PROCEEDINGS OF THE BRITISH CARDIAC SOCIETY

The Thirty-Fifth Annual General Meeting of the British Cardiac Society was held at Manson House, London, on Thursday, May 24, 1956. The Chairman, Evan Bedford, took the Chair at 9.30 a.m.; 148 members and 15 visitors were present.

PRIVATE BUSINESS

1. The minutes of the last Annual General Meeting, having been published in the Journal (17, 573, 1955), were taken as read and confirmed.

2. The Chairman thanked Sir John Parkinson for his help and guidance during his four years' office as President, and announced that Maurice Campbell, having been duly elected, was now taking over the duties of President.

3. The Chairman thanked Sam Oram for his work as Secretary during the last five years, and Patrick Mounsey, who had been appointed Secretary, took office.

4. The Balance Sheet for 1955-56 was presented, having been audited and found correct by Morgan Jones and Wyn Jones. The credit balance on May 16, 1956, was £739 5s. 1d.

5. Crighton Bramwell and Sir Henry S. Souttar were elected and acclaimed as Honorary Members of the Society.

6. Sir Alan Drury was elected an Extra-Ordinary Member of the Society.

7. Dr. Max Holzmann was elected a Corresponding Member of the Society.

8. The following Associate Members were elected as Ordinary Members.

   R. S. Benson
   J. Gibson Graham
   D. Lewes
   R. M. Marquis
   E. Lawson McDonald

   J. F. Pantridge
   D. S. Short
   W. Whitaker
   M. Zoob

9. The following Surgical Members were elected:

   C. Drew
   R. Milnes Walker
   W. F. Nicholson

   G. H. Wooler
   I. M. Hill

10. The following Associate Members were re-elected for a further period of three years:

    C. D. Anderson (Glasgow)
    D. H. Makinson (Llandudno)

    H. J. Wade (Manchester)
    A. G. W. Whitfield (Birmingham)

11. The following new Associate Members were elected and introduced to the President and the Chairman:

    J. D. Aitchison (Aberdeen)
    E. Besterman (London)
    J. M. Bishop (Birmingham)
    H. R. L. Fraser (Edinburgh)
    R. V. Gibson (London)
    I. R. Gray (Coventry)
    A. Hollman (London)

    J. M. S. Knott (London)
    K. G. Lowe (Dundee)
    R. K. MacCuish (Durham)
    J. T. Shepherd (Belfast)
    R. E. Steen (Dublin)
    R. M. Thomson (Glasgow)
    D. Weitzman (London)

12. Curtis Bain and William Evans were elected Members of the Council in place of Morgan Jones and Wyn Jones (term of office expired).

13. It was agreed that Rule 4 of the Society should be altered to read as follows:

   "There shall be a President of the Society who shall be nominated by the Council and elected by the Society. Nomination of the President by the Council shall be by written ballot, and if no nominee has a two-thirds majority the ballot shall be taken again between the two nominees receiving the most votes. If need be, the President shall have a casting vote. The Council shall give the Society at
least one month’s notice of the nomination, and if during that time any other nominations, which must be signed by ten members, are received by the Council then the election shall be by ballot. He shall be elected for two years and may be eligible for re-election for further periods of one year to a total of five years on the recommendation of the Council. He shall be ex officio a member of the Council. He will represent the Society at home and abroad and may preside over meetings of the Council but not at the Scientific Meeting of the Society for which a local Chairman will be elected annually.”

It was also agreed that Rule 7 should be altered to read as follows:

“Ordinary and Associate Members shall not exceed 225 in number. This includes up to 25 Ordinary Members or Associate Members who may be elected for their interest in cardiovascular surgery.”

14. The Secretary announced that in commemoration of the Tercentenary of the death of William Harvey, the Harveian Society of London proposed to hold an International Scientific Congress at the Royal College of Surgeons, London, from June 3 to 7, 1957. Details have not yet been finally decided but the Council of the British Cardiac Society have offered to provide one of the scientific sessions at this Congress.

SCIENTIFIC COMMUNICATIONS

Hæmodynamic and Ventilatory Studies in Mitral Stenosis Before and Two Years After Mitral Valvotomy

By K. W. Donald, J. M. Bishop, P. N. Wormald (introduced), and O. L. Wade. Twenty-eight patients who had been catheterized before a satisfactory mitral valvotomy were studied 17–51 months after operation (mean 26 months). Good results, as judged clinically, were obtained in 25 of these patients. Striking changes towards normal hæmodynamic behaviour were found. The “P.C.P.” pressures were considerably reduced in most patients at rest, but still reached highly abnormal levels on exercise even in patients denying any disability. Resting pulmonary arterial pressures were reduced in all patients but very few approached normal figures. Exercising pulmonary arterial pressures were less than before operation but were still highly abnormal. The pulmonary vascular resistance was considerably reduced particularly in those patients with excellent clinical results.

