and Embryology of Endocardial Cushion Defects

L. H. S. VAN MIEROP (*by invitation*), RALPH D. ALLEY

HARVEY W. KAUSEL, and ALLAN STRANAHAN, Albany,
N. Y.

We have re-examined the relevant embryology in 21, closely graded, serially sectioned human embryos ranging in size from 5 to 40 mm. in length. This has resulted in a clearer definition of the precise contribution of the endocardial cushions to adult heart structures. The normal embryology of the endocardial cushion derivatives was correlated with anomalous derivatives found in abnormal hearts. A classification of endocardial cushion defects will be provided.

32. The Surgical Management of Complete Common Atrioventricular Canal

JAMES V. MALONEY, JR., SAMUEL A. MARABLE (*by invitation*),

and DONALD G. MULDER (*by invitation*), Los Angeles,
Calif.

Our experience comprises six patients. The first two succumbed post-operatively even though the repair seemed technically satisfactory at autopsy. The others have survived complete repair of the lesion. There have been no instances of persistent heart block or of overt evidence of the low cardiac output syndrome. All are in satisfactory condition after follow-up periods ranging from one to 17 months. The anatomical variants of this defect and the required surgical maneuvers will be discussed. The factors in preoperative evaluation of prognostic significance will be enumerated.

33. Surgical Considerations for Treatment of Congenital Tricuspid Atresia and Stenosis

RAYMOND K. BOPP (*by invitation*), PARRY B. LARSEN (*by invitation*),

JOAN L. CADDELL (*by invitation*),

JAMES R. PATRICK (*by invitation*), and WILLIAM W.
L. GLENN,

New Haven, Conn.

Disappointment in the correction of this deformity has forced a re-examination of its basic nature and led to the present approach to management consisting of an anastomosis between

the superior vena cava and the right pulmonary artery. This has been applied in three cases with successful follow-up of 3 to 13 months. Our clinical, pathological and operative experience with this condition will be reported.

34. Surgical Correction of Congenital Supravalvular and Valvular Aortic Stenosis Using Deep Hypothermia and Circulatory Arrest

ARCHER S. GORDON (*by invitation*), BERTRAND W. MEYER,
and JOHN C. JONES, Los Angeles, Calif.

Deep hypothermia (8°-10° C.) without an extracorporeal oxygenator provides an uncomplicated technic for unhurried (approximately one hour) repair of congenital Supravalvular and valvular aortic stenosis. The necessity for anoxic arrest of the heart or perfusion of coronaries is obviated. During the past one and one-half years we have used this method clinically for all cases without evidence of brain damage or serious acidosis. Postoperative results in this series have been excellent. The most important aspects of management are: (1) Careful attention to details of the deep hypothermia system and circulatory arrest, (2) adequate correction of stenosis without creating any insufficiency.

35. An Improved Transatrial Approach to the Closure of Ventricular Septal Defects

ALLEN S. HUDSPETH (*by invitation*), A. ROBERT
CORDELL (*by invitation*),

JESSE H. MEREDITH (*by invitation*),

and FRANK R. JOHNSTON, Winston-Salem, N. C.

An approach that allows better visualization of the defect, avoids division of ventricular myocardium, and affords more accurate suture placement has been developed. It utilizes: (1) Antero-posterior incision of the right atrium near the atrio-ventricular groove, (2) circumferential detachment of the septal leaflet of the tricuspid valve near the annulus; (3) closure of the ventricular septal defect; (4) closure of the incision in the tricuspid valve; (5) closure of the atriotomy.

Clinical experience to date will be reported. A short movie will demonstrate the method.

36. Aortic-Cardiac Fistulas Following Corrective Operations for Ventricular Septal Defect and Tetralogy of Fallot

M. WEINBERG, JR., M. H. AGUSTSSON (*by invitation*),

B. M. GASUL (*by invitation*), E. H. FELL, J.
P. BICOFF (*by invitation*),

Z. STEIGER (*by invitation*), T. IWA (*by invitation*),

and R. ARCILLA (*by invitation*), Chicago, Ill.

