

GUNSHOT INJURIES IN THE LATE GRECO-TURKISH WAR, WITH REMARKS UPON MODERN PROJECTILES.*

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It is almost true to say that all bullet wounds, except those limited to the soft structures, result in fracture of bones. If there is any breach of surface it is of necessity a compound fracture, and is the most unfavourable form of any kind of bone injury, for (1) the wound is an infected one, (2) it is devoid of drainage owing to the long sinus left by the track of the bullet, and (3) the hygienic surroundings are invariably bad. When a joint is opened by a bullet it communicates with the exterior, and being exposed to all the sources of ordinary infective processes it suppurates. A fractured olecranon, a fractured patella, and an impacted Colles's fracture are fractures into the joint, but suppuration does not occur unless contamination is admitted to the seat of injury.

It is not my intention in this paper to give a routine description of bullet wounds, but I will confine my remarks to examples of projectile wounds that I saw in the late Greco-Turkish war. Definitions never cover all the ground, but I remember Sir William Mac Cormac's excellent definition of a bullet wound as "an extreme form of contused wound combined with the dangerous depths of a punctured wound." Shell wounds, of course, differ in the respect that they usually result in extensive lacerations of the soft tissues, with perhaps comminution of the bones as well.

MODERN BULLETS AND THE WOUNDS THEY PRODUCE.

Practically only three kinds of rifle bullets were employed in the war. The Greeks used the Le Gras French rifle with a Chassepot lever action. In Fig. 2 is shown one of the cart-

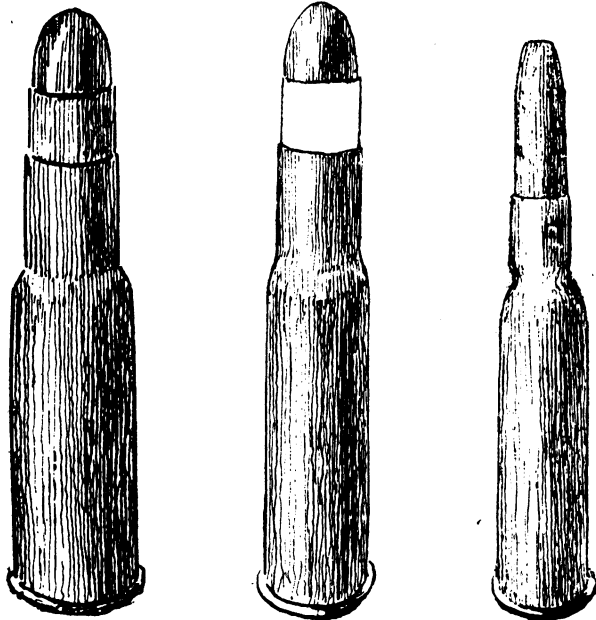


Fig. 1.—Martini-Henry cartridge (Turks). Fig. 2.—Le Gras cartridge (Greeks). Fig. 3.—Mauser German magazine cartridge (Turks).

ridges (which they sometimes, as a punishment, hammer up each other's noses) and Fig. 7 represents a ball which entered a Greek soldier's back, and which like two more given me in Turkey showed absence of rifling grooves. This I cannot explain. The Turks used chiefly the Martini-Henry, but some brigades were armed with the German Mauser magazine rifle. Only two of these brigades, that is, about 10,000 men, came into action at Domoko, and it was from

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this battle and that at Phourka that we filled our hospitals with wounded. A Martini bullet extracted from the foot is shown in Fig. 5. It had perforated and fissured the os calcis, but the shape of the bullet is almost unaltered. Another, Fig. 6, extracted from the left nape of the neck, was impacted and wedged between the atlas and axis, but the bones were not, as far as I could see, splintered. The cutaneous wound was as clean cut as though it had been incised with a knife, and hence I inferred that the bullet had ricocheted off a stone, and I think its general flattened appearance bears out the supposition. The swelling and œdema of the neck were enormous. The wound granulated rapidly. All the bullets extracted at the English hospital at Chalcis, and there were not many, proved to be Martinis (with the exception of 1 shrapnel ball and 2 Le Gras bullets, evidently fired by the patient's compatriots. We never found a single Mauser. I believe none were extracted at the English hospital at Athens, and I could get no specimen at the military hospitals at Chalcis. As a great many men were perforated in the part struck by the ball, and were not completely incapacitated, and it is known that the velocity of the Mauser is something terrific—being effective up to 4,000 yards—it is reasonable to assume that this bullet perforates the part struck, including perhaps the bone, and does little damage compared to the Martini, which, when it strikes a bone, such as the femur, fissures and splinters it in all directions. The disadvantages of the Martini rifles compared to the present magazine rifles are, briefly, that they "kick" hard, they do not repeat, they are short ranged, and the cartridges are heavy to carry. Conical bullets never make the wounds that round balls do, but the trajectory is flatter, they carry straighter, and kill at a greater distance. It may be of scientific, though not actually of surgical interest, to mention a few facts about the bullets employed in modern warfare. I have no specimen of the Mauser bullet, but the French Le Bel bullet (Fig. 12) resembles it in every

