adrenal was enlarged and hyperplastic to about three times its normal size, weighing 16 grammes, and Dr. Vines reported that it gave a fairly strong fuchsinophil reaction. Left unilateral adrenalectomy was therefore performed. It was obvious from the skiagram that the "tumour" we suspected was the spleen, although it is difficult to say why it appeared to be surrounded by air. Apart from an unexplained attack of pyelitis about the fourteenth day the patient made an uninterrupted recovery.

The post-operative assay for male hormone taken on December 13 showed that the amount of sterone was reduced to 6.5 mg. daily, a figure which may be regarded as a low normal. The sugar tolerance shows a decrease, and is charted with the pre-operative result. Within two months the patient had lost a stone and a half in weight, the blood pressure is the same, and her periods have been regular. The present photograph was taken in January, 1940; the pre-operative one was unfortunately lost.

This case of basophilism due to adrenal cortical hyperplasia presents several points of interest. A diagnosis was only arrived at by means of a urinary assay for androgens. The immediate response to unilateral adrenalectomy, both clinically and biochemically, and the corroboration of the diagnosis by histological means, conform to the experience which we have obtained in our work on virilism.

Summary

At the moment it may be said that the subject of basophilism is still *sub judice*. An apparently identical clinical syndrome may result from a lesion in either the pituitary or the adrenal glands. It is a matter of speculation whether the one is primary and the other secondary, or whether both are involved. From the practical standpoint in the treatment of a condition which has hitherto been unsatisfactory, and the study of these two cases, one of each type provides confirmation of the view that estimation of the urinary androgens affords a valuable means of making a differential diagnosis. When these are in excess it points to adreno-cortical overactivity. The ancillary methods of confirming such a diagnosis are discussed in the description of each of the two cases. The important outcome is that unilateral adrenalectomy in suitable cases offers a hope of alleviation, if not cure, in this most distressing condition.

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The printed newsletter which the Central Council for the Care of Cripples has published in the past has been discontinued for reasons of economy. It is being replaced by a quarterly stencilled newsletter, of which the first issue is dated January, 1940. Although the material in such a publication must necessarily be restricted and the circulation has had to be cut down, it is hoped to include in the new publication items of special interest to orthopaedic hospitals and institutions and to all workers for cripples. Those who are in a position to contribute such items may send them addressed to the Editor, News Bulletin, Central Council for the Care of Cripples, 34, Eccleston Square, S.W.1. The fifth International Exhibition of Cripples' Work, which was to have been held at the Seymour Hall, London, W.1, last October, has had to be indefinitely postponed owing to the war.

CARDIAC EXAMINATION IN WARTIME

BY

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The advantage in diagnosis of making the most of symptoms has been well appreciated by the profession in our time, and in no branch of medicine more than cardiology, thanks largely to the influence of Mackenzie. For instance, the diagnosis of angina pectoris can be, and often must be, made solely from what the patient tells us: the patient's story is the foundation of diagnosis. The recognition of slight heart disease in men of military age is to be approached by a very different method. Here physical signs come into their own and become the basis of diagnosis. Unfortunately the signs will often be slight or dubious, and difficult to interpret. A shaky sign is a poor foundation for a weighty diagnosis, though this may rest on a trusty sign supported by others less convincing. It may therefore be useful to recapitulate and examine these signs as they apply to the recognition of the early stage or minor grades of cardiac disease in recruits and soldiers.

The work of a medical examiner in wartime is difficult enough, and constant care will scarcely prevent the occasional acceptance of this type of cardiac subject. The difficulty will be mitigated by knowing that such cases will almost be limited to rheumatic and perhaps congenital heart disease. Even with proper care and reasonable skill, diagnosis may still remain a matter of probability—and yet a decision has to be taken.

The history cannot be neglected, for the candidate may know that his heart has been described as "weak" perhaps from his very early years, or later and maybe from an attack of rheumatism or of chorea. A history of tonsillitis has little value, and of scarlet fever or diphtheria almost none. He may also think or know that he is more short-winded than his fellows. Any such points in history will make the examiner more alert in his search for signs.

