deterioration of property, to compel the Board also to purchase this spot, or oasis of health, in the midst of its wretched insanitary surroundings.

Old Burlington-street, W.

FRACTURE OF THE BASE, FOLLOWED BY ENCEPHALITIS, ATAXIA, AND APHASIA; RECOVERY.

By M. J. MOLONY, L.R.C.P., L.R.C.S. ED.,
ASSISTANT SURGEON, TREDEGAR IRONWORKS.

ON the night of April 11th, 1883, I was called to see W. W—, aged thirty-four, who had been found lying insensible in the street. He was ordinarily a strong healthy man. The following was the condition of affairs: Profound insensibility, pallor and coldness, copious hæmorrhage from left ear, slight epistaxis, pupils inactive and unequal, pulse intermittent, respiration slow and feeble. I noticed that there had been recent hæmatemesis. The blood vomited was of the dark peculiar colour which Sir Prescott Hewett describes when he speaks of fracture of the base, and which he attributes to the action of the gastric juice. Behind the left ear was an extensive contusion, best marked over the mastoid region, but also including the occipital and posterior cervical areas. There was no history as to how the injury had been received, nor has any clue been since discovered. The patient was of a rather bibulous and pugnacious disposition at times. The extent of the hæmorrhage from the ear, and the subsequent draining away of cerebro-spinal fluid, indicated beyond doubt a fracture of the base. How was the fracture caused? There was nothing whatever which pointed to either a fall or blow on the vault of the skull. The most careful examination revealed nothing. However, as we know that fracture by *contre-coup* may be produced without an external mark, the mere absence of injury at the vertex would of itself be of but little value. There was, however, the positive evidence of direct violence, applied if not actually at the base, at least in close proximity to it. I refer to the contusion at the mastoid and occipital regions.

No doubt Sir Prescott Hewett, in his article on Injuries of the Skull, lays some stress on the fact that discolouration may occur from the oozing of blood through the fracture, and the consequent infiltration of the cervical cellular tissue. But in this case the discolouration was most marked exactly in the region corresponding to the mastoid portion of the temporal bone, and presented all the appearance of a contusion in so pronounced a form as hardly to admit of a doubt as to its origin by direct violence. Moreover, the short period which had elapsed between the discovery of the man and my arrival—a quarter of an hour—would scarcely account for so extensive an infiltration. That the patient was found almost immediately after the injury there can be little doubt, as there were still many people in the streets. Thus I believe we have evidence of fracture of the base, caused in a manner by no means usual, or at least not commonly described. The treatment at this stage consisted in measures calculated to restore the heat of the body and to avert collapse. The application of warmth to the feet and sinapisms to the calves produced the desired effect. During the three or four days succeeding the injury the symptoms were such as one might expect to follow severe concussion, with probable contusion and laceration of brain substance. The pupils were still inactive and unequal; the pulse grew perceptibly stronger; the patient was semi-conscious and restless. He complained of headache and intolerance of light, and was, particularly towards evening, violent and delirious. Soon, however, he began to improve to the extent of recognising his attendants, and partially realising his position. The treatment now consisted in the application of cold to the head, purgation, and the administration of bromide of potassium. Morphia was also found useful in controlling the violent delirium. The case was now progressing favourably. The patient's faculties were gradually approaching the normal; the condition of the pupils was decidedly better; the delirium was less frequent and much less violent. About this time a remarkable symptom manifested itself, and pointed, I believe, to cerebellar mischief. This was a tendency to roll over repeatedly, and further, to roll continuously from side to side. This exercise was indulged in

