only on right side and with difficulty. Both cremasteric reflexes weak. Pain felt in back on passive movement of legs, which were moderately flaccid. Zone of hyperalgesia around body on both sides just above Poupart's ligament, but most acute on the left side. Lower abdominals weakened on left side. Pain felt in lower part of the abdomen when bladder was full and at the onset of micturition, but no pain in penis. Pain and paresis of left arm but no numbness. Tenderness on pressure over lumbar and cervical vertebral spines. No bruising seen.

November 9th. Arm movements much freer. Can move right toes.

November 12th. Arm fairly powerful, and legs much stronger for movements at all joints. Still has pain with full bladder. Cannot quite stand or walk on legs. Three herpetic blisters on skin of left thigh from 3 to 6 in. above the knee (second or third lumbar segment). Hyperalgesia now only on left side of abdomen above Poupart's ligament. Legs still numb, so that the patient is completely unable to appreciate the position of the joints in passive movements. Movements of wider range still caused severe pain in the small of the back.

The final example is one of hysterical simulation of the true paraplegia, which can be at once recognized by the state of the deep reflexes, and a definite prognosis consequently given of the speedy recovery which will emphasize the distinction between it and the more prolonged results of real injury. Functional disorders of the nervous system are far from rare in the fright caused by a big shell explosion, and they assume very diverse forms. The man may become blind, or deaf, or dumb; he may be seized by a violent and coarse tremor that shakes his body for days; or he may be paralysed with a hemiplegia or paraplegia.

CASE IV.

No. 10348. 2nd Welsh Fusiliers.

November 4th. Was in the trenches when a large shell burst and killed the man next to him. He himself was not covered by soil, but he lost consciousness, according to his own statement, and afterwards was paralysed in the legs.

November 7th. Examined at base hospital. Legs incapable of movement, but not atonic. Deep and superficial reflexes all increased. No definite zone of hyperalgesia on the trunk. Headache and pains in the back of the neck. Hands tremulous.

November 9th. Up and walking about freely. Practically well.

Diagnosis is, therefore, easy in the first or second week after the injury. The functional paralysis reveals itself by an increase of tone in the leg muscles and by exaggeration of the knee and ankle jerks, with a tendency to clonic or coarse tremors. Tenderness and pain may be complained of, but they are felt all over the back, and not localized to the area from which spring the nerves that supply the paralysed limbs. Organic damage, on the other hand, depresses all the reflexes and lowers the tone of the muscles. There is generally a band of hyperalgesia at the upper limit of the area of numbness, and the back is acutely tender, but only over the corresponding spines. The worst cases may conceivably show change of electrical reaction, and subsequent wasting of muscles, but I have not been able to examine this point. Nor have the men been sufficiently long in France to follow the later history of their recovery.

The evidence is insufficient to determine whether the injury was confined to the spinal nerve roots, or whether it affected the lower segment of the cord itself. The absence of an extensor response and the freedom from paralysis of the bladder suggest that the cord was not injured. In Case III the outbreak of herpetic vesicles on one side made it certain that the posterior root ganglia were injured, and this would be at a level some inches below the corresponding part of the lumbar cord. On the other hand, the band of hyperalgesia around the body tends to support damage of the cord itself. But the lack of symmetry in the interference with function, and the fact that the hyperalgesia persisted much longer on one side than on the other, while it was in Case I associated with a unilateral root area of actual skin numbness, are all in favour of the view that the injury is one of the spinal nerve roots, perhaps as they pass through the foramina rather than while they lie free in the cauda. Damage of this character would explain the escape of the bladder, since its motor and sensory nerves pass by the sheltered second sacral roots.

The pain before micturition, which was complained of by Case III, is of interest in this respect. It was felt vaguely in the lower part of the abdomen as the result of a full bladder—that is, in the region of the hyperalgesic lumbar nerves. There was no pain in the penis, such as would have been expected with hyperalgesia of the sacral

nerves. It further shows that the hyperalgesia affects the visceral as well as the ordinary nerves of the trunk.

Lumbar puncture was not made to ascertain whether haemorrhage had occurred around the spinal cord. There was no obvious bleeding either within or without the spinal cord in the single case examined *post mortem*.

However, the distinction between damage of the spinal roots and of the cord itself is one of no great practical importance. The cases recover. But the clinical diagnosis of injury is important, for it is only fair to the injured men that they should not be classed with the neurasthenic or hysterical.

ANTISEPTICS IN WAR.

BY

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ALL my experience in South Africa made me confident that wounds ought to receive efficient disinfectant treatment as soon as possible after their infliction and that they should not be treated only by the application of an antiseptic dressing.

That was the conception of Lord Lister, who gave me a supply of double cyanide of zinc and mercury to be used as a powder on the field. I found powder impracticable; wind and rain prevented it from reaching the wounds and its application to the under surfaces of parts was impossible without turning over the patient or limb. Hence I made the powder into a paste by mixing it with 1 in 20 carbolic acid and used it with complete success in many minor fights. The wounds healed beneath a mixture of paste and blood clots were beautiful to see. The surrounding skin was also well treated with the paste and retained its position for days. The dye with which the powder is stained acts as a mordant, and by it the chemicals are more firmly fixed in the tissues.

On my return I placed the paste into the collapsible tubes from which artists squeeze their paints. Although no oil and no fatty substance was inserted into the tubes I am describing, the paste remains to-day of the same consistency as it did fourteen years ago. The tubes have not been altered by the contained chemical.

Personally I am very sorry to see that our troops are being supplied with iodine solution as a disinfectant. Many wounds have arrived in this country in a disgraceful condition after the early application of iodine. I believe that iodine has proved a failure in treating large wounds.

Since being at Haslar I have made perfect—at least from my point of view—a better solution than iodine. It is a mixture of 1 in 20 carbolic acid and 1 in 500 mercury perchloride in absolute alcohol. It is coloured with rosaline. The value of this combination is as follows: 1 in 20 carbolic acid is a solvent of fat as well as a germicide. Mercury perchloride is a most powerful germicide. Rosaline has an important action in being a mordant. Wherever the dye is seen mercury perchloride is present even weeks after application. Alcohol dries sooner than water, it does not macerate the tissues so much, and it appears to encourage greater penetration of the antiseptic. No case has suffered from mercurial or carbolic acid poisoning, although it has been applied frequently and freely to large granulating wounds.

If a solution is to be carried by the soldier, this would be better than a solution of iodine. It is more efficient and absolutely non-irritating, and can be applied safely to the scrotum, eyelid, and other parts liable to show the results of irritants. Pure carbolic acid cannot be applied to skin, and there is every reason to be convinced that, in a wound splashed with mud, the mud and the bacteria it contains are also on the surrounding skin. A friend of mine here blistered his skin with pure carbolic acid, although it was at once washed off with spirit. I have seen cases become infected with *B. pyocyaneus*, although washed with saline solution and hydrogen peroxide. The *B. pyocyaneus* at once disappeared on the application of 1 in 2,000 mercury perchloride, or on the application of the rosaline solution I have described in this article. I do not like the constant application of hydrogen peroxide to wounds; the granulation tissue under its influence becomes anæmic and swollen. It may have its uses in removing blood clot and sloughs, but that is another matter.