Description of Cardiac Wounds.

The pericardium showed an entrance and an exit wound over the right ventricle. On opening the sac a small piece of khaki cloth was found, together with a small quantity of clotted and fluid blood. The pericardium presented the appearance of early pericarditis. The left ventricle was distended, but the right was partially collapsed, and near the centre of its anterior surface was a small circular wound of entrance which passed obliquely through the muscle to a wound of exit very near to the right border of the heart; an interval of an inch separated the two wounds, and round each was a small circular area of bruised tissue. The right ventricle was opened posteriorly and found to contain some very bright red blood clot. No wound was visible from the interior, and on passing a probe it was found that the wound passed through one of the lacunae between the pillars of cardiac muscle, having just penetrated the ventricular cavity.

The cause of death was severe haemorrhage, complicated with pulmonary collapse and interference with the heart's action. The enormous amount of blood in the pleural sacs came from the heart; the lung wounds were not capable of causing much haemorrhage. With each systole some blood would be forced through the small openings in the right ventricle into the pericardial sac, and from there blood would ooze through the pericardial openings into the pleurae. There was no attempt at closure of the openings by clot. Their small size accounts for the length of time the patient survived.

The occurrence of pericarditis and pleurisy (the latter being curiously localized) showed the beginning of an infective process.

The wounds of the left lung were no doubt closed by blood clot, while that of the right was kept open by the shrapnel on the surface causing collapse.

An x-ray photograph of the specimen was taken by Captain F. H. Gibson, R.A.M.C., and no foreign body other than the one described was found.

The specimen has been sent to the War Museum of the Royal College of Surgeons, London.

WHITE GANGRENE.

BY

MAJOR A. J. HULL, F.R.C.S., R.A.M.C.

In addition to gas gangrene and gangrene due to direct interference with the blood supply, septic gunshot wounds may be attacked by a very acute infective process which is a form of gangrene. The condition appears to be an acute streptococcal infection, and is, in appearance, not unlike phlegmasia alba dolens, but is attended by the local circumstances associated with gangrene and the general effects of an acute toxæmia.

This form of gangrene has only been seen in the lower extremity.

The skin is glazed and white, moist, cold, and pits on firm pressure. A very firm oedema is present, and the distal pulse in the limb cannot be felt. The glazed white appearance of the distended skin, instead of the usual redness, seems particularly characteristic. Early in the condition the patient is extremely ill, with clammy, sweating face, and running pulse. The condition is extremely fatal, and death occurs in about twelve hours. The infection is so rapidly fatal that little change in the colour of the limb has been noticed. In those cases which have survived somewhat longer, it has been found that, during the last few hours, the limb has become mottled black and the discharge exceedingly foul. No gas has been noticed in the discharge, and no crackling has been detected in the tissues. The appearance is somewhat suggestive of deep-seated pus, owing to the tension of the skin, but, on making an incision into the limb, the wound merely oozes serum.

In the more severe and extensive forms the infection is so severe and the patient's condition so serious that no treatment appears practicable.

Amputation gives the only chance of recovery, and is successful when the infection is more localized, as happened in Case I.

White Gangrene of the Leg.

CASE I.—Pte. S., wounded March 9th with rifle grenade, dressed at field ambulance and transferred to base. Shell wound of left leg with comminuted fracture of upper third of tibia and fibula, and flesh wounds in the region of knee. Leg swollen and white, extending well up to thigh, and looking like

phlegmasia alba dolens. Foot cold, and no pulsation to be felt in distal vessels of ankle; wound foul with sanious discharge; temperature 102°, pulse 124. Bacteriological examination showed streptococcus. Amputation through lower third of thigh; recovery (Lieutenant S.'s case).

CASE II.—Pte. L. was shot through the calf on September 24th and admitted to a base hospital on September 25th. There was a small wound of entrance and a wound of exit the size of half a crown, through which muscle bulged; the leg was white, the skin tense and cold. Incisions, 3 in. long, were made on each side through the bullet track, capillary bandages were inserted, and continuous saline irrigation applied. The next day the skin was much more swollen, it pitted on firm pressure, and had the appearance of a limb containing deep-seated pus but was white in colour. Very little pus came from the wounds; a thin, foul-smelling discharge exuded. The patient's temperature was 103°; he was restless, and his general condition was very much worse. Numerous incisions were made into the subcutaneous tissue. The patient's condition did not improve, the pulse became rapid, shock was very pronounced. The limb turned blotchy black and was extremely foul. The usual remedies were employed, including rectal saline injection. The patient died eight hours after the second operation.

