PROCEEDINGS OF THE BRITISH CARDIAC SOCIETY

The Twelfth Annual General Meeting of the British Cardiac Society was held at the Liverpool Medical Institution on Thursday, May 13, 1948. Chairman: John Hay. The Chairman took the chair at 9.30 a.m.; 82 members and 12 visitors were present.

PRIVATE BUSINESS
1. The minutes of the last Annual Meeting, having been published in the Journal (9, 304, 1947) were taken as read and confirmed.
2. The balance sheet for 1947-48 was presented, having been audited by Hay and Wyn Jones. The credit balance on April 21, 1948, was £88 13s. 4d.
3. The meeting confirmed the action of the Council (under Minute 7 of the last meeting) in conferring Honorary Membership on:
   Dr. Helen Taussig, Baltimore
   Dr. Alfred Blalock, Baltimore
   Dr. Harold Pardee, New York
   Dr. Andre Cournand, New York
   Dr. Camille Lian, Paris
4. Cotton was elected as a member of the Council in place of Wallace-Jones (resigned). Cookson and I. G. W. Hill were elected in place of Peel and Parsons-Smith (terms of office expired).
5. Athelstone Hill was elected as an Extra-Ordinary Member.
6. The following Associate Members were elected as Ordinary Members:
   Arnott, Lendrum, Hunter, O’Donovan, Kerley.
7. The following new Associate Members were elected:
   G. Aitken, Glasgow
   C. G. Baker, London
   R. E. Bonham Carter, London
   E. M. Buzzard, Oxford
   W. E. Clarke, London

8. The following Associate Members were elected for a further period of three years:
   R. J. Duthie      E. Graham Jones
   J. G. M. Hamilton B. B. Morgan
   F. M. Hilliard    W. R. Snodgrass
   J. C. Hoyle      A. J. Wilson
9. The following addition was made to Rule 6:
   “In addition there may be 10 Ordinary Members who may be elected for their interest in cardiovascular surgery.”
   It was agreed that the Council should decide from time to time whether Rule 12 should be enforced as regards these members.
   After discussion it was agreed that surgeons specializing in surgery of the sympathetic should be included under this addition to Rule 6 and it was also agreed that the operation of this rule should not hinder election of new Ordinary Members from the list of Associate Members.
10. The following Surgeons were elected as Ordinary Members under the new addition to Rule 6:
    R. C. Brock      C. Price Thomas
    P. R. Allison    O. S. Tubbs
    T. Holmes Sellors Vernon C. Thompson
11. Resignations were received and accepted from:
    A. G. Biggam, I. de Burgh Daly, M. Kremer.
12. After discussion it was agreed that an Autumn Meeting should be held this year as an experiment, some time in October, and that the place of the Meeting should be left to the Council for decision.

DISCUSSION ON SYMPATHECTOMY IN HYPERTENSION

Opened by Robert Platt, Rae Gilchrist, Clifford Wilson, and W. T. Cooke

Robert Platt (introduced). Although sympathectomy may be described as dangerous, unphysiological, and undesirable, it must be admitted that in a certain number of cases—probably 30 to 40 per cent—it achieves results that are clearly worth while and cannot be achieved by any other method in use at the present time. In some of these the blood pressure is brought from dangerous levels into a range of comparative or complete safety. It is not proposed to discuss how sympathectomy acts but it is important to be sure that the patients are better for the reduction in blood pressure. Undoubtedly they are, for symptoms disappear, the heart size diminishes, electrocardiograms improve, and retinopathy may disappear, and there is no evidence of deterioration in renal function as a result of the operation.

The question of selection is difficult and makes it
usually impossible to compare one series with another. If the procedure were harmless and reliable obviously it should be used in an early stage of the disease. As it is neither, the speaker has reserved operation for cases in which the prognosis is otherwise judged to be bad. These are usually patients under 50 years of age with diastolic pressures remaining at 125 or more after adequate rest, provided that renal and cardiac function are not badly affected, or arteriosclerotic changes advanced. Early signs of impending cardiac failure or a transient cerebral incident have been regarded as indications for operation as soon as possible. Such a selection is hard on the surgeon and liable to increase the mortality.

Pentothal and other depressor tests show a general correlation with the results of sympathectomy in that the patients who do not respond to the one rarely respond to the other, but there are exceptions and a poor response to depressor tests has not been regarded as ruling out treatment by operation.

