The following Surgical Observations upon Gunshot wounds were obtained by me as Chief Surgeon of Rustchuk Hospital, while attached to the Stafford House Committee during the Russo-Turkish War. I shall commence by describing the Hospital and some facts relating to hospital management. The Hospital was a large railway workshop, its height, excellent ventilation and isolated position, and the fact that the sick came straight from the battle fields caused the comparative mortality to be very much less than that of any other hospitals in Turkey. The number of beds available was 210 and during the four months of my stay in Rustchuk merely did I have more than a dozen beds at my disposal. The nursing was done exclusively by Turkish soldiers, 30 in number, and excellent nurses they made, under proper discipline. The Sanitary condition of the Hospital was good; we had no epidemic of erysipelas, and Hospital Gangrene was
unknown to us. Only one death from Typhoid fever occurred. The precautions taken were as follows: constant supervision as to patients having clean sheets, shirts, etc. whenever soiled, by securing matters, blood, pus, etc. — Washing of patients, especially the feet by servants, and for those more a less convalescent, two baths were erected. Sulphur was burnt in the wards, but Carbolic Acid was used more frequently. Before suppurring wounds were opened, a shovel with red hot cinders was brought in, and some strong Carbolic acid poured on the top, this placed under the bed and the wound opened under the fumes. The latter were not disagreeable to the patient and acted admirably in destroying all noxious odours. — After the dressings were over, the wards were carefully swept and Carbolic Acid sprinkled on the floor; and also the fumes from hot cinders and Carbolic Acid were made to permeate over the whole ward, by a servant being directed to walk up and down with the shovel, pouring on a little Carbolic acid every now and then. All cases showing any inordinate inflammation were dressed last and Erysipelas cases were at once isolated. All soiled bandages, etc. were blood
were never used again but burned. The closet was a moveable shed, placed over a deep ditch dug out to about 10 feet deep, and those patients who were able to move about were compelled to use them. These closets were constantly supplied with chloride of lime, and the shed removed every month, the ditches being filled up with mud and chloride of lime. The bed-pans used in the hospital were always emptied down these closets and washed with carboic acid, before being returned to the ward. The closets in many particulars were inconvenient, but I believe, being quite apart from the building, added to its sanitary state. The heating of the wards was accomplished by the aid of large brick stoves. The Turkish patients were for the most part anaemic, scrobutic, subject toague, and generally ill in mind as well as in body, these facts often considerably retarding recovery. The diet was according to the Turkish military scale: No. 1, being rice, water; No. 2, thin broth and bread; No. 3, milk, broth, bread, and rice; No. 4, milk, meat, soup, and half a roll of bread; No. 5, stew, meat, milk, and half a roll of bread; No. 6, (the usual full ration), half a roll of bread, 1 lb. of meat, rice, flour, vegetables etc. The extras
principally used were beef tea, jelly, and brandy. — My experience in the above Hospital extended over four months, during which period 441 cases were admitted directly from the scene of action.

Commencing with wounds of the upper extremities, my experience was that 32 per cent. of the cases admitted into Hospital came under this head, the left arm, forearm, and hand being more frequently wounded than the right, which is accounted for from the fact that most of the wounds were received while in the act of firing.

Flesh wounds were more frequent than wounds accompanied with fracture, as a rule penetrating. As regards extraction of bullets, it appeared the most preferable plan to cut down upon the bullet and thus form a counter opening, instead of extracting by force from wound of entrance.

Wounds involving fractures of the humerus provided there is not much longitudinal splintering or contusions involving injures to the joints did admirably. Treated conservatively.

As regards cases requiring amputation, the operation which proved most successful was where it was performed by the anterior and posterior skin and muscular flaps
less sloughing taking place, than in those cases where the circular method or that of skin flaps with circular division of the muscles had been adopted. In those cases where the bullet had penetrated into the shoulder joint, excision of the joint in the majority of cases was mostly adopted, but when it was found there was much longitudinal splitting of the shaft, disarticulation was performed immediately.

The following case came under my observation: 'Hussan, at the battle of Pyrgos, received a bullet wound of the right shoulder, the bullet entering from the front; no wound of exit. On examination I found considerable comminution of the head of the bone and the shaft of the humerus, much splintered. Under chloroform a free longitudinal incision was made about 4 inches long, from the tip of the coracoid process cuttting down to the bone, the joint being then easily accessible loose portions of bone together with bullet were removed. Further examination showed how great was the splitting of the shaft of the humerus, amputation was then decided upon and performed after Professor Spence's method. The man made an excellent
recovery.- Cases of bullet wounds to the elbow joint were for the most part treated expectantly and did well. Where excision was found necessary, operation by the longitudinal incision was performed. Bullet wounds of forearm, wrist and hand may be closed together and are satisfactorily treated conservatively. Excision of the wrist was never performed, amputation being reported to if operative interference was necessary.