to an almost incredible extent, and was most distressing to the observer. Against any attempt to control the motion the patient protested most violently. Such symptoms are described by physiologists as occurring in animals whose *crura cerebelli* have been divided; and cases in which similar movements occurred in man have been recorded by MM. Seres and Belhomme, and by Dr. Paget. This phenomenon gradually disappeared, and on April 20th the patient, despite all efforts to prevent him, rose from his bed, dressed, and was with difficulty dissuaded from going out. Though less violent than hitherto, his condition seemed by no means favourable. His mind wandered; he was at times perfectly oblivious; his speech was jerky and incoherent; and his gait was distinctly ataxic. Between the 20th and 25th there was little or no alteration. On the 26th, and a few days afterwards, a distinctly new train of symptoms revealed themselves, and indicated beyond doubt inflammation of the brain: intolerable headache, rigors, quick pulse, pyrexia, intense photophobia; and subsequently strabismus, violent delirium, and convulsions. I applied ice to the head, purged freely, and gave aconite. Chloral and bromide were also useful. In the course of a few days the fever had subsided, the headache and other symptoms had considerably abated, and the condition of affairs was entirely satisfactory. Recovery now progressed steadily; and on May 5th the patient was allowed to sit up, but without leaving his room. He was now very good-humoured and tractable, and laughed heartily on hearing the tale of his previous performances. His condition at this period and for some time after, looked at from a physiological point of view, was of the most interesting character. The following symptoms were more or less constant: Headache, deafness, tinnitus aurium, strabismus, double vision, ataxia, jerky articulation, loss of memory, and aphasia. The strabismus, which was external and accompanied by other signs of paralysis of the third nerve, including ptosis and dilated pupil, disappeared in the course of a few weeks. The ataxia was well marked. The patient was unable to stand erect with his eyes closed. The movements of both upper and lower extremities were clumsy; the "muscular sense" was impaired. Westphal's symptom was also present, the "patellar reflex" being much diminished. The above motor derangement depended presumably on some cerebellar trouble, the earlier effects of which had already manifested themselves in the manner previously described. Loss of memory was a striking feature. While the patient's recollection of remote events was good, he utterly failed to remember recent ones. He called to mind without effort incidents of the Franco-Prussian War, yet he was unable to tell where he had been or what he had been doing three weeks before his illness. His memory for names of places seemed a complete blank. However, as he suffered from aphasia, it was of course a matter of great difficulty to decide when his failure arose from loss of memory pure and simple, and when it arose from aphasia, amnesic or otherwise. The aphasia was of a pronounced and complicated nature. I believe I was able to distinguish the amnesic, agraphic, and ataxic varieties, although to draw a hard-and-fast line where one variety began and another ended I soon discovered to be a hopeless task. Thus, for instance, on being asked his name he was unable to pronounce or write it. On hearing it he recognised it at once, and repeated, but failed to write, it. Then, again, on other matters he expressed himself correctly on paper where words of mouth absolutely failed him. On being asked his age he could not tell, but on being handed a pencil and paper he readily expressed it in figures. When he spoke for a little time his inability to coördinate the complex movements of articulation (ataxic aphasia) made itself apparent. During this latter stage a mild mercurial course, blistering, and iodide of potassium seemed beneficial.

As time wore on the above symptoms steadily disappeared, and in six months from the time I first saw him my patient was enjoying excellent health, in full possession of all his faculties and quite capable of attending to business. Deafness of the ear, from which the cerebro-spinal discharge occurred, was persistent.

The case, I believe, presents the following points of interest:—The somewhat unusual manner in which the fracture must have been produced; the distinct evidence of cerebellar mischief, the encephalitis supervening, as I ought to have mentioned, synchronously with the suppression of the cerebro-spinal discharge, the ataxic phenomena obviously depending on injury to the cerebellum; and, lastly, the loss of memory and aphasia.

Tredegar.

THE EFFECT OF COCAINE UPON THE EYE.

By LUCIEN HOWE, M.R.C.S.,

PROFESSOR OF OPHTHALMOLOGY IN THE UNIVERSITY OF BUFFALO,
NEW YORK.

THE readers of English medical journals¹ may remember that about ten years ago attention was called to the leaves of the erythroxylon coca, and considerable interest manifested in their real or supposed effects. Of late notice has again been attracted to the plant by a brief communication made by Dr. Carl Koller of Vienna at the last meeting of the Heidelberg Ophthalmological Congress. From the number of those who are at work in the same direction it is probable that the literature of the subject will grow rapidly, and it therefore seems to me worth while to record briefly some of the conclusions arrived at, especially those based on experiments with animals. The practical bearing of the matter will be apparent when it is stated, without any fear of exaggeration, that the proper use of cocaine, before operations involving the conjunctiva, cornea, or iris, lessens the pain of the patient, and thus facilitates the manipulations of the operator, without producing any irritation or serious inconvenience. These deductions are drawn from the experiments mentioned, and upon an observation of the effect of cocaine in thirty-eight cases in the clinics of Professors Schoeler and Schweigger. To these gentlemen acknowledgments are due for the clinical material placed at my disposal. In a study of the subject we are led to consider the degree of anæsthesia produced. It is by no means easy to estimate this from the varying statements of patients. In order to obtain some measure, therefore, at least approximately, of the amount of pain in one eye as compared with another, it seemed possible to make use of the physiological fact that every irritant to a sensitive nerve is accompanied by a corresponding increase of blood pressure. Accordingly, by means of a mercurial kymograph, in the laboratory of Professor Zuntz, I have noted the effect upon the blood pressure when the same irritant was applied successively to each eye, and have made 124 such observations in various ways upon several rabbits. There were 104 of these tests, or 52 in pairs, which could be fairly compared; and, in addition, I have used occasionally guinea-pigs and cats when a verification of the experiment was deemed essential. The conclusions thus far may be briefly stated as follows:—

I. The effect of the same irritant upon the blood pressure, other circumstances being the same, is invariably less in the eye with cocaine than in the normal eye.

II. The degree of difference varies (1) with the amount of the dose, (2) with the time when the dose is given, and (3) with the part of the eye which is irritated.

1. *As to the amount.*—Two drops of a .02 per cent. solution is sufficient to produce a noticeable difference in the size of the pupil, but at least twice that quantity is the minimum which will effect the sensibility materially. If a 2 per cent. solution be used, the effect at the end of about fifteen minutes does not differ materially from that which follows the use of the same quantity of a 4 or 5 per cent. solution. Certainly, the intensity of the effect in the latter case is not twice as great as in the first.