The cardiac output was, surprisingly, somewhat reduced at rest as compared with the pre-operative study but a number of patients showed a greater increase of cardiac output on exercise than before, although in only one case did it return to the level normal for exercise.

Both resting and exercise ventilations were greatly reduced, in the majority of cases to normal levels. Intermediate studies 6–12 months after operation provided no evidence of further objective improvement, as judged by these measurements, after this period.

A Physiological Classification of Pulmonary Hypertension with Observations on the Effects of Selective Pulmonary Vasodilatation

By Paul Wood. Pulmonary hypertension in mitral stenosis may be passive, vasoconstrictive, or obstructive.

Passive pulmonary hypertension merely reflects the rise in left atrial pressure, and rarely exceeds 60/30 mm. Hg at rest; these cases usually suffer from symptoms related to the high pulmonary venous pressure, e.g. cough, breathlessness, hæmoptysis, pulmonary oedema, paroxysmal cardiac dyspnoea, and orthopnoea.

Vasoconstrictive pulmonary hypertension complicates 25 to 30 per cent of cases of critical mitral stenosis, the pulmonary vascular resistance being extreme (over 10 units) in half of them. The lack of pulmonary congestive symptoms in this group led to the idea that the high resistance protected the pulmonary venous system from developing high pressures.

Obstructive pulmonary hypertension is a late complication of mitral stenosis, and is due to secondary occlusive changes in the pulmonary circulation, such as reactive intimal thickening of the small pulmonary arteries and arterioles with or without thrombosis, and recurrent or massive pulmonary embolism.

The view that active vasoconstrictive pulmonary hypertension is in any sense protective has been challenged, and the hypotensive effect of hexamethonium on both the pulmonary arterial and pulmonary venous pressures has been cited as evidence to the contrary. But hexamethonium tends to lower the cardiac output and reduces venous tone, and is therefore an unsatisfactory agent for testing the thesis. To probe the matter further acetylcholine was injected into the pulmonary artery in the belief that a critical dose would have a selective vasodilator action on the pulmonary arterioles in view of the rapidity with which it is inactivated.

The critical dose averaged 1.5 mg. The pulmonary arterial pressure and resistance fell immediately, while simultaneously the left atrial pressure, cardiac output, and systemic blood pressure rose. These results confirm that a high pulmonary vascular resistance is protective in the sense previously defined.
THE Hæmodynamic FINDINGS AT THORACOTOMY IN FIFTY CASES OF MITRAL VALVE DISEASE

By W. P. Cleland, Robert E. Rockney (introduced), and Max Zueb. Pressure pulses have been recorded at thoracotomy from the left atrium, left ventricle, and pulmonary artery in fifty patients with mitral valve disease. The pressure gradient across the mitral valve was measured and a value for \( \text{Ry/v} \) (Owen, S. G., and Wood, P. (1955), Brit. Heart J., 17, 41) and Allison's formula (Allison, P. R., and Linden, R. J., 1955, Lancet, 1, 9) was calculated. The findings were correlated with the surgeon's estimate of valve size and the presence or absence of incompetence.

The values for \( \text{Ry/v} \) were found to be consistently lower in patients with a greater degree of obstruction. The mean value for Allison's formula tended to be lower in patients with pure stenosis and sinus rhythm but there was much individual variation. Regarding the left atrial pulse contour a large \( v \) wave was usual in mitral incompetence but no absolutely diagnostic pattern could be established.

Left atrial and pulmonary artery pressures and atrioventricular gradients were higher in patients with smaller valve orifices. In patients with comparable valve sizes left atrial pressures were higher in those with sinus rhythm than in those with auricular fibrillation.

Following valvotomy the average left atrial mean pressures were lower, and the fall in pressure was greater in cases in which a larger split was produced. The pulmonary artery pressure fell following valvotomy in a proportion of cases. It fell most often and to a greater extent in patients with high initial pressures. Left atrial pressures and atrio-ventricular gradients showed greater falls in patients with high initial pulmonary artery pressures.