The appearance will only help if there happens to be cyanosis and clubbed fingers due to a cyanotic congenital lesion. The coloration of the cheeks is so varied in healthy men that suspicion of mitral disease should not easily be roused by a high colour.

The Pulse

Pulse-response tests (so-called exercise, tolerance tests) can have little value in the recognition of myocardial or valvular disease, or indeed in assessing myocardial efficiency; yet they are valuable in judging the nervous control of the heart rate. An examiner soon learns to overlook the natural tachycardia of nervousness, especially when it dwindles as the interview proceeds and during the recumbency which is essential to every cardiac examination. Where a high rate persists—for example, over 100—a thermometer may explain it, or the state of the throat or the lungs. Re-examination after an interval may be indicated if the rate persists well over 100 throughout the interview and after recumbency. A high grade of persistent tachycardia can be one expression of a neurosis, and judgment as to fitness may have to depend on the state of the nervous system more than that of the heart.

Hyperthyroidism is occasionally the cause of a high tachycardia which persists. For the detection of slight thyroid enlargement, the subject, sitting on a low chair, should lean forward and moderately elevate the chin. The observer, standing in front, asks him to swallow, when the gland will rise and reveal its size and form. If enlargement is doubtful, the lively temperament, the fine tremor of the fingers, and the wasting will tell in diagnosis.

The rhythm may show a waxing and waning of the rate with inspiration and expiration, especially if the pulse is infrequent, but this is normal sinus arrhythmia. Extrasystoles will disappear with the tachycardia of a trial exertion. Auricular fibrillation is a complete irregularity, and it persists or even becomes more characteristic on exercise. An electrocardiogram may be necessary, for it gives final proof.

Apex Beat

The apex beat is a clinical guide to the diagnosis of enlargement, and for this purpose is more reliable than percussion, which is certainly a waste of time in early or doubtful cardiac disease. Admittedly it cannot always be felt, though this in itself makes enlargement unlikely. A diffuse impulse is not an indication of enlargement. The apex beat is the lowest and outermost point at which the examining finger is raised by the heart. In disease the apex beat may be displaced and it may be too forcible; it is advantageous to separate in one's mind the position and the force, because either may give the clue and either may reinforce the other in its diagnostic significance.

It is remarkably how seldom the apex beat is found beyond its rightful place unless the heart is affected; hence its permanent value in diagnosis. In a heavy patient the apex beat, if felt at all, is often lifted by the high diaphragm out to the nipple line. With a rapid heart the apex beat may be jerky and seem to be displaced or forcible, or both, and yet there may be no enlargement. Wait for the tachycardia to subside, when re-examination will resolve any doubt on this score. The apex beat is often displaced simply from twisting of the thorax by scoliosis. Turn the patient round, let him stand at ease, and note a general spinal curvature almost always with a convexity to the right. If there is doubt, radioscopy will quickly decide that the heart merely lies a little to the left in the chest, and that it is not enlarged. If neither tachycardia nor scoliosis explains an apex beat beyond the nipple line, and the lung is not fibrotic, the sign indicates cardiac enlargement.

Listen for the harsh murmur and feel for an aortic systolic thrill (aortic stenosis), and listen closely with ear attuned for an aortic diastolic murmur (aortic incompetence), the most likely cause of enlargement being valvular disease. Hypertension is a less likely cause in an actual or would-be combatant. When the apex beat is too forcible at a normal or moderate rate it will probably lie in or outside the nipple line, and the assumption will be that it means an enlarged and therefore a diseased heart.

Auscultation

In auscultation generally it is better not to listen too long, but to pause and try again. A stethoscope should fit loosely in the ears; if tight it dulls the hearing. It is a mistake to apply the chest-piece only on the assumed apex; if moved an inch internally it may there pick up a localized presystolic murmur.