Five aortic-cardiac fistulas produced during surgical correction of ventricular septal defects and tetralogies of Fallot are presented. These include two cases of aortic valvular insufficiency, two cases of sinus of Valsalva-right ventricular fistula, and one case of coronary artery-right ventricular fistula. The following points are emphasized: (1) These defects may be unrecognized causes of death, or, if asymptomatic, may be missed if careful follow-up is not maintained over a long period; (2) the anatomic relationships of the aortic valves and sinuses to the ventricular septal defects must be appreciated if these fistulas are to be avoided; (3) when congestive heart failure occurs postoperatively the complications described here must be considered; (4) retrograde aortography is the procedure of choice in establishing diagnosis; (5) reoperation is mandatory for survival in those patients in congestive heart failure.

37. Cardiac Surgery in the Newborn

JOHN L. OCHSNER (*by invitation*), and DENTON A. COOLEY,

Houston, Tex.

In 300 infants less than one year of age congenital malformations of the heart and great vessels have been treated surgically. The defects in order of decreasing frequency are: Patent ductus arteriosus, tetralogy of Fallot, complete transposition of the great vessels, ventricular septal defect, coarctation of the aorta, tricuspid atresia, aortic stenosis, total anomalous pulmonary venous drainage, pure valvular pulmonic stenosis, and aortic vascular ring. The survival rate ranged from 64% to 100%, the over-all survival being 81%. Results of necropsies performed on 110 infants who had not received surgical therapy will be compared with the surgically treated cases. The indication for and technics of operation in these infants will be presented.

WEDNESDAY AFTERNOON, APRIL 26, 1961

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Wednesday Afternoon, April 26, 1961

2:00 P.M. Scientific Session: THORACIC SURGERY FORUM

Grand Ballroom

38. Parenchymatous Splenopulmonary Anastomosis as Possible Treatment for Portal Hypertension in Children

FRANCIS REMILLARD (*by invitation*), PATRICK E. CONEN (*by*

invitation), Toronto, Ont., and GEORGE R. WALKER, Sudbury, Ont.

The operation consists of embedding a portion of the spleen on its pedicle within the substance of the lung. This was carried out on dogs in the absence of, immediately preceding, and following the onset of portal hypertension. (This condition is created by a previously developed method known as the "sponge" procedure). This anastomosis is uniformly successful in the presence of portal hypertension and the latter is reduced as a result. Operations were also carried out in monkeys. In two cases, after a splenopulmonary anastomosis was done it was possible to do a one-stage portal vein ligation with survival. The monkeys used were *Cynomolgus*, which normally do not survive one-stage portal ligation.

39. Alterations in Intrabronchial Temperature, Humidity, and Oxygen Concentration Produced by Various Clinical Methods of Oxygen Administration

JD MORTENSEN (*by invitation*), Salt Lake City, Utah

Techniques have been developed for determining the oxygen content, humidity, and temperature of both inspiratory and expiratory gas samples at various points from mid trachea to bronchioles. Normal values for these variables at four points in the tracheobronchial tree have been established. The same determinations have been made when oxygen is being administered by various methods in current clinical use, and indicate often severe alterations from the physiologic state. More effective "conditioning" procedures are suggested.

40. The Regression of Pulmonary Vascular Disease after the Creation of Pulmonary Stenosis

J. FRANCIS DAMMANN, JR., Charlottesville, Va , JAMES A. MCEACHEN

(*by invitation*), Santa Monica, Calif., W. M. THOMPSON, JR.,

(*by invitation*), Charlottesville, Va., RODNEY SMITH (*by invitation*),

Santa Monica, Calif., and WILLIAM H. MULLER, JR., Charlottesville, Va.

Corrective surgery for large ventricular septal defects in face of relatively advanced pulmonary vascular changes has been attended by a high mortality rate. A palliative surgical procedure consisting of the creation of pulmonary stenosis has been reported. Twelve patients in whom this operation was performed have since returned for a corrective procedure. In each there was good evidence of regression of the pulmonary vascular disease and a close correlation was noted between the degree of stenosis created and the degree of improvement. The principle factors that appear important in this correlation will be developed.