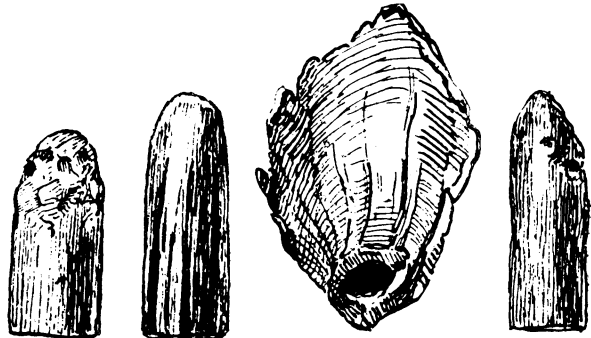


Fig. 4.—Turkish revolver bullet. Fig. 5.—Martini bullet showing rifling (it perforated and fissured os calcis). Fig. 6.—Martini bullet embedded against vertebrae of neck (probably a ricochet). Fig. 7.—Le Gras bullet (absence of rifling grooves).

way. This was given me four years ago by a French sergeant. In the cartridge is the patent French smokeless powder, which is yellow, and resembles chopped straw; it is perfectly smokeless. This bullet, like the German Mauser, and to the same extent the first Lee-Metfords used by our entire army, consist of a soft lead core surrounded by a nickel casing. Theoretically on impact the ball flattens or splashes, but this it does not always do. The Le Bel bullet shown in Fig. 12 has been fired as is seen by the rifling, but the nose of the bullet is not altered in shape. In the late Chitral expedition, the English troops noticed that their Lee-Metford bullets did not stop the tribesmen in their wild rushes, and so the ingenious and practical method was resorted to of cutting through the nose of the bullet, or of rubbing it against a stone, thus exposing the soft lead core, which had the desired effect. The velocity of the Lee-Metford is so great that it is said to do more damage at a distance than at close quarters. This was proved experimentally. Three shots were fired, not by me, at an old donkey who was eating hay in a paddock. The bullets passed "clean through" him, but he went on eating as though nothing unusual had happened, and it was not till,

I suppose, the symptoms of rapidly advancing peritonitis ensued that he desisted from his meal. The latest Lee-Metford (Fig. 11) has a nose of soft lead projecting beyond the nickel jacket. This umbrellas or mushrooms out, the less yielding metal behind becomes impacted, and the ball opens into a disc and splashes, causing a very cruel wound. A specimen of the bullet in section is shown in Fig. 11. Other Lee-Metford modifications are shown in the diagram. One (Fig. 9) is filled internally with soft wax; this other has



Fig. 8

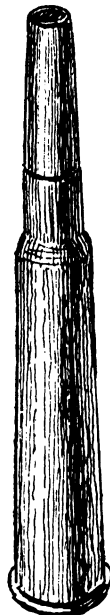


Fig. 9



Fig. 10

Fig. 8.—Soft nose Lee-Metford. Fig. 9.—Wax-cored Lee-Metford. Fig. 10.—Lee-Metford with lead core and vertical slits in outer nickel casing.