THE PULMONARY ARTERIAL BED IN PULMONARY HYPERTENSION: AN ARTERIOGRAPHIC STUDY

By David Short. While it is generally agreed that the pulmonary arterial bed is restricted in serious pulmonary hypertension, the nature of this restriction is widely disputed. Some hold that it is due mainly to structural changes in the arteries (or arterioles), others that it is chiefly functional. The problem is one that has an important bearing both on prognosis and on treatment. A technique of post-mortem pulmonary arteriography has been devised which affords a means of determining the extent to which the arterial bed is reduced by purely structural factors. This investigation has been performed on 54 lungs from patients with mitral stenosis, emphysema, congenital heart disease, recurrent pulmonary embolism, lone (or primary) pulmonary hypertension, and diseases unrelated to the cardiovascular and pulmonary systems. In approximately half the cases, there had been severe pulmonary hypertension during life.

The arteriogram showed considerable or great reduction in the arterial bed in every case of severe pulmonary hypertension, and abnormal inter-pulmonary and broncho-pulmonary arterial anastomosis in most of them.

Structural changes in the arteries are an important factor in pulmonary hypertension. They account for its serious prognosis, and militate against successful treatment.

DYE DILUTION CURVES IN THE STUDY OF THE Hæmodynamics OF MITRAL INCOMPETENCE

By John Shillingford. Dye dilution curves have been used in the study of regurgitant flow through the mitral valve in a series of patients with predominant mitral incompetence. Although no attempt has been made at this time to assess critically the value of this technique for determining the anatomy of the mitral valve before operation, examples of its use in representative patients are given and compared with the clinical and hæmodynamic findings.

The observations have also shown that, although the ratio of forward flow through the aortic valve to regurgitant flow through the mitral orifice in a given patient may vary from minute to minute, the total left ventricular output varies within smaller limits. Lowering the aortic peripheral resistance increases the forward flow and decreases the backflow. This is seen in the effect of exercise in patients with mitral incompetence in whom, although the forward cardiac output rises, the regurgitant flow becomes less. This phenomenon may explain the good exercise tolerance in these patients and the comparatively poor response to treatment once the heart begins to fail.

EXTRA-CORPOREAL CIRCULATION (PUMP-OXYGENATOR SYSTEM OF LILLEHEI-DEWALL) AND HEART SURGERY

By R. Heim de Balsac and (introduced) CH. Dubost, C. Lenfant, J. Guery, J. Passelecq, and M. Weiss. The pump oxygenator system of Lillehei-Dewall appears to the authors to be now the best and the most simple procedure to secure an extra-corporeal circulation during an operation such as opening the heart chambers.

The authors present in a short film this set-up which they improved by increasing the flow and by recovering the blood from the heart.

The first applications to human surgery are gratifying as far as the work of the pump oxygenator system is concerned. But the intracardiac surgical techniques involve often difficult problems.
LEFT ATRIAL SIZE IN PATIENTS WITHOUT MITRAL DISEASE

By W. B. COBBS (introduced) and R. E. STEINER. In a series of 100 patients with hypertension and without clinical evidence of mitral valve disease, left atrial enlargement was observed radiologically in 10 per cent. Autopsy studies of left atrial size by a technique of volume measurement at standardized pressures, has defined the normal distribution of left atrial size measured under these conditions. This varies between 70 and 120 ml.

Patients who in life had congestive heart failure from hypertension, ischaemic heart disease, or aortic valvular disease, frequently showed enlargement of the left atrium when studied radiologically and subsequently post-mortem. The post-mortem findings indicate that the left atrium in the patients mentioned above may be as large as that in some patients with mitral heart disease. Radiological evidence of left atrial enlargement may therefore be misleading in the diagnosis of mitral valve disease when other cardiac lesions are present concomitantly.

THE PROGNOSIS OF COARCTATION OF THE AORTA

By MAURICE CAMPBELL and J. H. BAYLIS. Published in full: British Heart J., 18, 475.

OBSERVER VARIATION IN REPORTS ON ELECTROCARDIOGRAMS

By L. G. DAVIES. One hundred electrocardiograms were used to test observer variation, 50 having been reported routinely as indicating infarction, 25 as normal, and the remainder as showing various abnormalities other than infarction. Nine experienced and, for comparison, one inexperienced observer then reported on these, being given the choice of reporting them either normal, abnormal, or showing infarction. Some weeks later the observers read the tracings again.

Disagreement between the observers was found in all three categories. Although there was general or majority agreement on four out of every five tracings, the fifth gave rise to considerable dispute. This disagreement appeared to be due to differences in interpretation and not to errors of observation. There was as much difficulty in deciding between normal and abnormal as between abnormal and infarction.

Each observer’s working definition varied, for after the second reading all were found to have changed their opinions in a proportion of the tracings.

The causes of this variation and of disagreement generally have been studied. Certain leads and patterns were particularly controversial, and when these are involved, the diagnostic value of the single electrocardiogram may be much less than is generally realized.

