day and night after night, with an established rota, waiting their turn to go into the mine.

Mr. Gerrard gave instances of their admirable and courageous work. On one occasion they went 100 yards in foul air, and they recovered a body 40 yards in the deadly fumes. Poor Eccleston's body lay day after day, 36 yards in gas, and it was fetched out of the place by the men with the breathing apparatus.

To recover the bodies lying in after-damp a small apparatus called the "Salvator" (on the same lines as the Fleuss) was used. It consists of a breathing bag and a small cylinder of oxygen; it weighs about 7 lb., and lasts a man travelling at a moderate speed about two hours; it is also extremely useful in reviving anybody gassed.

CONCLUSION.

After thirteen days' patient hearing of about a dozen expert witnesses, the jury brought in the verdict "that the explosion was caused by an accidental ignition of gas and coal dust, probably from a defective or overheated lamp." The views of the experts were varied, and hardly any two agreed.

Professor Galloway suggested that it originated at No. 1 jig, North Plodder, from an electric sparking.

Mr. Alfred Henshaw: That it started above the jig wheel in No. 1 jig from a defective lamp, one being found with a broken ring, leaving a space below the glass.

Mr. A. H. Lush: At the top of No. 2 jig, North Plodder district, where there were evidences of great force, and all the men were found dead at their places and burnt.

Mr. Jesse Wallwork: No. 2 jig, North Plodder, owing to a damaged lamp igniting gas, the explosion traversing all the workings by means of coal dust.

Dr. Thornton (Newcastle) thought it highly probable that it started at the conveyor switch.

Sir Henry Hall, after a very careful examination: That it originated from gas in the Three-quarter Seam.

Mr. Gerrard (H.M. Inspector) and Dr. Cadman expressed the opinion that it originated from the burnt lamp found in the North Plodder, No. 1 jig (86). It showed signs of overheating, and the meshes of the gauze had very fine coal dust; it was near the conveyor face, where there would be a good deal of inflammable coal dust, together with some gas. Evidently the jury accepted this as the most probable explanation.

It is of importance, in an endeavour to trace the cause of the disaster, to know which bodies had been subjected to flame and, if possible, the cause of it. The mine (see plan) is divided into five districts—the North Plodder, South Plodder, Three-quarters, Top Yard, Downbrow Yard; the last had a subdivision—the East Jig. Of the 345 persons who descended the mine on December 21st only two now survive; one (Davenport) was found in a recess or manhole by the side of the Downbrow, leading to the Downbrow Yard, near body 190. The other (Staveley) was found in a pump-room place near No. 4 Shaft, but, strange to relate, his companion lost his life by CO, owing to his being slightly in advance of Staveley, the CO clearing off quickly, by proximity to the shaft.

Those in the Three-quarters, the Top Yard, the Downbrow Yard, and the subsidiary district, the East Jig, were in great part subject to CO; those in the South Plodder were largely killed by CO, a few having received burns and violence. In the North Plodder the greater number had received burns and were subjected to violence, although a number died from CO. Around the shafts all had died from violence, and were burnt. In the North Plodder at the No. 1 conveyor face near the conveyor, three bodies (87, 88, 89) were found, where they had been working, on the east side; whilst on the west side bodies were found apparently fleeing from the conveyor. These facts led to the supposition advanced by some that the origin of the disaster was at or near the mechanical conveyor on the No. 1 North Plodder face.

It was in the Downbrow Yard district that the men were found to have walked the greatest distances from their working places. From the northern side of this district thirty persons (192 to 221) had travelled 260 yards, and to within 300 yards of the shaft; these were found in a group, some in a sitting, some in a lying position, some had got inside wagons which had been blown on to their side or upended. In appearance all these were as if they had fallen asleep; they had travelled without light to this point, where the foul after-damp prevented their going further; possibly they were waiting for the atmosphere to clear when they succumbed to CO. Other groups were found in similar poses, not having been able to travel so far (222 to 239). At two or three other places in this district—notably in Nos. 2 and 3 jigs—were similar

groups, having travelled some distance from their working places. Also in the Top Yard district were found several groups, having travelled some distance.

In the East Jig subdistrict—to a less extent, perhaps—the men had warning, and were able to leave their working places. In these districts it was unanimously agreed that the explosive force and the burning coal-dust had travelled inbye along the haulage roads. In the Three-quarters district also almost all the men had left their working places and were found in the roadways.

REFERENCES.

