

stomach and intestines was graphically represented in a picture of the outlined human anatomy with a moving indicator recording the path of the larval worm. The stages of intestinal development from embryo to adult worm figured in moving microphotographs of remarkable detail, which also showed the implantation of the now full-grown worm by its armature to the mucous membrane of the bowel, and the effect of the numberless local lesions leading to intestinal hæmorrhage and ulceration.

The results of infection were given in a series of pictures, some showing the blood films of marked anæmia, in comparison with the healthy blood, others portraying the lassitude, stunted growth and development of the infected child in contrast to the good physique of a healthy child of the same age. The importance of parents realising the necessity of seeking medical advice, as soon as signs of ill-health and failing strength are manifest, was emphasised by scenes in the home, in the consulting room and laboratory, where the larval hookworm from a specimen of the child's fæces is discovered and shown as it appears under the microscope. There followed the prescription and administration of a capsule of oil of chenopodium succeeded by saline purgative, and the result—a mass of the dead hookworms. The rapid response to treatment and speedy restoration of the child to robust health and activity formed a fitting conclusion to a striking achievement in film production and health propaganda.

Electrical Injuries.

THE advances in the use of electricity bring with them their own train of sacrifice of human life and limb, and with the ever-increasing sphere of electrical application it is only to be expected that the casualties produced by the electric current will be increased in proportion. It behoves us, therefore, not only to make ourselves familiar with the special characteristics, clinical and medico-legal, of the injuries so inflicted,¹ of the complications to be anticipated, and of their appropriate treatment, but also to study the best means of prophylaxis. In Switzerland it has been particularly easy to trace the increase in the number of electrical injuries, because since 1903 electrical accidents have been notifiable. The casualties have steadily increased (the war period being neglected), until in 1920 the number was more than double that for 1904—viz., 98 in 1920 and 46 in 1904. HANS JAEGER² has compared the number of casualties with the increase in electrical installations, and finds that, thanks to official control, the *relative* incidence has not increased; thus in 1904 the casualties, numbering 46 in all, were 8 to every 1000 kilometres of wiring. This number subsequently decreased to 3, 4, and 5, but rose again to 7 in 1920, when there was a great increase in installations, the total casualties amounting to 98. In legislating for the installation of electric power and the safeguarding of life, electrical currents have been divided into "strong" and "weak," according to their action on the human body, "strong" currents being those which have an injurious effect, while "weak" are those which are supposed to be harmless. JAEGER points out that the danger to life depends upon many other factors besides that of the strength of the current. The human body would be a good conductor of electricity,

owing to its fluid and salt content, if it were not for the isolation afforded by the skin. But the resistance of the skin varies with its thickness and its dryness. A man bathed in moisture should form a much better conductor than one with a dry skin, and this theoretical point is borne out by the observation that the number of accidents varies directly with the meteorological conditions. Nearly twice as many occur during the hot months of the year as during the cold, and, excluding those due to lightning, the explanation is apparently to be found in the increased formation of perspiration in the summer months. Unfortunately, even in the latest text-books it is set down that currents of 100 to 150 volts are harmless, while those of 200 and over are dangerous. This is incorrect; cases of death from currents of 50 volts, when acting under conditions of dampness, have been recorded. At a session of the Paris Academy of Medicine, held on Feb. 7th, it was pointed out that currents of low tension (200 volts or less) might cause cardiac arrest with fibrillary contractions. Two cases were quoted in which the victims while in a bath touched, in one case an electric radiator with faulty insulation, in the other a metal bell-pull into which there was a leakage of current. In a third case a workman was electrocuted by a current of 135 volts from a hand-lamp while working in a boiler. In Switzerland, during 1919, six deaths occurred from contact with ordinary hand lamps, and during the war period 11 fatal cases were reported in the German literature from the therapeutic application of a sinusoidal alternating current of 50 volts and under. Besides the strength, frequency, and nature of the current, and the resistance opposed to it, the danger of any particular current is influenced by the following factors: (a) the site of entrance into the body, (b) the duration of the contact, (c) the size of the area under contact, (d) the physical condition of the individual (status lymphaticus increases the susceptibility), and (e) the psychic component. Expectation of a current diminishes its effect, while surprise increases it. An example of this factor is afforded by an engine driver, who made a habit of catching hold of a 500 volt clamp with both hands, and letting go again, as a bet for a glass of beer. He repeated this game as often as the beer was forthcoming, until one day he accidentally came into contact with the lamp, under the same conditions, and collapsed dead on the floor.

