arm are still weak, but he is gradually getting increased power in them. He has still no use of the extensor muscles of the forearm, but they react briskly to the interrupted current. He is unable to perform flexion of the wrists and fingers as a separate movement, but only with movement of the arm as a whole. The extensor, adductor, abductor and flexor muscles of the hip- and knee-joints work well, but he has little use of the muscles of the foot, and his co-ordination with them is similar to that of the forearm and hand. They react sluggishly to the interrupted current. The reflexes in arm and leg are all very brisk. Ankle clonus is well marked. No Babinski’s reflex.

August 11th.—The following note as to the electrical reactions, &c., has been furnished by Fleet-Surgeon G. A. Dresper, from the Royal Naval Hospital at Chatham: “Marked irritability. Arm supinator jerk. Leg-patella clonus and ankle clonus and extensor plantar reflex. Reaction both to faradism and galvanism present. In the arm, triceps and extensors react more actively to galvanism than those on the sound side. In the leg the muscles supplied by the sciatic nerve and its branches act more briskly to galvanism than in the sound side. No qualitative changes could be elicited.”

This patient left the Royal Naval Hospital, Chatham, at his own request after being invalided on August 13th, 1909, and the last notes made on his case stated that he had no power of extension of the wrist or fingers. The pronators and supinator were regaining power, and the muscles of the upper arm were working well. The thigh muscles were working well, but the calf and anterior muscles badly, there being inco-ordination of foot movements, “the foot being brought down with a stamp and inward turn.”

Staff-Surgeon H. H. Jeans, R.N., of H.M.S. “Albion,” who assisted at the operation, has very kindly made the sketch which accompanies and illustrates this report.

AN EXTEMPORED HIGH-FREQUENCY APPARATUS.

By Lieutenant T. B. Nicholls and Serjeant G. F. HurrAN.

Royal Army Medical Corps.

The increasing use of high-frequency electricity in nervous diseases, especially those of neurasthenic and hysterical origin, and the fact that the apparatus is not supplied in military hospitals, led us to construct the apparatus ourselves.

I.—The Apparatus.

The regulation coil (a) for X-ray work supplies the induced current. This current is then led to a spark gap (b) consisting of two zinc rods, the ends of which are rounded (c) so that a quieter spark results. These are enclosed either by an ordinary lamp glass, or a ‘tabloid’ bottle with
a hole drilled in the bottom and a cork at the other end. This is necessary in order to deaden the noise of the discharge. One of the zinc rods is carried on a vulcanite handle \((d)\) to adjust the length of the spark. This handle slides in a hole in the cork. The rods are connected to the outer coating of two Leyden jars \((ee)\) made by pasting sheets of lead foil on either side of two discarded glass tops of bedside tables \((f)\). If no lead foil is available the "silver paper" from a cigarette box answers equally well. The plates are placed upright in a box \((h)\) at a distance of at least 9 inches, with a board \((i)\) on top carrying the bottle containing the spark gap. A fairly large margin should be left between the edge of the tinfoil and the edge of the glass, otherwise a spark will cross. The inner coatings \((gg)\) of the Leyden jars are connected to a solenoid \((j)\) made of about twenty-four turns of thick insulated cable copper wire wrapped on a bottle covered with a sheet of gutta-percha; the ends of the solenoid are frayed out \((kk)\) so that any excess of electricity may escape by a brush discharge into the atmosphere; from one end of the solenoid an insulated wire is carried to the resonator \((l)\). This is simply made as follows: A circle of about 9 to 10 inches in diameter is marked on two boards \((mm)\), and on these circles five ordinary broom handles \((u)\) cut to a length of about 2 feet 6 inches are nailed. These handles are notched at intervals of about 1 inch with a saw, and on the framework thus formed a spiral of thick uninsulated copper wire is wound \((o)\), taking care that it fits into the notches and does not touch any other turn of the spiral. To the bottom of the spiral the lead from the solenoid is fastened, and the electrode with which the patient is treated is led from the top of the spiral \((p)\); or if a stronger current is required the origin of the electrode can be approached turn by turn towards the bottom of the spiral by means of the sliding contact described below. This electrode is made of insulated cable copper wire frayed at the end \((q)\), enclosed near the extremity by a glass or vulcanite tube, preferably the latter, for convenience of handling and insulation \((r)\). A current of about 6 to 10 amperes and 20 to 30 volts should be used for the induction coil. The whole apparatus costs less than 5s., and works just as well as an expensive affair costing £20 or so.