¹ BRITISH MEDICAL JOURNAL, November 19th, 1910, p. 1577. ² BRITISH MEDICAL JOURNAL, 1896, vol. i, p. 1312. ³ BRITISH MEDICAL JOURNAL, June 11th, 1910.

TWO CASES OF SEVERE INJURY NEAR THE KNEE.

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I.—Hospital Gangrene: Condition Twenty Years After.

A MAN, aged 33, was injured on April 17th, 1890, by the fall of a large iron plate, extensively wounding his left thigh above the front of the knee. He was brought to the Liverpool Royal Infirmary, and was attended to by the house-surgeon, who put in stitches and dressed the wound.

The temperature rose on the second and third days to nearly 102°, and on the fourth to close upon 104°; by this time the skin around the wound had become deep red, and the region swollen and painful. Under an anaesthetic the stitches were removed by Mr. Parker, the wound explored, found largely to involve the knee-joint and extensor muscle, and to be bathed with foul dark-brown purulent discharge. After hot antiseptic washing and removal of pieces of lacerated muscle, the wound was lightly packed with cyanide gauze. The patient felt better after this, but the temperature reached 102° in the afternoon, falling at night and early morning to 100° or less; the pulse was about 90 for some days, during which chloroform was inhaled at each change of dressings.

On May 7th, the twenty-first day, the wound was found covered with a greyish-yellow exudation, and its margins much raised and thickened. This was judged to be the almost obsolete condition known as "hospital gangrene." Nitric acid was then freely applied, under chloroform, to these morbid surfaces. Three days later, the tissues having in the main become more healthy, but still showing patches of the greyish exudation, Mr. E. R. Bickersteth was consulted as to the diagnosis of hospital gangrene, which he fully confirmed, from experience dating from the days when this scourge was rife. At his suggestion the thermo-cautery was freely applied to the exudation that had re-formed. Obvious improvement followed the cautery, and each application of the nitric acid, which was preferred on all other occasions; the wound in most parts assumed a healthier look; but as the knee obviously needed a good fixing apparatus, the anaesthetic was again given, and the whole limb thoroughly steadied in a Thomas's knee splint. About the twenty-eighth day nitric acid was again applied, under chloroform, to recurrent patches, and some four days later all signs of hospital gangrene were gone, and the temperature had become normal.

About the thirty-fifth day great pain was felt below the knee on the outer side, attended with loss of sleep. On the fortieth day an incision was made and 1½ oz. of sweet green pus evacuated. The bleeding in the skin was stopped by acupressure with common pins. After this the patient became more comfortable and slept, but a few days later he had a return of pain, with burning, in the knee, this time on the inner side, followed by increased discharge from the incision on the outer side, with consequent relief.

Although great local improvement had occurred, these drawbacks were a great tax upon him, as he was greatly emaciated and short of resisting power. The outlook became so serious that, to save his life, amputation appeared inevitable, and with the consent of himself and parents it was arranged for a couple of days later. On the intervening day, however, things looked better, and this procedure was abandoned.

Three months and a week after the accident, two and a half months after the gangrene was thought to have been past, the temperature rose to 102°, with headache; and a patch of the grey exudation again appeared. This was rubbed with silver nitrate, and he was better next day, but still had pain. The caustic was again applied four days later, and a third time after three more days. The dressings were then changed every other day, and he got up on the intervening days, and steadily recovered.

Four months after admission, the knee being ankylosed in the straight position, he was, for security in getting about, fitted with the shorter ("calliper") splint (as in Fig. 2), attached to a cloth boot, and kept on day and night. He was discharged on August 24th, 1890, but some three or four weeks later discarded the splint, as he found the stiff straight knee unyielding, and comfortably fit for use without it.

Remarks.—This man accosted the writer in the street on February 7th, 1910, nearly twenty years after the accident, in which interval nothing had been seen or heard of him. A few days later he was photographed (Fig. 1). He is a tax collector and has walked many miles a day for years, with very little halt in spite of his stiff knee, on which the scars of his injury and operations are manifest. This is the only case of hospital gangrene ever seen by the writer, whose previous notions were chiefly gained from Lister's account and treatment given in the *Lancet* of March 23rd, 1867, and pictorially from the chromolithographs in the Surgeon-General's report of the American War, which he had copied and enlarged many years ago, and has used ever since to illustrate his annual lectures.

Fig. 1.—Twenty years after injury.

II.—Compound Fracture of Femur: Recovery without Defect.

On November 4th, 1898, the writer was called by Dr. Alexander Fisher of Liverpool to the case of a youth, aged 16, who had met with compound fracture of the right thigh near the knee. In the course of his duty as apprentice engineer, while sitting on the slide-rest of a large machine lathe at a foundry, his limb was jammed between the tool and the work. There was a wound on the outer and another on the inner side, both leading to a jagged fracture of the bone.