The clinical aspects of electrical injuries are characterised by great variability in their immediate symptoms, in their course, and in their late effects. Their features are, however, as a rule so characteristic that it is possible, as in hardly any other form of injury, to reconstruct accurately the method of their causation. The immediate effects can be divided into general, local, and distant. Of the general, the most important is "electric shock," associated with unconsciousness of variable duration, which simulates concussion and is often followed by a maniacal stage of cerebral irritation. This condition may occur even when the current did not pass through the central nervous system, and is probably reflex in origin. The local effects consist chiefly in burns at the sites of entrance and exit of the current. The lesions are characterised by anæmia, dryness, and insensitiveness, due to massive coagulation necrosis. Subcutaneous emphysema has often been noted, but the cause of its production is not clear. Shedding of the superficial layers of the skin is common, but is not comparable with that produced by ordinary burns. The skin comes off as a complete layer, with the hair attached to it intact, and may be found attached to the conductor which produced the shock, or hanging to the clothes covering

¹ A discussion on the Pathological Changes produced in Subjects rendered Unconscious by Electric Shock will be opened by Dr. Morison Legge at the Section of Electro-Therapeutics, Royal Society of Medicine, to-night (Friday), at 8.30 p.m.

² Schweizerische Medizinische Wochenschrift, Dec. 29th, 1921.

the part. This phenomena is pathognomonic of electrical injuries, and is therefore of the greatest medico-legal importance. Œdema of the part is of common occurrence. It is not associated with inflammatory reaction, but appears rather to be the result of changes taking place in the walls of the vessels, the intima and elastic tissue being the chief sufferers. These changes explain the occurrence of necrosis of the whole extremity. The entire arm has been known to become gangrenous, the blood-supply being cut off either at the time of injury or some weeks later. A case witnessed in the Zürich clinic illustrates this phenomenon; the current passed from the left hand to the left foot, and led to an immediate gangrene of the foot, the upper limit of the gangrene taking the exact line of the wet sock the patient was wearing at the time. Distant lesions occur at points other than those of entrance and exit of the current.

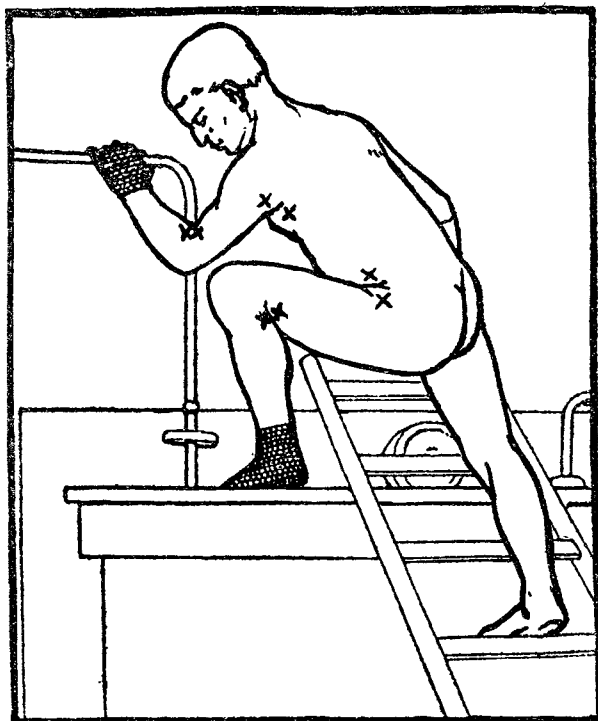


Diagram showing points of flexion, with burns (xx), of exit and entry at each "bridge." The shaded area shows the extent of the burns of the hand and foot.

