happens like the other kind of fits, without any apparent cause, the child experiences a sensation which begins in the abdomen and the stomach and rises up to the neck; he then says, 'I am ill! I am ill!' *Then he starts chewing mations (champing)*[7] *and his mouth fills with water*, in spite of noisy efforts at deglutition. At the same time the contractured hands and forearms are flexed and subject to irregular movements (not tremors or jerks)[8] which tend to carry the open or closed hands towards the head; the face was immobile and distorted, at first pale, then livid or purple (*violette*); the eyes are haggard. Whether seated or standing at the onset of the attack the child does not fall, but is willing to be supported. In the later stage of his malady, happening to have a seizure in the street, he continued walking, at first alone but like a drunken man, afterwards with help. That the child did not fall is not the only sign from which one could conclude that he does not entirely lose consciousness: as saliva runs from his mouth towards the end of the fit, *he seizes a handkerchief which was offered him; and he tries to wipe his lips*, but his arms seemed unable to be under the control of his will.[9] Sometimes during the seizures he repels any service offered him; indeed, one day he even answered a question by a few words. After the convulsive state, which lasts from one to three minutes, he remains quite quiet for a moment and then is well again. Sometimes in the course of the attack there will be efforts at vomiting. To sum up, this variety consists of exclusively tonic convulsions restricted to the upper portion of the body with more or less complete preservation of the senses and intelligence.

"In the less severe variety [of the incomplete attacks] which very nearly resembles simple vertigo, there are general immobility, *champing*,[10] sounds of deglutition, sometimes there is slight lividity of the face, but no convulsion of the limbs."

My reason for citing this case is partly on account of the champing movements (with an epigastric sensation) and also because of Herpin's statement about the arms when the patient was purple—the "irregular" movements, his seizing the handkerchief and his inability to use it. I suggest that in this case the champing movements signified a discharge lesion of gustatory cells of the uncinate gyrus and that the discharge besides spreading to motor centres for those movements spread also to the arrest centre and thus caused, by inhibiting the respiratory (medulla) centre, the patient's face to become livid and purple. I submit that the irregular movements of the arms were, like those of champing, movements proper, vague movements, especially of the accessory muscles of respiration, consequent on a state of suffocation. However, I must not forget that Herpin spoke of them as being part of a tonic convulsion.

In future notes I shall speak of symptoms of the group mentioned in this note with comments and may reconsider the state of the arms in the asphyxia of slight epileptic fits.

SURGERY IN THE GRÆCO-TURKISH WAR.

BY FRANCIS C. ABBOTT, B.SC., M.S. LOND., F.R.C.S. ENG.,

SURGEON TO OUT-PATIENTS TO THE EVELINA HOSPITAL; LATE CHIEF SURGEON TO THE "DAILY CHRONICLE" NATIONAL FUND FOR GREEK WOUNDED.

THE first part of this paper was in the hands of the Editors of THE LANCET before Christmas, 1897. Prolonged absence from work has delayed its publication; the results in more recent campaigns are therefore not alluded to.

MILITARY SURGERY AT THE PRESENT TIME.

The enormous surgical experience gained in some previous wars, with their vast numbers of men engaged and their long duration, may well make one pause before publishing a comparatively limited series of cases like my own. But war and surgery are changing sciences and in both there have been such great alterations since the last European war as to vitally alter the character of many of the problems with which the military surgeon has to deal. On the one hand the magazine rifle, throwing sheathed bullets of small calibre and high velocity for enormous ranges, has introduced a factor about which little is yet known, but which will certainly change the character of many of the wounds received in battle. It is only necessary to read the interesting chapters in which the most modern English text-book on military surgery[1] discusses the effects produced by the small bore bullet at different ranges and velocities to realise that as yet there is much to be learnt about them.

The chief experimentalists have differed widely in their results, mainly, I think, for two reasons. One is that the effects produced are not the same on the coagulated tissues of a cadaver as on the living, and the other and more important is that in so many experiments the charge has been diminished in place of increasing the range. This certainly obtains the same reduction of energy in the bullet but not the same effect, for some reason, on the tissues. In war where otherwise the experiments would be so perfect the results are vitiated, as a rule, by want of knowledge of the distance from which any particular bullet has been fired and by the fact that in many cases where the tissue damage is greatest the doubt occurs as to whether the bullet has not already struck something and so been altered in its shape before entering the body. In our cases where the bullet had completely traversed the body there was sometimes an additional doubt as to the calibre of the bullet. Some of the Turks were armed with the Mauser and the remainder with the Martini-Henry rifle. Wherever possible this point is noted but in many cases it had to remain uncertain.

On the other or surgical side there has been an equally great improvement in our antiseptic methods, especially perhaps in the way of simplicity and ease of attainment, making their successful application to military surgery not only possible but comparatively certain. In this connexion it was against us that many of the cases had not received any first aid. Some of the wounds were covered with an antiseptic pad, others had been bound up by the men themselves, but many were quite uncovered. On the other hand they had not been tampered with in unfavourable surroundings and they were not brought down in soiled ambulance waggons but all on horse or foot. The atmosphere was pure and the last part of the journey was performed in steamers not previously used for this purpose and which, though dirty, must have been fairly free from pathogenic organisms. The discovery of the Roentgen rays and their use for the detection of hidden bullets has also put a new weapon into the hands of the military surgeon.

THE CONDITIONS AND EQUIPMENT OF THE TWO TEMPORARY HOSPITALS EMPLOYED

My experience was gained in two temporary hospitals in which 153 cases in all were treated to a termination, and of these careful notes were taken. For the treatment adopted I was as far as possible responsible, though owing to the distance which separated the hospitals and heavy administrative duties much of the actual management of cases fell to my colleagues, Dr. H. J. Davis, Mr. R. Fox Symons, Mr. H. Moffat, and Mr. S. Osborn, to whose careful work I am much indebted. To Mr. H. Moffat at the Piræus fell practically the sole charge and initiative in many bad cases and excellent results he obtained. We treated at Chalcis a large number of other bullet-wound cases temporarily, but for want of room passed them on to Athens. These and many others which I saw in the various temporary and permanent hospitals by the courtesy of the Greek and foreign surgeons, no doubt helped to form my opinions.

As military surgery is mainly ordinary surgery under difficulties a word must be said as to surroundings and equipment. Our hospitals were placed in a villa at Phalerum (kindly lent us by Her Majesty the Queen of Greece) and a large one-storeyed pavilion building at Chalcis. Both had been crowded with refugees and were very dirty when we took them over. Disinfection was carried out by burning sulphur, by double lime-washing the walls, and by the employment of much carbolic acid and soap-and-water. We apparently got rid of the microbes but were not so successful with macroscopic foes. The house at Phalerum was connected with the drainage system—a doubtful advantage as we did not know in what way. Chalcis, on the other

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7 "Il se met à mâchiller."

8 "Sans tremblements ni secousses."

9 "Mais ses bras ne semblaient pas obéir régulièrement à sa volonté."

10 "Mâchillement" (this word is the only one italicised in the original except that of the patient's exclamation "J'ai mal"; the other italics are mine)

1 Wounds in War, by Professor Stevenson.

Fig. 1.

BULLET WOUND OF THE RIGHT WRIST (MARTIN.). BULLET IN HAND

Fig. 2.

SAME AS FIG. 1, BUT TAKEN AT RIGHT ANGLES.

Fig. 3.

PENETRATING BULLET WOUND OF THE HAND.

Fig. 4.

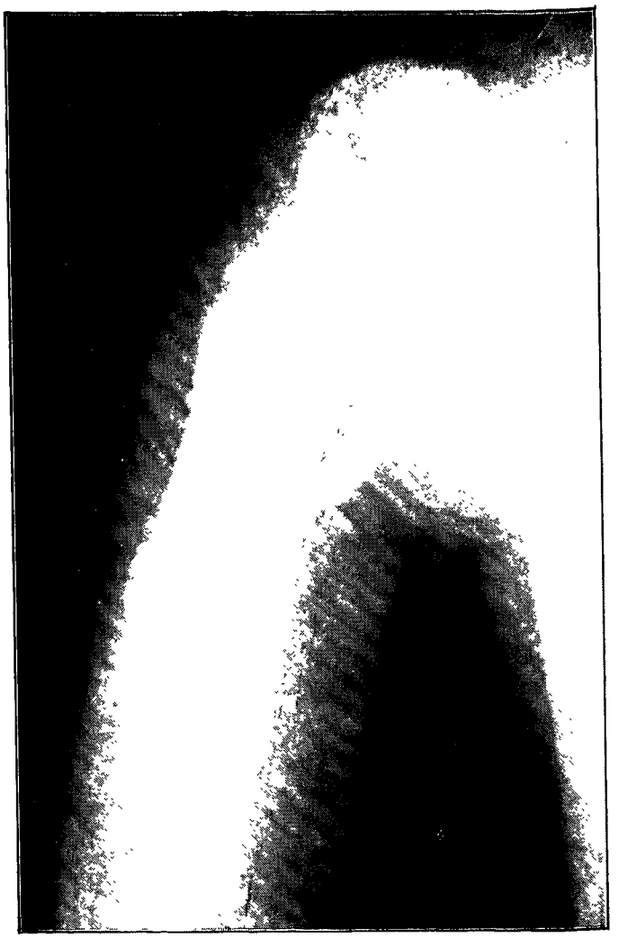
PENETRATING BULLET WOUND OF THE FOREARM. FRACTURE OF RADIUS AND ULNA.