vertical slits in the outer casing. These modern bullets are termed "expanding" bullets. The famous Dum-Dum bullets (Fig. 13) are the latest, and derive their name from the Government manufactory in India. They are not made in England. At present they are simply on their trial against the frontier tribes. The bullet resembles a slate pencil, and is a modification of the latest Lee-Metford, but the nickel shield is thinner, and the soft nose is flat and does not project so far beyond the nickel envelope. It was devised in recognition of the facts I mentioned above in the Chitral expedition. I am told on authority that on impact it collapses "like a concertina," making so ghastly a wound that in all probability it would be forbidden in European warfare. Why it should do so more than the Lee-Metford no one seems to know. The expansive principle has been carried to its greatest extent in this "Webley's patent man-stopping bullet." The service revolver bullet (Fig. 14) which looks



Fig. 11



Fig. 12



Fig. 13

Fig. 11.—Soft Nose Lee-Metford bullet, 303, in elevation and section. Fig. 12.—French Le Bel, in elevation and section. Fig. 13.—Dum-Dum, in elevation and section.

big enough, is said to be utterly devoid of "stopping properties" unless it strikes a vital part, whereas the bullet shown in Fig. 15, with its deep cup-shaped depression at each end, gives up the whole of its energy in administering the greatest possible shock. When fired through 18 inches of solid beef it assumes, as is seen from Fig. 15, the shape of a lady's sun bonnet or an antiquated top hat. On entering the body, the front acts like a wadding punch, cutting a clean circular hole, which does not close up, like those caused by other bullets. Expansion commences at once, and after travelling six inches it produces a jagged hole four inches in diameter, a wound doubtless sufficient to finish even a fanatic.¹

SHELL WOUNDS.

Shrapnel and common shell were employed by both Turks and Greeks. We saw several severe lacerations caused by common shell. The worst was that of a young Greek woman, who had the back of both thighs hugely lacerated, the raw area being extensive. She had no fracture. She was in the Chalets Hospital for two days on a stretcher, but we shipped her off to the Piræus, where she became convalescent and did well. Pieces of rock and stones are thrown up by shell and may do considerable harm. Shrapnel, which consist of round iron bullets surrounded by the shell casing, did little harm in this campaign. I saw some cases in the Turkish hospitals, but in the English hospital we only saw two in which we were certain that the injuries were caused by shrapnel. One of my colleagues extracted a shrapnel ball embedded in the right trochanter. The femur as far as we could ascertain was not otherwise injured, though there may have been fissures radiating from the cavity. Movement at the joint was always free. The patient convalesced very slowly. The other case was that of a gunner, who had a round shot hole through the left calf, the aperture of exit being extensive. He thought he had only been struck by a bullet, but I noticed scorching of the skin and hairs around as well, and as the Turks were bursting shrapnel at his battery and some exploded near his feet, I have no doubt this was caused by that projectile. A well-known war correspondent who left Greece after the battle of Pharsala owing to ill health, told me that up till then he had not seen for certain a single injury caused by shrapnel among the Greeks. He had seen, at Trihalia I think, two men supposed to have been wounded thus. As no Greek surgeons were at hand he went into the hut where the men were to render assistance. One he found had a large syphilitic ulcer on the leg, and the other he stripped and examined carefully, but he could find nothing wrong with him except a large corn on his left foot. The immunity from injuries due to shrapnel fire, I think, can be explained thus: In common shell there is a bursting charge of powder in the base; on impact a needle in the cone is driven against the percussion cap and the shell explodes, the fragments being scattered in all directions, radiating from the centre. A common shell then does just as much harm if it bursts 100 yards from the gun muzzle or three miles off, that is, at the extreme limit of the range of the gun. But with shrapnel it is very different: the bursting charge in the shell is ignited by an adjustable time fuse and is only just sufficient to release the bullets from their casing, and they fly straight on, their powers of damage depending not on the bursting charge, but on the momentum of the shell at the time of the explosion. Therefore the greater the distance from the gun at which it bursts the less damage the bullets will do. The Greek infantry preferred not to expose themselves to the Turkish shell firing, or, indeed, to any other for the matter of that, and hence their comparative immunity. Shrapnel wounds, then, are practically round shot wounds, and are not as a rule a combination of bullet wounds plus the disastrous effects of common shell explosions. The base of a Turkish Horse Artillery shell, a 12-pounder I should think (shown in Fig. 16), was given to me by one of the Red Cross sisters who picked it up on the field of Velestino. The gauge is marked on the base in Turkish letters. It must have burst splendidly. The dangerous zone of shrapnel if it bursts at the right elevation, that is about 80 ft. from the ground, is about 2 acres. The cone of dispersion of the bullets is simply in the direction of the travelling projectile, and the base of course widens the farther the bullets travel. When troops present a small front as in marching up a road, the shell is timed to burst

close to the advancing column, when if properly directed it sweeps the whole line; if a larger front is presented the shell



Fig. 14.

