the night-table. She could sit in a chair for a short time, and, till within a week or two of her death, she enjoyed carriage exercise. There was no muscular atrophy, nor did bed-sores form. Till the last hour of her life, her mental powers were perfect, being fully conscious and most pleased at the presence of her children around her dying-bed. She enjoyed reading, the leaves of the books being turned over by her attendants. Her powers very gradually failed; but there were no special symptoms except that, during the death-struggle, the muscles of the head and face were painfully distorted, but not the muscles of the trunk.

The pathology of the case is to me unknown. It resembled the unceasing tremulousness of paralysis agitans, and, like these, the muscular movements ceased during profound sleep, but began immediately on waking; indeed, the cessation of the muscular movements was often the only means of knowing whether or not she was asleep.

This case afforded the most marked example of the independence of the mental power of the spinal system; for though, as regarded her bodily movements a corpse, she ruled, not managed, a large household by her strong will; her wishes, as far as they could be learnt, being the law to those about her.

There was no *post mortem* examination.

I venture to add Dr. E. Long Fox's suggestions as to the probable cause and sequence of pathological changes in the spinal cord: 1. Spots of subacute myelitis; 2. As a sequence of this, spots of miliary sclerosis in the anterior column; 3. Larger patches of sclerosed tissue in the grey matter, and possibly even in the posterior column, but not affecting the anterior cornua; 4. The same sclerosed condition of part of the medulla oblongata, especially about the nuclei of the vagus, hypoglossal, and spinal accessory nerves.

ERYTHROXYLON CUCA IN THE TREATMENT OF TYPHUS AND TYPHOID FEVERS, AND ALSO OF OTHER FEBRILE DISEASES.

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SINCE Dr. Ringer made the important discovery that the amount of urea excreted by the kidneys stands in a certain relationship to the temperature of the body, it has been ascertained that in all febrile diseases, with the exception of yellow fever, the amount of urea formed is abnormally increased; and representing, as urea does, the wear and tear of the frame (tissue metamorphosis), it may be regarded in fever as affording not only an index to the severity of the disease, but also a direct clue to an exceedingly important line of treatment.

I will further illustrate the position I assume in this paper by submitting that, as throughout the duration of a case, *i.e.*, of typhus fever, there is present a specific morbid agency which so influences the sympathetic nervous system as to produce or permit an extent of tissue metamorphosis (indicated by the increased amount of urea excreted) not only incompatible with health, but most probably productive of the various febrile phenomena, the sum of which constitutes this disease; therefore, to restrain such metamorphosis until the morbid agency has ceased to exist, is clearly indicated as the most desirable end to accomplish in treatment. To accomplish this end, I believe we possess a very efficient remedy in *cuca*, the dried leaves of the *erythroxylon cuca*. I need not say anything of the properties ascribed to this drug (the subject having already been very freely ventilated), beyond stating that, when indulged in by a healthy person, it prevents for a time the feeling of fatigue, and diminishes the amount of urea excreted—subjective and objective signs of tissue-metamorphosis—and that in this property lies its value as a therapeutic agent.

CASE I.—Mr. R., aged 34, of a phthisical family, came under my care on September 8th, suffering from the usual premonitory symptoms of specific fever. He had been unwell for some time previously, but not confined to bed. Until September 15th, there was no perceptible increase of temperature, but from that date the ordinary symptoms of typhoid fever rapidly developed; and on the 19th the patient's condition was as follows. He complained of severe occipital headache and vertigo; sore-throat; pain in the back at the lower angle of the scapula; slight ileo-caecal pain; painful confusion of thought, with occasional delirium. I found the mucous membrane of the fauces much swollen, red, and ulcerated; the tongue moist and thickly coated; slight hypostatic pneumonia of the lower lobe of the right lung; sputa muco-purulent, streaked with blood; the abdomen slightly tympanitic; diarrhoea feculent. He had occasional paroxysms of profuse diaphoresis; also an abundant crop of miliaria

crystallina. Decubitus was dorsal. Pulse 108. Temperature at 10 A.M., 102.40; at 10 P.M., 104. Respirations per minutes 36. The amount of urea excreted during the preceding twenty-four hours was 59.05 grammes (2.08 ounces). Until to-day, the treatment had been purely expectant. The patient was ordered a drachm of tincture of *cuca* in water every four hours.

