The nerve trunk most frequently involved was the radial, a fact which is explained by the frequency, especially during the first few months of the war, of fractures of the humerus.

Neurolysis is a protracted, delicate, tedious operation, lasting from an hour to an hour and a half. In order to discover the nerve it is better to tackle it in healthy tissue, following it up to the seat of damage. The anatomical relations have disappeared, the parts have changed aspect, and the search is often very difficult. I have invariably done my best to spare the smallest nerve fibre, and when the nerve is incompletely divided I join it up partially with every regard for the remaining fibres.

I only did complete suture in two cases of divided sciatic. The first was completely divided and the two ends, swollen and clublike, were 3 cm. apart. The second was three-quarters cut through, only a frail band remaining.

The results are usually long delayed, though they may be more rapid where the nerve is gripped by fibrous tissue; they are very long in becoming manifest when the nerve is completely divided.

Vascular Lesions.

Under the term "diffuse secondary aneurysmal haematoma" I described in the *Presse médicale* for February 11th of this year a special form of haematoma which only makes its appearance from three days to three months after the infliction of the wound. I have been called upon to operate in a fairly large number of these cases of haematoma, the clinical characters of which are: (1) delayed appearance; (2) sharp pain radiating throughout the limb, due to stretching of the nerve trunks; (3) anaemia varying according to the size of the haematoma; (4) apyrexia. The rule I follow is to open the pouch and tie the two ends of the damaged vessel after rapid removal of the clots. But in certain cases of large haematoma the anatomical relations are destroyed, while in others the ends of the vessels are shrivelled and undiscoverable, or, after removal of the clots, the cavity turns out to be very deep, so that it is impossible to apply the ligature. Under these conditions ligature of the artery above the lesion yields the best results.

Extraction of Foreign Bodies.

Among the numerous projectiles that I have been called upon to remove fragments of shell were the commonest, then rifle bullets and the round shrapnel balls. In one instance I removed from the calf a bit of wood 8 cm. long; in another, after opening up a very septic track in the buttock, I lighted upon a square-headed hobnail.

Shrapnel balls, and particularly fragments of shell, invariably cause septic wounds, because they always carry in bits of clothing. It is a common experience, when we are called upon to remove a splinter of shell a long time after the infliction of the wound—by which time the track of the missile has quite healed—to find it encysted in a pouch full of pus of very attenuated virulence. We must therefore proceed very cautiously when called upon to remove bits of shell or shrapnel balls lodged in or near a joint. The breaking down of the protecting adhesions in this case may determine suppuration of the part as a whole.

Bullets sometimes break up, especially when they strike a bone, or ricochet before entering the body. In such case we sometimes find the envelope of the bullet more or less torn open and fragments of lead disseminated in the tissues.

Among the interesting cases of projectiles which I have had to extract I may mention (1) a rifle bullet lodged behind the sternum opposite the third rib; one inside the hip-joint; two in the knee-joint; one in the elbow-joint; another in juxtaposition to the left axillary artery, under the pectoral muscle; (2) a bit of shell in the left pleura; a fragment of shell weighing 350 grams under the fractured left scapula, where it had lain twenty days; another between the two condyles of the femur in front; (3) a shrapnel ball implanted in the small trochanter, one in the knee, etc. I should like to call attention to the method of extracting projectiles under the radioscopic screen devised by Dr. Vulyamoz, which has been of the greatest service to me.

AUSCULTATION OF THE HEART OF THE RECRUIT.

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THE issue by the War Office of a memorandum on the significance of abnormal signs in the heart of the recruit, and the papers on that subject in the *BRITISH MEDICAL JOURNAL* of October 30th, 1915, suggest that possibly it may be of use to reproduce what I wrote thereon in an article on auscultation of the heart in *A Dictionary of Practical Medicine* in 1890.

I have made no alterations, but have omitted certain sections dealing with conditions unlikely to be met with in the recruit. The italics are in the original.

All murmurs should be timed by the carotid pulse, *not by their relation to the apex beat.*

Cardiac murmurs may be present without structural change in the valves or orifices, especially in anaemia and chlorosis, and when the action of the heart is excited.

Sounds closely resembling those resulting from organic disease of the valves, but really produced outside the heart, are of frequent occurrence, and are termed *false* or *cardio-pulmonary* murmurs.

The various conditions which may give rise to these murmurs may be classified thus:

1. Displacement of, or pressure upon, the heart, the result of disease of the (a) lung, (b) pleura, (c) thorax, or (d) abdomen.
2. Effusion into the pleural cavity.
3. Changes in the pleura of the praecordial area.
4. Changes in the lung overlying the heart.
5. Changes in the pericardium.