In Manchester an extensive operation has been done by Boyd in two, three, and sometimes four stages, the sympathetic chain being removed from the 4th dorsal to the 3rd lumbar, since G. A. G. Mitchell (Edin. med. J., 1947, 54, 545) has shown that this is necessary in order to be reasonably certain that the splanchnic area is denervated.

Table I shows the results to date in 54 cases. These are not classified with regard to aetiology but successes have included essential hypertension, chronic pyelonephritis, and hypertension resulting from pregnancy kidney. The cases described as of malignant type have all shown papilledema with very high diastolic pressures.

### TABLE I

**RESULTS OF SYMPATHECTOMY, MAY 1948**

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>Malignant type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Still incomplete or too recent</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Failed to complete operation</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Deaths</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Failures after complete operation</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Worth while result</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Good result</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>54</td>
<td>17</td>
</tr>
</tbody>
</table>

Table II shows the change in diastolic pressure after operation, and it will be noted that in the 11 cases classified as “good results” the average post-operative blood pressure is at a very satisfactory level. Cases recorded as “worth while” would appear to have had their pressures reduced to much safer (though still not satisfactory) levels.

### TABLE II

**SYMPTHECTOMY CASES, MAY 1948**

<table>
<thead>
<tr>
<th>Group</th>
<th>Average age</th>
<th>Average pre-op. pressure</th>
<th>Average post-op. pressure</th>
<th>Change in diastolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good results</td>
<td>36</td>
<td>210/130</td>
<td>140/90</td>
<td>– 40</td>
</tr>
<tr>
<td>Worth while results</td>
<td>38</td>
<td>230/145</td>
<td>180/110</td>
<td>– 35</td>
</tr>
<tr>
<td>Failed</td>
<td>37</td>
<td>230/140</td>
<td>230/140</td>
<td>0</td>
</tr>
</tbody>
</table>

A. H. Radcliffe, in Professor Boyd’s department, has been using a sensitive method of charting electrical skin resistance and finds that in the failures of skin which has been efficiently sympathectomized is much smaller than in the successful cases. The correlation is not exact but the investigation suggests that in many cases failure is due to the fact that efficient sympathectomy has not been achieved. This may be due to anatomical anomalies.

Owing to a number of deaths having occurred as a result of the operation a physician was detailed to watch some of the operations. The sudden falls of pressure which may occur as the result of anaesthesia, movement of the patient, and the operation itself, are extremely alarming, and it is felt that some of the fatalities could have been avoided if the anaesthetists had had a clearer appreciation of the dangers. A sudden fall in pressure can usually be combated by mephenine.

RAE GILCHRIST. As the leading cause of death and with complications more widespread and more devastating than the ravages of malignant disease, the degenerative process labelled “hypertension” remains our greatest medical problem. The pressing need at the present time is the development of methods for the prevention of vascular damage at the sites that take the brunt of the burden, namely the retinal, renal, cerebral, and coronary systems. Until such time as a rational specific therapy is available, as in diabetes or pernicious anaemia, treatment necessarily falls short of the ideal and symptomatomeasures, whether medical or surgical, must be employed in a palliative sense. We recognize their inadequacy.

It might well be thought that the evaluation of a precise method of treatment such as sympathetic surgery offers for a state of affairs so common and so easily recognized as essential hypertension should not present any great difficulty. The reverse, however, is the case. An adequate knowledge of the
course and complications of hypertension is unfortunately lacking. In consequence it is difficult to compare the results obtained by medical and surgical methods. There are so many interacting factors such as age, sex, duration, severity, renal function, retinal grouping, and, above all, vascular vulnerability, that it is difficult to present for study exactly comparable groups—the one treated surgically and the other medically. Recognizing the limitations and admitting the crude method of analysis employed, a comparison of the results obtained, based on a study of 126 cases of hypertension, has led to the following tentative conclusions. Our data have not yet been submitted to specialized statistical methods and are therefore open to criticism.

Our results are largely impressions.

Eighty patients suffering from benign hypertension received medical care exclusively and forty-six received in addition surgical attention. All were subjected to detailed investigations according to a predetermined routine and have been followed for periods up to 5 and 81/2 years, respectively.