41. The Effects of Low Molecular Weight Dextran Upon the Blood Flow Rate During Extracorporeal Circulation

CHRISTOPHER DRAKE (*by invitation*), FIDEL MACALALAD (*by invitation*), and

F. JOHN LEWIS, Chicago, Ill.

During extracorporeal circulation with blood cooling, the blood flow rate tends to decrease as the body temperature drops. Thirty-one animals were cooled to 10° C. on by-pass without added blood. Fifteen of these were used as controls and 16 were given 10-12.5 cc./kg. of 10% LMWD intravenously just prior to by-pass. In the latter, flow rates were better maintained and less time was required to cool and rewarm the animals than in the controls. Arterial pressure tended to be somewhat higher but venous pressure did not appear to be affected, in the animals receiving LMWD. No pulmonary edema was noted. We conclude that LMWD may be used in small doses to maintain adequate flow rates during extracorporeal circulation with hypothermia without adding blood.

42. Mechanisms of Pulmonary Hypertension in Acute Hypoxia

IBRAHIM K. DAGHER (*by invitation*), HENRY G. MISHALANY

(*by invitation*), Beirut, Lebanon, and F. A. SIMEONE (*by*

invitation), Cleveland, Ohio

Sponsored by JOHN L. WILSON, Beirut, Lebanon

The occurrence of pulmonary arterial hypertension in hypoxia has been demonstrated. The mechanism of this has not been thoroughly investigated. Twenty-four dogs were made hypoxic with N₂O and were subjected further to vagotomy; bilateral thoracic sympathectomy; left atrioarterial shunt ; vagotomy and left atrioarterial shunt; bilateral thoracic sympathectomy and left atrioarterial shunt, sympathectomy, vagotomy and left atrioarterial shunt; bilateral adrenalectomy; bilateral adrenalectomy and phentolamine-Regitine^(®); RegitineW alone. Two underwent controlled constant right ventricular output and two others electrical stimulation of the thoracic sympathetics alone and coupled with controlled constant right ventricular output. Two animals were used as controls. We conclude: (1) The hypertension is initiated by the thoracic sympathetic system. Subsequent development of pulmonary congestion secondary to left heart failure adds to its intensity; (2) sympathetic activity accounts for about 55% of the total rise in pulmonary arterial pressure and left heart failure for 45%; (3) stimulation of the thoracic sympathetics produces a rise in the pulmonary arterial pressure. Blocking this system with RegitineW prevents this rise; (4) bilateral adrenalectomy, bilateral vagotomy and controlled constant right ventricular output do not influence the course of the pulmonary hypertension induced by severe hypoxia.

43. Experiences with NaI¹³¹ Injected into the Myocardium as an Estimate of Coronary Blood Flow

IRVING M MADOFF, and WILLIAM HOLLANDER (*by invitation*),

Boston, Mass.

Previous studies have shown that the rate of disappearance of an ion injected into a tissue is a function of blood flow. The disappearance of NaI¹³¹ was measured by externally monitoring the site of injection. Radioactivity increased in the blood as NaI¹³¹ disappeared from the injection site. In dogs the disappearance of NaI¹³¹ (10 micro-curies) was extremely rapid. The rate of removal decreased as a coronary artery was progressively narrowed and stopped completely following total occlusion of the artery. In human subjects without coronary artery disease, the disappearance of NaI¹³¹ was also rapid. In patients with coronary disease, the removal of NaI¹³¹ was markedly impaired being only ¹/₅ to ¹/₂₀ as rapid.

44. Replacement of Right Ventricular Myocardium with a Teflon Prosthesis

HAROLD A. COLLINS (*by invitation*), J. KENNETH JACOBS

(*by invitation*), ROBERT T. SESSIONS (*by invitation*),

and ROLLIN A. DANIEL, JR., Nashville, Tenn.

In one series of dogs, 25% to 40% of the right ventricular myocardium was excised and replaced by woven teflon fabric. In another series of animals infarction was produced by ligation of branches of the right coronary artery. The infarcted portion was excised and replaced with teflon fabric. Cardiac output was determined by the dye dilution technic pre-operatively and in six weeks. Animals were permitted to survive a minimum period of six weeks before sacrifice. Of 10 animals in the first group 7 survived. On sacrifice the teflon fabric was well incorporated and the intraventricular portion was smooth and no thrombi were apparent. Cardiac output had been maintained. The mortality in the second group was high; 7 of 13 dogs died as a result of sloughing of the fabric, apparently due to inadequate resection of non-viable myocardium. It would appear that prosthetic material can be utilized to replace right ventricular myocardium.

