may be set up occasionally on the infliction of the wound, but this is merely a temporary inconvenience, which can be removed if necessary by pushing the chloroform until the struggling ceases, or until anæsthesia is complete.

The following case, taken from the anæsthesia notebook, illustrate the method of administration:

AFZULGUNJ HOSPITAL.

April 28th, 1897. Mir Soobhan Ali, aged 31, years, male, had food last at 7 o'clock to-day. Is very weak and emaciated, passing twelve to fourteen dysenteric stools a day. Operation, aspiration of liver abscess. Chloroformist, Miss Tenducey, fourth year student. Administration commenced in one drachm doses at:

H.	M.	S.	
8	50	30	Breathing naturally, quiet.
8	51	30	Chloroform added to the cap, one breath of air.
8	52	15	Unconscious. Aspirated in seventh space. Six ounces of serum evacuated.
8	53	31	Needle withdrawn.
8	55	0	Patient removed on a stretcher.

The entire operation, from the time the chloroform was begun till the patient was taken away, occupied 4½ minutes, and there was no sickness or discomfort afterwards. A brief account of the case will show how important a part the partial anæsthesia played in the patient's recovery. He was admitted into the Afzulgunj Hospital on April 21st, 1897, suffering from dysentery and a large abscess of the liver. The dysentery was treated throughout with bismuth and Dover's powder, which he is still taking; and the aspirations were carried out as follows:

April 22nd. First aspiration under partial anæsthesia with chloroform. Thirty-five ounces of thick sterile pus were evacuated. The operation lasted 9 minutes and 45 seconds.

April 24th. Second aspiration under partial anæsthesia with chloroform. Fourteen ounces of pus were removed; and the operation lasted 5 minutes and 55 seconds.

April 25th. Third aspiration under partial anæsthesia. Eight ounces of pus and serum were evacuated, and the operation lasted 5 minutes and 25 seconds.

April 28th. Fourth aspiration under partial anæsthesia. Six ounces of sterile serum only were removed, and the operation lasted 4½ minutes.

May 6th. Fifth aspiration under partial anæsthesia. The abscess cavity was found entirely empty. The exploratory operation lasted 5 minutes. Rapid improvement had taken place after the aspiration on April 28th, when nothing but serum was found, and the temperature remained normal. The patient passes from one to three stools, free from blood and mucus, in the twenty-four hours; he is free from pain and feels quite well.

One word of warning must be added with regard to the employment of partial anæsthesia. It demands precisely the same undivided care and attention on the part of the chloroformist as the production of full anæsthesia. It has happened rarely that, intending to produce only unconsciousness with the 1 or 2 drachm dose, complete anæsthesia has unexpectedly supervened. If on these occasions, the chloroformist had not been attending properly to his duty, accidental overdosing might unawares have taken place, and the case been cited to bolster up the waning belief in shock under chloroform and primary chloroform syncope.

DEEP TISSUE TRAUMATISM FROM ROENTGEN RAY EXPOSURE.

BY DAVID WALSH, M.D.EDIN.,
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MANY instances have now been recorded of injury to the superficial structures of the human body, such as skin, hair, and conjunctivæ, by the process of skiagraphy. It has been generally assumed, however, that no harm has been done to the deeper structures by the passage through the body of rays from the focus tube. So far from that view representing the exact state of affairs, it seems to the present writer that the method of Roentgen ray diagnosis may exert a definite harmful action upon some of the deeper tissues of the human body. The facts that have suggested that opinion may be gathered from the following briefly noted cases:

Professor Waymouth Reid,[1] of Dundee, experienced a severe dermatitis and loss of hair after four exposures, from twenty to forty minutes each, within a period of four days. The focus tube was placed over the front of the body, and on the evening of each exposure marked erythema of the chest and belly was noticed, as well as slight redness of the back. This interesting observation seems to point to a kind of selective action traumatism of the deeper epidermis and dermis by rays capable of passing through the substance of the body.

The only recorded instance, so far as the writer knows, of apparent injury to deep structures by the Roentgen methods is one given by an American surgeon, Mr. Gilchrist.[2] It was that of a demonstrator, aged 32 years, affected by a severe dermatitis after frequent and prolonged exposures. At the same time the bones of the hand became tender on pressure. A skiagraph showed the presence of a distinct osteoplastic periostitis, and probably an osteitis of the first and second phalanges of the index and second fingers, and also of the heads of the corresponding metacarpal bones.

A remarkable instance of apparent injury to brain structures by the rays of the focus tube has come under the notice of the present writer. The sufferer, a man 49 years of age, had demonstrated the rays for some months, and had suffered from several slight attacks of dermatitis. At length he experienced a severe illness after a week's prolonged demonstration, during which the tube was constantly near his head, although separated by a wooden screen. The main features of his attack were giddiness, slight headache, vomiting, diarrhœa, high temperature, and prostration. He was under the care of Dr. Murray, of Clacton-upon-Sea, who has kindly furnished the following note. When the patient came under observation his temperature was 103.5°, pupils sluggish, frequent diarrhœa and vomiting, great languour and debility. Dr. Murray regarded the attack as in some way due to Roentgen ray exposure, and compared it at the time with the symptoms of "sunstroke." The giddiness persisted for a couple of months. On the whole the facts of this illness appear to be consistent with a theory of gastric and cerebral irritation set up by focus-tube exposure in a subject proved to be susceptible by previous dermatitis from a similar cause.

