pending on whether or not conditions favour a reversed flow of blood in the spinal veins, in which case it may enter this system and be carried to the brain—otherwise it may be carried by the azygos veins to the superior vena cava, and so be caught in the pulmonary network, where it is relatively harmless.

Summary

Three cases are described in which a metastatic

abscess in the brain developed secondary to focal infection in the chest.

Difficulties in differential diagnosis in two of these are described and briefly discussed.

The occurrence of secondary deposits of growth in the brain in cases of bronchogenic carcinoma is reviewed, and reference is made to recent observations on the anatomical paths by which metastatic deposits from intrathoracic lesions travel to the central nervous system.

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SOME CLINICAL AND SOCIO-MEDICAL ASPECTS OF CARDIOVASCULAR DISEASE

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The present state of affairs in respect of diagnostic, remedial, preventive, and socio-medical arrangements for cardiac patients is comparable to that regarding tuberculosis prior to the institution of tuberculosis dispensaries and tuberculosis officers in this country some 40 years ago.

A few historical data may briefly illustrate the development of tuberculosis services which contrasts so strikingly with the complete lack of similar arrangements for cardiac cases.

The control of tuberculosis was initiated by a voluntary system of notification of phthisis by the Metropolitan Borough of Finsbury in 1900 under the then Medical Officer of Health, Dr. George Newman. The compulsory notification of all forms of tuberculosis followed in 1912 under the Public Health Regulations.

The departmental Committee under the chairmanship of Mr. Waldorf Astor, M.P., in one of their reports (1913) advised that 'the aim should

be that not a single case of tuberculosis should be uncared for in the community, and that whatsoever services the scheme provides should be available for all cases of the disease.' Up to that time, the scheme consisted of tuberculosis dispensaries, the first one founded by Dr. Robert Philip (afterwards Sir Robert Philip) in 1887, sanatoria, hospitals, farm colonies, open air schools, etc.

Under the Public Health Act (Tuberculosis Act) 1921 the local authorities were directed to arrange treatment, aftercare, and supervision of tuberculosis patients.

The remarkable progress in the anti-tuberculosis services is evident from the following figures. In 1911 there were 5700 sanatorium beds for tuberculosis; in 1923 there were 442 tuberculosis dispensaries in England, and 249 tuberculosis officers; in 1936 there were 459 tuberculosis dispensaries, some 400 tuberculosis officers, and 26,773 sanatorium beds.

The importance of rehabilitation and re-employment of the tuberculous, without lowering of income was stressed as early as 1906 by Drs. M. S. Paterson and N. Bardswell.

Lack of Adequate Arrangements for the Cardiac Patients

With reference to cardiovascular disease there are at present only a few institutions where up-to-date diagnostic and remedial work is being carried out, namely, the teaching hospitals and some voluntary and London County Council hospitals. There are hardly any cardiac clinics in the provincial towns, neither are there any organized services for supervision, rehabilitation, amelioration of home environments or re-employment of cardiac patients or for prevention of cardiac diseases, in particular rheumatic fever and rheumatic heart disease.

Whereas the campaign against tuberculosis had been organized in 1908 the first effort to combat rheumatic fever on the part of a public authority began only in 1926 through the establishment of a special unit of 60 beds by the Metropolitan Asylums Board at the Queen Mary's Hospital, Carshalton, for the treatment of recent cases of rheumatic fever in children.

Around this special unit the exemplary organization of the London County Council evolved, consisting of rheumatism supervisory centres, supervision through the school medical service, and supervision in the out-patients' departments of the voluntary hospitals.

This is the scheme operating in the area of greater London and in Birmingham, but there are no similar arrangements in the remainder of the country.

Prof. J. A. Ryle's emphatic dictum 'we have much to learn from periodic health examinations' has undoubtedly its widest application in the field of cardiology. The proposal to start periodic health examinations, *albeit* confined to industrial employees, appears under present circumstances utopian, since, apart from teaching hospitals and a very few others, there are no organized facilities to offer the public up-to-date cardiological services, nor are there any provisions under the National Health Insurance Act or within the orbit of industrial medicine.

The position is the more disquieting as there is a lack of any suggestion of cardiological services in the present planning of specialities under the National Health Service Act. Therefore, it is encouraging to learn that the Cardiac Society of Great Britain and Ireland at their tenth Annual General Meeting on April 11, 1946, decided to appoint Dr. William Evans as their representative

on the Consultant Services Committee, and instructed the Secretary to write to the President of the College of Physicians with regard to formation of a standing committee of the College to deal with cardiology on the same lines as the committees appointed for other specialities such as neurology and dermatology.