4. *Changes in the Lung overlying the Heart.*—... a systolic murmur about the apex of the heart which closely resembles the murmur of mitral regurgitation. The sound is caused by the impact of the heart upon the lung... producing an audible sound by displacement of the air in the bronchi. . . . It is almost always most distinct during expiration, is superficial, high pitched, and disappears when the breath is held after a deep inspiration, and often becomes inaudible when the patient lies down. This murmur may sometimes be heard in the axilla and at the angle of the left scapula.

5. *Changes in the Pericardium.*—False murmurs, when due to chronic changes in that membrane, are frequently heard at one particular spot—namely, the sixth left interspace and over the seventh rib close to the base of the ensiform cartilage. Here the right ventricle is in contact with the chest wall, and it is on its anterior surface that the "white patch" is most commonly found. The sound produced by the movement upon each other of the pericardial surfaces at this spot is systolic in time, usually short, sharp, localized, and superficial; it seldom acquires a blowing character. In fact, it often resembles more nearly a rough reduplication of the first sound than a murmur. It is, perhaps, doubtful whether the altered sound, which is so commonly heard at this spot, is in all cases due to the presence of a "white patch" on the pericardium. It is especially common in emphysema with downward displacement of the heart. The effect of change of position upon this murmur is variable. It may disappear entirely when the patient is in the recumbent position, as often happens with friction sounds audible elsewhere over the heart, whilst at times it is hardly at all affected by such a change. When the heart is not displaced, a murmur presenting similar characters may often be heard in the fifth left interspace close to the sternum. Thickening of the pericardium of the left auricular appendix occasionally produces a rough systolic murmur in the second left interspace.

The following precautions should be observed in the examination of all cases presenting murmurs. Assuming that the presence or absence of those consecutive changes in the heart, which are almost invariably associated with disease of any given valve, has been noted, if there is still room for doubt, the following points must be observed carefully:

1. The exact period in the cardiac cycle occupied by the murmur. False murmurs are often not exactly synchronous with the commencement of systole or diastole; they may precede or follow the one or the other.

2. The site of maximum intensity and the line of conduction of the murmur. These do not usually coincide with what is found with similar murmurs of organic origin.

3. The condition of the lungs. With doubtful apex murmurs evidence of pulmonary engorgement is strongly in favour of organic valve disease, as that condition is almost invariably absent in the reflux of anaemia.

4. The effect of change of position upon the sound. *It is essential to examine every case of suspected valve disease both in the standing and recumbent position.*

It may be stated with confidence that an opinion given in a doubtful case without observing this precaution is of no value. Functional and false murmurs often disappear when the patient is down, whilst an organic murmur, especially that of mitral stenosis, may be only audible in that position. A murmur which suddenly and completely disappears when the patient lies down, provided there is not at the same time any marked alteration in the pulse-rate, is almost certainly not due to organic disease of a valve.

5. It is important in all cases to auscultate the trachea. A murmur audible in the trachea may be due either (1) to the conduction of the murmur of aortic stenosis; or (2) to the impulse of an aneurysm; or (3) to the impulse of the heart causing an air wave in the bronchi and trachea, this latter being by far the most common cause of tracheal murmurs. Mitral murmurs are not audible in the trachea.

6. False murmurs often disappear completely when the breath is held.

7. The state of the pulse may at once negative a suspicion of organic disease founded on the presence of a murmur.

I am disposed to add that *it is essential to examine the heart of every recruit both in the standing and recumbent position.*

Experience gained in civil practice is not always applicable to military practice. The civilian, as a rule, stops when he feels that his work is overtaxing his strength; the soldier may be obliged to continue until he is ordered to halt or drops from exhaustion. Compensation which might have lasted for fifty years or more in civil life, may, in a soldier, be quickly destroyed by prolonged over-exertion.

I published many years ago in the *Clinical Society's Transactions* the case of a man with aortic stenosis and regurgitation and mitral regurgitation, changes due to an attack of acute rheumatism with endocarditis, which occurred when he was a boy aged 14, who had worked for fifty-five years as a turner in wood at a treadle lathe, without a day of illness, and in whom compensation was still well maintained. It does not, however, follow that it would have stood the stress of active service, at or about the age of 20, and still have lasted for such a long period.

A personal physical defect of which the soldier is unaware may be of little importance, but it may become of great importance when he has got to know of its existence.

Examiners of recruits who pass defects as of no importance, when all symptoms are absent, must be prepared to support their opinion when, at a later date, the defects are found to be unchanged but accompanied by many subjective symptoms.

TARTAR EMETIC IN KALA-AZAR.