Though the percentage of wounds of the upper extremities was large, that of the lower extremities showed a much greater proportion, e.g., 42 per cent. Wounds of the lower extremities showed that the majority of cases were flesh wounds, the thigh being most frequently the seat of injury. It was found that wounds of the thigh required greater attention and watching in consequence of the tendency to suppurate which readily collects and burrows amongst the muscles. Cases of gunshot wounds of the hip joint are most fatal and excision is not advisable, as in the shoulder joint, accordingly amputation was most frequently resorted to. Fractures of the femur were
very difficult to treat conservatively, but unfortunately the surgeons were compelled to treat these cases in that manner having to act in accordance with the religious principles of the Turks, who were averse to amputation. The results in these cases were mostly fatal after undergoing a long and tedious illness. Bullet wounds in involving the knee joint are very grave cases, and amputation was the only treatment which was available. Excision proving useless & fatal in one case; however, after a tedious illness, ankylosis of the joint took place and the case did well. Such a case however proved the exception to the rule, than as a guide for treatment. Fractures of the bones of the leg admit readiness of conservative treatment, and were not generally serious. Primary amputation was seldom necessary and only called for when there was much destruction of the soft parts with injury to the principal vessels and splintering of the bones into the knee joint. When the operation was necessary, amputation at the knee was generally performed. Bullet wounds of the ankle, foot, and toes were not frequent and when they were admitted were generally treated expectantly.
Excision of the ankle was never performed, amputation generally being resorted to.

The prognosis in the majority of cases of Bullet Wounds of the Upper and Lower Extremities was generally favourable, unless there was considerable shattering of the shafts of the long bones, or where the larger vessels and nerves, and principal joints were involved. The complications which proved most serious were great prostration from loss of blood, diarrhoea, dysentery, &c. &c.

To summarise the treatment of gun-shot injuries of the upper and lower extremities, a careful examination with both finger & probe should be made for the removal of all foreign bodies. In cases complicated with practice, special care should be devoted to the spicules of bone which are driven into the substance of the surrounding tissues, & which if left give rise to a large amount of irritation & profuse suppuration. The sinuses should be washed out daily with a weak solution of carbolic acid, an irrigator being preferable to a syringe, as one is better able to control the force of the stream. - Obstructive syringing is very detrimental. The wound
of exit and entrance should then be dressed with pads of marine lint and bandaged. The triangular bandage in the majority of cases is preferable to the roller. Drainage tubes do more harm than good. As regards splints one has to be guided by the situation of wounds of entrance and exit. In fractures of the humerus or femur either lateral or antero-posterior Gough's splints, kept in situ with strips of plaster, were most convenient and efficient. In treating fractures of the femur no extension should be made on the limb, and in both cases of fractures of humerus & femur a bandage ought to be applied from the tips of the extremities to immediately below the seat of injury. Fractures of the leg were best treated on Monty's or Clyne's splints. Poultices should be avoided as much as possible. The many-tailed bandage, kept constantly moist, with a lotion of Carbolic acid I found was the most convenient dressing for wounds of elbow or wrist joint, the joints being kept at rest on a pillow. Wounds of the ankle or foot were generally enveloped in a layer of marine lint, bandaged with a triangular bandage.
The marine lint in the majority of cases is preferable to any other form of dressing, acting both as a Poultice and disinfectant. Flaps of amputations should be left open after the operation, for 24 to 36 hours, marine lint being stuffed in between and around the flaps. After a patient has been dressed and put into bed, a hypodermic injection of morphia should in all cases be administered. In cases where there was prostration from loss of blood or debility from profuse suppuration, quinine and iron should be freely administered. Sia, quinoa, and dysentery were best checked by Spermacoey, Bismuth, Catgut, Phatam, and Opium.

The percentage of deaths from all causes in the upper extremity was 7.88, and for the lower 9.81 not including the hip and knee joint 7.14. The percentage of deaths where the hip or knee joints were implicated was 71.42. But this exceedingly high death rate is to a large extent attributable to the causes previously mentioned.

Few of these cases came under treatment the percentage being 4.7, showing the fatality of such cases upon the field. Accordingly the wounds received as
a rule were not of a serious nature. Throphoning was rarely resorted to but was not successful. Pneumonia proved the most troublesome complication. Injuries of the face showed a percentage of 5.4. There was frequently noticed much destruction of the soft parts and commination of the bone of the face, yet notwithstanding, these wounds healed rapidly, and all the cases admitted recovered. Wounds of the chest existed in the ratio of 7.7 per cent, 4 per cent of which were not penetrating. The latter do well under treatment, though we had frequently necrosis of portions of the ribs. Penetrating wounds of the chest were very fatal and the cases generally succumbed from pneumonia or pleuritis. Still cases did recover and the treatment pursued was to simply place a bandage of marine lint over each wound with a broad roller bandage and to administer morphia hypodermically or opium internally. Several such cases did well and made good recoveries. Another case which died from gangrene of the lungs, after both the wounds of exit and entrance had healed, was attributed to the probable lodgement of some portion of clothing in the lung.
Wounds of the abdomen were very fatal; most of the cases succumbed from 24 to 36 hours after admission. The percentage received was about 4.08 p.c. Opium alone was used as an anchor and the treatment generally in nearly all cases was expectant. The following cases are of interest:

**Case I**

A young Turk shot through the abdomen from front to back in left lumbar region. No protrusion of viscera. On examination, the bullet was found to have traversed the abdominal cavity, and not merely travelled round the skin. There was no peritonitis, no vomiting, but some troublesome constipation. Carbolic dressings were applied, and a liquid diet ordered. Hypodermic injection of morphia night & morning. He left the hospital perfectly well in seventeen days.

**Case II**

In this case, the bullet had entered from behind in the lumbar region, and no wound of exit could be found, nor could bullet be felt nor was there any evidence of its lodgement. After severe constitutional symptoms of some days duration a hard mass was felt in the epigastic region, a poultice was applied and the mass became soft and fluctuating.
The abscess was opened, faeces pressed escaped and the bullet was found in the abscess cavity. The man made a good recovery.

The proportion of deaths from wounds of the head amounted to 9.09 per cent, of the neck 25 per cent, of the face 11 per cent, of the chest 38.23 and of the abdomen the large majority of 66.6 per cent.