The theory of the apparatus is as follows:—

The current of the induction coil charges the outer coatings of the Leyden plates, inducing an equal and opposite charge in the inner coatings. When this charge gets up to a certain strength—varying with the length of the spark gap—a spark passes and the charge is discharged, and both coatings return to their normal condition. These varying states are carried on to the solenoid, where any strength over that wished for escapes from the many points of the frayed-out wire. The remainder is carried on to the resonator.

The resonator, as its name implies, vibrates (electrically) with the solenoid as a sounding box vibrates (acoustically) in sympathy with a
tuning fork. This being the case the resonator must be tuned with the solenoid. This is accomplished by means of a sliding contact (p) which travels up a rod (r) and touches one turn of the copper spiral at a time. The electrode is fixed to this contact. By sliding the contact up and down the resonator can be tuned to the solenoid.

As the sounding box intensifies the effect of the tuning-fork, so the resonator intensifies the effect of the solenoid.

The E.M.F. is intensified at the expense of the current strength. The therapeutic properties of this form of electricity are due to the high E.M.F.

II.—METHOD OF USE.

(1) Local application.
(2) Auto-condensation.
(3) Auto-induction.
(4) To produce the X-ray.

This may be carried out in several ways:—

(1) Local application.—(a) The electrode described may be approached to the patient; when large, long sparks will pass. These produce hardly any sensation, and look more alarming than they really are. The organs of special sense do not respond. This discharge is usually termed the effluvie.

(b) This may be reversed by the patient holding the electrode while...
standing on a glass plate—the operator then draws the discharge from him, usually by means of the fingers. If preferred an earthed wire may be used.

(c) A somewhat startling method—useful in neurasthenia, hysteria, and especially malingering—is for the medical officer to hold the electrode while standing on a glass plate. Whenever he approaches the patient with his fingers, sparks will pass, with considerable moral and mental effect, especially when done unostentatiously in the darkened room.

(2) Auto-condensation.—The patient plays the part of one of the coatings of a Leyden jar. A sheet of metal is laid on the couch and a layer of felt or several blankets is placed between the patient and the metal. The metal is connected with the resonator, and the patient grasps an earthed wire.

(3) Auto-conduction is not possible without special apparatus; a huge spiral of copper wire is made and the patient placed inside. This is analogous to the primary and secondary wires of the induction coil.

(4) To Produce the X-ray.—It is stated that this is possible and that the ray is more penetrating, but we have been unable to obtain it with the service tubes. Nor did the effluve excite the screen of a cryptoscope.

A NEW SUGGESTION FOR THE PREPARATION OF POTABLE WATER.

BY CAPTAIN A. H. HAYES,
Royal Army Medical Corps.

During the Health Congress, recently held in Leeds, the apparatus to be described was demonstrated by Dr. Myer Coplans, in the Medical School of the University. Dr. Coplans has found that the gelatinous precipitate of aluminium hydrate, formed by mixing aqueous solutions of sulphate of aluminium and lime, in equivalent proportions, fulfils the double purpose of dragging down with great rapidity, under the action of ordinary gravity, visible suspended matter in water, at the same time entangling in its mesh 99 per cent. of organisms present; and acting as a most efficient filter.

He states that he is carrying out similar experiments with other colloidal precipitates, e.g., with silicates and iron preparations.

The demonstration was divided into three parts:—

—Four glass cylinders were shown, as depicted in fig. 1. The first three, (a), (b), and (c) contained tap-water, in each of which had been placed a similar quantity of dirty, black mud: (a) contained mud and tap-water only; to (b) had been added 5 per cent. of decinormal solution of aluminium sulphate; to (c) the equivalent quantity of gelatinous precipi-