TO ILLUSTRATE MR. F. C. ABBOTT'S PA

Fig. 5.

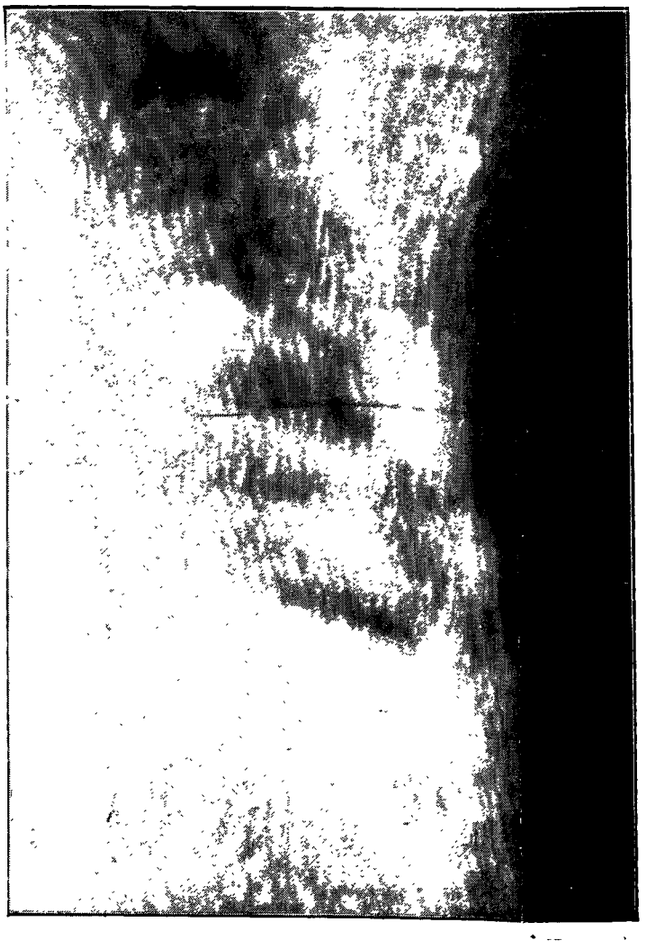
Bullet in the Forearm.

Fig. 6.



Compound Fracture of the Humerus.
Bullet in Arm.

Fig. 7.



Bullet in the Left Lung.

Fig. 8.

Bullet in the Femur (Martini).

hand, has no sanitary arrangements, and as it had 15,000 refugees quartered on an original 9000 inhabitants disease was very rife. The kitchen and offices were over a large cesspool, luckily connected only with our own building. It was too dangerous to make any great change, so all we could do was to partially close it and have frequent supplies of antiseptics thrown into the remainder which we were obliged to continue to use. Typhoid fever and small-pox were both very prevalent but we had no cases among the staff or patients except those which came down from the front with the former disease. For filtering water we used throughout Berkefeld filters, relying on their efficacy for both surgical and drinking purposes. The form adopted was a hand-pump supported on a stem ending in a stirrup for the foot. The machine could be taken to pieces, was very portable, and it was possible to pump half a gallon of filtered water a minute. I had no means of testing this water bacteriologically, but no case of the fearfully-prevalent typhoid fever arose in either place. I also used this water as sterile in surgery, because from the smallness of the open charcoal stoves it was impossible to boil sufficient, and as far as I know I used it without any bad result.

The hospital near Athens was furnished with beds and other fittings locally bought. The arrangements at Chalcis were more primitive. The beds were planks on trestles and the mattresses, for want of hay or straw, were stuffed with cotton-waste. The rooms, however, were large and airy, the largest ward containing 22, and the smallest 11, beds. Owing to overweight we left behind in England to follow by steamer all such nursing adjuncts as urinals, bed-pans, porringers, &c. I should advise anyone about to undertake similar work to sacrifice almost anything rather than these, as other things can be more easily extemporised, while nothing is more necessary in the treatment of bad cases. The patients in both hospitals were tended by English nurses assisted by Greek orderlies. The *Daily Chronicle* had generously given me a free hand as to equipment and we had a full supply of modern instruments and dressings.

On instruments I have little to say. Nearly all operations are of a cleansing and trimming character and require ordinary tools. We much preferred the new "Egyptian Army Pattern" bullet-forceps to any others. Those with sharp-toothed ends we found both difficult and dangerous to work at the end of a long sinus which with the new bullets is even narrower than formerly. I much prefer a long periosteal elevator with slightly curved end to any forceps whenever possible. All difficult bullets should be cut down on by a fresh incision and the track ignored. There is no hurry about removal and if the sinus is healed asepsis is all the more certain. We had no opportunity of using Murphy's button or other rapid means of intestinal suture, as the two cases of perforation of the gut were neither suitable. All instruments were sterilized by boiling before and after use. The chief dressings were cyanide gauze and Robinson's tissue and the antiseptic perchloride of mercury in tabloids or soloid cartridges for making larger quantities of solution. We of course used a good deal of carbolic acid, but found its bulk, the heat needed, and the time spent in preparing a solution distinct disadvantages. Creolin proved an excellent lotion for cleansing long suppurating bullet sinuses. We did not chance to need saline infusion, but the simple apparatus required should always be at hand, as many of the most favourable cases for its use must occur after hæmorrhage in bullet wounds. We had with us anti-tetanic serum, but no case of tetanus arose. Several cases of the disease occurred during the war but it was not common.

THE ROENTGEN RAYS (WITH MR. R. FOX SYMONS, BY WHOM MOST OF THE SKIAGRAMS WERE TAKEN).

The great field of future usefulness for the x rays in war is obvious; their limitations can only be told by experience. We were fortunate in having with us a powerful coil and all the other essentials for x ray work. This was the only apparatus of the kind in Greece and we therefore received cases from other surgeons to supplement our own and were in the position to gain a larger experience of the use of the rays in bullet wound cases than had yet fallen to other surgeons. The equipment was kindly chosen by Dr. Barry Blacker and furnished by Messrs. Miller and Woods. The only difficulty we had with the battery was the melting of the pitch of the partitions between the cells owing to the heat. The coil gave a nominal 10 in. spark. We only used three Crookes's tubes throughout, but, of course, in such circumstances as ours it is very advisable to have a good reserve. We had a large screen of platino-cyanide of barium which proved the means of saving much time and is probably even more necessary in war than in work elsewhere. The troublesome question of depth is so easily approximately solved by its aid. The only disadvantage is that we have not permanent optical records of all the results.

The chief difficulties in the use of the rays in war as they presented themselves to us were—the great weight of the coil and secondary battery, the absolute necessity of having a source of electric supply near at hand to recharge the batteries, the fragility of Crookes's tubes and glass negatives, the danger of carrying strong sulphuric acid, the difficulty of sparing the space and of making an efficient dark room with good water-supply, and the time taken up by the work. Besides these there is the general delicacy and liability to derangement of the whole apparatus, as every x-ray photographer will understand, which makes the manipulations a great extra anxiety when one is already working at high pressure and short-handed in disadvantageous surroundings. A more amusing source of difficulty was the superstition of the natives. They undoubtedly looked on the whole affair as the work of ὁ Διαβολος. It made it difficult to take a skiagram when the subject was constantly crossing himself unless strictly watched. Some of these difficulties quoted above absolutely preclude the use of such an apparatus at the actual front. It would of course be possible to work with a less powerful coil and battery than we used, but such small machines will only give results with easy cases, as hands or forearms, and are of no use for working with the screen. But if one is ever to use the rays in the first rush and press of wounded after an engagement it is clear that it can only be by means of the screen. There is no time for anything else. And as to use the screen efficiently demands a big spark and a heavy coil the thing becomes an impossibility at the actual front. Fortunately it is not really necessary there and could very possibly do harm by stimulating the young surgeon to premature operations in bad surroundings.

