to exist, and the various groups of ganglionic cells can therefore no longer be combined for synergic, orderly, or purposive action. There is no longer any harmony between the muscles which act, and their antagonists which regulate the action; wrong groups of muscles are called into play, which impair the action instead of facilitating it; and there is therefore useless expenditure of nerve-force, causing fatigue.

The mode of production of locomotor ataxy thus appears satisfactorily explained; it only remains for us to account for the phenomena of static ataxy which are generally associated with the former in tabes.

The cerebellum, which was once believed to be the seat of the reproductive faculty and desire, is now known to be the centre of equilibration of the body. Removal of this organ in an animal causes static ataxy; the animal cannot keep steady on its legs, but staggers about as if drunk. It is not paralysed, and endeavours to carry out certain movements; but there is an utter want of precision, and even the most desperate efforts do not succeed in steadying it. The behaviour of animals deprived of their cerebellum, in fact, resembles, in the closest possible manner, that which takes place when the ataxic attempts to stand on one leg, or on both, with his eyes closed, etc. The erroneous information which the cerebellum receives from the diseased posterior columns may, however, be, to some extent, corrected by sight; and this accounts for the fact of standing being so much more difficult when the eyes are closed (Romberg's symptom), as well as for the other phenomena of static ataxy. Whether the paths through which information is given to the cerebellum are situated in Goll's columns, in which case the road would be somewhat more indirect, or in the direct cerebellar strands of the cord, which would carry information in a straight line to the cerebellum, we are at present not in a position to determine. We may, however, take it as an indisputable fact that locomotor ataxy is caused by an interruption of the paths between the posterior roots and the central ganglia of the brain, through sclerosis of the posterior columns, and that static ataxy is, in its turn, brought about by an interruption of the paths between the posterior roots and the cerebellum, through sclerosis either of Goll's columns, or of the direct cerebellar strands.

CLINICAL NOTE ON THE TREATMENT OF BURNS AND SCALDS.

Read in the Section of Surgery.

By J. WALTON BROWNE, B.A., M.D.,
Surgeon to the Belfast Royal Hospital.

DURING the past ten years, I have had a very varied experience in the treatment of burns and scalds, in dispensary, hospital, and private practice, and may say that I have tried almost every known remedy, including continuous warm baths, warm water baths with sulphate of iron in solution, white paint, in the form of carbonate of lead, the immediate application of saturated solution of sodabibarbonate, carron-oil, oakum, and the use of many ointments; deriving much benefit from an ointment composed of iodoform, extract of conium, carbolic acid, and spermacetic. From the use of these various remedies I have obtained more or less success; but the local treatment which I wish especially to bring before the notice of the Section is the application of a solution of chlorate of potash. In doing so I do not imagine I am communicating any new or original method of treatment, but merely wish to urge the use of a remedy which has proved highly beneficial in many dozen of cases.

I know that the treatment which I advocate has been tried by some of my medical friends and found wanting, but I feel confident the non-success arose simply from the fact that the lotion was not applied of the proper strength, and with sufficient frequency.

This treatment was first recommended to me by my friend Dr. Harkin of Belfast, who for upwards of thirty years has carefully studied the therapeutical effects of chlorate of potash, and who read a valuable paper upon its uses at our annual meeting in 1879. Dr. Harkin has shown that the salt exercises a most marked influence on all maladies dependent upon defective nutrition, secretion, excretion, aëration, and molecular metamorphosis. We all know its great value in diphtheritic exudation of the throat, gangrenous stomatitis, etc.; but, perhaps, among its very valuable qualities, none is more remarkable than the rapidity with which its application as a lotion repairs the injuries produced by burns and scalds. It is really marvellous how

soon the healing process commences after the application of the lotion, and how rapidly the raw surface is covered by the formation of new skin.

In the treatment of burns and scalds of the second and third degree the lotion is especially useful; in many of these cases perfect healing has taken place in four to five days. I could give the histories of many such cases.

