the temperature was 101.4° . Some dry rales were heard over the front and back of the chest. At noon he had the last injection of 10 c.cm., which was given into the right frontal lobe.

March 15th. All tetanic phenomena had subsided.

April 2nd. The patient was quite convalescent but still extremely thin, weak, and anæmic. He was able to sit up but was not allowed out of bed. There remained some stiffness of the wrist and a small healing ulcer. The intellectual condition was perfectly satisfactory.

REMARKS.

The treatment of tetanus, as it is at present understood, would appear to aim at the following objects: (1) Maintenance of the patient's strength; (2) controlling, as far as possible, the painful spasms, by chloral; (3) restraining the development of the toxin in the blood by hypodermic injections of antitoxin; and (4) preventing the toxin from affecting the nerve cells in the higher centres by intracerebral injections of antitoxin. In cases where the presence of bacilli is still suspected, local operation may be necessary. In the case recorded it was presumed that they had been removed by the amputation a week before the first symptom of tetanus occurred.

It is important to bear in mind that immediate improvement is not to be looked for after intracerebral injection. In the case reported by Professor Semple¹ improvement was delayed for a week, and in the present case for nine days. On March 1st and 2nd the patient's condition appeared well-nigh hopeless. The unusually large intracerebral doses of serum were given on account of the intense severity of the symptoms; it is possible, however, that smaller doses might have sufficed. The quantities given were 71 c.cm. by intracerebral, and 104 c.cm. by hypodermic, injection of serum of ordinary strength. Apart from a scarlatiniform rash over the abdomen, lasting three days, the injections produced no ill-effect. There was no sepsis.

To the house surgeons, Drs. Holmes and Watson, thanks are due for their close attention to the case, and for the careful notes they have taken.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, January 7th, 1899.

CURE OF MORPHINE, CHLORAL, AND COCAINE HABITS BY SODIUM BROMIDE.

By NEIL MACLEOD, M.D.,
Shanghai.

In the BRITISH MEDICAL JOURNAL of July 10th, 1897, two pronounced cases of morphine habit were recorded as cured by treatment with bromide of sodium administered, so far as I am aware, in a novel way. Further trial of the treatment there described has met with equally satisfactory results in cases of morphine, chloral, and cocaine habits, and an improved method in the use of the bromide has been adopted, so that large doses of the different drugs were cut off within three days without suffering, and the length of the treatment

somewhat curtailed. The cases are recorded in the order of their occurrence.

CASE III.—A Chinaman, aged 32, was educated in America, where he contracted the chloral habit. This habit had lasted four years when his parents brought him to me for treatment. They described him as crazy at times, wandering away from home improperly clad and in all weathers, bemoaned his loss of several lucrative posts in consequence of the habit, and expressed their willingness to submit him to any treatment which would afford a prospect of removing the craving for chloral. The patient himself, a broken-down looking subject, desired relief, but acknowledged that no reliance could be placed on his promises of assistance towards that end. Circumstances prevented his remaining in the hospital, and I hesitated to undertake the treatment without European nurses in a Chinese house, but his parents, to whom I explained that he might injure himself when the effect of the bromide was passing off, and that careful nursing would be required, undertook all responsibility, and guaranteed that he would never be left alone. As I feared, the mother, who was responsible for the bromide administration, did not give it in the doses and at the times ordered, but I was enabled to determine with certainty that 33 drachms were given between November 6th and the 13th, during and after which time no other drug was given. He slept continuously from the 13th to the 21st, taking about 2 pints of milk daily. During this time no communication with him was possible. Until December 1st there were the same feeble motor, mental, and emotional manifestations as described in the first paper, recovery being slower and delusions of fear more marked. When he recovered his power of locomotion, notwithstanding repeated warnings that he was to be watched carefully in reference to stairs, windows, and verandah, there being delusions of persecutions at times, on December 10th he succeeded in getting through a window and fell from the first floor, fracturing the left tibia and fibula. He was removed to hospital, and the leg was put up in a plaster splint. He returned home on December 30th, quite recovered from the effect of the bromide and without any return of the chloral craving. He has remained free from it for a year, and for some time has been occupying a responsible, well-paid post.

No reliance could be placed on his statements as to the dosage of chloral in twenty-four hours, as he continued to drink from a chloral draught when under its influence. It was obtained from a Chinese source. Comparing this with the two previously recorded cases, I suspected that the slow development of the bromide sleep was due to the method of administration. This suspicion was confirmed in the next three cases, where the drug was pushed more boldly, with the result expected, and further justified in two other cases to be later referred to, in which the bromide sleep was produced in the treatment of other abnormal states. As will be seen, it was possible for the morphine to be withdrawn more rapidly than in the first two cases.