In the great majority of the bullet wound cases which come in the bullet has already passed out. In a good proportion of the remainder it is easily felt under the skin and extracted. These alone should be dealt with at once. On the other hand, the skiagram should, if possible, be taken before the necessary cleaning and splinter removing operations performed at the advanced base or line of communication hospital. The bullet will, of course, often be found in these even without the help of the rays. Putting aside these cases it is quite a small minority in which the location of the bullet remains hidden. These are just the cases which can wait and are at first merely dressed, or which (as in lung cases) only develop serious signs later, and are the ones which in a week or two will be arriving at the base. Besides these there are those cases in which no bullet is thought to be present but which do not go on well. These also can be skiagraphed as they arrive at the base and the source of irritation, be it bullet or sequestrum, often discovered. Although Domoko was fought on May 17th we did not often feel the want of the rays before we had our apparatus fixed which was not till June.

We believe, then, that the x rays in future wars will be of the greatest use but *not* at the actual front. In a European war they will of course be readily obtainable at the base, but so much of the surgery must be done before the cases get down so far that they will be wanted further forward than this. In Europe it will nearly always be possible to find some town near the fighting line with electric installations and this will be the place to choose. In our English service this would probably be the site of the most advanced of the line of communication hospitals. In wild countries the difficulty of obtaining electricity will always be enormous and must be the chief determining factor. In such difficulties the plan used is worth remembering. Every modern man-of-war can furnish an abundant supply which will, of course, be given for this purpose with pleasure.[2]

In Greece the apparatus was fixed in a room at the hospital at Phalerum. This was practically an advanced base hospital. Chalcis was ten hours nearer the front but there was no possible source of electricity. Phalerum also was near enough

[2] Since the above was written Major Beevor, R.A.M.C., has successfully worked with a primary battery at the front in the Afridi campaign.

to Athens for the Greek surgeons to bring us their cases. We obtained our electric supply from H.M.S. *Rodney* to whose officers we were much indebted for their willing help. We used no glass negatives, thus saving weight and having less chance of breakage. All the skiagrams were taken direct on to Eastman's positive paper and we would recommend this method to others in similar circumstances. In the only cupboard we could spare for a dark room we lacked that great essential a good water-supply, hence from insufficient washing some of the pictures have since considerably "fogged."

In addition to looking at all the cases in which we had reason to believe bullets or fragments of them were still in the tissues we took skiagrams of bullet fractures. These show plainly in what very various directions the lines of fracture may run from the point of impact. They vary from almost longitudinal to quite transverse. In some instances multiple fractures start from the bullet hole and in others the fracture commencing as one breaks up into several branches. One os calcis shows only a clean hole and another shows a true stellate fracture with the hole as centre. Fragments of bone in other cases have been driven into the surrounding tissues. Probably the unknown factor of range (and therefore velocity) would explain these differences. The absence of callus puzzled us at first, but callus of recent formation is not opaque to the rays, and all our skiagrams were taken at the latest within six weeks of the injury. The rays in addition to showing bullets brought out other sources of irritation—e.g., pieces of dirt and sequestra—and thus proved useful guides to a secondary operation.

The skiagrams should be taken in two different planes at right angles to each other as the body may be a mere scale or splashing of lead. This will be undiscovered in one plane and yet appear quite large in another. One English volunteer with a compound fracture of the tibia showed no bullet in Greece or on the first attempt in England, yet a large scale of lead was subsequently seen and removed. It is also important to remember that the skiagram will very likely show the bullet decidedly magnified if it is deeply situated in the tissues and some distance from the plate. This is seen in Fig. 6, where we took the bullet to be a Martini but it proved to be a small bore bullet. Since the apparent size of the bullet cannot be smaller than the real, if a bullet shows smaller than a certain calibre it is safe to say that it is not a bullet of that calibre; it is only in the opposite direction that mistakes occur. Conversely, if in any case we know what bullet has entered, its size on the skiagram will give us a rough clue to its depth. The track of the lead bullet in several skiagrams is marked by a number of small opaque points on the plate. These we do not remember to have seen previously described and think them to be small pieces of lead rubbed off the bullet in its course. There is no doubt that the belief that he has a bullet inside him even when false will worry a patient and keep him back. By taking a skiagram, having previously laid a wire on the skin to show on the plate, one can convince these sceptics that no bullet is there with immediate alleviation of symptoms.

The illustrations are given in order to show that even inexperienced hands working under considerable difficulties can get fair results rather than on account of any intrinsic merit, and also as a record of the first skiagrams taken in war time. All the original skiagrams were shown at the annual meeting of the Roentgen Society in the autumn of 1897. The reproductions in Figs. 1 to 8 are very accurate except that the bullets in Fig. 1 and Fig. 7 stand out too white and prominent. Even in the originals, however, they show with almost startling clearness and with their sharp definition of outline are much more conspicuous than any of the bones around them. The other fault is that the reproductions do not show certain details, especially the white marks in the course of the bullets and details at the line of fracture. The exposures were long as compared with our present ideas, but of course to show a bullet in bone the exposure should be longer than to show the bone alone as the bone must be penetrated by the rays. We no doubt made many mistakes of technique, at the details of which neither of us profess to be proficient. Besides those figured the most interesting cases were as follows: A wound of the shoulder in which the bullet could not be found. The skiagram showed a bullet just above the spine of the scapula near its vertebral border. This was subsequently removed. A bullet wound of the back of the thigh passing downwards. The patient had so much pain below the head of the fibula that the surgeon in charge explored the outer side of the leg here. Nothing was found and the case was brought to us. The skiagram showed a shrapnel ball in the soft parts on the outer side of the upper part of the popliteal space. This was cut down upon and found to be lying in contact with the external popliteal nerve which was pressed on but uninjured. In a case in which we had every reason to believe there was a bullet at the back of the orbit we failed altogether to see it either in a skiagram or on the screen. Many of the fractures skiagraphed showed interesting points, the main features of which have been described above.

THE SKIAGRAMS.

Fig. 1 is a skiagram of a bullet wound of the right wrist (Martini). There was a large wound situated above the base of the styloid process of the radius anteriorly. There was great swelling of the wrist and hand, especially on the radial side, and the bullet could not be certainly felt; movements at the wrist were very limited and there was no grating in the joint. The skiagram shows a fracture of the lower end of the radius with the comparatively transparent track or groove through this bone, which is widened, the bullet lying over the carpus and between the bases of the second and third metacarpals, which are uninjured. The original shows the bullet track marked by numerous white dots (? scrapings of lead). (Tube, 8 in.; exposure, 4 minutes.)

Fig. 2 shows the same hand as in Fig. 1 but taken at right angles. The skiagram shows the great thickening of the wrist and hand and that the bullet is lying near the dorsal surface with its distal end nearer the skin, thus keeping the direction in which it had entered the wrist. Slight flattening is seen on that side of the head of the bullet which first struck the bone. The case had been previously treated in a Greek hospital. The bullet was removed.

Fig. 3 represents a penetrating bullet wound of the hand (Martini). There were large ragged wounds of entry and exit with much damage to the soft parts. The skiagram, taken six weeks after the injury, shows oblique fractures of the second and third metacarpals. The callus scarcely shows. In the original the bullet track is plainly marked by (?) lead splashings. Taken through gauze and bandages. (Tube, 10 in.; exposure, 7 min. Case 40.)

Fig. 4 represents a penetrating bullet wound of the forearm. The bullet had passed from the outer side of the back of the forearm to the inner side of the front of the wrist. The holes of entry and exit were small. The skiagram shows the actual point of passage of the bullet between the bones with loss of substance in each filled with new bone. Oblique fractures of both bones pass upwards from here, the much more oblique one of the radius falling into a more nearly transverse one higher up the bone, thus separating a wedge-shaped piece on the ulnar side. The lower end of the ulna is slightly tilted. Very little callus. (Exposure, 6 min. Case 54.)

Fig. 5 shows a bullet wound of the forearm. The wound had been opened up by a Greek surgeon who had resected a broken piece of radius with its periosteum. The skiagram shows a gap in the radius exactly corresponding to this. The body seen among the muscles is therefore part of a bullet altered in shape. There was a hole of exit, so part of the bullet had escaped. The end of the lower fragment shows some bone thrown out by the damaged periosteum.