45. Blood-Brain Barrier Studies in Extracorporeal Cooling and Warming

HARRY S. POLLARD, JR. (*by invitation*), R. J. FLEISCHAKER (*by*

invitation), J. J. TIMMES, and K. E. K. ARRLSON, St. Albans, N. Y.

Seventeen dogs were perfused under varied circumstances, for study of the fluorescein blood-brain barrier. These included normothermic total perfusions, total perfusions with rapid cooling, partial perfusions via the femoral artery with rapid cooling, cooling with perfusion via the aortic arch, cooling by partial perfusion via femoral artery and warmed by heat exchanger in the *arterial* line and finally cooling by femoral perfusion and warming by heat exchanger in the *venous* line. The areas of brain fluorescence were recorded for each category. The results of these studies suggest that,

from the standpoint of minimizing the risk of gaseous embolism to the brain, rapid cooling of a patient is most safely accomplished by partial perfusion via the femoral artery and that rapid warming is safest with the heat exchanger proximal to an adequate bubble trap.

46. Hemodynamic and Metabolic Responses of the Whole Body and Individual Organs to Cardiopulmonary Bypass with Profound Hypothermia

THOMAS J. YEHL (*by invitation*), LOIS T. ELLISON (*by*

invitation), and ROBERT G. ELLISON, Augusta, Ga.

Profound hypothermia was induced in dogs undergoing total cardio-pulmonary bypass. Venous return, venous and arterial oxygen saturation, pH, pCO₂ and bicarbonate were determined at different temperatures and perfusion rates. Venous return diminished progressively with cooling in all dogs. With higher flows blood sequestered in large quantities and was only partly recovered during rewarming. Portal venous pressure rose markedly. With lower flow rates, these effects were minimized. Arterio-venous oxygen saturation difference narrowed with cooling, and was abolished at about 10° C. By reducing flow rate, venous oxygen saturation could be kept at 70% to 80%. With high flow perfusion, pH was not affected appreciably, but with low flow perfusion metabolic acidosis developed in spite of seemingly adequate flow. In cardiopulmonary bypass, the use of mixed venous oxygen saturation as monitor of adequacy of flow may be fallacious. Thus, flow rates must exceed those anticipated from reduction in metabolism associated with hypothermia. It seems desirable to adjust flow at maximum possible, without seriously exceeding available venous return at a given temperature.

47. Metabolic Alterations Associated with Profound Hypothermia and Extracorporeal Circulation in the Dog and Man

WILLIAM F. BERNHARD (*by invitation*), HANS F. SCHWARZ

(*by invitation*), and ROBERT E. GROSS, Boston, Mass.

Certain inherent metabolic alterations accompany continuous hypo-thermic perfusion, and are accentuated by periods of circulatory arrest. The least well documented of these involves the development of a metabolic acidosis during the rewarming period. The reductions in arterial pH and plasma CO₂ content which occur have been found to be directly proportional to an elevated plasma lactate concentration. This lactacidemia is dependent upon several factors: (1) A relative failure of the muscle mass to cool sufficiently; (2) the duration of total circulatory arrest; (3) a depression of hepatocellular activity noted below 30° C. The material for this investigation includes: (1) An evaluation of the changes in arterial pH, whole blood CO₂, pCO₂, plasma CO₂ content, plasma lactate, and oxygen consumption, in 30 dogs subjected to profound hypothermia, (10°G); (2) a similar study involving 13 patients with congenital heart disease, who had open repair of their intracardiac defects at body temperatures of 9°-14° C.

48. Treatment of Respiratory Insufficiency by Prolonged Extra-corporeal Circulation: Experimental Observations

ROBERT SCHRAMEL, WILLIAM CHAPMAN (*by invitation*),

BERWIN VOLNIE (*by invitation*), and OSCAR CREECH, JR.,

New Orleans, La.

Thirty-five dogs were subjected to partial cardiopulmonary bypass for six to eight hours, whereby blood was removed by gravity from the inferior vena cava, pumped into an oxygenator and returned by gravity to the superior vena cava. Observations were made to delineate the control of blood gases that can be achieved by this method as well as the effects on the animal of prolonged partial cardiopulmonary bypass. The various data derived from these studies will be given in detail. It is concluded, that this procedure can safely be applied for six to eight hours and should be effective in controlling arterial levels of oxygen and carbon dioxide in the presence of respiratory insufficiency in humans.