BY

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My attention has been drawn to a letter on this subject from Lieutenant-Colonel Sir Leonard Rogers, I.M.S., in this JOURNAL for July 31st, 1915. I have had a little experience of the antimony treatment of leishmaniasis which I will now briefly refer to.

CASE I.

The first case was that of an officer in the XIIth Pioneers, who was stationed in Quetta. He first noticed the disease when he was in camp at Christmas time, and it began in a deep fissure in the mucous membrane of the lip which had been caused by the cold dry wind then prevailing. It increased rapidly, and when I saw it was the size of a pigeon egg, and was painful, ulcerating, and very unsightly. He had had various kinds of treatment, including the application of CO₂ snow, but

the condition was worse rather than better. He also had a cyst-like swelling deep in the cheek, which had no visible communication with either the mucous or skin surfaces. This was punctured, and yielded *Leishmania* in pure culture, and the exudate from the ulcerating lip also showed these parasites together with *Staphylococcus albus*. Treatment with intravenous injection of tartar emetic was begun on February 11th, 1915, and six injections were given at intervals of two days or three days, in doses of 4 to 6 c.cm. of a 1 per cent. solution in normal saline. The treatment was very successful so far as the cutaneous and subcutaneous part of the disease was concerned, but the mucous ulceration was more difficult to cure and healed only after several applications of carbon dioxide snow.

The officer was cured and shortly afterwards proceeded on active service.

There are three noteworthy points in this case:

1. The disease began in a fissure in the lip and apart from any exposure to insect infection.

2. The presence of a subcutaneous nodule due to *Leishmania* which had no discernible connexion with the outside surface. (Cases of this sort have been described, I think, in the Sudan.)

3. The good effect of antimony in rapidly sterilizing the cutaneous and subcutaneous lesion and its slower action on the mucous ulceration. (This has been noted by Terra.)

CASE II.

The second case of leishmaniasis which I treated with antimony injections was that of a native officer in the Gurkha Rifles. He seems to have contracted the disease in passing through an infected village in the Nepal Terai where he spent four days in returning from leave at the outbreak of war. It was an acute case of kala-azar with persistent high temperature, irritable heart, darkening of the skin and rapid emaciation. The spleen enlarged very rapidly, doubling its size in three weeks, and puncture revealed *Leishmania* in that particular state which indicates rapid division and a high state of vitality.

He was going downhill rapidly, so I commenced intravenous injection of antimony tartrate, and gave him doses increasing from 4 c.cm. to 7.5 c.cm. of a 1 per cent. solution on alternate days. The treatment was begun on May 23rd, 1915, and continued till I left Quetta on service about June 10th. The temperature shot up after the first two injections and fell rapidly to normal, and after the second injection he had no more fever and the spleen began to recede and the general symptoms to abate. Without going into details as to his condition, I can say that in two and a half years' experience of kala-azar, I have seen no such promising result from any drug or any line of treatment. When I left for Europe he was improving, but I have heard nothing of him since. His blood state, according to Arneth's system of differential counting, was as follows:

	May 22, 1915.	May 25, 1915.	May 29, 1915.	June 2, 1915.	June 8, 1915.
White cells, in thousands ...	0.9	1.0	1.0	1.7	2.7
Basophiles ...	—	—	—	—	—
Eosinophiles ...	—	0.5	1.0	—	1.0
Neutrophiles —					
Myelocytes ...	—	—	—	—	1.0
Juvenile ...	2.0	4.5	5.0	2.5	2.5
Rod-nucleate ...	21.0	17.5	12.0	8.0	12.0
Segmented nucleate ...	29.0	39.5	36.0	14.0	19.0
Lymphocytes ...	30.0	29.0	34.0	12.0	38.0
Large mononuclears ...	18.0	9.0	12.0	13.0	26.0

* Before the first antimony injection.

† Fifty per cent. of decapsulated mononuclears.

The study of the blood bears out the general tendency to improvement which was so marked from the clinical side.

During the last two years tartar emetic has been used successfully in the treatment of leishmaniasis by Machado and G. Vianna (1913), Terra (1913), Cardina (1914), Da Silva (1914), Lapa (1914), Di Cristina and Caronia (1915).

In my opinion the credit for first using antimony tartate in leishmanial infection belongs to the Brazilian workers, Machado and Vianna, who used it in 1913 for cutaneous lesions, and to Di Cristina and Caronia, who, previous to February, 1915, used it in the treatment of Mediterranean kala-azar.

The Director of the Bombay Bacteriological Laboratory kindly arranged to provide me with capsules of 1 per cent. solution of antimony tartate sterilized by filtration, and he would, no doubt, supply it to others on application.