cups, can generally be roused, at any rate to mutter and grumble. Moreover, his nervous signs are no more on the one side than the other; and his urine, though of low gravity, is probably free from albumen and sugar. The same points hold good for opium, except, perhaps, that the patient may have sunk too far *Lethe-wards* to be recalled at all. In addition, his pupils will be narrowly contracted, his skin cold, moist, and livid, his pulse slow and weak, and towards the end his breathing flickers out. As to lead, it will be enough to remember that, now and again, instead of its customary attacks on the outposts of the nervous system, it gathers its forces to storm the citadel itself. And so hot is the assault that the brain, after a few increasingly distressful days marked by headache, vomiting, and double vision, is pushed to its last extremity of violent but useless, exhausting convulsions, and soon all is quiet in a fatal coma.

Finally, there is the unconsciousness of Adams-Stokes disease, which, beginning suddenly, and often preceded by an epileptiform convulsion, comes from the *anæmia* of the brain when the ventricle of the heart stops beating in consequence of some grave disease of the auriculo-ventricular bundle. The diagnosis in these cases is made with the finger on the pulse, when, with a beat of only thirty or even fewer, the nature of the seizure will be apparent.

Then, for a last word, let me add that, whatever our difficulties in recognizing these several states, we have always, in addition, to beware the cunning of the malingerer and the delusions of the hysteric. It is true that neither of these is ever really comatose, or even can assume the essential signs of coma. Your misgiving, if any, will lie rather in the thought that perhaps the patient, before your arrival, was indeed comatose, and is now mending. Coins of this stamp, however, usually ring false as soon as you come to test them. Yet, if you feel any uncertainty, wait; for, whatever happens, you must not mistake a genuine case of coma for one of these. With them, as indeed with every dubious case, err—and err we all must at times—by inclining to the side of caution and prudence.

GALVANIZATION OF THE BRAIN.

BY

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ALTHOUGH the value of electricity is so well known, and its action on the circulation is so marked, yet it is difficult to find records of its application in brain lesions.

The following case is interesting:

D. L. J., aged 33, a mining surveyor and assayer, was at the bottom of a mine shaft in South America, when a stone or "key" fell on his head, rendering him unconscious. The skull on the left side above and in front of the ear was fractured. He was for three months unconscious—from July 5th, 1909, till about the beginning of October. He then made a gradual return to consciousness and a tedious return to partial recovery.

For an account of this period of his illness I am indebted to his Spanish doctor, who made copious notes of his condition during his stay in hospital. At that time his right arm was useless. Speech was normal, but he very easily lost all power to talk, any slight excitement or sudden noise rendering him incoherent. He suffered from convulsions which were very easily induced. He returned to England, went into a hospital, and several pieces of bone were removed, but when he left the hospital he was not much better.

When I saw him, at the beginning of July, 1911, two years after the accident, he had great difficulty in speaking, and it was often impossible to understand what he said. He was in a very nervous state, was quite unable to go about by himself, could not dress himself, as he could not use his right arm. He was unable to express his thoughts in word. His eyesight was "blurred and foggy," and he "saw double." He suffered from convulsions, very slight causes being sufficient to excite them. He was quite unable to raise his arm from his side, though he could pronate slightly; his hand was numb; he could grasp an object in his hand, but could not let go again. The electrical reactions of the various muscles were curiously varied, but there was no reaction of degeneration.

I had no hesitation in promising him considerable benefit, not complete cure, of course, but that he would, after electrical treatment, be able to speak correctly, lose his convulsions, regain his sight, and be able to use his arm. He then told me that he had been advised not to have any electrical treatment, as it would make his arm more "rigid." As time had gone on without any improvement he had made up his mind to have electrical treatment, in spite of that advice, and had undergone a three months' daily course, including Sundays, without any

benefit whatever; on the whole, he thought he was rather worse after, than before, treatment.

I commenced treatment on July 13th, 1911. On this occasion the current was passed through the brain and right arm, the latter being immersed in a porcelain arm bath. The amount of current was only 2 milliamperes, this being sufficient. I afterwards increased the current considerably, being guided entirely by symptoms. On two occasions I passed as much as 30 milliamperes. The application of the current was always followed by an increased sense of well-being; it acted as a tonic to him; it made him somewhat drowsy and he slept well from the commencement of his treatment. It was so pleasant in its action that he was always asking me to increase the strength. The current was passed on each occasion for fifteen minutes. This was followed by stimulation of the affected muscles by means of the interrupted-continuous current, 100 interruptions to the second. No medicine was given.

This combined treatment was carried out twice weekly till August 24th (six weeks), when I stopped all treatment.

He can now talk quite easily and plainly, having only a slight stammer, and can convert his thoughts into words without any trouble whatever. The convulsions have stopped. His eyesight is normal. He can use his right arm quite well, can dress and feed himself without any trouble, but cannot extend his thumb. The arm is much wasted, but is considerably increased in size under the treatment, and will continue to improve with use.

He goes about by himself, using train, bus, etc., according to his needs, transacts his business, and has so entirely and successfully recovered that he has obtained another post similar to the one he occupied before his accident.

It is seldom possible to obtain such direct evidence of the value of passing an electric current through the brain.

For some unknown reason this treatment is not adopted in many cases which undoubtedly would be benefited by it. There must be a large number of persons suffering from the after-effects of a "stroke," who would derive considerable benefit from this method of treatment, and who would be willing to submit to it if even they had a chance of improving their condition.

The condition of the brain and its coverings is very much the same whether the lesion is caused by an effusion of blood from a vessel damaged either by degeneration of its walls or from injury. The blood is there in either case, attended by pressure effects. In recovering cases a certain amount of absorption takes place, but there still remains an appreciable amount, which can often be directly influenced by a suitable electric current, leading to a further improvement.

The rapidity with which the effusion, due to a recent injury, disappears under the application of a properly applied current is very striking. I have reduced a 2½ in. swelling of the ankle-joint in thirty-five minutes, and that is quite an ordinary and usual experience, and the reduction is accompanied by entire loss of pain.

If, then, this can be done to the ankle-joint, why not make use of the same treatment in the case of the brain? It is, of course, not advisable to use the galvanic current too soon, time must be given for recovery from shock. This would probably begin at a month or six weeks from the onset. In cases of embolism it would do no harm to commence much earlier. Each case should be judged on its own merits, and every case, if possible, should be treated by the foregoing method. Electrification of the paralysed muscles alone is not sufficient, as this case clearly demonstrates, but what may be called the greater treatment should include the less.

We are, after all, only making use of Nature's own remedy. An electric current is set up in our bodies whenever a muscle is used or the heart beats. Whenever any part of the human body is injured a current is caused and flows in a definite direction and can be measured. This electric current must therefore be necessary, and probably acts by stimulating the various cells of the part to increased work, thus leading to repair of tissue and absorption of deposits.

The current should be turned on very gradually and carefully measured by a galvanometer. The choice of and relative position of the poles vary in any given case. The electrode should be water, the usual pads of gauze or lint not being so satisfactory. The patient must be assiduously attended to throughout the treatment.

UNDER the title of *Dunlop Motor Tyres, 1912*, the Dunlop Company has brought out a booklet which, in addition to information as to prices, contains a large number of useful hints on the subject of economical driving. There are also well-illustrated descriptions of the firm's detachable wheels.