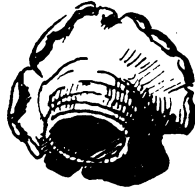


Fig. 15.

Fig. 14.—.476 Revolver cartridge. Fig. 15.—Webley's "patent man-stopping bullet," in elevation and section, and the same when fired.

is burst well ahead to sweep a greater area. Shrapnel firing, then, requires a very accurate knowledge of distance and

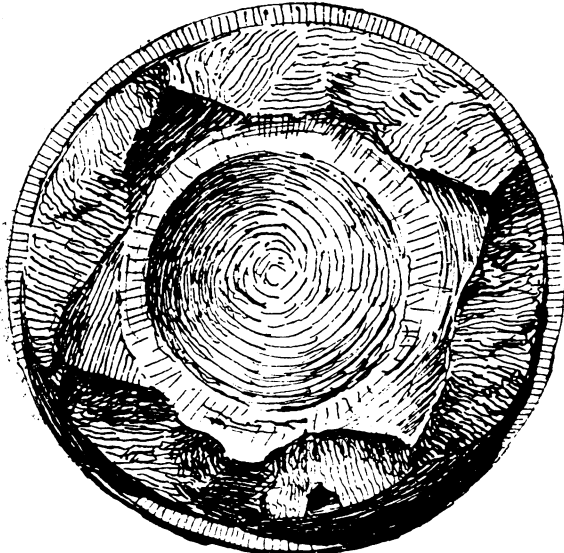


Fig. 16.

Fig. 16.—Base of Turkish common shell, twelve pounder. Showing complete symmetrical fracture.

gunnery to be effective. The shrieking of bursting shrapnel is caused by the released bullets whistling through the air, and resembles the screaming rockets which are fired at the Crystal Palace. It has a very demoralising effect on troops, and even if no one is hit, all are frightened a good deal more than they would care to admit. I was told by a Turkish surgeon in Constantinople in the Sultan's Hospital, erected temporarily at Yildiz Kiosk, that they had suffered much from shrapnel; in other words, the Greeks were better gunners in spite of the fact that German officers were assisting the Turks, who also fought more in the open and almost scorned to take shelter when advancing. There were many more casualties on the Turkish side than on the Greek, though all the Greek hospitals were filled to overflowing. These remarks may seem to have little bearing on the surgical aspect of my paper, but it is the nature of wounds caused in battles that determines the continued use or the disuse of certain projectiles, and by whom can these be better judged than by the medical men who have the care and charge of the wounded?

CHARACTER OF WOUNDS.

If I were asked what were the points that struck me most in injuries of this kind (for with the exception of a few revolver and gunshot wounds which I had seen in hospitals,

my knowledge on the subject was very limited) I should say that I was at first surprised at the comparatively little damage done by rifle bullets. In some cases, it is true, it was enormous, but in the majority of wounded men, the ball had passed straight through the part struck, leaving a tiny bluish black hole at each end, resembling to my mind, a magnified leechbite wound of about three days' standing. In most of the cases it was impossible to tell by the appearance of the wounds which was the hole of entry and which was that of exit; the patient himself could rarely say, and it was only by ascertaining his position when struck that this could be determined. Some of the edges of the entry wounds were inverted but not all; some, especially the oblique wounds, were round and gaping. The wounds of exit in many cases seemed the same as those of entry; a few, however, had everted edges. Superficially the wound is nearly always smaller than the bullet producing it. This has been accounted for by the great twist there is on the ball at the time, like the screw on the turning point of a gimlet—but is that really so? I should say that a bullet traversing the whole body would not revolve on its long axis more than, at the most, half a turn, unless it is arrested in the tissues, when theoretically it would spin like a top; hence the area of the internal wound often bears no proportion to that of the external wound. If an express bullet be fired into a thick board it will hardly be possible to pass even a wire down the track of the ball. I asked nearly every wounded man I saw in the war, however slight the wound, excepting perhaps grazes and hand wounds, whether he was knocked over when struck. This seemed to be invariably the case. When hit, he experiences the sensation of a sudden heavy blow. If wounded in the head, trunk, or lower limbs, he does not fall forward as one sees on the stage, but collapses and sinks to the ground, turns pale, sweats, and often vomits. All this may be due to the mental shock, or the consciousness that he has at last succumbed. The ball rips through the tissues, carrying in pieces of cloth or other foreign bodies, which are left in the bullet track, leading to suppuration and the formation of a troublesome sinus, and requiring the continual "tinkering" which is characteristic of these wounds.