Fig. 6 represents a compound fracture of the humerus. The wound of entrance (small) was internal to the anterior axillary fold below the second rib. There was another wound at the back of the deltoid near its insertion and thought to be the wound of exit. The humerus was extensively comminuted in its second quarter. There was slight suppuration from the posterior wound and much callus. The humerus became enormously thickened, this thickening extending a long way down the bone. A small piece of bullet was removed from the exit wound. A body—callus or bullet—was felt in front of the fracture. The skiagram shows the bullet with flattened end on the inner side of the humerus at the upper edge of the callus. Its course from the wound of entrance can be made out in the original by lead marks. The opaque white patch behind the humerus is due to discharge from the posterior wound damaging the paper and shows the position of the sinus. The great sheath and second outline around the humerus was thought to be false and due to movement. It, however, appeared exactly the same at a second attempt and must be the callus, with which it corresponds and which was certainly remarkable in extent. The bullet was removed and proved to be a Mauser. (Case 63.)

Fig. 7 represents a bullet wound of the left lung. The wound of entrance was in front of the left shoulder joint. The patient developed pneumonia, then pleurisy with effusion. The serum became offensive, a rib was resected and the empyema was drained, but by the finger no bullet could be felt. The skiagram was taken nine weeks after receipt of the injury. It shows a Martini bullet lying pointing downwards and inwards over the eighth rib on a level with the lower angle of the scapula and extending inwards to the tips of the transverse processes. The white opacity of the bullet is exaggerated in the reproduction, but it stands out with clear definition in the original. The patient recovered. The bullet was not removed. The body was much emaciated. (Exposure, 25 minutes. Case 21.)

Fig. 8 shows a bullet in the femur (Martini). The wound of entrance was in the back of the thigh and quickly healed. The symptoms and the pain were slight. The case had been treated by a Greek surgeon. The bullet lies antero-posteriorly in the femur, apex forward. It is at the level of the upper border of the patella and therefore much below the line of reflexion of the upper pouch. The outline of the anterior surface of the femur is quite clean cut and there appears to have been no splintering here. There was considerable damage to the posterior surface which was better seen in the original. Looking with the screen in plane at right angles to this the bullet was seen to lie in the femur somewhat to the inner side. (Exposure, 35 min.)

(To be continued.)

"LETTER" WITHOUT "WORD" BLINDNESS.[1]

BY JAMES HINSHELWOOD, M.A., M.D., F.F.P.S.GLASG.,
SURGEON TO THE GLASGOW EYE INFIRMARY; DISPENSARY PHYSICIAN TO THE WESTERN INFIRMARY; AND ASSISTANT TO THE PROFESSOR OF CLINICAL MEDICINE IN THE UNIVERSITY OF GLASGOW.

IN three preceding papers[2] on word-blindness and its varieties certain views have been expressed which, in my opinion, afford the only reasonable explanation of all the varieties of this condition which are met with. Since the last paper my attention has been drawn to a rare form where the patient is able to read words but not the individual letters of which the words are composed—i.e., "letter" without "word" blindness. Recorded cases of this variety are excessively rare and my attention was specially drawn to it by the occurrence of two cases in the Western Infirmary of Glasgow. Since the occurrence of such cases forms powerful clinical evidence in support of the views maintained in the preceding papers I have thought that a critical examination of the visual phenomena manifested in this little-known variety—"letter" without "word" blindness—would prove an interesting appendix to the series of papers already published. I have to thank Professor Sir William T. Gairdner and Dr. James Finlayson for their kind permission to quote their as yet unpublished cases and also to express my great obligations to their assistants, Dr. James Carslaw and Dr. John Love, who supplied me with every facility for studying them. These cases were somewhat complex and the following must not be regarded as in any sense a complete report of them but simply as very brief records of the chief visual phenomena, that being the only aspect of these cases which concerns us in the present paper.

CASE 1. (Abbreviated from the notes supplied by Dr. John Love.)—A young man, aged twenty-four years, was admitted to Dr. Finlayson's wards in the Western Infirmary on March 19th, 1898. About four months previously his illness had begun somewhat suddenly with severe headache, vomiting, and feverishness, with stiffness of the neck and back and some deafness. Shortly thereafter there developed paralysis of the right arm, leg, and the right side of the face, with aphasia and profound apathy from which, however, he could be roused. The history and development of the case suggested that it was most probably a sporadic example of cerebro-spinal meningitis though rash was absent. Improvement was very gradual both as regards the general state and the paralysis and aphasia. When admitted into the Western Infirmary there were still present some paresis of the right side and a trace of loss of power about the right angle of the mouth. He had still aphasia which was motor or articulative in part and partly amnesic. There was a gradual improvement in his speech during his residence in hospital and before dismissal he could converse with the other patients and nurses. There was no word-deafness, all requests being quite promptly obeyed. His visual symptoms were somewhat remarkable. There was no object-blindness, as he could indicate by pantomime the use of articles presented to him and he could recognise by sight pictures, colours, and geometrical forms. When tested with words and letters it was evident that a peculiar condition was present. On testing him with letters it was found that he could neither read nor write a single letter of the alphabet except "T," which he generally recognised and always named "Tom" which was his own name. Nor could he point out any named letter except "T." The inability to recognise them was the same with all sizes and forms of letters both written and printed. On testing him with words, however, in a large number of trials it was quite evident that he could read almost every word presented to him, even words of three or four syllables and very unfamiliar ones, while at the same time he was quite unable to name or point out a single letter of the word he had just read. Such words as "stethoscope," "telescope," "electricity," "infirmary," &c., were read at once. The word "JOB" was read at once, but when the letters were arranged "OBJ" and he was asked to read them he could not name a single one. The contrast between the fluency with which he read the words and his inability to make anything out of the individual letters was very striking. Substantives he could make out much better than verbs and could read them with the greatest fluency. Slight intentional mistakes in spelling and even reversing letters were not observed by the patient who read the words just as if no alteration had been made and did not seem conscious of anything peculiar about the word. Numerals he recognised and named as far as "nine," but not beyond that, and only the Arabic numerals and not the Roman. There was no amusia; the patient could name and intone correctly the signs of the new notation but could not name them as letters of the alphabet. During his residence in hospital the patient's power of reading words improved so that when he was shown to the Glasgow Medico-Chirurgical Society on May 6th, 1898, he could interpret correctly any request in printing or writing and was able to read a letter written by himself. He had been instructed to educate himself by learning the letters of the alphabet again. This was done but only with partial success. When he left the hospital about three months after admission he was able to recognise some letters but only occasionally and with many failures. He could write a few letters to dictation but he made many mistakes. On May 2nd he wrote the following letter which he was able to read afterwards:—

DEAR MOTHER,—Please send my clothes to-morrow and my boots as I am getting on the grounds. I am keeping better; hoping you are well.

He addressed the letter quite correctly. On attempting to write the alphabet from memory he wrote as follows:—"a, b, c, d, e, i, j, h, m, n, s, u, w, v, y, z," and the following letters being dictated he wrote as follows:—

Dictated b, wrote b.	Dictated c, wrote c.
,, y, ,, l.	,, f (failed).
,, p (failed).	,, d, wrote a.
,, r (failed).	,, n (failed).

Numerous trials as to his power of writing and reading individual letters were made but the above may be taken as a fair sample of the measure of success attending these trials. While he failed with many of the letters he wrote readily words beginning with the same letters. In the above trial he failed to write "p," "r," or "n," but wrote quite readily "pot," "Robert," "nail," and so on. He left hospital at the end of May and has not been seen since the above examination was made, so that nothing can be said as to his further progress.

As a parallel to this case I will briefly quote a case reported by Dr. Byrom Bramwell,[3] selecting only those features of it which specially interest us in the present paper.

[1] A paper read at a meeting of the Glasgow Medico-Chirurgical Society, Nov. 18th, 1898.

[2] THE LANCET, Dec. 21st, 1895, Nov. 21st, 1896, and Feb. 12th, 1898.

[3] Edinburgh Medical Journal, 1887, p. 241.

will obtain equally beneficial results in the treatment of these cases as I have had for so many years past myself; but it is absolutely indispensable to be very strict with regard to the work. It is notorious that electricity is frequently applied in the most careless and haphazard manner and this explains why so many persons are sceptical concerning its curative effects. An application of the constant current to the brain during which not the slightest fault has been committed is in a certain sense an artistic performance which requires not only knowledge but also much practice and some talent like a good musical performance. How often does one hear a sonata by Beethoven or a polonaise by Chopin actually murdered? The same applies to electrical treatment. A man who labours with love and care and has the discrimination to select one of the methods described by me or several of them which may be particularly appropriate for a given case will in the nature of things obtain better results than another whose heart is not in his work, who acts by mere routine, and who is devoid of the elements of an artistic disposition or true clinical instinct.