CASE IV was one of the morphine habit, in a lady aged 48, whose medical attendant furnished me with the following remarkable history:

Family History.—Father died, aged 70, of cerebral hæmorrhage. Mother living, aged about 70, subject to migraine. (1) Brother, paroxysmal oinomania, suicide. (2) Brother, alcoholic. (3) Brother, paroxysmal oinomania. (4) Brother, alcoholic. (5) Brother, good health, sound nervous system. (1) Sister died, aged about 40, of pulmonary tuberculosis after many years suffering from hysterical disorders, anorexia, etc. (2) Sister died, aged about 35, of morbus cordis, consequent on rheumatism; sound nervous system. (3) Sister living, in good health, was laid up for two years with a knee-joint affection, probably hysterical. The patient herself is the eldest of the family. History of alcoholism in previous generations and collaterals.

Early History.—Shortly after the onset of menstruation she suffered from hysterical oedema of the breasts. She has all her life been subject to periodic illness from neuralgia, in various sites, most often gastric. About twenty years ago was laid up for many months after an injury to the knee, the long duration of which was probably dependent on neurosis.

First married in 1875, and lived in Japan till her husband's death in 1884. She never became pregnant during that time. About 1880 she suffered from hysterical oedema of the feet, which she has had in slight degree occasionally since then. She became a nurse in 1885, suffering only from migraine at each menstruation. Morphine had to be given in 1890 for severe trigeminal neuralgia with and without facial cramp, or for gastric pain and vomiting, requiring larger than medicinal doses in 1893, in which year she became pregnant, and severe vomiting set in, requiring morphine in increasing doses, up to 4 and 5 gr., before confinement, and continued till April, when it was discontinued, with the aid of bromide, and only given during the next two years during menstruation. "In the second month of pregnancy she became insane, the insanity taking the form of morbid jealousy and of intense dissatisfaction with all her surroundings. In the autumn of 1894 paroxysmal oinomania became a serious trouble. An irresistible craving for alcohol would seize the patient. The gratification of this craving would give rise not to drunkenness, but to *mania a potu*, transitory acute mania, lasting perhaps twelve hours. In one of these attacks she thrust her hand through a window, in another she threw a lighted lamp at her medical attendant. This tendency to alcoholic excess was not entirely new, and earlier in the year she had tried to shoot herself in an outburst of excitement probably due to alcohol. In 1895 she put herself through the 'Keeley' treatment for drink habit, with apparently complete success, for she has been quite free from the craving from that date." In August, 1896, severe facial cramp set in, continued through 1897, becoming gradually replaced by uncontrollable retching, independent of the presence of food in the stomach, and worse at the menstrual periods, requiring increasing doses of morphine. In the autumn of this year regular menstruation ceased. From January 1st to October 6th, 1898, the average daily dose of morphine, as ascertained from the entries in a diary, was 12.6 gr.—the maximum 22 gr. and the minimum 6 gr.—injected.

I saw the patient for the first time on admission to hospital on October 7th, 1898, 12 gr. of morphine having been already injected that day. Between 4 and 8 P.M. 6 drachms of bromide were given. Ordinary diet ordered.

October 8th (eleventh day). Slept all night; 6 gr. morphine injected in two doses; 9 drachms bromide given between 9.30 A.M. and 10 P.M.; awake all day.

October 9th (third day). A good night; 2 gr. morphine injected; 1 oz. of bromide between 9 A.M. and 10.30 P.M. From this date no drug of any kind was given except an aperient pill occasionally. Milk only ordered.

October 10th (fourth day). Slept all night through an alarm of fire causing disturbance in the hospital. Stupid; speech thick; cannot stand without assistance. Asked for morphine at 10 A.M., but the request immediately forgotten and never renewed.

From this date till October 15th (ninth day) she slept continuously except when roused for food or for evacuation of bladder or bowel, but even then could not be described as awake. She would put out the tongue at command, could not speak, or but a few words indistinctly, and was completely helpless. Regular suggestions of evacuating the bladder and bowel were made by placing the patient on the commode. During this time she moved on three or four occasions as if to get out of bed, and with support under the arms would walk a few steps aimlessly.

October 15th (ninth day). Muttering indistinctly. She recognises and names me.

October 16th (tenth day). Speech more distinct; scared; somewhat noisy in the evening; easily controlled.