CASE III.—Cpl. W., admitted to hospital suffering from a shell wound of thigh. There was a compound fracture of femur and severe destruction of the knee-joint. The wounds had been cleaned and dressed with cyanide gauze at a clearing station. About fifty-six hours after the injury the patient had a rigor. His temperature rose to 104° F.; vomiting and collapse occurred. The limb became cold and no pulse could be detected. The skin was white in colour, and a firm oedema rapidly occurred in the whole limb. No crackling was present, indicative of gas. The patient's condition did not admit of surgical interference, and he died twelve hours after the appearance of the gangrene. Bacteriological examination discovered streptococci in the blood and in the discharge from the wound.

SIMPLE AND INEXPENSIVE METHODS FOR FERMENTATION TESTS AND FOR OBTAINING CULTURES OF ANAEROBES.

By J. M. BEATTIE, M.A., M.D.,

PROFESSOR OF BACTERIOLOGY, UNIVERSITY OF LIVERPOOL.

In most bacteriological laboratories the work during the war has been very much increased, and with the increased cost of apparatus and media various devices have had to be employed to reduce expenditure. It may, therefore, be of interest to record two methods which I am using, and which are simple, inexpensive, and, at the same time, efficient.

1. For Fermentation Tests.

For these I use small test tubes, which can be made in the laboratory from ordinary glass tubing of $\frac{1}{4}$ in. or $\frac{3}{8}$ in. diameter. Introduce into these tubes about $\frac{1}{2}$ c.cm. of any of the sugar media. These tubes, plugged and sterilized in the ordinary way, are inoculated with the organism whose reaction is to be tested, and then some sterilized vaseline, which has a melting point of about 55° C., poured into the tube. The vaseline solidifies and forms a plug, lying in contact with the fluid media. The tubes are then incubated in the ordinary way, and where gas is formed the vaseline plug is pushed up in the tube, and, if the media is cold when inoculated, there is sufficient absorbed oxygen to allow the free growth of the organism and to allow the reddening (the acid reaction) to show. In twenty-four hours, with the ordinary acid and gas-producing members of the typhoid-coli group, the reactions are very definite. Later, reduction takes place and the media becomes colourless, but if a hole is bored through the vaseline plug to allow ingress of air the red reaction reappears in a few minutes, starting at the upper part of the media and gradually spreading downwards. This method is simple and inexpensive, and it has the added advantage over the ordinary method that small quantities of gas, which may not be indicated by the ordinary Durham tube method, are always detected, the gas showing as small bubbles at the lower part of the vaseline plug. The method may be used for accurate estimation of the amount of gas produced by any given organism.

2. For Anaerobic Cultures.

Ordinary test tubes containing peptone broth or glucose peptone broth are used, and for the common anaerobes I find the peptone broth quite satisfactory. Melted sterilized vaseline is poured into the tube till it forms a

plug about $\frac{1}{2}$ to $\frac{3}{4}$ in. long. The broth and vaseline are then boiled for twenty to thirty minutes, so as to expel any absorbed air, and allowed to cool. The vaseline solidifies very rapidly and forms a very effective plug. The tubes can be kept for any length of time and are perfectly airtight.

When they have to be inoculated, they are put in a water bath at about 55° C. in order to melt the vaseline, and the infective material is introduced into the broth by means of a sterile pipette. Immediately after the tube has been inoculated it is my practice (though I think in most cases this is unnecessary) to heat the vaseline over the Bunsen flame before putting in the incubator, in case of infection of the surface vaseline during inoculation.

I have used the method for the common anaërobic, and I have never failed to get a good growth in twenty-four hours. The method has the advantage over the ordinary anaërobic methods of simplicity and cheapness, and I really adopted it because of the increased cost of and the difficulty of obtaining the reagents which are usually employed in anaërobic culture. It has a further advantage that the development of even mere traces of gas can be detected. For examination of the culture, the plan I use is to puncture the vaseline with a thinly drawn-out pipette sealed at the lower end, and constricted about half an inch from the sealed end. By pushing the pipette against the bottom of the tube it easily breaks at the constriction, and any quantity of the fluid culture can be drawn up. After the pipette is withdrawn the vaseline is melted and the tube is again tightly sealed.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

THE CAUSE OF APPENDICITIS.