Queen Anne-street, W.

SURGERY IN THE GRÆCO-TURKISH WAR.

BY FRANCIS C. ABBOTT, B.SC., M.S. LOND., F.R.C.S. ENG.,

SURGEON TO OUT-PATIENTS TO THE EVELINA HOSPITAL; LATE CHIEF SURGEON TO THE "DAILY CHRONICLE" NATIONAL FUND FOR GREEK WOUNDED.

(Concluded from p. 83.)

THE CASES.[1]

Mortality.

OF 114 bullet and shell wound cases treated to a termination 6 died (mortality 5·26 per cent.). These included 1 death from septic pneumonia secondary to extensive comminuted fracture of the base of the skull and both jaws (Case 4); 2 deaths in cases of wounds of the intestine, neither of which was fit for operation (Cases 28 and 30); 2 deaths from rapid emphysematous gangrene (Cases 87 and 88); and 1 death from septic embolism following a bullet wound of the knee-joint treated conservatively (Case 91). Of 24 medical cases 4 died (mortality 16·6 per cent.). These included 2 cases of dysentery, 1 case of pneumonia, and 1 case of renal disease.

Treatment.

All cases on admission were cleaned up and dressed antiseptically. Only obvious bullets and fragments of clothes or bone were removed at this time and no tinkering or probing was allowed. No drainage was used primarily. Syringing and irrigation were only used for removal of macroscopic débris. The dressings were changed as little as possible and only when indications to do so occurred. Even where no first dressing had been applied, as was the case in numbers of the wounded, the entrance wound was so small that there was very reasonable hope that the deep parts were not infected. Though we did not receive most of the cases at Chalcis till 36 hours, and at Phalerum till 48 hours, after the wounds had been inflicted, and although the majority had had no dressings, we treated them as clean wounds unless there were plain indications to the contrary. I ascribe much of our success to the wounds not having been tampered with before they reached us. Better no dressing, and no unreliable probes or fingers in the wound than too early interference. All work at the actual front should be most rigorously confined to the application of dressings and fixation apparatus excepting only in the case of urgent hæmorrhage and other emergencies and the surgeon at the front is almost safer without probe and forceps. Now that all our soldiers carry an antiseptic first dressing every man can give his neighbour not only makeshift, but the best possible, help. The wounded came down on horse and foot—ambulance wagons were impossible in the passes. They ran in this way less chance of infection in transit. The Greek peasant only drinks resin wine and no spirits. Drunkenness is almost unknown in the country districts and this was much in their favour.

Bullets in situ.

Eighteen bullets were found in the body and were all removed with a single exception. This was a bullet in the lung discovered by the x rays (Case 21). Of these 18, 2 only were Mausers and 1 a shrapnel ball, the remainder were Martinis. The small proportion of Mausers found in the body was no doubt due to their greater penetrating power. The Mauser bullets had both been stopped by bone, one by vertebræ, the other by the humerus. The nose in each case was much flattened out. Of the 15 Martini bullets only 6 had struck bone. Some were quite unaltered, others were much changed or even broken up. Several were found under the distal skin which alone had prevented their emergence. There need be no hurry to remove deep bullets. They are better cut down on by a fresh clean incision than searched for through a long track, likely, at any rate near the surface, to be septic. The bullet itself was aseptic in all but one case. In this man there was an entrance wound over the left lower ribs, the track passing downwards and backwards. Increasing tenderness developed over the left loin. Three weeks after injury the temperature rose and deep fluctuation was felt in the spinal muscles at the level of the upper lumbar vertebræ. The abscess was opened and an unaltered Martini bullet removed (Case 19).

Flesh Wounds.

The penetrating flesh wounds were all treated alike—cleansed and an antiseptic dressing placed over each opening. Many healed without any complications. In others there was slight skin sloughing, more commonly round the hole of exit than of entrance. Sometimes there was a prominent button of granulations, also more common on the exit side. Others became inflamed and began to discharge. These were opened up at one or both ends and in nearly all fragments of clothing were subsequently discharged and were doubtless the source of infection. Creolin was found to be the best lotion for septic sinuses. I several times excised septic superficial sinuses in their whole length, thus getting a clean wound which was sutured and this saved time in healing. Where there had been much sloughing or immediate destruction of skin, as in wounds by shell fragments, so soon as they were clean we used Thiersch's skin-grafts. Drainage and counter-openings had sometimes to be employed in undermined and lacerated wounds. The hole of entrance of the Mauser was generally extremely small, only taking a probe, and twice was overlooked till on the operating table. In other cases a definite circle of skin had been punched out. The Mauser exit hole was often not much larger. There is much more skin damage when the bullet strikes obliquely. Immediate tendon suture is impossible in bullet injuries owing to bruising of parts. This does not hold in sword-cuts, where tendons should be sutured as soon as possible. Wounds by shrapnel were scarce; I only had one under me and saw two others in the Greek hospitals. One of these we detected by the x rays.[2] No wounds of great vessels were treated. The hospitals were too far from the front for this. In several the great vessels had escaped in an extraordinary way, but the only secondary hæmorrhage was from the temporal artery in a case of fracture of malar, &c. (Case 10).

The cases of nerve involvement were as follows:—

CASE 57. *Bullet-wound of the brachial plexus.*—The bullet had entered in front of the upper arm, crossed the brachial plexus and passed out far internally in the posterior axillary fold. A piece of cloth was removed from the anterior wound. There was great pain, especially at night and in the course of the median nerve, with hyperæsthesia over its distribution. The median thumb muscle wasted and also the posterior scapular muscles. The other median muscles remained. No operation was done.

CASE 59. *Bullet-wound of the brachial plexus.*—This case is also described under "Wounds of the Lung." There was intense pain down the inner side of the arm and forearm into the hand and wasting of the ulnar hand muscles. The pain became worse and the patient could stand no movement or jarring in the ward. The damage was explored one month after injury by a longitudinal incision on the inner side of the arm including the scar in an ellipse. The nerve trunks were freed above and below. The ulnar was found included in dense scar tissue and was partially divided by the bullet. The scar was firmly adherent deeply into the

[1] The cases are numbered throughout for reference.

[2] THE LANCET, Jan. 14th, 1899, p. 82.

TABLE GIVING SYNOPSIS OF THE CASES OF COMPOUND FRACTURE.