The dressing and setting of the fracture were carried out on his mother's dining-table, which served afterwards as his bed during recovery. A large tea-tray was placed under the limb to catch the copious washings of the skin, while the wounds were protected and tied up with cyanide gauze. The surfaces were begrimed with dirt and machine oil. Warm carbolic lotion 1 in 40 was alone used for this purpose, vigorously rubbed in with added soap, after which the wounds were dressed with carbolized cyanide gauze, firmly bandaged on with the limb held at full length. A Thomas's knee splint, projecting some distance below the foot, was slipped on, and the limb kept in it at full length by tails of wide, strong bandage firmly stuck to the leg by plasters, doubled with the sticky sides out, fixed by rolls of bandage over all, and the loose tails tied to the lower end of the iron splint; counter pressure was provided by the padded ring at the upper end against the perineum.

Plenty of dressing was packed around the wounds and fractured region, covered with hollow splints of sheet iron surrounding the thigh, encircled by strips of bandage and tied firmly to the iron bars of the longer splint. Perfect stillness was attained from the first, and all along the patient could control his own attitudes on the improvised bed, and could very shortly sit up occasionally when he chose.

The dressings were changed on loosening one or two at a time the sheet-iron splints, of which that placed behind the limb reached a few inches beyond the knee, and was independently slung to the iron bars, keeping level the

fractured region, and seldom needing adjustment. No suppuration occurred in the wounds, which soon closed very kindly in their depths, and at the surface cleanly granulated.

The severe pinching of the injured part in the irresistible machinery, during the few seconds before stoppage by the turner, led to superficial necrosis of the skin in patches near the wound, on the outer side of the limb. This was at first dressed like all the rest with carbolized cyanide gauze; but, when these necrosed layers gave place to ulceration, the great tenderness was relieved by smearing boric acid ointment on the gauze, and avoiding the irritating carbolic lotion. A shortened "calliper" knee-splint (Fig. 2) attached below to a boot, with bandage round the knee (supported on a leather band pinned across) was now used, and worn night and day after six or seven weeks, by which time the bone was firmly united and the sores healed. This enabled him to be up and about the house, and by its full length took most of his weight off the limb, for fear of bending the unhardened united bone. In less than three months he was allowed to remove the splint at night, and to dispense with the bandage round the knee, thus permitting slight use of the thigh muscles and a trifling movement of the knee-joint.

Remarks.—The leather band, pinned behind as a support to the knee, is shown here pinned in front of the thigh, to be out of the way and permit a view of the inner scar during the photographic process. It will be noticed that the knee-joint is thickened, an almost necessary part of the injury, due to the violence that fractured the bone. The maintenance of the limb in the straight position, for the time required to secure due hardness of the bony union, is always followed by gradual return of the knee to suppleness and to the proper shape shown in the other limb. Any attempt to hurry this restoration of the knee, by forced movements, is apt to result on the contrary in fresh injury and swelling, with delay or even prevention of suppleness.

Fig. 2.—Three and a half months after injury.

VAGINAL HYSTERECTOMY FOR ENDOMETRITIS.

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THE following case is recorded because an unusual, not to say heroic, method of treatment for a fairly common and very troublesome condition has resulted in a measure of success which is not often attained by the less drastic procedures usually carried out in cases of equal severity.

CASE.

Early in 1910 I was consulted by a married woman, 39 years of age, who had been a hard worker all her life, and was the mother of a large and healthy family. She complained of constant dragging pains in the groins and back, dysuria, menorrhagia, and a profuse semipurulent discharge which was occasionally offensive. For several years she had been practically a chronic invalid, and so profoundly was her general health undermined by the constant pain and discomfort that both she and her relatives were convinced of the presence of malignant disease. She said that she had undergone several operations, by which I understood her to mean that she had been curetted. Examination, in the course of which a very fetid pessary was removed, revealed a large "boggy" uterus, extremely painful upon pressure, freely movable in every direction, with the fundus well above the pelvic brim. The sound passed four inches. The cervix, which was the size of a Tangerine orange, was studded with innumerable small semi-transparent nodules and was very friable to the touch. The nodules were soft, there was no ulceration, and the general appearance was not that of malignancy. Pressure upon the uterus caused quantities of mucus to pour through the cervical canal. The possibility of specific infection was excluded by repeated microscopic examinations for the gonococcus, which was never found.