October 17th (eleventh day). Slept all night; tongue, hitherto coated, now clean; wrist-drop, cannot hold a book, cannot read; speech distinct enough to reveal delusions.

October 19th (thirteenth day). Sitting in a chair; full of delusions; easily controlled; walking unsteadily; memory past and present dislocated; sleep irregular and sometimes delayed but good and sufficient; delusions continue, gradually becoming fewer until October 28th (twenty-second day), after which date they ceased.

On November 7th menstruation reappeared with an attack of migraine, tolerably severe, and preventing her from taking any food all day.

On November 10th she informed me that she had been longer without morphine than at any time since February, 1890.

December 2nd. Two other attacks of migraine and one of trigeminal neuralgia have passed without use of or desire for morphine. There has been a gain in weight, and the patient returns to Japan declaring herself better in health than for years, there being a very manifest improvement in her general appearance, and no inclination to retch or vomit with migraine.

December 9th. A letter from her husband reports her walking about the streets with her daughter for the first time in the latter's lifetime.

CASE V, seen in consultation with Dr. Milles, one of cocaine and morphine habit of several years' standing, in a highly nervous, excitable man, of whose sanity there was considerable doubt. I recommended proceedings similar to those adopted in Case IV, which produced after three days four or five days of continuous sleep, no drug of any kind being given after the third day. Sleep was followed by the stages described in the other cases, recovery of locomotion, speech, and memory being more rapid, no craving for morphine or cocaine being manifested, although its absence was noticed by the patient, contrasting markedly with his first day in the hospital, when his demands for morphine were urgent enough. Four weeks after leaving the hospital there had been no relapse.

CASE VI.—A medical man, aged 37, wrote to me on November 30th, 1898: "I first got addicted to the habit in 1889 after the Burmese war, during which I got an attack of dysentery, for which another surgeon gave me morphine injections, and kept it up till 1897, when I took leave home and placed myself in a home. In two months I had quite given up the habit, and kept from it till last May, when owing to trouble, worry, and depression I again started. I nearly succeeded in recovering again in August, when I took a trip in a sailing ship, and was at sea forty days. My supply ran out in fifteen days, and I had none for the remaining twenty-five days, but I resumed it when I landed. During the first half of last month I daily took as much as 30 gr. of morphine with 15 to 20 gr. of cocaine. The last ten days I have come down to 5 gr. daily. I came up here from Hong Kong. I know if I continue as I am now doing that a few months will

finish me, and I would submit to any means you could suggest. One thing I cannot bear, the sudden and total deprivation, and I nearly committed suicide at Hong Kong because—who I placed myself under tried that plan." Family and personal history other than that referred to in the above quotations good, with the appearance of an enfeebled, excitable man. He was admitted to hospital on December 1st, 1898, having himself injected 64 gr. of morphine on that day. Syringes and supplies given up. There being some diarrhoea, milk only was ordered. The stools from this day were natural; 1 ounce of bromide was given in 2-drachm doses before bedtime.

December 2nd (second day). Slept all night a dreamless sleep; 2½ gr. of morphine injected seemed to satisfy him. In discussing the risks of the treatment with him, I pointed out that I could not say it was free from risk, but that so far in the 7 cases I had dealt with I had not had reason for anxiety, adding curiously enough that the intercourse of, say, a pneumonia would be dangerous. Prepared for all risks, he drafted and executed a will that evening; 10 drachms of bromide taken before bedtime.

December 3rd (third day). Part of the night restless; ¾ gr. morphine given. Slept nearly the whole day; the eyes were observed to be flushed. After bedtime the nurse, not understanding that the bromide was then to be suspended, continued it in drachm doses through the night at intervals for restlessness.

December 4th (fourth day). Awake at morning visit and afraid he would not have enough morphine. Injected a grain and ordered the bromide to be stopped—36 drachms having been given. He slept quietly all day, but became restless at 10 P.M., remaining so till 2 A.M., when he slept.

December 5th (fifth day). Could be roused and took his milk. Coughing through the day and spitting over the bedclothes. Slept all day.

December 6th (sixth day). A quiet night till daylight, when there was very rapid breathing, embarrassed if lying on the back or right side, eased if lying on the left. 9 A.M. Temperature 102.8°; pulse 96, good; respirations 38, shallow and regular. As examined lying on the left side, no dulness, but numerous moist sounds audible behind. Noon. Temperature 105.2°, pulse 100, respirations 96; dulness at right base was made out at 3 P.M., and extended at 9 P.M. right up to the apex behind (lying on the left side).

December 7th (seventh day). Died at 8.45 A.M.