The heart sounds afford little help apart from this important exception—the sharply-loud first sound at the apex suggestive of early mitral stenosis. The sign is most significant if the rate is normal or moderate, for tachycardia itself may sharpen the first sound. The diagnosis of mitral stenosis should never rest along on the sudden (or snapping) first sound; and it will generally prove possible to elicit the diagnostic presystolic murmur in such a case. Get the subject to swing or exercise his arms briskly, then to lie down and turn towards his left side. Listen during the succeeding half-minute for the short rumbling presystolic murmur of mitral stenosis. But there must be no doubt about it; so significant a sound must be truly heard or not accepted. Duplication of the first sound without accentuation is occasionally heard in normal hearts, and it may even be suggested in the feel of the apex beat and feebly imitate the purr of a thrill. A loud aortic second sound in young people should be a reminder of the possibility of missing a faint aortic diastolic murmur which the loudness of the second sound is apt to hide. A loud pulmonary second sound may add to the probability of mitral stenosis.

MURMURS

A thumb on the right carotid artery (internal to the sterno-mastoid) is the best guide in the timing of a murmur. A systolic murmur at the base may generally be ignored if soft, and obvious only in recumbency. If loud or long and constant it may mean on the left (pulmonary area) a congenital lesion, or on the right (aortic area) rheumatic aortic stenosis, and a confirmatory thrill will be felt by a light hand, especially with the patient leaning forwards after an expiration. The aortic second sound may be absent for the same reason that a diastolic murmur may be present—because of the fixed stenotic valve.

A systolic murmur at the apex gives most trouble, and no diagnosis is satisfactory which depends on the evidence of a systolic murmur. If at all difficult to hear, being soft and short; if louder at the end of inspiration; if varying much with posture, it is probably functional and can be neglected. A systolic murmur produced only by exertion is also negligible. If constantly heard during standing and recumbency, still more if harsh and long, it demands close investigation. Is there a history of rheumatism or chorea? Is the man short-winded? Is the first sound replaced by the murmur? Or, best of all, can the presystolic murmur of mitral stenosis be elicited on listening quickly at the apex when the subject briskly exercises, promptly lies down and turns over towards his left side? Even if not, the man with a forcible apex beat slightly or doubtfully displaced, and with a noticeable and invariable systolic murmur, should be under suspicion of rheumatic mitral disease. If the murmur is palpable (a systolic thrill) the term "mitral incompetence (rheumatic)" is permissible, though mitral stenosis will almost certainly coexist. Alternatively, a systolic murmur at the apex may easily be a clinical hint of aortic incompetence. Anaemia is a fruitful source of systolic murmurs, basal and apical.

So important is the discovery of an aortic diastolic murmur that not merely the aortic area but the left border of the sternum should be searchingly auscultated in a quiet room, preferably with the ear on the chest, the patient leaning forward and pausing at the end of expiration. The secret of the diagnosis of early aortic incompetence is thus to listen with the direct question in one's mind: Is there a diastolic murmur or not? Forgotten may be the collapsing pulse and capillary pulsation of the

fully developed disease. Once the aortic diastolic murmur is surely heard, and confirmed preferably by others, the diagnosis is certain. Below the age of 35 it is rheumatic; after that age it may be syphilitic (history; W.R.).

Congenital Heart Disease

Congenital heart disease will be suggested by a history of a cardiac murmur or "heart trouble" from infancy, by cyanosis, or by an obvious murmur (and thrill) loudest towards the pulmonary area and not conforming to the familiar pattern of acquired valvular disease. Cyanosis with clubbed fingers and a pulmonary systolic murmur (and thrill) in a young adult generally represents *Fallot's tetralogy*—that is, pulmonary stenosis with a ventricular septal defect.

Most congenital heart cases without complication are free from cyanosis. A loud hissing systolic murmur in the third and fourth left spaces (mid-precordial), if the only sign, means a *ventricular septal defect*. A systolic-diastolic continuous murmur ("like machinery") in the pulmonary area implies a *patent ductus arteriosus*. The rare occurrence of a congenital *dextrocardia* will be remembered, though *dextrocardia* is more often acquired and due to a fibroid lung. An *auricular septal defect* may explain a displaced apex beat with a pulmonary systolic murmur, and radiology reveals the huge pulmonary artery and its branches, which are almost diagnostic.