In severe burns of the fourth or fifth degree it is also useful, seeming to favour the formation of granulations after the separation of the sloughs, and certainly no remedy which I have tried so thoroughly keeps the wounds clean and sweet.

In superficial forms, after a few applications, a zone of new skin appears at the margins of the broken surface, and proceeds towards the centre until healing is perfect. It is quite common to see a border of newly formed cuticle in the short space of twenty-four hours. The method I adopt is the following. In superficial burns, I direct the blisters to be punctured, and a bread and water poultice to be applied over all the injured surface every fourth hour, until the cuticle has become detached; you generally find this accomplished upon the removal of the second poultice. I then commence the application of the solution of chlorate of potash, five grains to the ounce; pieces of lint of the required size, saturated with the lotion, are applied four times a day. The lint is covered over with gutta-percha tissue or oiled silk; all dressings being retained *in situ* by a bandage. The lotion must not be of greater strength than five grains to the ounce; of this strength it acts as a sedative, although at the same time stimulating the capillaries to the formation of new skin. If applied much stronger it causes pain; in fact, it acts as a caustic. In some cases, where the lint occasionally adheres to the wound, and is difficult of removal, without injuring the capillaries and causing bleeding; I add to the chlorate of potash solution some glycerine, in the proportion of two ounces to the pint. To prevent the lint from adhering to the wound, Dr. Harkin has for years used an ointment composed of chlorate of potash and lard, of the strength of five grains to the ounce.

In the treatment of very deep burns I advise the application of poultices until all sloughs are separated; granulations then spring up, and nothing seems to increase their activity and vitality equal to the potash solution, of the strength of five grains to the ounce; should the granulations become weak, flabby, or too exuberant, we then use a potash-lotion of the strength of ten grains to the ounce, and at the same time prescribe a mixture of chlorate of potash and tincture of perchloride of iron, to be taken three times a day. At any time, should there be offensive discharges, one can combine the potash-solution with some permanganate of potash.

In the treatment of burns and scalds, the indications are, after promoting reaction and calming the system: 1, to limit resulting inflammation; 2, to promote the sloughing process; 3, to favour the development of granulations; 4, to moderate contraction; and 5, to sustain the strength of the patient during the wasting effects consequent upon the protracted suffering which so often occurs.

I submit that all these indications are fulfilled by the local and internal uses of the salt, the beneficial effects of which, in the treatment of burns and scalds, I have had the honour of bringing before your notice.

ON THE METHODS OF DEMONSTRATING THE PHYSIOLOGICAL ACTIONS OF DRUGS ON THE FROG'S HEART.

Read in the Section of Pharmacology and Therapeutics.

By DUDLEY W. BUXTON, M.D., B.S., M.R.C.P.,
Assistant to the Professor of Medicine in University College, London.

It is my duty to-day to bring before you some of the many striking points which the field of practical therapeutics brings before the explorer in physiological research. As the time allotted to my demonstration is necessarily short, I have decided to bring under your notice only a few experiments, and explain briefly the method I propose to employ. It has appeared to me most consonant with your interest that I should select illustrations of the methods from most striking instances of antagonism and mutual co-operation of salts, instances which will evolve themselves in a few moments, rather than to attempt to introduce to you, in the short space of time at my disposal, any original and so disputatious communication.

Dr. Sydney Ringer, in the *Journal of Physiology*, has brought before the world the remarkable behaviour of the various saline constituents

of the serum of blood. The correlative action of these salts is perhaps one of the most striking in the whole range of therapeutic physiology. It has been my privilege to assist at some of these experiments, and it is my intention to reproduce them as fully as time will permit.