No.	Age.	Locality.	Treatment.	Remarks.*	Result.†
4	?	Temporal; superior and inferior maxillæ.	Removal of bone; incisions for cellulitis.	Mauser; septic pneumonia; 8 days.	D.
8	18	Nasal bones and orbit.	Cleansing under anæsthetic.	Shot wound; traumatic hare-lip; injury to third nerve.	R.
9	25	Malar and orbit.	Excision of the eye; sequestrotomy subsequently.	Rupture of the globe; necrosis.	C.
10	30	Malar and nasal bones.	Excision of the eye; ligature of the temporal artery.	Secondary hæmorrhage from temporal artery.	C.
11	30	Inferior maxilla.	Splinters removed.	—	C.
12	25	Inferior maxilla: fourth cervical vertebra.	Cleansing operation; removal of the bullet; abscess opened.	Wound of the pharynx; deep abscess of the neck.	C
16	?	Inferior maxilla.	Removal of the bullet and splinters.	Œdema of the glottis.	C.
36	28	Phalanges of the fingers.	Amputation of the fingers.	—	C.
37	30	Phalanges of the fingers.	Amputation of the fingers.	—	C
38	28	Phalanges of the second finger.	Conservative.	Enormously swollen.	C.
40	27	Second and third metacarpals.	Antiseptic.	Roentgen rays (Fig. 3).	C.
41	25	Fifth metacarpal.	Antiseptic.	Roentgen rays; shaft blown away.	C
42	?	Carpus and metacarpus.	Trimming amputation.	Dynamite accident.	C.
43	?	Carpus and metacarpus.	Trimming amputation.	Dynamite accident.	C.
52	31	Right radius.	Antiseptic.	No displacement; no necrosis.	C.
53	30	Right radius and ulna.	Antiseptic.	Much swelling; good movement ultimately.	C
54	30	Right radius and ulna.	Cleansed under anæsthetic.	Roentgen rays (Fig. 4); passive movement and massage.	C.
61	27	Left humerus.	Secondarily opened up under anæsthetic.	Involvement of the elbow-joint; superficial suppuration.	C.
62	29	Right humerus.	Bullet removed, and cleansed under anæsthetic.	Surgical neck; much comminution; movement fair; aseptic course.	C.
63	26	Right humerus.	Wound cleansed and fragment of bullet removed; bullet removed 5 weeks later.	Mauser; suppuration posteriorly; much callus round second quarter; necrosis; Roentgen rays (Fig. 6).	C
64	32	Left humerus.	Antiseptic.	Condyle involving elbow-joint; synovitis of joint.	C
66	21	Right scapula.	Splinters removed; antiseptic.	3 bullet holes made by the same bullet; bullet not found.	C.
88	?	Left femur.	Amputation of the thigh in upper third (fourth day).	Extensive comminution of the middle third; emphysematous gangrene.	D.
89	30	Right femur.	Four fragments of the bullet removed; counter openings, drainage, &c.	Septic on admission; extensive comminution of the middle two-fourths; union.	C.
90	28	Left femur and patella.	Joint drained and bone removed.	Joint full of breaking-down clot on admission; temperature elevated for a week; some movement.	C
91	44	Right patella and tibia.	Removal of the bullet from the tibia; drainage of the knee-joint.	Septic on admission; septic embolism.	D.
92	29	Left tibia.	Antiseptic.	Vertical fracture.	C.
102	?	Left tibia.	Drainage; exploration under anæsthetic.	Septic on admission; junction of upper and middle third; scale of bullet removed in England.	C.
103	?	Right tibia.	Antiseptic.	? Fracture of the fibula; anterior border of the tibia carried away in middle third.	C.
104	25	Right tibia.	Wounds plugged.	Fissured fracture just below the knee.	C.
105	27	Left tibia.	Incision; drainage; removal of bone.	Septic on admission; extensively comminuted in lower third; lymphangitis.	C.
106	30	Left tibia and astragalus.	Cleansing and drainage.	Ankle-joint involved.	C.
107	29	Right tibia, os calcis, and astragalus.	Antiseptic.	Ankle-joint involved.	C.
111	?	Right fibula.	Irrigation and antiseptic.	Large hole; necrosis.	R.
112	25	Left os calcis.	Bullet removed; sinus plugged.	Stellate fracture; lymphangitis.	C.
113	30	Right os calcis.	Antiseptic.	Clean perforating hole.	C.
114	47	Phalanges of the foot.	Amputation of toes.	—	C.

* The Roentgen rays mentioned refer to the illustrations in THE LANCET of Jan. 14th.

† C = cured, R = relieved, D = died.

biceps. A dense scar band also passed across the median. The ulnar was thickened above the point of partial division. All scar tissue was excised and the nerves were cleared. The patient lost his pain after operation.

A case in which a shrapnel ball pressed on the external popliteal nerve and was excised has been mentioned under "The Roentgen Rays."[3]

Compound Fractures and Wounds of Joints.

In all cases of compound fracture, whether involving joints or no, the treatment was thorough cleansing, when necessary under an anæsthetic. Bullets were removed and loose fragments of bone, though these latter were preserved where possible. All joint operations were informal and partial, and everything was saved that could reasonably be. Drainage was never employed except for sepsis and deep syringing was avoided. The military surgery of the limbs will in future consist almost entirely of these cleansing and "tinkering" operations and the minimum of interference should be sedulously aimed at. Natural curiosity to know the full extent of the damage must be checked. Even where no first dressing has been applied, as was proved in numbers of our cases, the entrance wound is small and often protected by scab, so that there is very reasonable hope that the deep parts are not infected and no inquisitiveness should risk this advantage.

[3] THE LANCET, Jan. 14th, 1899, p. 82.

The later bone operations were several of sequestrotomy and drainage. All the big joints of the limbs except the hip were involved in different instances. These were treated conservatively and the limbs saved except in the patient in Case 91, who, I think, lost his life through delay in amputating. In this series of cases the only primary amputations were in the hand and foot. There was one secondary amputation of the thigh in the upper third. Plaster-of-Paris splints were used whenever possible, otherwise improvised wooden splints. In a good number the callus thrown out was considerable, in a few surprisingly large, this depending on the periosteal damage and small enclosed sequestra. The binding down of muscles and tendons which had been involved in the wound was troublesome, especially at the wrist and ankle, and needed massage and even forced movements under anæsthetic. This danger was anticipated and these cases were early taken down and moved, so I think it is an unavoidable sequela and not a fault of treatment.

I was struck by the large number of wounds of the lower part of the leg and foot, and especially of the heel, as shown both among fractures and wounds of soft parts. The explanation is that these wounds are not received standing, but when lying down behind earthworks, which if not high enough will only protect the anterior part of the body. There is also with many a natural tendency to raise the feet in the air when firing in the prone position and thus make them the most vulnerable part. The accompanying table gives a synopsis of the cases of compound fracture, 37 in all, with a few details.

CASE 4. *Compound fracture of the temporal, superior and inferior maxillæ; death.*—The patient was admitted from one of the earlier engagements four days after receipt of the wound (Mauser bullet). The hole of entrance was extremely small, just admitting a probe, on the back of the lower part of the left concha auris. The exit hole was also small, not half an inch across, through the lip below the right ala nasi. The track penetrated the petrous bone, breaking the lower wall of the meatus and glenoid fossa and smashing the left condyle of the lower jaw and the left superior maxilla. The whole of this side of the hard palate was blown away with the alveolus, and the antrum was opened widely into the mouth and nose. Much brawny infiltration ensued over the parotid region. Incisions were made and the condyle was resected in splinters. Septic diarrhœa and pneumonia with suppression of urine set in and death occurred on the twelfth day after injury.

CASE 12. *Compound fracture of the inferior maxilla and cervical spine; wound of the pharynx.*—The entrance wound was over the lower half of the right ramus; it was an extensive fracture with much swelling. Exploration was made and the incision prolonged to the neck, exposing the wound of the pharynx. Splintering was found at the left side of the front of the body and the root of the transverse process of the (?) fourth cervical vertebra. The hole could be felt, but no bullet. Subsequently a Martini bullet was felt lying almost under the skin at the level of the lower cervical vertebræ behind and removed. A tube was inserted down to the pharyngeal wound through which food came. Five weeks later a deep offensive abscess was opened on the right side of the neck. This entirely healed. There were no nerve symptoms throughout.

CASE 88. *Compound comminuted fracture of the femur; acute traumatic gangrene; amputation of the thigh; death.*—The patient was wounded on May 18th. The wound of entrance was small, in the middle of the outer side of the left thigh. It was two days old and looked slightly inflamed. The femur was extensively comminuted. Exploration was made under anæsthetic for temperature; the knee-joint was free; the bullet was not found. A counter incision was made on the inner side of the thigh. Rapid emphysematous gangrene ensued on May 22nd. The man looked extremely ill, sweated profusely, and his skin was cold and clammy. The subcutaneous tissue and intermuscular planes contained much gas. Rapid brown discolouration under the skin extended with definite edge up to Poupart's ligament. The thigh was amputated at the upper third; the patient died during the night five days after the injury. I made an error of judgment in attempting to save this limb. The comminution and longitudinal splintering were very extensive. I might have been successful but for the acute traumatic gangrene. Another patient, whose notes follow, was also wounded on May 18th in the Phourka Pass, came in on May 20th, was in the same ward, and developed the gangrene on May 21st. This case I had not touched except to dress. Whether they were both infected outside or whether Case 88 was infected from the other man I cannot tell.

CASE 87. *Bullet wound of the thigh; acute traumatic gangrene; death.*—The patient was wounded on May 18th and admitted on the 20th. There was a small hole in the upper posterior part of the left thigh, looking like a deep graze, and the track passed deeply from this. On May 21st the patient had three rigors. Towards evening he sweated profusely and the thigh swelled with much pain. The thigh became tense, swollen, and discoloured, and brownish discolouration extended rapidly on to the lower abdomen. There was much emphysema, especially over the lower third of the thigh, but slight crackling extended even on to the flank. Amputation was out of the question in his condition. Long incisions were made, gas bubbled out, and the fœtor was great. The patient sank rapidly and died at 3 A.M. on May 22nd.