Symptoms as a test of cure are misleading in that their intensity cannot be gauged with accuracy, and the spontaneous fluctuations and natural remissions, which are a feature of the disease process, make accurate deductions all the more difficult. Nevertheless, in the medical group symptomatic improvement was observed, though the changes were relatively slight. In the surgical group, in whom symptoms were distinctly more severe, symptomatic improvement was striking. For instance, in the medical group, at the end of 3 years, 20 per cent were symptom free, and in the surgical group approximately 50 per cent. We do not have sufficient facts to warrant the conclusion that sympathectomy postpones the date of death from vascular disease.

Progress has also been assessed on the response of the diastolic blood pressure. This sign is also admittedly fallacious, for if there is one finding more misleading than another, more liable to unpredictable fluctuations, it is the blood pressure level. The diastolic pressure has a smaller range than the systolic and we have therefore attempted to make use of it for comparative purposes by recording the figures in the horizontal position after at least half an-hour’s rest, the subject being thoroughly accustomed to the surroundings, the technique, and the observer. In the medical group the tendency is for the diastolic pressure to rise with the passage of time. Comparing the findings at the end of 3 years, there is an increase in the number of patients with a diastolic pressure over 120, just as there is a decrease in the number of those with a diastolic pressure 100 or less. There is therefore a tendency for the diastolic pressure to rise, despite a reduction in the severity of the symptoms. In the surgical group at the end of 3 years there is an increase in the number of patients with diastolic pressures under 100 and some reduction in the number of those in the middle ranges, without much alteration in the proportion of patients with diastolic pressures over 120. It therefore appears that 3 years after sympathectomy a significant fall of diastolic pressure remains evident in approximately 20 per cent of the patients submitted to surgery. There were 5 fatal cases in the 46 submitted to surgery. All died from vascular causes.

Thirty patients suffering from malignant hypertension have been under observation, 10 of whom had sympathectomies done—a number too few to justify statistical analysis, but the facts observed are worth recording. The 20 patients treated medically without exception died within six months of coming under observation. Of the 10 receiving surgical treatment, 3 obtained no benefit and in the light of further experience would not now be submitted to surgery. Moderate benefit, enabling a return to work for a year or two, in 2 patients was encouraging. The remaining 5 have made remarkable improvement, all showing a regression in the retinitis and a subsidence of the papilledema, without, however, any significant change in the level of the diastolic pressure. Our most remarkable case is a man aged 47, well and in steady employment 4 years after sympathectomy. He came under observation on account of haemoptysis with papilledema.

It is in this group that sympathectomy can claim its greatest achievements. Provided renal function is reasonably good and heart failure does not threaten, a bilateral sympathectomy can arrest the degenerative process, restore vision, relieve symptoms, and apparently prolong life.

Surgery is not the ideal treatment of hypertension. As a palliative measure it is capable of relieving symptoms, even when these are severe, in about 50 per cent of patients, carefully chosen for this procedure. It has little effect on the diastolic blood pressure level: in only about 20 per cent is the diastolic pressure restored to normal. These results are far from ideal, but they are better than those obtained by purely medical means.

The contra-indications to surgical intervention are arteriosclerosis, angina, congestive failure, and impaired renal function. Minor cerebral episodes, even transient hemiplegias, do not necessarily contraindicate surgery. In the desperate condition labelled "malignant hypertension" surgery can postpone the fatal outcome, restore vision, relieve symptoms, and enable the sufferer to return to work—an achievement that has hitherto not resulted from any medical measures so far employed.

Clifford Wilson (introduced) presented the results
of lumbo-dorsal sympathectomy in 46 cases of hypertension followed for six months to five years. Twenty-five cases were diagnosed malignant hypertension, eleven severe benign hypertension in young subjects, and ten primary renal disease. The effect of cerebral and cardiac complications, and of renal impairment on the surgical risk was discussed. In general the malignant hypertension syndrome carried a greater risk than any of these complications taken singly but cardiac asthma or renal failure with blood urea up to 100 mg. usually contra-indicated operation.

Analysis of results showed that during the five-year period 18 of the 46 cases had died; 14 of these were diagnosed malignant hypertension. Mortality was greater and survival periods shorter in males than in females. Examining the diagnostic groups separately: in malignant hypertension where the need for some form of therapy is most urgent, the operative risks are grave and the results disappointing. In selected cases the operation may increase the expectation of life by two or three years. In the present series, the longest survival period was 4½ years; in almost all cases there was symptomatic relief particularly from headaches, and retinal changes, including papilloedema, improved or disappeared. Severe benign hypertension in young subjects would seem to provide the most favourable indication for sympathectomy but unfortunately improvement is largely subjective and the ultimate effect on prognosis is difficult to assess. In our group of 10 cases there were no deaths, but sustained fall in blood pressure was observed in only 3 patients.