I believe it to be a fact that the Lee-Metford and other modern bullets have so high a velocity, that at close quarters, pieces of cloth, etc., are not carried before the bullet in its track. I wish especially to point this out, as it means that the severity of the wounds as regards infective processes is thereby diminished. Another point that struck me was how very difficult it was to tell at a glance whether a fracture existed or not. This may be due to the fact that there is not a complete solution of continuity of the bone, and as the fracture is due to direct violence very little displacement arises. I observed many instances of this. One man, I remember, was struck when the right elbow was flexed in the act of firing; there was one wound over the olecranon and another about $2\frac{1}{2}$ inches above the joint posteriorly. There were swelling, œdema, and extravasation up the arm, but though I was certain that a fracture, and an extensive one, too, existed, there was no backward displacement of the forearm, such as we see in a transverse fracture above the condyles, nor could I detect crepitus. Forceful manipulation was not attempted for obvious reasons. Later, when the œdema disappeared, a great mass and thickening of bone was felt at the lower end of the humerus. The sinus proved troublesome, and the patient suffered considerably. Some time later the joint was opened posteriorly, and the sinus scraped. The fracture was in the process of repair, but there were still evidences of a comminuted fracture of the bones. The man did well.

Another case was that of a bullet wound on the outer side of the left thigh, the patient having been shot from the hills above while fighting through the Phourka Pass. The wound was oblique, and the ball in the limb. A first dressing had been applied by the Greek military surgeons, who are most careful in their antiseptic methods. The patient was huddled up with 300 other wounded in the hold of a collier, used as a transport, which presented the most gruesome sight of tortured humanity I have ever seen. When taken to our hospital, he "hobbled" to a chair, and I redressed the wound. I suspected a fracture from the swelling of the limb; but I thought it might be partial only. When the patient was in

bed, on raising the foot it was quite apparent. Large pieces of bone were resected in this case. The femur was comminuted and fissured in all directions, fragments being driven into the adjacent muscles, and yet the characteristic deformities in which we rely on the diagnosis of fractures, were not apparent. The veriest tyro in surgery could detect, at sight, a fractured femur in the middle and lower thirds in an ordinary accident, unless, perhaps, the fracture was transverse, as often occurs in children. There was no overriding of fragments in this case, as there were practically none left to override. The limb became gangrenous, and it was amputated by one of my colleagues, but the patient died some hours later. A search was made for the ball in vain; it may have been comminuted itself. That it was a Martini I have no doubt, as the Mauser brigade did not come into action at Phourka, where this man was wounded. The wound well exemplifies the fact that the extent of the deep injuries inflicted bear an out-of-the-way proportion to the small area of the external wound.

BONE INJURIES.

I have already mentioned some interesting clinical facts on injuries to bone. It was very noticeable how rapidly wounds of the upper extremities, and severe ones too, such as compound fractures of the humerus, healed compared to corresponding wounds of the lower limb. Some of the cases of fractured radius practically healed under a scab, and in one case there was no exfoliation of bone whatever. The heel and ankle injuries did badly. Unless the fracture is keyhole, there is nearly always comminution, by which we mean secondary fractures at the seat of injury. Many of these little fragments must be stripped of their periosteum but they do not always necrose, for they serve as a mechanical scaffolding for the granulations to grow on and to ossify. The heat produced by a bullet striking a bone may be very great, and it is said to add to the severity of the injury. What we view in a museum specimen is not the bone itself, but the skeleton of the bone. When inflammation resulting from injuries occurs the hard substance merely takes on a passive inflammation, the active inflammation being limited to the soft structures in the Haversian canals, which become swollen and œdematous from exudation with the production of new bone. A bullet injury, apart from the inflammation set up at the seat of fracture, may result in osteitis or even in periostitis. The former is very common and requires continual surgical interference. I saw an admirable example of the latter at Vienna. Here a femur had been amputated for old gunshot injury, but I noticed on its surface, in addition to the deformed mass of osseous tissue at the seat of fracture, a beautiful series of longitudinal grooves extending up the shaft from the enlargement of the periosteal vessels. The condition was that of an osteoplastic periostitis.