CASE 89. *Compound comminuted fracture of the femur.*—In this case the bullet was extracted from the back of the thigh. There was a small healthy wound at the outer anterior aspect of the junction of the lower and middle third of the right thigh. There was a large sloughy surface, 4 in. by 2 in., over the middle third posteriorly. This led to the femur, which was splintered in six pieces. The patient was examined under an anæsthetic and four fragments of lead were removed. A counter opening was made lower down as there was pocketing of pus. A long outside splint was applied. There was much suppuration and several pockets of pus were opened. His condition fluctuated considerably. There was some necrosis, but he eventually did well. Union was firm on discharge and the shortening was 2 in.

CASE 90. *Compound fracture of the femur and patella; knee-joint involved.*—The patient had had no splint on for some days when brought down. The lower third of the thigh and knee-joint were much swollen. There was a small clean opening in the popliteal space and a sloughy opening at the upper part of the patella. There was œdema over the outer side of the joint which was full of fluid. The joint was drained by lateral incisions two days after admission. Many fragments of bone were removed from the knee-joint which was full of softening blood-clot. The joint was washed out. All the tubes were removed in six days. The temperature was up for one week and then normal. The result was slight backward displacement of the tibia. The patella was moveable and there was slight flexion and extension at the knee-joint. The x rays showed oblique fracture of the femur and some (? fibrous) attachments of the patella to the femur.

CASE 91. *Bullet wound of the knee-joint; septic embolism; death.*—The wound of entrance was small, at the inner side of the upper border of the right patella. The temperature was up on admission. The joint was opened by an oblique incision from the original wound. A Martini bullet which was firmly impacted in the outer tuberosity of the tibia was removed. A fragment had been knocked off the patella. There was turbid fluid in the joint. The joint was washed out and drained. The temperature was 103° F. at the time of the operation; it steadily sank and was normal in four days. It then began to rise, the joint suppurated, and steady septic temperature ensued. Sudden collapse with difficulty of breathing occurred eighteen days after injury and death ensued in a few hours. This man, an officer, unlike our other cases, was a heavy drinker. He was also forty-four years of age. I think I did right to attempt to save the limb, as proved by the course of the case at first. But when the temperature rose again I should at once have amputated the thigh. Difficulty with him and his friends caused delay and the sudden death occurred.

Head and Neck.

Not a single case of brain injury came down to me. Judging by the number of wounds of the face and neck many such must have occurred. I assume that they were rapidly fatal. Two eyeballs had to be excised for gross injury. Another, wounded by small shot, had partial injury to the third nerve (paralysis of the internal and inferior rectus with sphincter pupillæ) and loss of sight on the nasal half of the field of vision. A case of penetrating wound of the floor of the mouth had much subglossic swelling and commencing œdema of the glottis which subsided on opening a deep abscess under the tongue. Another instance of œdema of the glottis occurred in a transverse wound of the neck in which the

bullet was extracted from beneath the opposite sterno-mastoid. The exact course could not be determined. A penetrating fracture of the cervical spine (Case 12) has already been described. Another bullet (a Mauser) was found much flattened against the vertebræ which were unbroken.

The Chest.

Of 11 cases of bullet wound of the chest 6 certainly involved the pleura and lung. 9 were cured and the other 2 were doing well when I left Greece. In 3 cases the bullet ran round the chest outside the ribs. In one of these the track suppurated, discharging bits of cloth. It was laid open, the whole track excised, and the wound sutured. The bullet in the second (Case 19) caused an abscess in the lumbar muscles and was cut out. The third patient had pain in a precisely similar position; a skiagram showed nothing, but the pain was so persistent that the spot was explored with negative result. The 6 cases involving lung and pleura were briefly as follows.

CASE 20. *Penetrating bullet wound of the lung.*—The entrance wound was beneath the right clavicle in the anterior axillary fold. There were ecchymosis and emphysema over the lower ribs in front. Below the seventh rib on the abdominal wall was a long, vertical, furrowed wound of exit. The bullet certainly ran deep to the ribs. A considerable quantity of fluid developed in the right chest but was absorbed without anything further being done.

CASE 23. *Penetrating bullet wound of the lung.*—The patient in this case spat up much blood directly he was shot and continued to do so slightly up to admission. The entrance wound was below the centre of the right clavicle. The exit wound was inside the vertebral border of the scapula between the sixth and seventh ribs. There was surgical emphysema behind and much blood was extravasated into the tissues. Fluid, probably blood, was present up to the nipple in front and the spine of the scapula behind. There was spitting of blood for 7 days. As the dulness cleared up there was tympanitic resonance over the lower part of the chest posteriorly and to a less degree in front with *bruit d'airain* over the lower part of this area. The patient recovered. (Mauser bullet.)

CASE 59. *Penetrating bullet wound of the lung.*—In this case the bullet had passed through the arm over the brachial plexus and through the chest. He had hæmoptysis at the time of injury, continuing for 7 days and recurring a week later. Four pints of bloody serum were withdrawn by the aspirator 3 weeks after injury. Subsequent operation for nerve involvement, q.v. (Mauser bullet.)

CASE 60. *Penetrating bullet wound of the lung.*—This patient was shot through the right arm and chest, having four openings in the course of the bullet in a transverse line at the nipple level with the arm dependent. The bullet did not knock him down and he went on fighting, spitting a dozen mouthfuls of bright blood after injury. He was still coughing bloody mucus on admission. No abnormal physical signs developed in the chest. (Mauser bullet.)

CASE 21. *Bullet wound of the lung; bullet in situ; empyema.*—In this case the bullet entered the left shoulder anteriorly through the fore part of the deltoid, passing downward and inward. There was no fracture. The patient was very ill on admission. There were signs of consolidation in the whole of the lower lobe and upper lobe posteriorly. The wound was septic and was opened and plugged. On the eighth day there were signs of fluid at the left base; none was found by needle. On the tenth day there were fluid at the right base and crepitations over both lungs. On the fourteenth day 47 oz. of bloody fluid with slightly offensive smell were aspirated on the left side. On the sixteenth day a rib was resected and 2 pints of pus were evacuated. The pleura was drained. No bullet was felt. The patient made steady improvement. The pleura was nearly closed when we left. A skiagram showed a bullet in the lung (Fig. 7 in THE LANCET of Jan. 14th, 1899).

CASE 25. *Bullet wound of the liver and the lung; abscess of the liver.*—In this case there was a grooved wound over the upper part of the abdomen to the left of the sternum. The other wound was below the seventh right rib near the posterior axillary border. There were no signs in the chest or abdomen on admission. On the fourth day he was very ill, with painful, rapid respiration. A friction rub was heard. On the seventh day there was membrane over the fauces and uvula, clearing on the ninth day. Friction was heard in the right axilla. On the thirteenth day there was puffiness around the axillary wound, from which clear fluid, probably pleural, escaped. It was lightly drained by gauze. On the fifteenth day there was a sudden rise of temperature to 105° F. A drainage-tube was inserted and much clear serum escaped. On the sixteenth day lobar pneumonia of the left lower lobe was detected. On the nineteenth day the temperature continued almost equally high. More fluid escaped by the tube. On the twentieth day he suddenly began to cough up bile and pus in the sputum. The serum from the wound became purulent and deeply bile-stained. On the twenty-fifth day he was improving. The crepitations on the left side were reduced. The sputum and serum were still bile-stained but much less so. Steady improvement took place from this time onward. On discharge the anterior wound had quite healed. The posterior was a mere sinus with scarcely a drop of pus and no bile.

It will be noticed that 3 of the 4 wounds of lung with which we had least trouble were due to Mauser bullets. The ribs escaped fracture in all cases.

The Abdomen.

Several bullets travelled considerable distances in the abdominal wall without entering the peritoneal cavity. One, a Mauser, entered just below the crest of the right ilium in front of the centre, was deflected by the bone without fracture, and passed out through the upper part of the right rectus 1 in. below the costal margin. A clean punched-out plug of leather cut from his belt and of the same diameter as the bullet was discharged by the lower wound (Case 27). One abdominal section was performed.

CASE 29. *Bullet wound of the abdomen; hæmorrhage; abdominal section.*—The patient had been wounded for thirty-six hours. There was a small wound of entrance over the eighth left costal cartilage 2½ in. from the mid-line measured along the costal margin. The exit wound was over the middle of the back of the left loin below the last rib, small but larger than the entrance wound. His general condition was one of exhaustion with rapid pulse. The abdomen moved well. There was some distension and a considerable quantity of free fluid in the abdomen, causing shifting dulness in both flanks with some fixed dulness on the left side. Liver dulness was present and there was no blood in the urine. The operation was performed four hours after admission by a median incision above the umbilicus. Dark blood escaped in quantity on opening the peritoneum and much more when the hand was inserted. There was no wound of the peritoneum opposite the entrance wound, but a hole was found in the parietal peritoneum below the costal margin near the tip of the tenth rib and a bleeding point was found here. No lesion of the intestines, mesentery, or omentum was found. The spleen was intact. The wound was closed with silkworm gut. There were no complications.