September 20th. He had spent a better night; said he had "greater control of his thoughts". There was no delirium. Temperature at 10 A.M., 100; at 10 P.M., 102.40. Pulse 104. Respirations 30. The amount of urea excreted during the preceding twenty-four hours was 53 grammes (1.87 ounces); the diarrhoea was much the same; and there was still much diaphoresis. He complained that the medicine produced flatulence. The tincture was continued in doses of a drachm and a half with fifteen minims of essence of ginger, every four hours.

September 21st. There was now no confusion of thought. Temperature at 10 A.M., 99.40; at 10 P.M., 100.50. Pulse 98. Respirations 26. Urea excreted during the preceding twenty-four hours was 48 grammes (1.7 ounces). Much less diaphoresis and flatulence. The patient's general appearance much improved. The *cuca* to be continued as before.

September 22nd. No pneumonic crepitation; sputa mucous. Yesterday and to-day, he had been able to read the newspapers. Diarrhoea still continued. Temperature at 10 A.M., 99; at 10 P.M., 100. Pulse 87. Respirations 22. To-day, there were a few spots of typhoid roseola on the abdomen. He was ordered two drachms of the tincture of *cuca*, combined with a drachm of liquid extract of bael, with a view to restraining the diarrhoea.

From September 23rd to September 29th, the patient continued to improve; the temperature, pulse, and respiration on the 29th being about normal. The diarrhoea ceased on the 27th, and on the 29th the amount of urea excreted daily had fallen to 27 grammes (416.7 grains), and I now considered convalescence fairly established; but on the evening of the 30th the patient, having become rather careless, allowed himself to be exposed to a draught of cold air from a window. This was succeeded the same night by rigors. On October 3rd, he was suffering from a severe attack of lobular pneumonia; and on the 10th, I regret to say, he died.

I have treated two or three other cases of typhoid fever with *cuca*, and in each case obtained a favourable result; but have selected this case for publication, as in the others I made no quantitative analysis of urea.

CASE II.—C. B., aged 46, was seized on October 3rd with the usual premonitory symptoms of fever, and on October 10th the patient's condition was that of a well marked case of typhus fever. Temperature 104; pulse 108; respirations per minute, 34. The amount of urea excreted during the preceding twenty-four hours was 58 grammes (2.05 ounces). I prescribed a drachm of tincture of *cuca* every four hours. From October 10th until October 18th, the tincture was continued, and the dose gradually increased to three drachms every four hours. On the 18th, the amount of urea excreted during twenty-four hours was 28.05 grammes (nearly one ounce). With the diminished amount of urea, there was a corresponding diminution of temperature, pulse, and respiration, all of which at this date had become quite normal. In this case, no remedy save the tincture of *cuca* was used; and, as in the preceding case, from the time the patient began to take the tincture until convalescence was established, there was a daily amelioration of symptoms.

CASE III.—I would here refer to a case of protracted convalescence after typhoid fever. On September 17th, I was called to see Mrs. S. She informed me that she had been suffering from typhoid fever about two months ago. I found her very much emaciated, and confined to bed, from which, I was told, she had not been moved for two months, not even to have the bed made. She seemed to suffer entirely from extreme debility. The temperature was irregular, but generally high in the evening, with slight nocturnal perspiration. The respiratory murmur was normal. The amount of urea excreted during twenty-four hours was 56.05 grammes (nearly two ounces). I ordered an infusion of *cuca*-leaves to be taken when thirsty, and did not see her again for a week, when I found her much improved and able to sit up. She informed me that she experienced "great support" from the infusion for about an hour after taking it; and that, when she found she required further support, she repeated the dose. I had not another opportunity of making an analysis of urea.

I have also found *cuca* of great service in both acute and chronic pneumonic phthisis. Where there is much febrile excitement, it lowers the temperature and restrains or materially alleviates the distressing perspiration. In febricula, also, it may be used with great advantage.

I do not, however, wish it to be understood that I regard *cuca* as sufficient to meet every complication that may arise in specific or other

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