very imperfect, so that the prick of a pin, though just felt, cannot be localised upon any of the fingers. Dr. Gowers has suggested to me that the lesion may be due to the sudden thrombosis of a small vessel; this, he thinks, is a probable cause of hemiplegia in young adults in whom there is no evidence of cardiac or arterial disease.

Museum-street, Ipswich.

THE PHYSIOLOGICAL EFFECTS OF HIGH FREQUENCY ELECTRIC CURRENTS.

By W. S. HEDLEY, M.D. EDIN., M.R.C.S. ENG.

MR. A. C. SWINTON'S letter in THE LANCET of Oct. 14th will not only be appreciated by medical men as a valuable contribution to our knowledge of a new and difficult subject, but it will be accepted also as an indication that the electrical expert is willing to aid in the efforts of the profession to decharlatanise medical electricity and to reduce some at least of its problems to a question of sound physics. In referring to an article of mine which appeared in THE LANCET of Aug. 19th, Mr. Swinton correctly states that the view therein adopted that high frequency currents are harmless mainly because of their small current strength is one previously put forward by him in the *Philosophical Magazine* of February last. It might also have been added, and no doubt would have been so had Mr. Swinton been aware of the fact, that before the appearance of the article in the *Philosophical Magazine* II, and before me the *Electrical Review*, had accepted this principle and referred to the "whittling down" of current strength by the various transformations to which it had been subjected as a probable cause of this and many similar phenomena. This seems to be evidenced by an article on the physiological effects of alternating currents published in THE LANCET of Dec. 24th, 1892, and by the pages of the *Electrical Review*. With the knowledge that exists of the surface transmission of high frequency currents along metallic conductors, Mr. Swinton's explanation of the power of such currents to light incandescent lamps becomes a very probable one; but when the human body becomes the conductor there seems to be no good evidence to show how such currents are transmitted unless (and this the present state of the question seems scarcely to warrant) the physiological effects claimed for them are accepted as a proof that they deeply penetrate the organism. This is a question in biological physics concerning which light and leading are still sought for. Mr. Swinton suggests a general law that, apart from some possible minor influences of frequency and abruptness of alternation, the physiological effects of electric currents are mainly proportional to their electrolytic effects. Other things being equal, this is probably true. But it seems to minimise the importance of other factors, and, taken as a law, to fall far short of the facts. As an instance those most obvious of all electro-physiological phenomena, the neuro-muscular effects that follow electric excitation, may be cited. Putting aside for the moment the influence of current density, an old and familiar experiment, in which a volta-meter, an interrupting wheel, and a frog à la Galvani ("physiological limb") are connected up in a continuous current circuit, may be considered. With the wheel at rest gas is disengaged and there is no visible muscular contraction. Once the wheel is put into motion evolution of gas nearly ceases, and the muscle is seen to strongly contract. In other words, unless a certain current is made and broken no visible muscular movement occurs. The mere passage of the current, be the electrolytic effect what it may, fails to produce visible contraction. Here motor reaction is proportional to the variation of the potential and to the suddenness with which that variation is made, as well as (no doubt) to the strength of the current used. But the question is not even so simple as this. With the "interrupted Franklinic" current there is obtained a maximum motor effect with a minimum amount of sensation—viz., violent muscular contraction with practical immunity from pain. How does current strength help here? If smallness of quantity accounts for the absence of sensory effect it can scarcely be invoked also to account for the marked presence of motor effect. Further, how does such a law cover the phenomena of "make" and "break" and the reversal of the formula in the "reaction of degeneration," or how does it account for those conditions of altered excitability

known as "anelectrotonic" and "katelectrotonic"? In these cases there are varying physiological effects with the same current strength. How far the ordinary laws of physics and how far "vital" endowments of living structure account for such phenomena have yet to be ascertained. It would appear that we must still content ourselves with the statement that the effects of electric currents on the body depend not only upon current strength but on the mode in which such current strength is presented—i.e., that physiological effects are proportional not only to the quantity of electricity but also to its modality.

Western-terrace Brighton.

CASE OF ODONTOMA OF THE LOWER JAW; REMOVAL.

By ALFRED SWANN, M.D., M.R.C.S., L.S.A.,
SURGEON TO THE BATLEY AND DISTRICT HOSPITAL.

THE following case seems to me to be worth recording on account of its rarity. Mr. Christopher Heath says, in his "Lectures on Diseases of the Jaws," that "there are, I believe, but nine cases of this form of odontoma recorded, and these all occurred in the lower jaw."