Post-mortem examination revealed consolidation of right lower lobe, the tissue sinking in water; a similar though less advanced condition at the left base; 15 to 16 ounces of bloody fluid in the right pleural cavity, and a few ounces of similar fluid in the left; numerous old, more or less stretched, adhesions over the anterior, lateral, and basal surfaces of both lungs.

In this case more bromide was given than necessary, I think, during the third night, the nurse not understanding that the bromide was not to be given after bedtime. The recent journey from the warm South into our cold weather, the enfeebled health consequent on the habits, and the bromide may have acted as predisposing causes to the acute lung ailment. The respiratory centres showed no sign of depression from the bromide, their response to the pneumonic poison producing respiratory movements as rapid as one sees in infants. Its action in repressing cough was manifest, and probably when the flushing and restlessness at night were present, had there been no bromide, the cough would have attracted attention. Had he not had bromide, he would have had morphine, which cannot be said to be without danger in pneumonia.

The results in these cases, though few, were so marked and constant that they seem to me to promise fulfilment of the following claims for the method of treatment: (1) The withdrawal within three days of even large doses of the drug causing the habit; (2) the certainty that this will cause no suffering; (3) the patient cannot deceive those dealing with him in the matter of secret administration, nor can he enlist after the third day the aid of attendants; (4) any physician with the aid of vigilant nurses can deal with the case in any hospital or private house, no special institution is needed; (5) there is no risk of substituting another drug habit, and the craving will be lost whether the patient desires it or not.

Whilst nothing has been observed in these cases, which pointed to disturbance of vascular, respiratory, or alimentary systems to a degree causing anxiety, they are too few to determine that the treatment is without risk. Intercurrent maladies in the course of treatment may be dangerous, but here we have to choose between the apparently temporary risk of the bromide, and that from the more prolonged use of the morphine or other drug. With regard to ultimate recovery of locomotion, memory, etc., so far, each case has been quite satisfactory in that respect, with the one exception of a blank representing the period under bromide. When memory before treatment, as in Case IV, has been defective, and also the power of concentration of attention and prolongation of that effort, these have markedly improved. As a psychological experiment, the rapid retrogressive changes in the functions during the first few days, the vegetative intermediate state and the slow evolutionary progression of recovery are full of interest.

The treatment is directed against the morphine or other habit, in which the craving for the drug is so strongly reinforced by the slightest demand for the relief of pain, sleeplessness, etc., that it appears impossible to resist it. The treatment removes this craving, and if the disorder is functional, the bromide rest, the changed dietary, the cutting off of all ordinary surroundings more completely than is possible by other means, may not be without beneficial effect on the pain, etc. For those in whom other treatment has failed, and for all who are willing to submit to this method, it offers what appears to be a certainty of deliverance from the craving without suffering, which is more than can be said of any other method of treatment of which I am aware. By the time the patient has become capable of making the drug which has caused the habit the object of thought, it has actually become dissociated from his comfort, and the new relationship a matter for astonishment.

That this use of the bromide may prove beneficial in other maladies is suggested by two other cases. In one of these, a lady 48 years old, suffering from an attack of acute mania occurring in a Japanese hotel in the interior of Japan, where the sounds from the other inmates, drove the patient frantic. Without forcible restraint, a two days' journey by hammock and boat would have been impossible. In the bromide sleep all irritation from light and sound ceased, but, as no assistance could be had in nursing the patient through such an illness on the spot, in this sleep she was carried twenty miles in a hammock swung on two chair poles, lay asleep on the deck of a small steamer for several hours, spent a night in another Japanese hotel, was put on board a steamer, carried 500 miles, and placed in her own bed in her own house, where she awoke two or three days later none the worse for the journey. She passed through stages similar to those already described, and, when the effect of the bromide passed off, there was not a trace of mental disturbance, and she is still well over a year later. The part played by the bromide in securing sleep and rest amid such surroundings, and the aid to transportation were sufficient in my opinion to justify its use. How far its effects had to do with the rapid recovery from the acute mental ailment is difficult to estimate. The profound bromide sleep was a great contrast to the excitement of mania, and secured a prolonged condition of complete mental rest where it was much needed. The circumstances under which the illness broke out demanded stringent measures.