In the first place, I would like to offer an explanation of the apparatus sketched upon the black board. It possesses the qualities of simplicity and, when compared with the clock-work usually in vogue, of cheapness. The recording apparatus is that devised by Professor Schäfer. Essentially it consists of a glass chamber with four openings. At each side are tubes of even bore; these are guarded by glass stop-valves. The one serves as an escape-tube; the other has an absolutely true piston, made of aluminium, which travels to and fro. To the piston is attached a light steel recorder, which lies upon the cylinder, and performs its excursion when the piston travels. The chamber has an upper aperture admitting the heart, which is tied upon the double cannula, the cannula passing through an accurately adjusted stopper. One electrode traverses this, being geared by a small screw. The lower aperture is stopped by a cork, itself perforated to allow the passage of the other electrode. Should the heart leak, this lower cork can be removed, and the serum run off. When the stop-valve shutting off the piston-tube from the heart-chamber is opened, the oil which fills the chamber is forced against the piston, when the heart-cavity dilates, and the recorder performs an excursion and records a corresponding trace upon the cylinder. When systole supervenes, the oil recedes, and the piston travels back again, tracing its excursion upon the cylinder. The heart is supplied by blood or other circulating medium through this afferent tube opening into one cannula while it traverses out this the other cannula and escapes through this the efferent tube. The advantages of Professor Schäfer's frog heart-recorder over Dr. Roy's and similar apparatus are many. The idiosyncrasies, if I may be allowed the expression, of the membrane in Dr. Roy's apparatus are absent (a diagram of Dr. Roy's method was here given and explained), while the lever, a source of complication and error, is unneeded.

The cylinder need not detain us. It revolves upon a horizontal axis, and is on a stationary framework, so that the recording apparatus in this method travels, its excursion being regulated by a nicely adjusted travelling stage, which traverses a board-roadway. The wheel at the end of this roadway controls the extent of the excursion. My motor has been a source of anxiety, but, in spite of gloomy predictions, has shown itself to be a success. It is nothing more than an American clock. Permit me the remark, that there are American clocks and American clocks; this is one of the latter class. Its escapement has been removed, and a large "fly" geared on. The cord connecting my driving wheel with the cylinder can be placed on drums of different diameter and so secures me several speeds. This simple mechanism is all that one needs to repeat the ordinary series of experiments upon the heart of the frog, after that animal has been killed, and the organ ablated.

I may here insist that all these experiments are performed upon animals which are dead, as the batrachian heart beats long after the frog is dead. The electrical portion of the apparatus calls for no especial description; it is the same as used in other physiological research, being a Daniell's cell and a coil, the electrodes touching the heart, and excitation being effected by a make-and-break key placed in the primary circuit.

In the adjoining room, I propose to commence my demonstration by showing you a trace derived from a normally beating heart, fed with blood. I shall then show you that, if we pass a 0.75 per cent. saline fluid through the heart, its beats lessen in amplitude, until eventually they almost cease. Now, if we add one cubic centimetre to each 100 cubic centimetre saline of a one per cent. solution of chloride of calcium, we a full exaggerated beat restored. Calcium chloride, a substance have whose relations to protoplasmic life were considered slight or nil, at once restores the heart to vigorous action. But we see, also, that, together with this vigorous beat, there is some persistent spasm shown by the elevation of the trace from the base-line. This spasm is at once annulled if .75 cubic centimetre to the 100 cubic centimetre saline of a one per cent. solution of potassium chloride be added—a practically normal beat resulting. However, to effect a constant rhythmic action, we must add a quantity of bicarbonate of soda equal to the amount of lime used. With this fluid as a circulating medium, the heart will continue to work as efficiently as with a true blood-circulation.

I will not further trespass upon your time, as any additional remarks, which may be necessary should we enter upon the further interaction of lime and potassium salts in massive doses, will follow my present demonstration.

[The Section then adjourned to the side room during the progress of the demonstration.]

THERAPEUTIC MEMORANDA.

THE TREATMENT OF TUBERCULOSIS.