A woman forty years of age, a weaver, came under my care in the year 1884, with the following history. Shortly before seeing me she received a blow from the "picker" of her loom over the right side of the lower jaw. Soon afterwards a hard swelling formed, which was poulticed until it burst. She then consulted me regarding the sinus in her face, and on looking inside her mouth I found some carious stumps—viz., the canine and anterior bicuspid—which looked as if they might be responsible for the abscess. These I extracted. The swelling, however, became no less, but continued to discharge until September, 1889, when she again consulted me. At this time the tumour had obviously enlarged, and there was a sinus leading down to what felt like roughened bone. I advised her to come into the hospital with a view to making an exploratory operation and of removing any sequestrum that might be found. On admission she was suffering from a tumour the size of a large filbert, situated on the right side of the chin and directly below the position formerly occupied by the canine and anterior bicuspid teeth. At the margin of the chin and below the tumour there was a sinus discharging some thin and very offensive pus. On Sept. 28th, 1889, the patient having been placed under the influence of ether, I made a submental incision, and, turning up the upper flap, found that there was, deeply situated in the substance of the lower jaw on its anterior aspect, a hard dentine-like growth which required the free use of chisel and mallet for its removal. The posterior bicuspid was displaced to some extent, the fang lying obliquely in the jaw, with its crown looking towards the mouth. The wound was washed out with salufer solution and plugged with iodoform and lint. The patient left the hospital cured in about three weeks.

Remarks.—When I had removed the foregoing tumour I was puzzled to know what its nature was, and, after submitting it to various pathological friends and receiving no definite information, I sent it to Mr. Christopher Heath, who at once informed me that it was an odontoma, and he kindly forwarded me his "Lectures on Diseases of the Jaws," where at p. 36 will be found a description of all the known cases that have been reported. The specimen has now found a home in the museum of the Royal College of Surgeons of England.

The patient called to consult me on Sept. 29th last, just four years after the operation, regarding the advisability of having artificial teeth applied. The alveolus had slightly fallen in where the growth existed, but otherwise she was perfectly well.

Batley, Yorks.

SURGICAL AID SOCIETY (BRIGHTON AND HOVE BRANCH).—The first annual meeting of this Society was held on the 28th ult., under the presidency of the Mayor, Dr. Ewart. A most satisfactory report of the year's work was read by the secretary, and the sum received in subscriptions amounted to over £196.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

POTT'S FRACTURE BY DIRECT VIOLENCE.

BY W. N. CLEMMET, M.R.C.S. &C.

A MAN fifty years of age was admitted to the Bootle Borough Hospital on Nov. 7th, under the care of Mr. Wills. He had been working at the docks lifting iron bars, each weighing about 5 cwt., off a pile 4 ft. in height. He was standing close to the pile when one of the bars, accidentally loosened, fell to the ground, striking his right leg a few inches above the outer ankle, throwing him on his left side and pinning his right foot under him. When examined, bruising was noticed on the outer side of the leg at the point where the patient said he was struck, the ankle-joint being swollen, especially on the inner side; the foot was displaced outwards and slightly backwards, the fibula broken $2\frac{1}{2}$ in. above the tip of the external malleolus, and the end of the internal malleolus broken off—in fact, the condition known as Pott's fracture. The interest in this case is that the cause of the fracture is very rare, the same result being brought about by the direct violence of the bar striking the leg on the outer side just above the ankle as usually follows the indirect violence of the well-known street ankle-twist. The patient himself was very emphatic in the statement that the bone broke at the moment the bar struck him, and not owing to any attempt on his part to raise himself from the ground, the bruising found above the ankle on the outer side adding confirmation to this.

Bootle.

HÆMOGLOBINURIA IN A CHILD EIGHT YEARS OF AGE, PROBABLY DUE TO THE INHALATION OF SEWER AIR.

BY GORDON SHARP, M.B. EDIN.,

AND

WILLIAM SUMMERSKILL, M.R.C.S. ENG., L.R.C.P., LOND.

CASES of hæmoglobinuria are so comparatively rare that we have thought fit to put upon record the following case which occurred in our practice.