THE ARTERIAL PRESSURE AND PULSE WITH AORTIC STENOSIS

LAWSON McDONALD, JOHN SHANKS (introduced), and WILLIAM SMITH (introduced). Normal subjects and patients with aortic stenosis and with hypertension have been studied. The severity of the aortic stenosis was first judged by symptoms; asymptomatic cases were included, also patients with slight and severe symptoms, some of whom underwent aortic valvotomy. The intra-arterial pulse and pressure were recorded, systolic upstroke and brachial arterial mean pressure were measured, and normal values were determined. Prolongation of the upstroke in aortic stenosis was related to severity and in cases with symptoms it was always prolonged beyond a critical length. Although occasionally patients were asymptomatic at this length, the systolic upstroke was usually much shorter in those without symptoms. The brachial arterial mean pressure tended to be above normal in the early and intermediate stages of the disease, but later it fell below normal levels. The value of considering the systolic upstroke in relation to the brachial arterial mean pressure is shown; such data agreed well not only with clinical findings reflecting the severity of the aortic stenosis, but also with electrocardiographic changes. The systolic upstroke was prolonged in hypertension, but it shortened as the heart rate increased. The effect of pulse pressure was insignificant, and of myocardial failure inconstant.

THE EFFECT OF LONG- AND SHORT-TERM ANTICOAGULANT THERAPY ON THE PROGNOSIS OF MYOCARDIAL INFARCTION

By M. M. SUZMAN, Johannesbur. The prophylactic value of prolonged continuous anticoagulant therapy in survivors of acute myocardial infarction was tested by comparing the prognosis of groups of (1) 150 patients receiving anticoagulants continuously, (2) 64 patients who discontinued long-term therapy, and (3) 498 patients whose treatment with anticoagulants was limited to the acute phase of the infarction. The prognosis was judged on the basis of the overall and annual mortality rates and of the incidence of subsequent attacks of myocardial infarction.

Drawn from unselected hospital admissions and private practice, the patients were followed after recovery from the presenting acute attack until their death or for periods ranging from 12 to 106 months. Living patients observed for less than one year were excluded.
The total mortality rate was substantially lower (17%) in the patients on prolonged continuous anticoagulant therapy than in those who discontinued their long-term treatment (25%) or received only short-term therapy (43%).

THE MECHANISM OF THE BISFERIENS PULSE

By P. R. Fleming (introduced). Left ventricular and aortic pressure pulses recorded at aortic valvotomy have been superimposed and the gradient across the valve has been measured at regular intervals during systole. The curve representing the changing gradient is used to represent the changing flow rate through the aortic orifice as the two are directly related.

The maximum flow is seen to coincide in time with the aortic anacrotic notch which, it is suggested, is due to the negative pressure exerted alongside the high-velocity stream of blood (Venturi effect). In severe aortic stenosis, the peak aortic pressure is delayed in relation to the maximum flow and the anacrotic notch is therefore situated low down on the upstroke of the pressure pulse. In milder cases, or after a successful valvotomy, the peak aortic pressure is reached earlier and nearer in time to the maximum flow; the anacrotic notch is therefore higher on the upstroke and in even milder cases, when the velocity of flow approaches normal, is not seen at all.

If, however, in a mild case of aortic stenosis, the flow velocity is increased by a large stroke volume, the notch appears on or near the summit of the aortic pressure pulse and is deep (due to the high flow velocity). This is the classical bisferiens pulse of combined aortic stenosis and regurgitation in which the stenosis is relatively mild and the stroke volume very large. The presence of the bisferiens pulse is, therefore, a clear contraindication to aortic valvotomy.

TRANSPOSITION OF THE PULMONARY ARTERY AND AORTA WITH PULMONARY STENOSIS

By W. P. Cleland and J. F. Goodwin. Eight patients with transposition of the pulmonary artery and aorta associated with pulmonary stenosis have been studied. The ages ranged from 11 months to 8 years. They were undersized, severely dyspnoeic, and extremely cyanosed. The right ventricle was enlarged clinically, radiologically, and cardiographically in all, and seven had a systolic murmur maximum at the left parasternal area. The second heart sound was loud and single in 7 patients. In several the peripheral arterial pulses were of unusually full volume.

In all of them the lungs were oligemic on X-ray, and the pulmonary arteries were poorly visualized. The heart size and shape varied considerably from case to case.

Angiocardiography showed the aorta arising from the right ventricle, and in 4 of the 5 in whom it was performed, the main pulmonary artery was not opacified. The diagnosis was confirmed at thoracotomy or autopsy in all.