49. Correction of Complete Heart Block by a Self-Contained and Subcutaneously Implanted Pacemaker

WILLIAM M. CHARDACK (*by invitation*), ANDREW A. GAGE

(*by invitation*), and WILSON GREATBATCH (*by invitation*),

Buffalo, N. Y.

The development of a transistorized and completely implantable pacemaker has been previously reported. The dimensions of the device, including its battery supply, are approximately 6 x 9 x 2 cm. The current drain is so low that the useful life of the batteries is conservatively estimated to be between five and six years. A bipolar electrode is placed on the myocardium and its lead wires travel to the upper abdominal area where the pacemaker itself is placed subcutaneously. The device has been implanted in eight patients. All are alive. Results have been gratifying. Complications

have occurred in two but have not necessitated interruption of electrical pacing of the heart. Follow-up observations and operative technique will be reported upon.

ALPHABETICAL ROSTER

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1960-61

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SMITH, DAVID T.Duke University, Durham, N. C.
THOMPSON, SAMUEL A... 850 Park Ave., New York 21, N. Y.
THORBURN, GRANT1602 West Genessee St., Flint, Mich.
TOUROFF, ARTHUR S. W..... 994 Fifth Ave., New York 28, N. Y.
TYSON, M. DAWSON.. Hitchcock Clinic, Hanover, N. H.

VAN ALLEN, CHESTER M.State Hospital, Bikaner, Rajputana, India
WANGENSTEEN, OWEN H..... University Hospitals, Minneapolis 14, Minn.
WEINBERG, JOSEPH A..... Veterans Adm Hospital, Long Beach 4, Calif.
WELLES, EDWARD S..... 20 Church St., Saranac Lake, N. Y.
WILLAUER. GEORGE..... 1930 Chestnut St., Philadelphia, Pa.
WILSON, JULIUS LANE..... 1790 Broadway, New York 19, N. Y.

MEMBERS DECEASED

ROBERT P. GLOVER
WILLIAM LERCHE
ROBERT T. MILLER, JR.

CHARTER MEMBERS

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THE AMERICAN ASSOCIATION FOR THORACIC SURGERY

Charter Members

June 7, 1917

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Harlow Brooks	Walton Martin
Lawrason Brown	Rudolph Matas
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Nathan W. Green	Samuel Robinson
John R. Hartwell	Charles I. Scudder
George J. Heuer	William H. Stewart
Chevalier Jackson	Franz Torek
H. H. Janeway	Martin W. Ware
James H. Kenyon	Abraham O. Wilensky
Adrian V. S. Lambert	Sidney Yankauer

ANNUAL MEETING DATES

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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
1921-Boston..... President, Rudolph Matas
1922-Washington..... President, Samuel Robinson
1923-Chicago..... President, Howard Lilienthal
1924-Rochester, Minn..... President, Carl A. Hedblom
1925-Washington..... President, Nathan W. Green
1926-Montreal..... President, Edward W. Archibald
1927-New York..... President, Franz Torek
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
1939-Los Angeles..... President, Harold Brunn
1940-Cleveland..... President, Adrian V. S. Lambert
1941-Toronto..... President, Fraser B. Gurd
1944-Chicago..... President, Frank S. Dolley
1946-Detroit..... President, Claude S. Beck
1947-St. Louis..... President, I. A. Bigger
1948-Quebec..... President, Alton Ochsner
1949-New Orleans..... President, Edward D. Churchill
1950-Denver..... President, Edward J. O'Brien
1951-Atlantic City..... President, Alfred Blalock
1952-Dallas..... President, Frank B. Berry
1953-San Francisco..... President, Robert M. Janes
1954-Montreal..... President, Emile Holman
1955-Atlantic City..... President, Edward S. Welles
1956-Miami Beach..... President, Richard H. Meade
1957-Chicago..... President, Cameron Haight
1958-Boston..... President, Brian Blades
1959-Los Angeles..... President, Michael E. De Bakey
1960-Miami Beach..... President, William E. Adams