PROFESSOR SHATTOCK'S paper in the Section of Pathology in the Royal Society of Medicine, which treats of the mechanical causation of appendicitis (p. 690), is of special interest to me. Having had it myself, a few facts as to my experience may help those who are trying to find out the true cause. Towards the end of 1881, when in practice at Eccles, I began to suffer from insomnia. If I fell asleep when I went to bed I awoke about 4 o'clock next morning, and could not sleep again; whereas if I did not sleep on going to bed, it was about 4 o'clock before I slept. That fact points to a periodicity which ought not to be overlooked. I did not feel ill, and went about my work as usual until about the middle of December, when I went to my ancestral home in Scotland for a holiday, hoping to get rid of the insomnia. While there I was out all day, generally with the gun. I ate as usual and the bowels acted every morning, but I was conscious that there was some difference in the motion. It was a spluttering motion, from flatus passing with the faeces. After ten days I returned to Eccles on December 24th. Having had breakfast before starting, I might have had a sandwich on the journey, and when I got home I had an egg, a slice of white toast, a cup of tea, and went to see a patient who was very ill. Going to bed at my usual time I fell asleep, and awoke about 4 a.m. with pain in the left side of the abdomen. I took a dose of castor oil, and was sick, but had no motion. In three days, having been in bed all the time, appendicitis was diagnosed by the late Sir William Roberts, who advised me to keep to peptonized milk as food and to have morphine to relieve pain. I had general peritonitis, and for twelve months afterwards could feel a lump, the size of a hen's egg, just inside the superior crest of the ilium, where, according to my observation, and not at McBurney's spot, the appendix lies. Having been about three weeks in bed I went to Scotland to recruit. I was astonished to find that my memory, which was very good before that illness, had failed. I have never had another attack, but ever since have had to be careful as to diet, and was induced to study the physiological action of foods for my own sake. As a result I published what I called *A Doctor's Discovery*, which, although not new, was quite original on my part; and there I think I prove that food is the chief cause of disease. Having got rid of all unnecessary fat I can feel my caecum, and, watching the effect of food on it, I find that vegetables

make it large and flabby, just like an uncontracted uterus after confinement; while on fruit it is small and firm, like the well-contracted uterus.

It was by mere accident that I came to the conclusion that animal food was not good for me, and I have been a vegetarian since 1896.

Professor Shattock from his researches concludes that vegetarianism—the recent rise of which he has recognized—may be the cause of appendicitis, leading to an increase in the formation of appendicular concretions. That conclusion, taken in connexion with my observations on the different effect of vegetables and of fruit upon the caecum, points towards food as having to do with the increase in the number of cases of appendicitis, and may help to direct the attention of physiologists to the physiological action of our common foods—a subject hitherto entirely neglected.

Denholm, Hawick.

JOHN HADDON, M.D.

Reports of Societies.

TOXIC CAUSES OF IDIOCY AND IMBECILITY.

At the ordinary quarterly meeting of the Medico-Psychological Association of Great Britain and Ireland, held at the rooms of the Medical Society of London on May 16th, when Lieutenant-Colonel DAVID G. THOMSON, President, was in the chair, two papers were read by Dr. ORR (Prestwich) and Major ROWS, R.A.M.C. (Maghull, Liverpool), on experimental toxic lesions in the rabbit's brain and their bearing on the genesis of acquired idiocy and imbecility in man. Dr. ORR said that the communication was a continuation of experimental work on the action of bacterial poisons on the nervous system. In the former work the induced toxic action was studied in the spinal cord only; in the present series the research had been extended to the brain, a capsule containing *Staphylococcus aureus* being placed in contact with the common carotid artery in the neck. The positive results so far obtained helped to explain the pathogenesis of certain obscure lesions of the central nervous system in man. Rabbits were used for experiment. The alterations seen as the result of the poison were typically those of coagulation necrosis. The neuroglia participated actively in the inflammatory reaction, and around the area of softening there was found to be much neuroglial proliferation and hypertrophy. There was a high degree of proliferation of the adventitia of the small vessels in the immediate vicinity of the softening. The research showed that the two factors, degree and situation, could produce dissimilar pathological results although the pathogenesis was the same. Applying this to clinical neurology it became evident that certain nervous syndromes, though widely different in symptomatology, were, pathogenetically, one and the same disease, the different symptomatology being largely due to the anatomical site of the lesion. The experiments also shed light on the genesis of the infantile cerebropathies, now regarded as due to toxic-infections of medium intensity contracted between the fifth and the eighth month of fetal life, or, more rarely, in early infancy.

Major ROWS, M.D., said that the term "vegetative system" comprised both the sympathetic and the autonomic systems. Under the term "vegetative nervous system" were included all the fibres which went to the organs having smooth muscles, such as intestines, blood vessels, glands, ducts, and skin, as well as the nerve structures exerting a secretory influence upon glands; it also embraced certain organs with cross-striated muscles, such as the heart, the beginning and the end of the alimentary canal, and the muscles of the genital apparatus. Anastomoses were common among the nerve fibres of the vegetative system. This system also had a much more independent action, and it reacted to drugs in an altogether different manner; indeed, it was from the latter that so much had been learnt about it. A sort of balance seemed to be maintained between the autonomic and the sympathetic systems, so that one assumed an exaggerated action if the influence of the other were interfered with. Both systems were much affected by the secretions of various endocrine glands. Dr. Orr and he had demonstrated that changes could be produced both in the vegetative system