Diagnosis in the Fore

The paucity of diagnostic work throughout the country, lack of cardiac clinics, implying want of preventive measures and socio-medical organization, are responsible for the quite inadequate care for cardiac cases.

'If the standard of health of the community is to be raised it can only be by the earliest possible detection of slight departures from normal health.' (Sir E. Farquhar Buzzard, 1937.)

The rapid development of ancillary sciences during the past 50 years or so, i.e., physics, bacteriology, biochemistry, etc., with the consecutive advent of the sphygmomanometer, cardiology, and electrocardiography, endowed the medical profession with precise instruments and methods for the perfection of cardio-vascular diagnosis for the benefit of the public at large. Indeed, it cannot be too strongly emphasized that only by generously employing such modern ancillary methods of investigation, together with exhaustive oral and physical examination, can the diagnosis be perfected, this being, after all, the very basis of the successful practice of remedial, preventive and social medicine.

The more time devoted to examination the greater the chance to elicit morbid findings. 'The better educated the doctor the more time he will require to carry out the examination.' (Sir E. Farquhar Buzzard.)

The history of the case must comprise not only somatic symptoms and their development but also psychic traumas, emotional experiences, the coincidence and inter-relationship of somatic and physical manifestations. In other words, we have to apply the psycho-somatic concept in our search for clinical diagnosis.

There is no branch of clinical medicine which warrants a more thorough application of the psycho-somatic conception than cardiology. The knowledge of the heart as the vital organ has been most popular since time immemorial. With the people of antiquity and the primitives of to-day the belief prevailed, and still prevails, that the heart is the site of mind and soul. The heart as symbol of religious rites, of affection and sensual love, has been pictured throughout history since the ancient Egyptians.

The psychic reactions to a suspected, imagined,

or organic heart disease are more profound and protracted than in the case of any other malady. Indeed, the chronicity, the crippling effect, the onset in childhood of the rheumatic heart disease, and the anguish inherent in some cases of myocardial disease appear to be apt to produce profound repercussions in the psychic sphere.

The older we grow in clinical practice, and the more we learn of human nature the more we appreciate how intimately interwoven are psychic and somatic processes, and the more time we are inclined to spend on systematic case-taking.

Only through complete integration of history, clinical, and ancillary findings can an acceptable diagnosis be established. At the same time it must be noted that only judicious assessment and critical appreciation of radioscopic, electrocardiographic, and laboratory findings enable one to realize their limits and value in cardio-vascular diagnosis.

The Electrocardiogram

The electrocardiogram *per se* is not diagnostic, it is but an adjuvant. It is insignificant in valvular disease unless there are concomitant structural changes of the myocardium, e.g., marked hypertrophy.

A single record is useless in assessment of a myocardial lesion during the course of infectious or toxic processes; only series of tracings can discern development and retrogression of characteristic changes in the electrocardiogram. On the other hand, even when clinical evidence of myocardial involvement is in abeyance, the serial electrocardiogram may prove diagnostic.

A single abnormal feature such as a prolonged P-R (i.e., auriculo-ventricular conduction time), slurring of a ventricular complex in one lead, a slight elevation or depression of the S-T segment, does not permit us to diagnose disease.

The intricacies of the electro cardiographic interpretation should be mentioned here. Large, peaked, bifid or widened P waves may be due to disorder of impulse formation, to its abnormal spread within the auricles, to auricular involvement in mitral or hypertensive disease, or to vegetative nervous imbalance.

Aberrations of the S-T segment occur in myocardial anoxemia, viz., coronary insufficiency, in disorders of vegetative nervous system, during administration of digitalis, during acute infections or intoxications, in the wake of paroxysmal tachycardia, in hormonal and metabolic disorders, in ventricular strain, pericarditis, cor pulmonale, etc.

There are, nevertheless, some instances in which the electrocardiogram may be conclusive

per se, e.g., in mirror image dextrocardia, in recent myocardial infarction, especially when the serial electrocardiogram is being applied, in digitalis medication. Its domain *par excellence* is that of the arrhythmias, many of which cannot be diagnosed on clinical observation alone, e.g., some forms of A-V block, auricular flutter with regular ventricular responses, or auricular fibrillation with complete auriculo-ventricular block. The numerous varieties of bigeminal rhythm, complex arrhythmias, interference dissociation are purely electrocardiographic problems.