The second case was one of uncontrollable vomiting, a feature in neurasthenia, the subject of which was a lady doctor, sent to me by her brother, also a doctor, from the interior of China. As the vomiting seemed to me to be of undoubted nervous origin I suggested a trial of the bromide. Given by the rectum it caused such irritation that it could not be retained, irritation not confined to bromide, as was found later. Given by the mouth it took longer to produce its effects because of its frequent rejection. The stomach, however, seemed more tolerant of the drug than of other things, and after five or six days sleep set in, but not so profound as in the other cases described, with cessation of the vomiting habit. When recovery from the bromide was taking place the vomiting again manifested itself but much less than before treatment, and to an extent not causing any anxiety. I regretted not having pushed the drug effect to a greater degree, but not being certain of the amount retained, and as its effect appeared greatest sometimes two or three days after the last dose, I was afraid to continue it in this case. She is now, three months later and after a trip to Japan, apparently quite well.

It is noteworthy that the loss of alcoholic craving in the second case was pointed out by the astonished patient himself. It may not be out of place here to add a sketch of the method of treatment, with some reference to the immediate results of the drug. Having taken the weight of the patient and ascertained that there is nothing to contra-indicate this treatment in the way of organic disease, the sodium bromide may be given in two doses of 2 drachms, in solution every two hours for the first two days, and 1 drachm during the third day. None is given after bedtime on the third day. Three ounces of the drug in all will probably suffice, but more may be given to induce deep sleep that may continue for five or six days and nights, during which time milk alone should be given. Every night and morning during this time,

the patient should be placed on the commode for bladder and bowel evacuation, or oftener if there be any sign of soiling the bed linen. For a week or ten days after this sleep, the speech, which is at first indistinct, locomotion, which is of the feeblest or impossible, and the great confusion of ideas will all be seen gradually to improve, the mental condition, however, most slowly. Delusions, at first numerous, will lessen; memory will improve; sleep may then be irregular, but further treatment is undesirable. Solid food should be given as soon as it can be taken, and the bowels regulated, and after locomotion is recovered it is well to encourage the taking of exercise. The muscles may be observed to become tender, but this will pass off. Morphine may be given the first day in the habitual dose, halved the second, and none or but a small dose the third. Chloral may be cut off at once if there is a good sleep the first night. Cocaine may be dealt with like morphine. A case may appear well in three weeks, but at least other three weeks, and if possible longer, should be insisted on, as if for convalescence after a severe illness. An even, warm temperature of the room should be maintained. Warm night clothing for protection on getting out of bed or throwing off the blankets should be provided, and a nurse should be on duty day and night for at least the first three weeks.

OBSERVATIONS ON OXYURIS VERMICULARIS IN CHILDREN.

By GEORGE F. STILL, M.A., M.D., M.R.C.P.,
Medical Registrar and Pathologist to the Hospital for Sick Children,
Great Ormond Street.

THE presence of threadworms in the intestine is so common a trouble in childhood, and so often difficult to cure, that I venture to put on record the following observations which may be of interest in so far as they have a practical bearing on symptomatology and treatment. In 200 necropsies, as far as possible consecutive, on children under the age of 12 years at the Hospital for Sick Children, Great Ormond Street, the intestine was carefully examined for the presence of threadworms, and these were found to be present in 38 cases, that is, in 19 per cent. When, however, only children over the age of 2 years were included, the percentage was much higher; in a series of 100 necropsies on children between the ages of 2 and 12 years, threadworms were found in 32 cases, that is, in 32 per cent.

The point, however, on which I wish to lay special stress is not the frequency of threadworms, which is familiar enough, but their situation. It is often stated that the threadworm inhabits chiefly the rectum and lower part of the colon and occasionally the cæcum, but the fact that the vermiform appendix is a favourite habitat of the threadworm has received but little attention.

In no fewer than 25 out of the 38 cases in which the oxyuris vermicularis was present the worm was found in the appendix vermiformis; in other words the threadworm was found in the appendix in two-thirds of the cases.

Moreover, the appendix is in some cases the only part in which the threadworm is found; in 6 of the 38 cases mentioned no threadworms were found either in the cæcum or elsewhere in the large intestine, but in each of these 6 cases threadworms were found in the appendix, and sometimes at its extreme tip.

The number of threadworms in the appendix is sometimes very large: thus in one case described below, 111 were present here; and it is noteworthy that these large numbers may be found in the appendix, when only very few or none are present in the large intestine.

A further point, which may be of significance, is the immature character of the worms found in the vermiform appendix. In some cases only one or two of the worms found here were full grown, the rest were extremely minute, measuring 1.5 to 3 mm. in length, and requiring the use of a lens for accurate counting. These minute worms had already acquired the characteristic differences of sex, from which it could be determined that many, probably the majority, were immature females, though some certainly were males. It has been stated by Blanchard¹ that the embryo when first hatched measures in the case of the female 1.7 to 1.97 mm., and in the