In primary renal disease (bilateral) with severe hypertension but with good renal function, the results of operation were encouraging and it seems possible that in these patients progressive renal deterioration may be retarded.

In conclusion, more emphasis should be placed on diagnosis; renal biopsy should be performed at operation in order to confirm the clinical diagnosis. In benign hypertension the natural history of the disease should be more carefully studied so as to provide a control group against which the operative results would be more reliably assessed.

W. T. Cooke. In Birmingham, a Smithwick operation has been performed upon 50 patients more than 12 months ago by Mr. W. H. Sweet, Brodie Hughes, and J. M. Small. The main features are summarized in Table III.

In the absence of a large control group, blood pressure changes and survival rates are of little value in assessing the merits of the operation. The procedure appears to have been beneficial for certain subjective reasons—the disappearance of severe headaches and lassitude, and increased capacity for work. Thus of the whole group, approximately 25 per cent, including 5 of Grade IV severity, are working full time in factory or the home, approximately one-third are dead or invalids, whilst the remainder are improved and not prevented from working, though still incapacitated to some extent. Objectively 2 out of 30 of the patients showed decrease in heart size, the remainder no change. Haemorrhages and papilloedema cleared up in all those in whom they were present. Of 25 patients with abnormal cardograms, 10 became normal after operation and 4 showed only left axis deviation.

In 25 cases, renal plasma flow and glomerular filtration rate was determined, and in 20 cases, effective kidney mass. These determinations though revealing all stages of kidney impairment, gave no indication as to whether an operation might be successful. Renal biopsy on 16 patients also revealed the great diversity of kidney pathology, which was

| Table III |
|-----------------|-----------------|-----------------|-----------------|-----------------|
|                | Grade I and II | Grade III       | Grade IV        | Total           |
| Men             | 5              | 3               | 11              | 19              |
| Women           | 16             | 6               | 9               | 31              |
| Average age     | 42             | 41.8            | 40              | 41 (10–58)      |
| Average blood pressure | 236/143        | 233/137         | 240/144         | 237/142         |
| Average fall    | 47/25          | 70/35           | 43/34           |                 |
| Normal blood pressure | 1              | 2               | 8               | 14              |
| Deaths          | 1              | 0               | 2               | 3               |
| Untraced        | 2              |                 | 2               | 4               |
| Average survival| Living (18)    | Living (9)      | Living (10)     |                 |
|                 | 30 months      | 31 months       | 35.8 months     |                 |

Average survival whole group living and dead: 28.7 months

Average time since operation: 32.5 months
often completely unsuspected clinically. For these reasons, it is of utmost importance that renal biopsies should be taken as a routine if any accurate assessment of results is to be obtained in the future.

Cerebral catastrophes which had occurred in 15 patients did not prove a contra-indication. Six are working full time. Four have normal blood pressures including two who have each two normal pregnancies. Four are dead. Of four patients with congestive cardiac failure, one responded dramatically and is now working.

In this series, there were patients in whom the operation appeared life-saving; and others to indicate that there was a place for surgery in the treatment of hypertension and papilledema below the age of 50; for progressive hypertension in the young age groups with signs of incipient failure of cerebrum, kidneys, or heart; or at any age for the relief of the intractable type of headache occurring in hypertension. Contra-indications are advanced kidney failure, generalized arteriosclerosis, recent cerebral hemorrhage, or any case with marked functional overlay.

SHORT COMMUNICATIONS

MEASUREMENT OF PULSE VOLUME

BY E. B. COLEGRAVE AND T. G. RICHARDS
(introduced)

A method is described by which true pulse volume may be measured at any external pressure. A triple armlet is used and volume is directly measured by a liquid lens of negligible inertia.

It was shown that the orthodox graph of pulse volume against external pressure cannot give a derived curve of arterial collapse. The instability in collapse which makes this impossible is found to be related to the total arterial rigidity, which may then be calculated. The internal pressure valves are given by subtracting the valve of internal rigidity from the clinical blood pressure figures.