WOUNDS OF JOINTS.

That a bullet wound of the knee-joint does not always suppurate, perhaps resulting in irreparable harm, was proved by the Mayor of Lamia, who fired at some sheep in the pass and hit a refugee woman in the right knee. The ball had perforated the outside of the joint. She eventually came to the English hospital at Chalcis, where she was treated as an out-patient. We fixed the limb in an improvised splint, and after a few attendances, and when she was almost well, she disappeared, so it is only fair to assume that she made a perfect recovery. We had another bullet wound of the knee-joint. The ball, a Martini, lodged in the outer condyle. It was extracted, some osteomyelitis was perhaps set up, but the patient when he seemed on the high road to recovery suddenly died with symptoms of pulmonary embolism.

INJURIES TO SOFT PARTS.

1. *Contusions*.—If a man is struck obliquely by a bullet a simple contusion may result. There may also be a subcutaneous fracture. We saw one instance of this. The right ribs were "black and blue" from extravasation. It was assumed that a fracture of rib existed, though crepitus was not detected.

2. *Furrowed Wounds*.—A ball may run parallel to the surface grooving it; "furrowed wounds" as they are termed. A man had been struck in the right cheek and the bullet lodged in

the jaw. The cheek was cleanly furrowed, having as the base the mucous membrane of the mouth. There was some necrosis, but a plastic operation was performed by my colleague, Mr. Fox Symons, with admirable result.

3. *Seton Wounds*.—A ball fired obliquely burrows for some distance just under or a short distance beneath the skin and then emerges. A gendarme at Lamia tried to interfere in a quarrel between two other gendarmes who were doing a little pillaging on their own account. A few shots were exchanged, with the result that the spectator was shot through the right pectoral region with a revolver. The bullet burrowed under the right pectoral region and passed out at the axilla. The track of the bullet was marked by a ridge of elevated tissues for the whole of its extent (about 6 inches) with great redness and enlargement of glands. It seemed to be a case in which it was feasible to lay open the whole sinus, and this I did and scraped the track with a Volkmann spoon, removing at the same time several pieces of cloth. I am certain, judging by other cases, that this would have produced a troublesome sinus if not a worse result, but as it was, after paring the edges of the pectoral muscle and inserting some deep stitches, the wound, to my surprise and gratification, practically healed straight away and the patient, though one of the last in, was the first out of the hospital.

4. Sometimes a ball enters the tissues and falls out again. I may give an amusing example of this. A soldier was struck in the middle of the back in the left erector spinae. There was simply a wound of entry. I asked the patient, through an interpreter, whether the military surgeons had removed the ball. He replied in the negative. I proceeded to search for it, but without avail. There were no signs of abdominal injury. I made a second search next day, enlarging the wound and probably giving the poor fellow much pain. He then inquired what I was doing to him. On being told I was trying to extract the ball he replied, "I have it here in my shoes. I found it in my trousers after the battle." The bullet (Fig. 7) is a Le Gras bullet, evidently fired by his own side, so the wound was not so dishonourable as might appear. There is no rifling on the ball.

5. A bullet may perforate a part of the body struck, and emerge, almost unchanged, or it may undergo comminution itself without necessarily fracturing a bone, though bones are really not so hard as is assumed. An example of the first was that of an English volunteer who had been engaged with the Turkish Mauser brigade. He had been shot under the right clavicle, and the ball had passed out posterior to the scapula, which must have been perforated. The wounds of entry and exit, which seemed exactly of the same size and character, healed rapidly under a scab. How the vessels and nerves about the region escaped was a wonder. He had no hæmoptysis, but some part of the lung must have been wounded. He had been shot at at about 800 yards. The Mauser is good for 4,000 yards, so it presumably passed through the part, and proceeded with almost undiminished velocity. Another remarkable case of vessels and nerves escaping was that of a patient struck in the palm while firing. The ball entered the web of the finger and passed out at the ball of the thumb. There was no loss of sensation or any signs of injury of the median or ulnar nerves, and the palmar arches presumably also escaped. We saw several perforating flesh wounds of the thigh, but the vessels escaped.