Another case has come under the writer's notice. A practical worker, Mr. Greenhill, was carrying out a series of experiments involving exposure of the region of the stomach for a period of about two hours daily. After some weeks he complained of gastric symptoms, such as pain, tenderness on pressure, flatulency, colic, and diarrhœa. He went away into the country for a fortnight and got well. On his return he resumed his experiments, and after a fortnight experienced a similar attack. He subsequently shielded his stomach with a thin sheet of lead, and his symptoms finally disappeared. This history certainly suggests that in his case the rays of the focus tube caused a direct inflammation of the gastro-intestinal mucous membranes.

Other facts pointing to deep action of the focus tube rays are the local tremors often set up by exposure, and the apparent shrinking of the heart noticed in several instances by Dr. Bezly Thorne.[3] Lastly, there is the action, noted by Despeigne[4] and others, of these rays in the relief of the pain of cancer.

If from the foregoing grounds we may assume that focus-tube traumatism of the deeper structures of the human body occurs, then we have at once a remarkable analogy with the results of exposure to the sun. Severe resulting rashes are common to both agencies, and may follow a single exposure. Pigmentation of skin is another common effect. In the case above mentioned Despeigne used the rays to relieve the pain of cancer; he reported that after the eightieth sitting the skin of the patient's neck became as black as that of a negro. Then in the case of Dr. Murray we have a perfect mimicry of mild-heat apoplexy. So far as any ill-effect of the sun on gastro-intestinal mucous membranes is concerned, the writer knows of no direct evidence; on the other hand, however, obstinate constipation is the rule, together with what is usually regarded as cerebral vomiting. From the inherent conditions of the exposure, the brunt of the sun's rays would naturally fall upon the head, and it is commonly supposed by anatomists that the thickness of the negro skull is an acquired character due to prolonged exposure to the rays of a tropical sun. We know that sunlight has a powerful influence upon the general health, and it seems quite possible that the sun may have a much greater and more direct effect upon the deeper structures of the human body than has been hitherto imagined.

Three chief theories have been mentioned by Gilchrist, in the paper already alluded to, as the cause of focus tube dermatitis:

1. Professor E. Thompson thinks that the injury is caused by the *x* rays, or by something that constantly accompanies them. He himself was sceptical as to the traumatism, and exposed his own hand at a distance of a few inches to a Crookes's tube, an experiment which resulted in a severe dermatitis.

2. Tesla maintains the effect to be due to ozone liberated in the surface tissues. His theory, however, is upset if we accept the existence of focus tube traumatism of the deeper structures, where ozone is not generated.

3. Gilchrist fancies the result to be due to actual particles of platinum carried by the cathode rays. If so, they must have been carried through a board in Dr. Murray's case.

Personally the writer is inclined to think that the focus-tube traumatism may ultimately prove to be due to heat rays, in other words, to be a kind of burn. The cathode rays strike the platinum anode or anti-cathode and make it hot; there they are in part converted into Roentgen or *x* rays. What becomes of the rest of the cathode rays is not quite known, but it is generally believed that some of them, at any rate, are converted into heat rays, by which means a tube in action becomes warm.

This heatburn theory was suggested to the writer by the following cases, brought under his notice by Mr. Webster, of Blackheath, a gentleman who has had considerable experience of Roentgen-ray work. In the first instance he exposed an individual something like a score of times during a period of six months. Six weeks after the last exposure the hair fell out from one side of the head. The only differing condition of experiment, so far as could be ascertained, in the last exposure was that the cathode end of the Crookes's tube had been kept continually heated.

The other case was that of Mr. Webster himself. For a year or more he had undergone constant exposure to the rays without bad results. He then injured himself with a metal developing solution, and shortly afterwards a diffuse dermatitis appeared on the back of his hand. This traumatism, again, coincided with the heating of the cathode end of the tube.

Now in both the above instances previously insusceptible persons became susceptible under altered conditions of experiment. The alteration consisted in heating the cathode end of the tube, which means, when applied to a Crookes's tube in action, an increased production of cathodal rays which are, as already stated, in part converted into heat rays. There is therefore some probability that in heating the cathodal end of the tube we increase the resulting heat rays thrown off from the tube. Lastly, the cathode rays strike the platinum anode or anti-cathode and render it red hot, and it is not unreasonable to suppose that their contact with the skin surface might also have a calorific effect. The identity, however, of the actual damaging factor to the living human tissues is still unascertained. It may possibly prove to be a non-luminous ray common to sunshine and to the rays emitted from a focus tube. In both sun and focus-tube traumatism individual predisposition plays a vital part. Whatever the real nature of the irritant ray, it is obvious that the subject is pregnant with future possibilities as it is instinct with present interest.