Arterial resistances to collapse in normal subjects are found to be of the same order. Much higher figures are found in arteriosclerosis. In true hypertension the figure depends upon the severity and duration of the disease. Arterial rigidity may occur before electrocardiographic changes are evident.

COMPLETE HEART BLOCK ASSOCIATED WITH AMOEBIC HEPATITIS

M. D. RAWKINS AND G. L. S. KONSTAM
(introduced)

An ex-army officer, aged 28, complained of fainting attacks over a period of three days and pain over the lower sternum aggravated by breathing. In 1942 whilst serving in the Western Desert he had periodic attacks of mild diarrhoea, for which he did not receive treatment, and since then occasional diarrhoea, but none for nine months.

There was no history of rheumatic fever nor diphtheria but he had had scarlet fever, when 19, and since then occasional pains in the limbs.

On examination (1/1/48) he was well nourished. 2d

Resting pulse 40 and regular. B.P. 145/70. Heart not enlarged, no murmurs. Liver dullness extended upwards in the mid-axillary line to fourth space, edge not felt.

Cardiogram showed C.H.B. and X-ray examination showed that the right dome of the diaphragm was considerably raised, immobile, and its outline blurred. The transverse diameter of the heart was slightly increased to the left and right. The appearances were typical of amoebic hepatitis but stool examinations were negative for E. histolytica and sigmoidoscopy showed normal appearances.

A course of eleven emetine HCl (gr. 1) injections was started and after the third injection the pulse rate increased to 80, with a P-R interval of 0:2 sec., the chest pain disappeared, and the Stokes-Adams attacks ceased.

A further X-ray examination showed free movement of the diaphragm and the right dome had returned to its normal level and was regular in outline.

Heart block associated with amebiasis is a rarity. We have found in the last twenty-three years three other cases of A-V dissociation. (Petzetakis, Arch. Mal. Coeur, 1925, 18, 70; Gerbasi, La Pediatria, 1931, 39, 513; Heilig and Visveswar, Indian Med. Gaz., 1943, 78, 419.) In each this complication occurred during active dysentery and response to emetine seemed certain in only one.

In the course of prolonged diarrhoea other factors that could influence the conducting tissue are anemia, toxemia, thiamin and nicotinic acid deficiency, peripheral circulatory failure, uremia, and possibly abnormal blood and tissue chemistry.

The case here described had not had diarrhoea for nine months and both the hepatitis and heart block appeared to respond promptly to emetine. An amoebic metastasis in the heart therefore seemed more probable than an indirect toxic effect on the conducting tissues.
STOKES-ADAMS ATTACK IN LATENT HEART BLOCK

BY G. BOURNE

Two cases of Stokes-Adams attacks were described in which the underlying disease of the bundle was not suspected to be cause of the attacks; one had been examined by a cardiologist and the other by a general physician. In each the history of the attacks aroused suspicion as to their possible cause. The first patient was a man of 70 who for seven months previously at intervals of a month or less had had constant attacks of syncope. These were abrupt in onset, lasted three to five seconds, and were not followed by any headache, drowsiness, or any other sequelae. He was just as well after the attacks as before. The heart showed moderate enlargement on cardioscopy. There was a harsh systolic murmur at the apex base. The heart rate was 56 and was regular. The blood pressure was 116/72. The cardiogram showed a P-R interval of 0.2 sec. and a prolonged QRS complex. He was given ephedrine 0.5 grains t.i.d., and from that day, a period of 21 months, has remained free from attacks.

The second patient was a woman of 61 with a two years history of from four to eight weeks interval between attacks, but the frequency of the attacks had increased for a month or two previous to examination. The attacks were abrupt and were followed by no sequela, nor were they preceded by any warning. They lasted ten seconds, for the husband was in the habit of counting ten seconds by which time he knew that his wife would recover. She had been thoroughly investigated for epilepsy. There was an aortic systolic murmur. The blood pressure was 150/90. The cardiogram showed an increased P-R interval of 0.23 sec. Cardioscopy showed moderate enlargement. Further tracings taken to exclude a previous infarct were done and in two of these a true heart block was shown. The purpose of showing the cases was to stress the importance of an exact history in suspecting examples of Stokes-Adams attack in patients hitherto unsuspected of heart block.