Blood Pressure

The blood pressure should be estimated if the apex beat is displaced or forcible without other cause, or if the aortic second sound is accentuated. Tachycardia often raises the first systolic reading and therefore should be allowed to subside. If only for this reason the patient is better lying down. A reading by the palpatory method is a useful control. Only figures persisting after a fair interval of rest (lying down) at or above 160 systolic and 90 diastolic should be regarded with any misgiving. Re-examination on another day is then advisable. A high diastolic reading (over 100) is especially significant. The urine may contain albumin. Rarely, coarctation (congenital stenosis) of the aorta explains an unexpected hypertension in relative youth. Deficient femoral pulsation, dilated collateral arteries about the scapulae, and x-ray evidence of rib erosion by collateral vessels will establish the diagnosis. A high systolic and low diastolic blood pressure will prompt an examiner to listen once again for an aortic diastolic murmur.

An *electrocardiogram* will be necessary only in special cases, notably those with a perplexing irregularity, or with exceptional bradycardia or tachycardia. It may serve in the diagnosis of a congenital anomaly or a valvular lesion, or in distinguishing between them.

X-ray examination, radioscopy for choice, is desirable where the presence or absence of enlargement must be established; and it is now more widely known that the heart assumes a characteristic form in congenital and valvular diseases—though not always in the slighter cases—which may consolidate a cardiac diagnosis.

Acute Rheumatism.—Sodium salicylate is considered a specific anti-rheumatic drug and must be given in large doses for at least six weeks. Tachycardia alone is not an indication for unlimited rest, but should be treated by digitalis and "careful mobilization."—Polyarthritis Rheumatica Acuta in Children. C. F. van der Merwe.—*S. Afr. med. J.*, June 24, 1939, 13, 455.

EMERGENCY PREPARATION OF PYROGEN-FREE WATER

BY

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AND

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The production of distilled water free from pyrogens requires the special precautions regarding distillation and autoclaving laid down in the monograph in the *British Pharmacopoeia Addendum*, 1936. A civil or military emergency may give rise to a sudden demand for very large quantities of intravenous saline. Here is described a method whereby tap-water or unsatisfactory distilled water may be readily freed from pyrogens, even though only the most primitive laboratory facilities are available.

Pyrogens were first described by Hort and Penfold (1911). Their exact nature was thoroughly established by the work of Seibert *et al.* (1923, 1925; Bourn and Seibert, 1925). Banks (1934) and Co Tui *et al.* (1936, 1937, 1939) have also carried out research on this subject, and many other American authors have studied pyrogens from a clinical point of view (Walter, 1935, 1936; Rademaker, 1930, 1933; Thompson, 1933). Although it is not yet widely enough realized, the cause of pyrexial reactions following intravenous injection has been definitely established, and many of the traditionally accepted factors have been proved to be of relatively little importance. Pyrogenic agents are filterable thermostable products of the growth of certain strains of bacteria that are ubiquitous enough to infect any water that is not kept absolutely sterile. These bacteria grow very rapidly in distilled water, and large quantities of pyrogen can be formed in a day in water kept at room temperature. Ordinary autoclaving does not destroy pyrogens, but water can be freed from them by distillation.

To obtain pyrogen-free water the still used must be fitted with vapour baffles to prevent passage of droplets, and the condensing system should be of such a design that it can readily be kept scrupulously clean. All glassware must be carefully cleaned immediately before use, and for storage the water (or solutions prepared from it) should be autoclaved and sealed very shortly after distillation.

Importance of Pyrogens

A typical pyrogenic reaction consists of a rigor and feeling of chill any time from fifteen minutes to eight hours after the injection. There is a sharp rise in temperature and pulse rate. The reaction is followed by profuse sweating and a fall in temperature. There may also be nausea, vomiting, headache, and albuminuria.

It is difficult to estimate the amount of damage done by these reactions. They are often stated to be relatively harmless, but surgeons and physicians agree that they are a highly undesirable toxic side-action of saline therapy. Owing to the fact that a considerable proportion of patients who receive saline infusions are in a dangerous condition, it is not possible to estimate how far pyrogenic reactions may be an actual cause of death.

Testing for Pyrogens

Seibert and Mendel (1923) and Banks (1934) have described a satisfactory technique for the detection of