Radioscopy

In respect of X-ray examination it must be emphasized that radioscopy and orthodiagraphy are the routine methods of study of the heart. A single radiogram obtained in dorsoventral projection cannot furnish adequate information about a three dimensional irregular body constantly varying in shape, size, and position, according to the phase of cardiac revolution and respiration. Only by rotating the patient through all degrees of the circle are we enabled to obtain the fullest information about the position, configuration, and size of the heart silhouette as a whole and its individual chambers, the density of individual parts of the cardiovascular shadow, the contour of the apex, and about the relationship of the cardiovascular structures to the barium filled oesophagus to the tracheo-bronchial tree and to the diaphragm.

Dyspnoea and Cough

In clinical, industrial, and private practice alike especially in those past middle age, more commonly in men, one frequently encounters cases of cardio-vascular and pulmonary degenerative disease combined. There is frequently a concomitant bronchitis, with numerous sonorous rhonchi and wheezing expiratory phase masking the clinical picture.

Dyspnoea may result from increased metabolism, e.g., in thyrotoxicosis, from disturbed acid-base equilibrium, in diabetic acidosis, or through ingestion of acids, from disorders of the nervous system, both functional and organic, and, most of all, from respiratory and cardiac disease.

Though the diagnostic criteria of pulmonary emphysema have recently been clearly established (Christie, 1944), and though the radiological significance of the enlarged pulmonary artery and of the conus of the right ventricle for the diagnosis of the chronic cor pulmonale is recognized, the distinction between the cardiac and pulmonary pathology underlying the dyspnoea-cough syndrome may tax the diagnostic ability of the physician to the utmost. The questions which

arise here are : What is the underlying aetiology of the chronic dyspnoea and cough ? is it cardiac or pulmonary ? is there concurrent cardiac and pulmonary pathology ? and, if so, which was the primary aetiological factor, and which the superimposed one ? is the cardiac or pulmonary involvement predominant ?

It may suffice mainly to classify this group as follows :

(1). Pulmonary signs and symptoms primarily due to early or advanced or free left ventricular failure resulting from hypertensive heart disease, from chronic or acute coronary insufficiency, or from aortic or mitral valvular disease, as the case may be. It is to be noted that the most common form of circulatory failure is the isolated failure of the left heart presenting the syndrome of dyspnoea on exertion, orthopnoea, paroxysmal nocturnal dyspnoea, cough and wheezing, all this resulting from engorgement of the pulmonary vascular tree and diminished output of the left heart.

(2). Pulmonary signs and symptoms primarily due to some chronic respiratory malady, in particular pulmonary emphysema with chronic bronchitis.

(3). Pulmonary signs and symptoms due to pulmonary and cardiac disease combined, e.g., the common association of pulmonary emphysema with arterial hypertensive disease or with coronary sclerosis.

The differential diagnosis between pulmonary emphysema with dyspnoea, cyanosis, and some distension of cervical veins (the latter due to increase of intrapleural pressure) and right heart failure depends on X-ray findings, and estimation of circulation time and venous pressure. Clinically, venous engorgement, dependent oedema, and deepening of cyanosis indicate super-vening right heart failure.

The Importance of Exact Diagnosis in View of New Surgical Methods

A clearly established diagnosis of an uncomplicated isolated patent ductus arteriosus Botalli enables one to offer the patient a complete cure by surgical section or ligation of the ductus. Even cases of patent ductus complicated by subacute bacterial endocarditis can be cured by this method. The number of patients thus successfully treated is steadily growing. Chronic constrictive pericarditis is in many a case amenable to surgical cure. Tracheal obstruction resulting from a congenital malformation of aorta, i.e., double aortic arch, has been successfully operated on.

Surgical procedure has also been applied to cases of coarctation of the aorta.

Essential hypertension, even of malignant type,

especially in younger individuals, may be improved and, sometimes, even cured by means of resection of the great splanchnic nerve. Malignant hypertension following unilateral renal disease can be successfully treated by nephrectomy.

Surgical treatment has been recently developed to increase the pulmonary blood flow in cases of pulmonary stenosis and atresia, by establishing an anastomosis between the subclavian or innominate artery and a main branch of the pulmonary artery.

Surgical procedures may be applied in many a vascular disorder, e.g., embolectomy for sudden embolism of the arteries of extremities, dissection of an arterio-venous fistula or excision of an aneurysm of a peripheral artery, complete sympathetic denervation in Raynaud's disease, and sympathectomy in obliterative arterial disease.