HEART BLOCK IN OSTÉITIS DEFORMANS

BY C. V. HARRISON AND B. LENNOX

(introduced)

The authors reported two cases. The first was a woman of 71 who, while in hospital with advanced Paget’s disease, developed Stokes-Adams attacks with temporary complete heart block. At autopsy there was calcification along the base of the mitral valve which had spread on to the interventricular septum to involve the bundle of His. The second was a man of 74 with advanced Paget’s disease who was admitted with recent dyspnea and found to have complete heart block. He died soon after admission and at autopsy there was calcification along the bases of the mitral and aortic valves and spread on to the septum involving the bundle of His.

The authors believe that this association between Paget’s disease and cardiac calcification is not fortuitous. An analysis of 30 published post-mortem records on cases of Paget’s disease revealed that 11 of them had cardiac calcification. Similarly, 13 cases of Paget’s disease in their own departmental records included 6 cases with cardiac calcification.

From a comparison of these figures with those from a control series of routine autopsies, the authors concluded that cardiac calcification was five times as common in Paget’s disease as in controls and that the heart block observed clinically in their two cases is to be regarded as a true complication of Paget’s disease.

TWO NEWER MURMURS IN DIASTOLE

BY WILLIAM EVANS

The first was a trivial or incidental murmur in early diastole, exocardial in origin, and found in cases of sternal depression; the murmur was not evidence of aortic incompetence.

The second was a continuous murmur in systole and diastole which is the outcome of a small and unimportant A-V fistula and should be distinguished from the murmur of patent ductus arteriosus in order to save patients from unnecessary operation. The phonocardiogram will decide both clinical problems.

PHONOCARDIOGRAPHY IN HEART DISEASE

BY E. D. H. COWEN (introduced)

A phonocardiographic investigation of systolic murmurs (1) in valvar and congenital heart disease (63 cases) and (2) in subjects without other evidence of cardiac disability (40 cases), revealed no significant difference in time of onset of the murmur in relation to the S line of lead II of the electrocardiogram in the two groups. This analysis was undertaken following the work of W. Evans (Brit. Heart J., 9, 1 and 225, 1947).

A new phonocardiograph evolved by the Cambridge Instrument Company in collaboration with the author was used, consisting of a piezo-electric crystal microphone, andion tube amplifier, and double fibre string galvanometer. A frequency response curve of this instrument was shown in a discussion on the calibration of phonocardiography. Phonocardiograms taken by the new instrument were shown, in which it was demonstrated, confirming many previous workers, that there is no exact correspondence between the mechanical and electrical events of the cardiac cycle.
ANGIOCARDIOGRAPHY AS A DIAGNOSTIC AID
BY FRANCES GARDNER

The angiocardiographic work described in this report is confined to congenital heart disease. The technique employed is that described by Robb and Steinberg in 1938 with the addition of a preliminary intravenous sensitivity test.

The film cassettes are changed by hand and only one exposure every three seconds is possible. The arm-lung circulation time is a reliable guide to the exposure time for the right heart. The arm-tongue circulation time is extremely unreliable as a guide to similar times for the left heart and aorta. Good contrast films of these structures are therefore difficult to obtain unless large quantities of radio-opaque material are used.

The slides demonstrate the angiocardiographic appearances in the following conditions.

1. Congenital dilatation of the pulmonary artery with stenosis and incompetence of the pulmonary valve.
2. Isolated pulmonary stenosis.
4. Fallot’s tetralogy.
5. Pulmonary atresia with patent ductus arteriosus.
6. Coarctation of the aorta.

There are probably few congenital heart lesions where angiocardiography is essential for accurate diagnosis. It is, however, valuable as a method of visualizing the precise anatomy of the pulmonary circulation and the site and extent of aortic coarctation.

A CLINICAL COMPARISON OF CR, CF, AND UNIPOLAR CHEST LEADS
BY AUBREY LEATHAM (introduced)

Leaving aside theoretical considerations of the relative advantages of certain chest leads now in common use, an investigation has been made of the clinical value of these leads. Standard limb leads, unipolar limb leads, and chest leads CR, CF, and V1 to 7 have been taken in over 300 cases so far, and the following conclusions have been reached.

In rare cases of cardiac pain the CF lead has shown changes in the T wave that were not found in either CR or V leads. Since such an event is so rare, and since the lead commonly shows similar changes in healthy subjects, and must then be read in conjunction with the unipolar limb leads, the practice of recording CF as the only chest lead should be condemned.

