febrile conditions, but would submit that its real value lies in the influence it exerts over that section of the nervous system which controls the *constructive* and *destructive* forces which are constantly in operation in the living body; and that when, as in fever, assimilative nutrition or *constructive* force is in abeyance, *cuca* restrains tissue-metamorphosis or *destructive* force.

P.S.—Perhaps, for the benefit of those who may wish to try the tincture of erythroxylon *cuca*, as I found great difficulty in obtaining it, I may mention that I have lately obtained it in large quantities from Messrs. Hewlett and Son, Cree Church Lane, Leadenhall Street.

INDEPENDENT MOVEMENTS OF THE EYES IN COMA.

By CHARLES MERCIER, M.R.C.S.,

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IN every case of loss of consciousness, in which the coma has reached a certain depth, or, in other words, at a certain stage in the onset of coma, the eyes lose their normal correspondence and move independently of each other. Usually, the optic axes diverge; but divergence is by no means essential, and, when it exists, is only temporary. One eye may be at rest while the other is in motion, or both may be moving in different directions and at different rates; the positions assumed being often most striking and unnatural, but quite inconstant and uncertain. The movements are never "spasmodic", that is, abrupt; but always slow, rolling, gliding motions. They have no relation whatever to the cause of the loss of consciousness, but only to its degree. I have seen them in coma from injury to the head, from cerebral hæmorrhage, from alcoholism, from uræmia, from "simple apoplexy" after an epileptic fit, and in profound anæsthesia from chloroform and ether. I have never failed to find them in any case of deep coma that I have examined.

The degree of coma with which this appearance corresponds is most readily observed in the artificial production of loss of consciousness by anæsthetics. After the first purely voluntary struggling, comes usually a period of quiescence and delirium, and then a second struggle, from which the patient gradually passes into "surgical anæsthesia", in which the conjunctiva is insensitive. It is usually just at this point, at the end of the second struggle and just before the conjunctiva ceases to be sensitive, that the independent movements of the eyes begin, and the return of the optic axes to parallelism is a certain indication that the anæsthesia is passing away.

So invariable is this sign, that I have been in the habit, when administering chloroform and ether, of taking these movements as the indication of the degree of anæsthesia, instead of the rather barbarous method of rubbing off the corneal epithelium with the finger.

The independent movements have also, I believe, a great diagnostic value. Since it is clearly quite impossible for any one to simulate them by an effort of will, their existence forms a ready and certain means of excluding malingering and hysteria from the diagnosis of a case. The movements are in no degree an active process; but are simply dependent on loss of control, and what Dr. Hughlings Jackson calls "reduction in automaticity". In this connection, it is interesting to note that, in some of the lower animals (*e.g.*, the chameleon), the eyes normally move independently.

The terms coma and loss of consciousness are used here in a wide sense, to include not only the state of profound stupor, with stertorous breathing, etc., but also all the stages which precede this graver degree.

LOSS OF ASSOCIATED MOVEMENTS OF THE EYES UNDER CHLOROFORM AND IN DISEASE.

By FRANCIS WARNER, M.D. Lond., M.R.C.P.,

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THE movements of the eyes have been studied with much care, and present a field for clinical observation. I wish now to direct attention to the loss of association in the movements of the eyes in patients deeply under the influence of chloroform, and in some cases of disease, and congenital defect of the brain. In the healthy subject, the eyes when moving in the horizontal plane are strictly parallel; when they are directed upwards they diverge slightly, but symmetrically; similarly, when directed downwards, they converge symmetrically. In looking at near objects they also converge. Now, in each of these physiological departures from parallelism, the inclination of the axis of the eye towards or from the median plane, is equal on the two sides,

and these associated movements are supposed to be due to certain "brain centres", which govern such associated movements.

1. Preserving parallelism when they move horizontally.
2. Governing convergence when accommodating for near vision.
3. Governing divergence or convergence as the individual looks at an object above or below the horizontal plane.

When a patient is being placed under chloroform, the eyes first roll upwards as in sleep, and, in so doing, they diverge symmetrically, as when they roll up from any other cause. When the patient is fully comatose, and before he begins to breathe stertorously, there is a *loss of association in the movements of the two eyes*. At this stage of temporary brain-paralysis, the eyes are usually directed in the horizontal plane (or what would be the horizontal plane were the patient in the vertical position). In this condition, *one eye may remain perfectly quiescent, while the other slowly wanders* either inwards or outwards; the same thing may then recur, or the other eye may remain at rest, or the two eyes may both move, but without any association of movements except that they both (generally at least) keep at the same level. I have myself never seen the same phenomena in the coma produced by ether, presumably, because with ether surgical coma may be brought about by a less degree of brain-paralysis than in the use of chloroform. This is an argument in favour of the greater safety of ether as an anæsthetic.

The following case came under my care at the Children's Hospital, Birmingham. A girl, three years of age, was the subject of permanent paralysis of one arm and leg, following convulsions in infancy. She had never been able to speak, was constantly dribbling, and idiotic in manner. On observation, there was seen to be an occasional loss of parallelism of the eyes: one would remain at rest, while the other wandered inwards or outwards; this was a chronic condition in the child, who was suffering from no acute disease.

I have seen a few similar instances, one in conjunction with two other physicians, who confirmed my observations. In a few instances, I have seen the same thing in acute cerebral meningitis. In considering the physiological significance of this condition, I think the cases quoted indicate that it is due to paralysis of certain portions of the brain, and that it is not due to any spasmodic action of the recti muscles. If it be granted that a brain-centre governs the horizontal parallel movements of the eyes, this centre must be paralysed in the condition referred to. Chloroform administered to the stage of complete surgical anæsthesia, and just short of producing stertorous breathing, paralyses this centre; ether may produce surgical anæsthesia without paralysing it. These observations are incomplete, and the deductions crude; but I have thought the subject worthy of notice, and of clinical interest.

THERAPEUTIC MEMORANDA.

SALICYLATE OF SODA.

THE use of salicylic acid in rheumatic fever is not restricted to the period of pyrexia. At the St. George's Dispensary, a coachman, aged 50, who had previously suffered from rheumatic fever, came under the care of Mr. Prince, the resident surgeon, in January last, for severe polyarticular rheumatism. He was treated during the first week with citrate and acetate of potash. The knees, ankles, and wrists were affected; there was free perspiration, and the fever was high. In the second week, hiccup, vomiting, and diarrhoea set in, with distension of the colon, and dyspnoea; enemata afforded relief. The articular pains persisted, but the temperature fell. Six to eight ounces of brandy in the twenty-four hours were added to a liberal supply of milk (three pints), eggs, and beef-tea. In the third week, with further swelling of the joints, salicine was given. The temperature ranged from 101 to 102 deg. An endocardial murmur appeared; there were cough and distress at night, with a tendency to morning diarrhoea. The salicine had to give place to bark and ammonia. The urine was free, of low specific gravity, with excess of phosphates. In the next week, one or two full doses of quinine were prescribed, and cod-liver oil was given at night with benefit; an eczematous rash appeared over the chest where warm poultices had been applied, and extended along the inner aspect of the arms; the breathing was better, the cardiac murmur disappeared, and the appetite returned. On February 23rd, fresh rheumatic swelling showed in the right wrist. The temperature at 4 P.M. was 98.8. Ten grains of salicylate of soda were given every three hours. The night was quite free from pain or disturbance; so, also, the next. The breathing became easy, the pulse quiet, the urine of higher specific gravity, with a deposit of lithate for the first time since the early part of the illness, and giving the well