clot removed. Pleural cavity swabbed clean. Diaphragm sutured with catgut. Laceration of outer and lower border of liver admitting three fingers, but liver not bleeding. Peritoneal cavity swabbed dry, peritoneum closed. Right kidney split across beyond repair. Nephrectomy. Incision closed except for small two-way catheter left in para-renal space for forty-eight hours. The operation was carried out entirely under local anaesthesia—no gas and oxygen. An almost continuous conversation was carried on between the patient and the anaesthetist during the whole operation.

Progress.—On account of difficulty in finding another donor of his blood group, sodium bicarbonate was given intravenously at the end of the operation. Recovery was complete and uneventful. The lung was in almost complete expansion in less than forty-eight hours. Although the patient remained perfectly well and had never complained since operation, on the twenty-first day an increasing area of dullness was noted in right chest. On exploration, fluid was found and 48 oz. of thin serum, of the colour and consistency of olive oil, was withdrawn by aspiration. Cultures, staphylococci. Explored ten days later—no fluid found. He was evacuated on November 20th, 1917, perfectly well.

CASE VI.

Sgt. G., aged 32. Case of chest crushed by falling in of dug-out. Subscapular fracture of four ribs (third, fourth, fifth, and sixth) on left, and two ribs on right side. Small haemothorax or haematoma of lung (left). Detained at advanced dressing station for twenty-four hours.

Admitted September 6th, 1917. On arrival at the casualty clearing station he was deeply under the influence of morphine, but coughing and complaining of intense pain in the left scapular region. Kept submerged with omnopon for five days. Each day an effort was made to discontinue omnopon, but violent coughing and pain made this impossible. X rays showed overriding of fractured ends of fourth, fifth, and sixth ribs (left side) to the extent of nearly three inches; the third rib on left, and the two ribs on right showed clean fractures. Effusion in left pleural cavity increasing. It was decided to undertake this most serious operation because it seemed impossible to relieve the pain otherwise, and the patient's condition was becoming rapidly worse.

Operation (September 9th).—Omnopon-scopolamine; para-vertebral (six spaces) and local anaesthesia. A curved incision was made from the second to the seventh intercostal space (left), internal and parallel to the vertebral border of the scapula. Pleura found open in the fourth, fifth, and sixth spaces. Three inches of each of these ribs removed. Haemothorax (3 to 4 oz.) cleared out. Left lung in almost total expansion, with its entire posterior surface excoriated, and showing minute petechial haemorrhages in its substance. Pleural cavity swabbed dry. Incision closed. No gas and oxygen given.

Progress.—Aspirations were made at the following periods after operation:

- 18 hours: 10 oz. blood-stained serum.
- 11th day: 1 oz. blood-stained serum haemolysed.
- 14th day: 12 oz. blood-stained serum with streaks of pus.
- 19th day: 10 oz. thick, foul-smelling pus. Cultures: aerobic, staphylococci; anaerobic, gas producers.
- 24th day: 20 oz. thick, foul-smelling, yellowish-green pus. Cultures: staphylococci and gas producers.
- 28th day: Explored; no fluid found.
- 31st day: 7 oz. fluid, more serous and sweeter.
- 33rd day: 6 oz. thin yellowish serum, sweet.
- 36th day: 4 oz. yellow serum, streaked with pus, sweet, sterile.
- 42nd day: 8 oz. yellowish-red serum, sweet. Cultures: aerobic, sterile; anaerobic, gas producers.
- 45th day: Explored; no fluid found.

Convalescence uninterrupted. He was out of bed on the seventieth day, and evacuated on November 20th, 1917.

As the hospital had to be cleared, this patient, together with two others, was evacuated before being put on light duty. All aspirations were made in practically the same place in the left mid-axilla. They appeared to empty a small localized collection. Otherwise the lung was in complete expansion eighteen hours after operation. Although this case was operated on under the most rigid asepsis and there was not even an abrasion of the skin, bacteria gained entrance to the pleural cavity. The wound itself healed by first intention. Immediately after operation the patient lost his pain and it did not return. The success of this operation, in spite of a subsequent empyema, suggests that more radical surgical measures might be adopted in similar cases in civil practice. The rapid recovery by aspiration from an empyema infected by aerobes and anaerobes demonstrates that repeated aspiration should be resorted to before considering resection and drainage. The mortality of the latter operation in chest wounds at casualty clearing stations is nearly 50 per cent. (Elliott).