The patient, a girl eight years of age, in comfortable circumstances, had previously enjoyed good health, and there was no history of a previous similar attack. When first seen she was suffering from dyspnœa, her face was puffy and she frequently had a desire to micturate, but six ounces of urine only were passed in the twenty-four hours. The onset of symptoms was rapid, the child having been quite well two days previously. At first the case was diagnosed as acute Bright's disease, although there was an absence of the "Bright" eye, a sign which has been called attention to more especially by Professor Grainger Stewart. The dyspnœa was thought to be due to uræmia, and it was only after the urine was examined chemically and microscopically that the true nature of the disease was discovered. The urine was chocolate-brown in colour and contained a coffee-brown sediment. When it was heated this brown sediment rose to the surface, giving a clue to the disorder that we had to deal with, for hæmoglobin rises to the top when heated in a fluid, while coagulated blood cells fall to the bottom. On applying the guaiacum and ozonic ether test a blue colour was at once struck, showing the presence of hæmoglobin in some form or other. The microscope revealed no casts, only a few red cells entire, but the field was covered with masses of amorphous hæmoglobin. A few red cells with the hæmoglobin partly extruded, some transitional epithelium, and crystals of calcium oxalate were also seen. The absence of casts, the comparative absence of red blood cells, and the presence of a large amount of hæmoglobin made the diagnosis certain. The acute symptoms soon subsided, the patient being convalescent in three days after the onset of the illness, although she was in a very anæmic condition. Day by day the urine was examined for casts, but none were found. A trace, but only a trace, of albumen was detected up to the eleventh day, after which the urine was normal. The hæmo-

globin disappeared entirely after the fourth day. The treatment consisted in administering four-minim doses of tincture of digitalis four times a day till the dyspnœa disappeared, which it did by the end of the second day. The intention was to produce diuresis and to strengthen the heart. Milk diet, diluents, warmth, and the recumbent posture were enjoined. The latter was necessary, for on one occasion, when the patient disobeyed orders and sat up, she fainted, most likely owing to the anæmia. After the brown sediment of hæmoglobin had disappeared from the urine and a larger amount of urine was being passed the digitalis was stopped, and three-minim doses of Fowler's arsenical solution were given four times daily, and in a day or two the anæmia disappeared and the child became quite rosy.

The cause of the disease is obscure, but the watercloset pipes of the house had been leaking for a few weeks and a disagreeable smell was perceived, and at the time of the attack the leaking pipes were being taken up and replaced by sound ones, the smell being more than ordinarily disagreeable. It is possible that the inhalation of sewer air was the cause of the rapid and severe disintegration of the blood cells, for sewer air readily affects young children, and noxious vapours cause hæmoglobinuria, although, as far as we are aware, no case has as yet been traced to the inhalation of sewer emanations.

Meanwood-road, Leeds.

A Mirror

OF

HOSPITAL PRACTICE, BRITISH AND FOREIGN.

Nulla autem est alia pro certo noscendi via, nisi quamplurimas et morborum et dissectionum historias, tum aliorum tum proprias collectas habere, et inter se comparare.—MORGAGNI *De Sed. et Caus. Morb.*, lib. iv. Proœmium.

ST. THOMAS'S HOSPITAL.

TWO CASES OF CÆSAREAN SECTION IN DEFORMED PELVES;
RECOVERY OF MOTHERS AND CHILDREN.

(Under the care of Dr. C. J. CULLINGWORTH.)

IN THE LANCET of Dec. 2nd we gave the notes of a case in which the operation of Cæsarean section was performed in a case of cancer of the cervix uteri. This week we publish notes of two cases in which the operation was performed for contracted pelvis, the estimated true conjugate measurements in the first being $2\frac{5}{8}$ in., and in the second the pelvis was small in all its dimensions. In a discussion on this subject before the Obstetrical Society, Dr. Cullingworth is reported to have said: "If a vote were taken, all obstetricians would agree that the patient should be advised to undergo Cæsarean section if the conjugate diameter was $2\frac{1}{2}$ in. or under. The majority would most likely be in favour of giving that advice where the conjugate did not exceed $2\frac{1}{2}$ in.; whilst a large minority would be disposed to recommend Cæsarean section under such circumstances if the contraction was even as considerable as $2\frac{3}{4}$ in. He himself would be found in the last category." At the same meeting it was stated that the maternal mortality after the operation of craniotomy was 6.6 per cent. and after Cæsarean section 8.8 per cent., whilst in the latter the infant mortality was nil.

CASE 1. *Cæsarean section in a case of flattened pelvis; recovery of mother and child.* (From the notes of Mr. C. S. Wallace and Mr. P. Northcote.)—A woman thirty-one years of age was admitted to St. Thomas's Hospital on Jan. 28th of this year, in the ninth month of her seventh pregnancy, with a view to having the operation of Cæsarean section performed in the course of a few days. She had suffered from rickets as a child, and did not begin to walk until four years of age. The catamenia commenced at the age of fifteen, and were regular. She was married on Jan. 31st, 1885. Her first child was born at full term on Oct. 30th, 1885. Craniotomy was performed at her own house, and she was in bed for two months afterwards. She again became pregnant at the end of 1886. Labour was induced at the end of seven months, no instruments being used. The child only survived its birth a few hours. Her third pregnancy terminated spontaneously in