Typical of the lesion are two small burns occurring at every point of flexion of the limb through which the current passes. A patient, with burns of entrance and exit in the left hand and foot respectively, showed also burns on the flexor aspect of the left elbow, in the left axilla, in the left groin, and in the left popliteal region, demonstrating that these points had been in flexion at the time of the injury (see figure). It is clear that in these cases, the current, instead of passing through the middle of the limbs and trunk, jumped across the bridge formed by the apposition of the skin of the distal and proximal segments of the limb, and produced a burn of exit and entrance at each bridge. This type of lesion is called by JAEGER "Etappeläsion." He finds that it never occurs when the limb is extended. The condition is important owing to the proximity of the large vessels, and to the danger of contracture on cicatrisation. Spontaneous dislocation has been known to occur, due to strong tonic muscle contractions. The internal organs, heart, and kidneys may suffer, the affection probably being due to toxæmia as produced in ordinary burns, but the condition may be noted immediately after the injury.

Among the late effects, extending necrosis plays an important part, the primary necrosis extending in

area and in depth, and not infrequently attacking the underlying vessels. The pathology appears to be a spreading necrobiosis, and not only may the local lesion increase in size, but the whole limb may be placed in jeopardy. In a 16-year-old patient total mummification of the arm with spontaneous fracture of the humerus and spontaneous amputation occurred in the sixth week. The radial pulse was palpable up to five days after the injury. Secondary hæmorrhage is of frequent occurrence, and should in every case be prepared for. Lesions of the skull lead to osteomyelitis and sequestrum formation, but only one case of subsequent cerebral abscess has been recorded. Nervous disturbances are common; they were previously thought to be entirely functional in origin, but JELLINEK has demonstrated the presence of cell degeneration in the central nervous system. This explains the development of symptoms of tabes dorsalis, hæmatomyelia, lateral sclerosis, multiple sclerosis, and bulbar paralysis, any of which may become apparent weeks or months after the accident, and render the prognosis very uncertain. In regard to prophylaxis the precautions suggested at the Paris Academy of Medicine should be memorised: 1. Never to touch any part of an electric lighting or heating apparatus with wet hands. 2. Never to handle any part of an electric lighting or heating apparatus while touching water taps or pipes or any other metal which will make a good contact with earth. 3. To fix electric fittings as far as possible away from water fittings.

A TRAINING SCHOOL FOR MIDWIVES.

H.M. the QUEEN is announced to open the new buildings of the British Hospital for Mothers and Babies at Woolwich on Thursday, March 23rd. The ward block, antenatal block, and part of the administration block have been completed with the aid of a sum of £20,000 from the Ministry of Health, being two-thirds of the promised grant of £30,000, and on April 1st it will be possible to open the hospital to a large number of expectant mothers in Woolwich. It is just 20 years ago since the Home for Mothers and Babies was established on a small scale, with the object of becoming eventually the National Training School for District Midwives, which it now is. The aim is secured by the presence on the managing committee of six nominees of the Council for the Promotion of the Higher Training of Midwives along with representatives of the Royal Colleges of Physicians and Surgeons. In a recent lecture before the Institute of Hygiene, Dr. J. BRIGHT BANISTER stated that 42 per cent. of gynæcological out-patients ascribe their condition directly or indirectly to childbirth. The question arises whether the majority of these troubles could have been prevented. The further development of the Woolwich Training School will help to answer this question, as we believe, in the affirmative. No case of septic infection occurred during last year among the 202 confinements in the hospital. 281 women were delivered in the district, among whom there was no case of serious illness. The new scheme trebles the available beds, but it is much to be hoped that a further £40,000 may soon be forthcoming to build and equip the nurses' home and to set free the antenatal department entirely for its proper use. We trust that the QUEEN'S visit may afford the needed stimulus.

THE British Medical Association is calling a Conference of Medical Representatives of the honorary medical staffs of voluntary hospitals to be held in the Wigmore Hall, 36, Wigmore-street, London, W. 1, on Wednesday, March 22nd, at 11 A.M., under the chairmanship of Sir James Galloway, to discuss the report of the Council of the Association on hospital policy. This is the report on which we commented last week in a leading article.