A subclavian-pulmonary anastomosis was carried out in seven, and an aorto-pulmonary anastomosis in one. Three patients died, or soon after operation, but the remaining 5 were strikingly improved. It is concluded that the diagnosis can be suspected clinically, and usually confirmed by angiocardiography. The differential diagnosis and indications for operation are discussed.

THE PATHOLOGICAL EFFECTS OF ARGENTAFFIN CARCINOMA ON THE HEART

By Reginald Hudson. The primary tumour and its metastases in the liver produce an excessive amount of 5-hydroxytryptamine (serotonin) which circulates in venous blood as far as the lungs, where it is largely removed by the enzyme mono-amine oxidase, and thereafter excreted as 5-hydroxy-indole-acetic acid in the urine.

The major lesions associated with this excess of circulating serotonin are therefore confined to the right heart, causing fibrosis and stenosis of the tricuspid and pulmonary valves. The effects on the tricuspid valve resemble closely those of chronic rheumatism.

In the case to be presented, there were, in addition to the tricuspid and pulmonary valve lesions, metastases in the lungs and these are thought to be associated with minor changes found in the mitral and aortic valves.

The interest of the condition lies in the fact that it is the first time that a "hormone" has been shown to be associated with valvular lesions of the heart, and this leads to speculation as to whether the study of arterial blood might reveal some substance, possibly produced in the lungs and removed by the liver, in association with the lesions of rheumatism.

PÆRCORDIAL BALLISTOCARDIOGRAPHY

By Patrick Mounsey. Palpation of the heart beat yields important information in heart disease and a method was therefore sought to record this movement. An instrument capable of responding to total movements of the chest wall in space was needed, and an accelerometer was therefore chosen, which was
designed and kindly given by Dr. Elliott (Elliott, R. V., Packard, R. G., and Kyrazis, D. T., 1954, *Circulation*, 9, 281). The accelerometer was attached to the precordium in selected areas, and records were obtained on a two-channel recorder, using an electrocardiogram or phonocardiogram as a reference tracing.

Precordial ballistocardiograms have been studied in 20 normal subjects and found to give information about the sequence and direction of forces acting during the cardiac cycle. A study has also been made of the precordial ballistocardiogram in examples of different diseases, including systemic and pulmonary hypertension, mitral, aortic, and tricuspid valve disease, and left heart failure.

The conclusion was reached that the precordial ballistocardiogram contributes to our knowledge of cardiovascular dynamics in health and disease, enables us to relate dynamic events to other cardiac phenomena, such as heart sounds, depicts graphically information about the forces responsible for precordial pulsations, and lastly offers the possibility of an ancillary diagnostic aid in distinguishing between dominant stenosis and incompetence in valvular disease of the heart.

**The Ballistocardiogram Before and After Mitral Valvotomy**

By C. B. Henderson. Ballistocardiograms were recorded before mitral valvotomy and again three weeks and eight to twelve months after operation in fifty patients with mitral stenosis. The heart rhythm was normal in 38 and auricular fibrillation in 12 patients. In all, cardiac catheterization was performed before valvotomy and in twenty was repeated eight to twelve months afterwards.

Before operation the grades of abnormality of the ballistocardiogram correlated well with the levels of the mean pulmonary artery pressure. Eight to twelve months after valvotomy the ballistocardiograms showed improvement in 32 (64%), no change in 12 (24%), and deterioration in six patients (12%). In the 20 recatheterized after operation an improved ballistocardiogram was accompanied by a fall in the mean pulmonary artery pressure, an unchanged one by a virtually unchanged pressure, and a deteriorated one by a rise in the pressure.

It is suggested that the ballistocardiogram provides useful information both in the selection of patients for mitral valvotomy and in the assessment of the results.

**The Nephrotic Syndrome and Mercurial Diuretics**

By I. Beswick (introduced), F. Gardner, and M. Riddle (introduced). The long-term use of mercurial diuretics appears sometimes to have precipitated the nephrotic syndrome. Five cases have been described with convincing pathological and histological changes, but two of these were known diabetics and the kidneys showed diabetic intercapillary glomerulosclerosis in addition to the tubular changes ascribed to mercurials.

In this paper four new cases of the syndrome are described, including the histological findings in the three who died. Reasons for attributing the renal damage to mercurial diuretics are given, and some of the possible factors concerned in the occurrence of the syndrome are discussed.

Three of our cases had received an oral mercurial preparation (chlormerodrin) during the last few months of treatment. The possibility of an increased danger of toxicity with this route of administration is considered. Prophylaxis and treatment of the condition are briefly discussed.