PROMINENT amongst the subjects under discussion at the recent International Medical Congress, at Copenhagen, was the treatment of tuberculosis. In the papers that were read there, the measure of the patient's progress was estimated by considerations of the temperature, weight, etc.; but in the reports which appeared in the JOURNAL, it is nowhere stated that the effects of the various systems of treatment upon the bacilli of tubercle were recorded. This seems a most important omission. I have already shown ("The Diagnostic and Prognostic Value of the Tubercle-Bacilli," *Edinburgh Medical Journal*, 1884, p. 1 *et seq.*) that, though the temperature be normal, and the body-weight increase, the germs of the disease may still be present in fair numbers, and pursue a course of characteristic activity. I have at present under treatment a young lady suffering from tubercular disease of the apex of the left lung, who, from October 1883 to June 1884, increased in weight 17 lbs., but in whose sputum the tubercle-bacilli have not correspondingly diminished, but increased. In this case, if attention be paid to the body-weight, the result will be deemed satisfactory; but, if the bacilli be considered, it will be quite the reverse. It seems, therefore, that one is justified in considering the behaviour of the bacilli as the most scientific test of the effects of treatment in tuberculous disease.

It is, however, in relation to the use of iodoform in phthisis that the present communication is chiefly made. At the Congress, Dr. Shingleton Smith brought forward this subject, and submitted a series of cases illustrative of its influence upon the disease, which, as it was generally followed by an increase of the body-weight, he presumably holds to be good. Here, again, no reference is made to its effect upon the bacilli of the disease, and, in the absence of this, I contend that the other proofs of its supposed beneficial action are untrustworthy. I have for some time back paid particular attention to the action of this drug upon the bacilli of tubercle, and am in a position to state that, whatever its method of administration, and even when pushed to such excess as to induce mental excitement, in no single case can it be said to have had any effect upon these germs. It possesses antiseptic and anæsthetic properties, and, combined with a little morphia, forms a good local application in laryngeal phthisis, but has no effect upon the organisms which are now pretty generally considered as the cause of the disease.

G. HUNTER MACKENZIE, M.D.,
Surgeon for Throat-diseases to the Eye, Ear, and Throat
Infirmary, and to the Western Dispensary, Edinburgh.

WILLOW-CHARCOAL IN DIARRHŒA.

I WISH to direct attention the value of willow (*salix*) charcoal in diarrhœa.

In 1858, I was appointed surgeon to Lord Newborough's steam yacht, bound for a cruise in the Mediterranean. Somebody informed me that the Liverpool captains were wont to use a black powder. My enthusiastic friend procured me a bottle, which I found labelled with directions for use in various languages. It was, as it purported to be, willow-charcoal. Sceptical at first, I soon learnt to trust the drug as my sheet-anchor in cases of diarrhœa. I found it valuable, too, when in practice on shore.

I was sorry when I had used it all. I should be glad if any Liverpool ship-captain would forward me another bottle of the powder.

The eminent medical men whom I consulted about it, thought the drug was useful in fermentative diarrhœa. In some cases there is shivering and dryness of the skin, denoting feverishness. Finding that the powder obtained from druggists failed to do good except as a deodorant, I consulted the late Mr. Mason of Birmingham. He tried to abstract the salts, thinking them the cause of failure. However, this had no effect.

I lately requested my London druggist to forward me some willow-charcoal. I find that salicine, as an antiseptic, is more powerful than carbolic acid, and less irritating to the digestive organs than quinine. I have little doubt that it is a powerful diaphoretic. Neligan "considers its powers fully equal to quinine." It is valuable in intermittents. I mean to make further trial with a fresh supply of willow-charcoal in cases of diarrhœa.

SAMUEL W. SMITH, M.D., Pershore.

HAZELINE AS A HÆMOSTATIC AGENT.

I HAVE been much impressed by the effect of hazeline in the two following cases. A young lady, aged 18, menstruated for the first time; in May last, the discharge continuing for four days. Her health had