THE School of Maritime Hygiene at Naples has, by permission of the Italian Minister of Marine, assumed the name of the late Professor Alessandro Pasquale, colonel in the medical service of the Italian army, its founder and organizer. He made it a centre of higher study in hygiene and tropical pathology for the special instruction of medical officers of the navy.

A PRELIMINARY NOTE ON THE TREATMENT OF INFECTED HAEMOTHORAX.

BY

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THE surgical treatment of infected haemothorax depends, as in other infections, on the stage at which the case is seen and the necessity for intervention recognized. Resection of rib, evacuation of fluid and clots, the removal of foreign bodies when possible, and immediate closure of the pleural cavity, is ideal, and is being more and more widely adopted at the casualty clearing stations. It is only applicable in the earliest stages of the infection, and at present the published records leave some doubt as to the results and the number of cases in which a secondary drainage has to be established. Experience of men detained on the lines of communication as unfit for further transport shows that when recurrence of symptoms arises these patients very rapidly become seriously ill.

A high degree of surgical judgement is required in the selection of cases of infected haemothorax suitable for immediate closure. As experience increases, and facilities for early operation are improved, we may expect much better results; but at the present time there are a large number of cases which cannot be treated in this way—the infection has passed beyond the contents to the walls of the pleural cavity.

I have had some opportunities of treating cases of this kind by a method of irrigation through a special cannula (Fig. 1), which appears to be of promise. The curved silver cannula has no terminal aperture, and is perforated with twelve small holes. It is employed in the following manner:

FIG. 1.

A sufficient opening is made into the chest by resection of a length of rib, preferably the eighth. Tuffier's spreader is then inserted, the pleural cavity wiped out, and perhaps a foreign body is removed or other complication dealt with. A point on the chest wall towards the upper limit of the cavity is selected where the cannula may most conveniently be introduced. This is usually in the third or fourth space, about or just external to the mammary line; a small incision is made through the skin, and the cannula pushed through the intercostal muscles into the

FIG. 2.

chest. The tip of the cannula should point outwards and downwards, and the instrument is fixed in position by two sutures to the skin. The original incision is then closely sutured around a tube which may be long enough to reach into a bottle of antiseptic fluid (Fig. 2). The tube of a Carrel ampoule is then attached to the cannula, and

the cavity irrigated every two hours. Hitherto I have used eusol, but no doubt other solutions will be as efficacious.

If the working of the cannula is tested in the *post-mortem* room, it will be seen that a fine spray of fluid is thrown in every direction on to the lung and chest wall. The irrigation causes no distress; a full ampoule of fluid has been run through the pleural cavity at one dressing without any inconvenience to the patient. As the lung expands the point of the cannula is pressed against the chest wall and causes some pain; it should then be removed. For this reason it is desirable to insert it at some little distance from the anterior and upper limits of the cavity, otherwise it may have to be taken out before the infection is controlled.

It is too early yet to speak of actual results. The impression I have gained from a limited number of cases, and these all late, with severe infection, is that the infection is quickly controlled, that the lung expands well, and that the general condition of the patient improves very rapidly. Certainly at present the results of drainage of a badly infected haemothorax are not good. (I refer now to cases which cannot be treated by immediate closure.) Many cases discharge for long periods, and only heal after much falling in of the chest wall, or after wide resection of ribs—in any case with a greatly damaged and comparatively useless lung, and a deformity of the chest and spine.

I have not yet had a case in which there seemed any necessity for secondary closure of the chest. If the lung did not expand after the pleural cavity had been rendered sterile, or approximately so, by irrigation, I should not hesitate to reopen the wound, free the adherent lung, and close the chest.

GUNSHOT INJURIES OF THE ELBOW-JOINT: TREATMENT BY EARLY EXCISION.

BY

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INJURIES inflicted in the region of the elbow-joint of necessity vary with the nature of the missile, the degree of sepsis, and the amount of damage to bone and soft parts.

The experience of civil practice in connexion with fractures involving this joint serves to show how even a slight injury may interfere with and cause permanent disability and restriction of function. The ultimate results of injuries to the elbow-joint caused by gunshot wounds cannot be regarded as satisfactory, as in the majority of cases there is complete ankylosis, and not always in the most favourable position. Several such cases have recently come under observation at the base. Even if the wound remains aseptic, bony outgrowth will in the long run inhibit movement to a considerable degree. It is, however, the regrettable experience of most surgeons that comparatively few gunshot injuries remain aseptic, and this is particularly true in the case of joints.