Rheumatic Fever

The Council of the British Cardiac Society, and the Executive of the British Paediatric Association have published a report about the care of rheumatic children. (*Br. Heart J.*, vi, 99, 1944.) The chief objects propounded by the Committee are as follows :

(1). The establishment of cardio-rheumatic clinics to deal with early diagnosis, treatment, and supervision of the rheumatic child, and with its rehabilitation. Education of medical practitioners in cardiac diagnosis and differential diagnosis of chorea and 'growing pains.'

(2). The organization of hospital schools for rheumatic children.

(3). The compulsory notification of all cases of suspected acute rheumatism, chorea, and rheumatic heart disease in children under the age of 16 years.

It is an established fact that rheumatic fever, chorea and rheumatic heart disease represent a serious social and economic problem, and that clinical science alone cannot remedy these maladies. Rheumatic fever is perhaps twenty to thirty times more frequent among the poor children of the industrial areas than among the children of the well-to-do. 'Rheumatic fever . . . with chorea and rheumatic heart disease remains second only as a cause of death to phthisis between 5 and 45 in women and follows phthisis and violence in man.' (Morris and Titmuss quoted by Ryle, *Brit M. J.*, November 1943.) The prevention of disease arising from social background cannot be achieved without far-reaching social legislation.

Although the scheme outlined in the above report of the British Cardiac Society deserves wholehearted support of the medical profession.

and of the State, and although it must be agreed that the care of rheumatic children deserves the first consideration, there is every justification to set up a system of cardiac clinics based on a nation-wide organization for the benefit of cardiac cases of any type.

The crippling effect of rheumatic heart disease, the growing incidence of arterial hypertensive

disease and of the degenerative cardio-vascular disease generally call for a comprehensive scheme providing up-to-date diagnostic and remedial facilities, as well as after-care and rehabilitation for all cases of cardio-vascular disease.

I beg to extend my sincere thanks to Dr. Maurice Davidson for his criticism and helpful advice in the preparation of this article.

HAEMOLYTIC ANAEMIA, WITH PARTICULAR REFERENCE TO CAUSE AND MECHANISM

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The anaemias resulting from abnormally rapid haemolysis constitute an important group of disorders of great interest to both clinician and pathologist, but although considerable progress towards their understanding has been made in recent years, much is still unexplained. In this short review general principles are first considered, then, choosing certain important types of haemolytic anaemia as examples, the various mechanisms of causation are discussed. Recent work of importance is mentioned as far as possible and some of the many points still requiring elucidation are indicated.

The Results of Increased Haemolysis

(a) Increased blood pigment excretion

The essential feature of haemolytic anaemia, however caused, is a shortening of the life of the red blood cell, now known with certainty to be normally about 120 days. In health, therefore, about 0.85 per cent. of the circulating red cells are eliminated from the circulation daily; in haemolytic anaemia, however, the rate of destruction may be increased tenfold or more.

The result of this unusually rapid haemolysis is a greatly increased excretion of bile pigment, almost invariably accompanied by jaundice. The excess bilirubin in the plasma gives a Van den Bergh reaction of the indirect type. In the faeces, the content of bile derivatives, usually measured as 'urobilinogen,' is above the normal daily figure of 80 to 250 mgm. The urine generally contains no bilirubin—the jaundice is 'acholuric,' and only traces of urobilinogen.

In some less common types of haemolytic anaemia blood destruction takes place mainly in the circulating blood stream, and blood pigment may appear in the urine (haemoglobinuria). In the more common types in which haemolysis seems to take place chiefly in backwaters of the main blood stream, such as within the spleen pulp, haemoglobinuria is not seen. In the former instance the patient's plasma may contain considerable amounts of oxyhaemoglobin and methaemalbumin, the haemoglobin in the urine being derived from the plasma oxyhaemoglobin.

(b) Compensatory red cell regeneration; the bone marrow and the peripheral blood picture in haemolytic anaemia

Increased haemolysis leads invariably to increased red cell formation within the bone marrow, at least after the first few days of a haemolytic attack, and equilibrium between destruction and formation may be eventually attained. Usually however, the red cell count is well below normal. Many patients stabilize with haemoglobin levels between 50 and 80 per cent.

This increased marrow activity is accompanied by a centrifugal spread of red marrow into the long bones and a partial or complete disappearance of fat spaces from large areas of marrow, which becomes increasingly hyperplastic and erythrocytogenic. The presence in the peripheral blood of an increased proportion of *reticulocytes* is evidence of this. The reticulocyte count may indeed reach very high levels; sometimes as many as 50 per cent. of the red cells, or even more, are in this form. Macrocytosis is commonly