In CR leads, T wave positivity tends to be exaggerated which is an advantage in health, but in very rare cases may conceal small changes in the T wave that are indicative of disease; however, only once did the V chest leads show a change in a patient with cardiac pain that was not present in the CR leads.

A disadvantage of CF leads is the fact that in health the T wave in V1 is often inverted, and the T waves in V6 and V7 are customarily low and may be flat, or even inverted in V7.

TUBERCULOUS PERICARDITIS
BY A. A. F. PEELE

CARDIAC INFARCTION COMPLICATED BY BUNDLE BRANCH BLOCK
BY W. SOMERVILLE (introduced)

An attempt has been made to estimate the frequency with which an electrocardiographic diagnosis of cardiac infarction can be made in the presence of bundle branch block.

A series of 58 cases each with a clear history of cardiac infarction and a cardiogram showing bundle branch block was examined. The cases fell into two groups; in one, the pathological signs of infarction were present in the cardiogram in addition to those of bundle branch block (37 cases); in the other group, the signs of infarction were suppressed (21 cases). There were 34 cases of left bundle branch block, in 15 of which the signs of infarction were present, and 24 cases of right bundle branch block, in 22 of which the signs of infarction were present.

The distribution of the abnormal Q and T waves, and RS-T segment deviations, diagnostic of cardiac infarction is set down in Table IV. The term chest leads refers to unipolar leads V1 to V6 or V7; in a few cases, only V1, V3, and V5 were taken. Unipolar limb leads refers to the Wilson leads VL, VR, and VF.

<table>
<thead>
<tr>
<th>TABLE IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>PATHOLOGICAL SIGNS OF CARDIAC INFARCTION IN PRESENCE OF BUNDLE BRANCH BLOCK.</td>
</tr>
<tr>
<td><strong>RIGHT BUNDLE BRANCH BLOCK</strong></td>
</tr>
<tr>
<td>Abnormal Q</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td><strong>Anterior infarction (11 cases)</strong></td>
</tr>
<tr>
<td>Limb leads (11 cases)</td>
</tr>
<tr>
<td>Chest leads (9 cases)</td>
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<tr>
<td>Unipolar limb leads (6 cases)</td>
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<tr>
<td><strong>Posterior infarction (11 cases)</strong></td>
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<tr>
<td>Limb leads (11 cases)</td>
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<tr>
<td>Chest leads (8 cases)</td>
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<tr>
<td>Unipolar limb leads (2 cases)</td>
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LEFT BUNDLE BRANCH BLOCK

<table>
<thead>
<tr>
<th></th>
<th>Abnormal RS-T</th>
<th>Abnormal T</th>
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<tr>
<td></td>
<td>Q deviation</td>
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<tr>
<td>Anterior infarction</td>
<td></td>
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</tr>
<tr>
<td>Limb leads (11 cases)</td>
<td>10/11</td>
<td>2/11</td>
</tr>
<tr>
<td>Chest leads (9 cases)</td>
<td>7/9</td>
<td>7/9</td>
</tr>
<tr>
<td>Unipolar limb leads</td>
<td>4/5</td>
<td>1/5</td>
</tr>
<tr>
<td>(5 cases)</td>
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<td></td>
</tr>
<tr>
<td>Posterior infarction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limb leads (4 cases)</td>
<td>4/4</td>
<td>4/4</td>
</tr>
<tr>
<td>Chest leads (4 cases)</td>
<td>1/4</td>
<td>2/4</td>
</tr>
<tr>
<td>Unipolar limb leads</td>
<td>2/2</td>
<td>1/2</td>
</tr>
<tr>
<td>(2 cases)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When dealing with such restricted numbers, it is not possible to draw firm conclusions regarding the frequency with which a diagnosis of cardiac infarction and bundle branch block can be made from the electrocardiogram. The findings in the present series indicate that when right bundle branch block complicates cardiac infarction, signs of infarction may be expected to be found in the majority (22 of 24 cases, or 92 per cent).

When left bundle branch block complicates cardiac infarction, the signs of infarction may be found in about half the cases (15 of 34, or 45 per cent). Emphasis should be placed on the fact that there is approximately an even chance that the electrocardiographic signs of a cardiac infarct will be suppressed if left bundle branch block is a complication.