2. *As to the time required for its action.*—From two to six minutes after a full dose some anæsthesia of the conjunctiva appears. The maximum effect is reached in about fifteen minutes, and in thirty or forty minutes commences to subside. When the cocaine has been once applied, subsequent applications apparently act with more rapidity than at first. When the dose is sufficient to produce a well-marked anæsthetic effect, this precedes the dilatation of the pupil. The latter, however, continues for some hours after the former has disappeared.

3. *As to the different parts of the eye.*—The anæsthesia is shown, first, in the conjunctiva and cornea, afterwards in the iris. Its degree is also much greater in these external portions than in the iris. It reaches the latter by passing into the anterior chamber, as can be shown by drawing out from an eye already treated with cocaine the aqueous humour, and dropping that into a normal eye. If a 2 per cent. solution be injected into the anterior chamber,

comparatively little irritation is produced, but the degree of anæsthesia, especially in the iris, is not apparently greater than when the same quantity is dropped upon the conjunctiva.

Second in importance to the anæsthetic effect of cocaine is its action as a narcotic. In many of the acute inflammations of the cornea or iris, in abrasions of the conjunctiva from foreign bodies, and in the pain following the use of silver nitrate or cupric sulphate, its influence in this respect is very decided. In the third place, it should be remarked that it acts as a mydriatic. Reference has already been made to this fact. It must be conceded, however, that atropine possesses this quality to a greater extent. Intimately connected with the mydriasis is the paralysis of accommodation. The comparatively slight degree of this, together with the short duration of the mydriasis, is of evident advantage in ophthalmoscopic examinations. Fourthly, the mydriasis is accompanied by a perceptible increase of intraocular tension, as shown by the double manometer of Graser. Fifthly, a slight anæmia of the conjunctiva and enlargement of the palpebral fissure are noticeable within five minutes after the use of a 2 per cent. solution. Sixthly, it does not retard the healing of wounds. Seventhly, watery solutions so complete as to hold no particles in suspension do not irritate the eye. Although not relating immediately to its effects upon the eye, it may be worthy to note, eighthly, that stronger solutions, those of about 5 per cent. and upwards, delay the putrefactive changes in an extract of meat. Ninthly, when cocaine enters the circulation rapidly, the kymograph shows an immediate lessening of the blood pressure, the animal dying with paralytic condition of the heart as one of the chief symptoms.

It is probable that future experience may modify some of the conclusions thus far reached. In the first trials of an apparently useful drug the judgment is apt to be warped by ardent enthusiasm. A fair consideration, however, of facts already well established seems to justify the belief that cocaine is destined to rank as one of the most valuable agents in ophthalmic surgery.

BRIEF NOTES OF

PAINLESS EYE SURGERY BY THE USE OF COCAINE.

By C. BADER,

CONSULTING OPHTHALMIC SURGEON TO GUY'S HOSPITAL.

CASE 1.—Lady, aged twenty-two. Burnt both corneæ with acetic acid; exhibited extreme intolerance of light and suffered great pain. An ointment composed of chrisma (one ounce) with 2 per cent. of muriate of cocaine was ordered. Immediate relief and rapid recovery followed.

CASES 2, 3.—Aged sixty and sixty-five respectively. Slitting of lower tear puncta and canaliculi. Five, three, and one minute before operating a drop of a 2 per cent. solution of cocaine was applied to the inner surface of the lower eyelids. The patients did not complain during the operation.

CASES 4, 5, 6.—These cases were young ladies with convergent strabismus. The 4 per cent. solution of cocaine was used in one case only to one eye, to note the difference as to pain, which was most striking.

CASE 7.—Tumour removed from upper eyelid. A 2 per cent. solution of cocaine was applied five, three, and two minutes before the operation. No pain was complained of when making the incision, but the patient experienced some pain while I was crushing the tumour.

CASE 8.—Double iridectomy. A 4 per cent. cocaine solution was applied four times in six minutes. No pain whatever at the corneal incision, but the patient felt some pain while the iris was excised.

CASES 9, 10, 11.—Aged forty-five, seventy-five, and eighty respectively. Extraction of cataract by corneal flap without iridectomy; left eye in all. Large hard cataract in the two latter cases. One week after operation the incision was healed; central clear pupil. One case will illustrate the proceedings adopted in the others. I arrived at the patient's house at 3 P.M., and immediately put a drop of a 4 per cent. solution of muriate of cocaine on the inner surface of the left lower eyelid three times in six minutes. At the seventh minute no sensation was experienced by the patient when

¹ Vide THE LANCET, 1876, vol. i., pp. 631, 664; Brit. Med. Jour., 1874, vol. i. pp. 234, 272, 305, 414; 1876, vol. i. pp. 524, 531, 750; 1877, vol. i. p. 291; Med. Times and Gazette, 1871, vol. ii. p. 407; Edin. Med. Jour., 1873, pp. 323, 341.