CHEST INJURIES.

An Evzone² was shot through the left shoulder. The humerus was not fractured. The bullet, a Martini, we found by the *x* rays in the lung. Pneumonia, pleurisy, hæmorrhage into the pleura and empyema rapidly supervened. The chest was first aspirated, and then a portion of rib excised. The patient was extremely ill, and had it not been for the excellent nursing he received at the hands of the Red Cross Sisters he must inevitably have died. The ball will doubtless become encapsuled, as is the case with General Smolenski, who carries a ball in his lungs to this day. Another lung case was that of a man shot through the right chest. The ball emerged to the left of the ensiform cartilage; a fracture of the rib existed. The patient had pleurisy, diphtheria, pleurisy and pneumonia on the other side, and eventually had a biliary fistula in the axillary line about the level of the fourth rib. The ball had perforated pleura, lung,

diaphragm, and injured also the liver. We left both these cases in the Queen's Hospital at Athens convalescent.

PELVIC AND ABDOMINAL WOUNDS.

Pelvic wounds are very serious and used to be a frequent cause of pyæmia. We saw a very severe case. The patient was a Garibaldian volunteer, aged 17. He was fighting the Turkish Mauser Brigade and was struck in the left hypogastrium. He had been in the German Red Cross Hospital at Styliida, but after the battle at Phourka he was sent on to Chalcis. The abdominal tissues were sloughing. The bullet had perforated the small intestine, passed through the bladder, through the rectum (the two holes could be plainly felt by examination), and out through the buttock. There had been localised peritonitis. The matted gut was raised out of the pelvis, which was a cavity filled with pus, large sloughs, urine, contents of intestines and undigested curds. It had to be emptied and dressed every four hours. I used to get my right hand through the abdominal opening into the pelvis and scoop out the stinking contents with the palm. A more disgusting dreadful condition I never saw. The poor fellow became emaciated to a degree, but hung on to life with wonderful pertinacity. He eventually died of exhaustion. Among other interesting cases was one of what at first appeared to me to be a furrowed wound about the level of the natal fold of the left thigh. The ball, I assumed, had not passed into the thigh. There was no dressing on the wound, though the patient had been wounded at Phourka about thirty-six hours before. I found him in the hold of the collier already referred to, and as he looked extremely ill and we only took out the worst cases, the journey from Chalcis to Athens being about twelve hours, I assumed he was more severely wounded than at first appeared to be the case. The wound was dirty, and the clothes covered with mud, grime, and blood were in contact with the wound. The patient had several rigors which he attributed to fever, from which he was a continual sufferer (and I did find the spleen enlarged), and asked for quinine, which is a drug everyone takes as a preventive. Next day I found the thigh immensely swollen, as though hæmorrhage had occurred into the limb, and there was emphysema from the thigh almost to the ankle. Amputation was out of the question, as the abdomen was discoloured; but several long incisions were made, and gas hissed and bubbled out of the limb, mingled with dark venous blood. The stench was awful. The bullet, a Martini, was found just under the skin, which it had undermined for about 2 inches from the spot which I assumed was the exit of the ball. This, then, was a case of acute emphysematous gangrene. The case was hopeless and the patient died four hours later. We isolated him as best we could. He happened before I discovered his condition to be in the next bed (and from want of space they were necessarily closer to each other than was scientifically correct) to the patient whose femur was amputated. I cannot say whether one infected the other. Nothing further of the kind occurred in the room, though there were several severe injuries to lower extremities, splintered tibia, perforated wound of ankle, two of the os calcis, a laparotomy, and several very serious cases beside.