When the bones are badly comminuted, especially the lower end of the humerus, and with it perhaps also the olecranon process of the ulna, results are deplorable—sepsis spreads in the surrounding parts, which become oedematous and swollen, the synovial membrane is infected, drainage is difficult and unsatisfactory, and the patient rapidly shows signs of septic absorption. Whatever method to combat infection be undertaken the results are the same—the bone goes on necrosing, and accurate apposition of fragments is out of the question, a long and tedious illness results, and one not devoid of risk to the patient—risk of both life and limb.

Primary excision of the elbow for tuberculous disease, fracture dislocation, and the like yields good results, and it would therefore appear feasible that equally good results might be obtained by early excision of wounded joints. The degree of sepsis in the surrounding tissues forms no contraindication to immediate excision—in fact, experience has shown that the free drainage immediately provided by the excision of the joint is coincident with a rapid fall in pulse and temperature, and the patient makes strides towards recovery, and is soon able to be up and about.

The question arises, How much bone is to be removed to secure a satisfactory new joint? but this, of course, will largely depend upon the nature of the primary injury.

A large number of cases of gunshot wounds of the elbow-joint with little or no damage to heads of radius or ulna have passed through my hands at a base hospital. In an early series of cases the classical excision of the joint was performed, removing the humerus just above the level of the epicondyle, the whole of the head of the radius and ulna at the same level, but, as was to be expected, movement was long in returning, and the forearm muscles had to be re-educated. A more satisfactory functional result can be obtained by removing less bone and interfering less with muscle attachments.

In a late series the lower end of the humerus was removed above the level of the epicondyles and rounded well off, preserving the radius and ulna intact and not interfering with the attachment of triceps to ulna if the latter was not already damaged. The incision employed was the angled incision of Kocher, beginning at the lateral epicondylar ridge two or three fingerbreadths above the joint level, pressing vertically down to the head of the radius and thence along the lateral border of the anconeus to the dorsal border of ulna about three inches below the tip of the olecranon, and finally curving medially over the ulna. In certain cases the incision had to be modified to suit the wound existing, but as far as possible the angled incision was employed to avoid damage to important structures.

The treatment naturally varied, depending upon the degree of sepsis present. If severe the wound was left widely open and treated with eusol gauze or after the method of Carrel-Dakin, the arm being fixed to a splint at right angles until sepsis subsided and the surrounding parts returned to normal. In milder cases the wound was partially closed with sutures, while the last few cases which came to the base early were excised, bipped, and closed after the method of Rutherford Morison, with excellent results.

The splint is left off as soon as the wound has healed sufficiently and the arm supported with a sling, the patient being encouraged from the first to use his wrist and fingers. At night the arm is extended on a pillow or fixed to a straight or widely-angled splint, if desirable.

The results, even in very septic cases, were surprising, the wounds cleared up rapidly, and the patient was able in all cases in the series to be out of bed at an early date, and movement was encouraged by the end of the fifteenth to eighteenth day. One patient at the end of a month could flex and extend his elbow as well as pronate and supinate his forearm and only a small healing sinus remained. The earlier the excision is performed the more certain is the patient to have a good and serviceable arm with free movement.

The conclusions arrived at from observation of fourteen cases are as follows:

1. Excision of the elbow-joint in gunshot wounds offers the patient the best chance of combating the infection and of a rapid recovery with a movable joint.
2. If excision can be performed without the removal of the heads of radius and ulna, the results are better and more quickly attained.
3. Where possible the triceps insertion should always be preserved.
4. The earlier the excision is performed the shorter is the illness and more perfect the result.

TWO CASES OF ABSCESS OF TESTIS DUE TO BACILLUS COLI.

By W. GIFFORD NASH, F.R.C.S.

THE two cases related in the following notes illustrate a comparatively rare affection and one which has received very scant notice in works on diseases of the genito-urinary organs.*

CASE I.

On February 17th, 1913, I saw, with Dr. L. Gifford Nash of Turvey, Beds, a gentleman suffering from acute cystitis, following a wetting whilst shooting in Ireland. The urine was acid, and contained a fair amount of albumin with a deposit of pus and blood. The Clinical Research Association reported that it also contained a colon bacillus of the *Bacillus lactis aerogenes* type. Under urotropine the cystitis soon cleared up.

* A very complete description of a similar case was given in the *Lancet* of October 4th, 1913, by Mr. W. P. Bonner.