REFERENCES.

[1] *Scottish Medical and Surgical Journal*, February, 1897. [2] *The Johns Hopkins Hospital Bulletin*, No. 71, February, 1897. [3] BRITISH MEDICAL JOURNAL, 1896, ii, p. 1238. [4] *Lyon Méd. Journal*, December 28th, 1896.

DENTAL HOSPITAL OF LONDON.—At a *conversazione* given recently by the staff and lecturers of the School of Dental Surgery of the Dental Hospital, London, at the Royal Society of British Artists, Sir F. Lockwood, M.P., distributed the prizes to the students of the hospital. In his address he referred to the great progress which had been made in the profession of dentistry during recent years. He was much impressed by the fact that last year relief was granted to 57,654 cases too poor to pay for surgical aid. The Committee have commenced the erection of a new hospital in Leicester Square, upon a larger site, near the existing hospital, at a cost of £25,000, exclusive of the site. The new building will largely increase the accommodation by providing 150 operating chairs. At present only 40 are available.

CIRSOID ANEURYSM OF THE ORBIT, FOREHEAD, AND SCALP.

By W. M. BEAUMONT, M.R.C.S.,

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CASES of cirsoid aneurysm are not very common. Amongst the last 20,000 patients at the Bath Eye Infirmary the following is the only one; and although the brow and orbit are favourite sites, it is probably very much rarer at ophthalmic institutions than these figures would indicate:

A. B., a servant, aged 22, presented herself at the Bath Eye Infirmary on February 8th, 1894, complaining of a pulsating tumour, which appeared to start from the upper part of the interior of the left orbit, spreading upwards to the lid of the eye, the brow, and the left half of the frontal bone. It consisted of a tortuous, dilated, and plexiform condition of the vessels, and extended backwards behind the coronal suture, whilst anteriorly it was lost in the roof of the orbit. Strongly pulsating vessels ran into it from the occipital artery behind, from the temporal on the left side and from the angular in front, whilst vessels crossed the median line from the right frontal and temporal regions. They were all of a dusky hue. The skin was raised and depressed by varicose vessels, which were convoluted upon each other. These were soft and resilient, and in them a vibratory thrill could be felt and a rasping murmur heard. On deep pressure an irregular ridge-like margin could be distinguished, bounding the angeiomatous swelling all round as though there were either an absence of bone under the tumour or that it had been deeply grooved by a prolonged erosion. The area involved corresponded approximately with that of a case of Bruns illustrated by Bland Sutton.[1] The veins were not visibly enlarged, and there was no evidence that they were in any way abnormal. The swelling she said had existed from birth, and she had never had an injury to her head or brow; it had grown with her growth, but had never given her much trouble nor caused her any anxiety. Lately, however, she had developed a left external squint, and she had had severe headaches, which was not the case in childhood. Her friends noticed the swelling, and whereas formerly she could easily cover it by a fringe of hair brought over the forehead, this was now no longer sufficient to hide the disfigurement. Her vision in that eye was reduced to $\frac{6}{18}$, and the disc was white with pigmented borders. Pressure on the temporal artery or on the external carotid lessened the thrill, but it was evident that much of the circulation was due to anastomosing vessels running up from the occipital, the opposite temporals, the right angular and other arteries. In the photograph (Fig. 1) the right anterior temporal and angular arteries are plainly seen.

Fig. 1.—July, 1894.

The next few months clearly demonstrated that she was right in her statement that the tumour was increasing. The eye became proptosed and more displaced downwards and outwards; the skin more dusky and the headaches more frequent. They prevented her from carrying out her household duties in a satisfactory manner, and that part of the swelling which could be seen on the forehead and brow was very disfiguring. The time had arrived when it was necessary for the patient's comfort, for her appearance, for her sight, and for possibly stronger reasons, that some surgical attempt should be made to check the increase. Her consent having been obtained, the hair was cut off close to the scalp over the left half of the frontal bone, the rugose condition of the head preventing a razor from being used, and ether was administered on July 29th, 1894. An incision was then made through the skin over the temporal artery just before it divides and at right angles to the course of the vessel. No attempt to dissect down upon it was made, but the edges being retracted the site of the vessel was found by the pulsation, and a catgut ligature was passed under it by means of a sharp aneurysm needle. The ends of the ligature were then tied, including in the knot the artery and tissues surrounding it, after which the edges of the wound were brought together by sutures. In the same way ligatures were rapidly applied to seven other arteries, including the angular, supra-orbital, occipital, and on the other side of the head the anterior and posterior temporals and angular, in each case before the vessel became varicose. All the principal feeders, with the exception of possibly some branches of the ophthalmic, which being within the orbit could not be reached, were thus occluded, and the thrill and pulsation were immediately very much reduced in intensity.