Two cases of bullet wound of the intestine were neither suitable for operation.

CASE 30. *Bullet wound of the small intestine, bladder, and rectum (Mauser).*—This patient was admitted on the ninth day. The wound of entrance was in the left iliac region and the exit in the right buttock close to the great sacro-sciatic notch. There was no general peritonitis. The anterior aperture was sloughy and discharging urine, which had burrowed under the skin, the latter having a greenish discolouration. Direct communication with the bladder could not be made out, but urine bubbled out on coughing. An incision was made in the left side downward from the wound exposing a foul cavity from which sloughs were removed. A long tube was introduced through which urine drained into a receptacle under the bed. Per rectum two openings could be felt. The one in the anterior wall communicated with the bladder and the postero-lateral one with the wound in the buttock. This wound was opened up, the sloughs were removed, and it was packed with gauze. On the eleventh day there was enormous discharge anteriorly, consisting of chyme, pus, blood, and urine. A catheter was tied in the bladder. On the twelfth day the dead skin and sloughs were removed revealing a hole 2 in. above the pubes barely admitting the little finger. This, when followed up, exposed a large part of the cavity of the pelvis filled with sloughs, pus, and fæces. The intestines had been raised out of the pelvis shutting off the abdominal cavity by dense adhesions. The bladder with the catheter in it was to the right but its wound could not be defined. Pressure here caused a flow of urine into the cavity. The wound in the buttock continued dry without

urine or fæces. A large tube was inserted into the depth of the pelvis. Death occurred on the fourteenth day.

In this case a Mauser bullet had traversed the small intestine, wounding it high up judging from the contents, the bladder and rectum, and out through the buttock. All the palpable holes were small and clean cut; the immense sloughing was secondary and due to sepsis.

CASE 28. *Bullet wound of the small intestine.*—The patient was wounded forty-eight hours before admission. There was a double wound in the right groin, the holes of entry and exit being respectively 2 in. above and below Poupart's ligament. There was another wound, due to a separate bullet, 2 in. above and internal to the left anterior superior spine, surrounded by reddened skin, and from this fæces were running. There were marked signs of general peritonitis with constant vomiting and his general condition made operation impossible. He lived till the eighth day.

Another case (Case 24) in which the liver was wounded with formation of an abscess has been already described under "The Chest."

CONCLUSIONS.

The Roentgen rays should always, if possible, be available at that hospital nearest the front in which the wounds can be first properly examined and dealt with.

The electricity should be derived from a secondary battery consisting of separate covered cells charged from the nearest town, a man-of-war or other steamer, or by means of a cycle motor, as has been recently done in the Soudan by Major Battersby, R.A.M.C.

The skiagrams should be taken on to Eastman's positive paper which is sufficiently satisfactory for the detection of foreign bodies.

The apparatus is of no use on the field where the detection of bullets can only be an incentive to premature exploration.

The less wounds are tampered with before satisfactory surroundings are reached the better. All difficult bullets should be removed by a fresh incision and the track ignored.

The modern bullet from its greater penetrating power will be much less frequently found in the body than its predecessors. It is practically aseptic and there is no urgency for removal.

The hole of entrance is often extremely small. Suppuration is generally due to pieces of clothes carried into the tissues. Superficial septic sinuses should be excised. Wounds of lung by modern bullets run a comparatively favourable course.

Small-bore bullets may bore through a bone without causing any line of fracture whatever and every degree of injury from this up to the most extensive comminution may be met with.

Passive movements and massage when possible should be begun early in bullet wound fractures.

Welbeck-street, W.

NOTE ON A CASE OF BILHARZIA DISEASE.

BY EDWARD CURETON, M.D. BRUX., M.R.C.P. EDIN.,
SENIOR PHYSICIAN TO THE SALOP INFIRMARY;
AND
T. LAW WEBB, L.R.C.P. LOND., M.R.C.S. ENG.,
PATHOLOGIST TO THE SALOP INFIRMARY.

A RESIDENT of Shrewsbury, aged forty-one years, who was occupied as a scavenger, died suddenly on Oct. 5th, 1898. He had suffered for some time from shortness of breath and from attacks of the nature of angina, but had not had any medical advice. An examination of the body twelve hours after death revealed a few old pleuritic adhesions, the lungs being otherwise normal. A white patch was noted on the anterior surface of the left ventricle. There was old-standing disease of the aortic valves and an aneurysm admitting the whole thumb occupied the posterior left aortic sinus extending into the adjacent coronary artery. The left ventricle was hypertrophied. The liver was somewhat enlarged and hard. The spleen which was about twice its usual size was very dense, hard, and dark coloured. The right kidney was enlarged, being double the size of the left one and showing signs of chronic congestion. On removing the intestines nothing abnormal was noted until the head of the cæcum came in view, when the large size of the appendix arrested attention. It was twice the size of the natural part and was bulbous or distended at its extremity which had a gritty feeling. It was non-adherent, bluish in the middle, and yellowish at the extreme end. Several hard nodules of the size of a mustard-seed projected slightly beneath the peritoneal surface of the part. The heart, portions of the liver and spleen, and the appendix were removed for examination. The liver was congested as also was the spleen. On making sections through the nodules or tubercles of the appendix each nodule was found to consist of several areas of dense connective tissue the fibres of which were arranged in a more or less circular manner so as to surround and include certain peculiar bodies, apparently parasites. These lay in groups of 3 or 4 but in some places 15 or 20 could be counted in one space. They varied greatly in shape but were mostly oval, one end bluntly rounded and the other more or less pointed and often terminating in a distinct spike. The average length was about 0·06 mm. In some places only the shrunken capsules of the parasites were seen, in which case the appearances were very puzzling and at first slightly suggestive of some kind of crystalline deposit. Staining was difficult and only effected by a prolonged stay in strong carbolic fuchsin. In this way it was possible to distinguish a transparent capsule which only stained very slightly and coarsely granular contents which were more deeply coloured. The parasites were exceedingly brittle and fragile, so that the slightest pressure on the cover-glass caused fracture of the capsule. Many of them were so shrivelled and altered in shape as to be unrecognisable and it was only by finding one here and there still retaining the shape characteristic of the ova of bilharzia that it was possible to be sure that this was a case of old-standing distoma disease.

Upon inquiry it was ascertained that the deceased had been in the army from June, 1883, to 1889. He was in South Africa, at Pietermaritzburg, in 1886, and in Egypt and Malta in 1889. He had had fever and ague when in Egypt and had also had a "touch of the shakes." No doubt he became infected by the parasite whilst in Egypt.

Professor Sheridan Delépine of Owens College, Manchester, has kindly examined some of the sections of the appendix. He considers the appearances to be characteristic of distomatosis.

AN INTERESTING CASE OF CÆSAREAN SECTION IN PRIVATE PRACTICE.

BY A. LUCETTE HOME, M.B., B.S. LOND.,
LATE HOUSE SURGEON AND OBSTETRIC HOUSE PHYSICIAN, ST. THOMAS'S HOSPITAL.

AT 2 A.M. on Oct. 23rd, 1898, I was called to attend a patient in her fifth confinement. She was thirty-three years of age and had had three living children and one (premature) stillbirth. The labours had all been tedious affairs and the children big, but in no case had instruments been required. On this occasion pains had started about the 17th, had continued then some few hours and ceased again, to reappear at intervals on succeeding days. During the 22nd the pains had been present nearly all day, though not severe enough to make it necessary to send for me till early next morning. On my arrival at about 3 A.M. the pains were recurring every five or ten minutes. The membranes were unruptured; the presentation was right occipito-anterior, and the os was soft and dilateable, of the size of half-a-crown. At 6 A.M. the membranes were tense and bulging, the os was softer and admitted four fingers readily, while the head had made no advance; the pains continued vigorous, so I ruptured the membranes. At 7.30 A.M. the head, which lay rather forwards over the pubes, had not descended at all; the os was thick and œdematous and the patient was becoming exhausted. I noted at this time that the promontory was very easily reached with the finger, the conjugate diameter being about 3½ in. I applied the Barnes-Simpson forceps, but the head was too high to permit of easy locking and the patient too fidgety to allow of their use without an anæsthetic. I got the patient under chloroform, the continuance