The laparotomy case was that of a man who was shot through the abdomen, the ball passing out in the flanks. He had signs of internal hæmorrhage. My colleague, Mr. Abbott, opened the abdomen and removed clots, but could find no injury to intestine. As there was no hæmaturia presumably the spleen was lacerated. The patient made an uninterrupted recovery. This was the only laparotomy on the Greek side during the war that I heard of. Some had been performed by foreign Red Crescent surgeons with the Turks, but these I am told mostly proved fatal. Whatever correspondents may have thought of the fighting propensities of the Greeks, I must say that the wounded were most heroic in enduring their sufferings and privations. Mr. Abbott is himself reading a paper on his cases later, and I therefore wish to thank him for his courtesy in allowing me to mention them before their publication.

REFERENCES.

¹ The Field, August, 1897. ² *Evzone* *εὐζώνος*, that is, "well belted") a term applied to the kilted regiments of the Greek army.

ON and after December 23rd the muzzling order will be extended to Brighton, Hove, Lewes, Worthing, and certain adjacent parts of the county of Sussex.

REPORTS OF SOCIETIES.

ROYAL MEDICAL AND CHIRURGICAL SOCIETY.

W. H. DICKINSON, M.D., President, in the Chair.

Tuesday, December 14th, 1897.

ADJOURNED DISCUSSION ON THE PREVENTION OF ENTERIC FEVER.

DR. J. F. PAYNE resumed the debate. He said the fundamental question was whether enteric fever was strictly a specific disease or whether it could arise *de novo*. The possibility of the disease originating otherwise than from a previous case had not been entirely negatived by the discovery of the typhoid bacillus. For, assuming the bacterial origin of the disease, the bacilli could conceivably have had a saprophytic existence or have originated from bacilli which had passed through the intestines of a person without giving rise to enteric fever. If the disease always arose from a pre-existing case, the problem of prevention would be very much simplified. Practically this was so in the immense majority if not in all cases. Hence the great importance of preventing the infection spreading from one person to another, for if this was done effectually the disease would be stamped out. These measures, though sometimes hard to effect, were as nothing in comparison with the gigantic enterprise of searching for and destroying the bacilli in streams, sewers, and reservoirs. If every case were efficiently looked after, the disease would, everyone would admit, be greatly diminished or, from the strict specific point of view, exterminated. Our first duty, therefore, was to take such measures as would ensure efficient disinfection of the excreta, etc., of typhoid cases. Assuming that it was possible to destroy all the bacilli in the fæces, burning was the best method, but was often inconvenient from the large bulk of liquid mixed with the fæces, and at any rate in private houses could not always be carried out. If the liquid method was adopted, sufficient quantities of perchloride of mercury or hydrochloric acid must be employed. Fæces were not the only channels by which infection spread; urine, sputa, and even saliva must be taken into consideration. Linen and cotton garments, after being dipped in carbolic acid, should be finally disinfected by boiling; the risk of infection then fell only on the laundress, but was much less than in scarlet fever. Woollen garments, flannels, and blankets, however, were never boiled, and so might go again and again to the wash without being ever properly disinfected. It was not certain that the customary 1 in 40 carbolic acid solution was sufficient to thoroughly disinfect, but there were difficulties in the way of using any stronger solution. Mr. White, of St. Thomas's Hospital, had found that perchloride of mercury so stained and destroyed woollen fabrics as to be useless. In hospitals woollen articles could be disinfected by means of the disinfecting oven, but this was inapplicable in private houses, and some new method was required. This disinfection of fæces, linen, etc., was the first line of defence against typhoid fever, and was the province of every medical man; when the disease had broken through it the matter was one for public health officers. One case of enteric might give rise to a terrible epidemic, and hence the most vigorous measures must be adopted; and, without undervaluing the labours of our sanitary reformers, we should, in our domestic management of cases of typhoid, act as if that second line of defence did not exist. The public were fully convinced of the universality of typhoid infection by inhalation; this was a doubtful question, but he could quote cases in which it seemed probable that it occurred.

Surgeon-General JAMESON showed charts of the incidence and mortality of typhoid fever in the various military stations. It was lowest in Scotland; admission 0.7, mortality 0.22 per cent. In England and Wales the admission-rate was 0.8 and the death-rate 0.17. The latter corresponded with the rates in the civil population, and inasmuch as the army was largely composed of men at the age most subject to the incidence of the disease, it spoke well for their results. In Hong Kong the ratios were 1.3 and 0.3; then came the Straits Settlements, Canada, Ireland, Ceylon, Egypt, and, last, Bermuda. In some stations the efforts of the medical