display of the functions of the cerebral cortex, that the disease must be seated there, and this is supported by experimental investigations, especially those of Bechterew. He proved that convulsions with tonic and clonic spasm followed by coma just like epilepsy are produced on electrical stimulation of the brain cortex. But does it follow that the disease must be in the cortex because the symptoms are those of cortical function and they have been produced by stimulation of the cortex? I think not; Bechterew's experiment amounts to this, that a healthy brain gave epileptic symptoms on stimulation. This is significant; there are two factors—healthy brain and stimulation—and they give epilepsy. No need of heredity, no need of rickets, no need of abnormal chemical nutrition, with detaching molecules and yielding atoms. I am of opinion that we have in Bechterew's experiment the explanation of epilepsy as we find it in everyday practice—a healthy brain bursting out into fury owing to its over-stimulation by sensory impressions poured into it from one or more or varying sensory areas, the pain and tension of teething acting like the electrical stimulation: the brain gets teased, less tolerant, almost vicious in its habits, so that it will reply, long after teething has passed away, to other sensory disturbances with an epileptic fit, thus explaining how so many cases of infantile convulsion go on to what is called idiopathic epilepsy. Epilepsy thus becomes a reflex act in its origin and a cerebral vice in its fuller development and perpetuation.

This view of epilepsy in its origin being mainly, if not wholly, a reflex disease, brings into harmony many apparently hopelessly divergent facts regarding its etiology and treatment; for there are undoubted cases on record where correction of errors of refraction has cured the epilepsy, and of epilepsy ceasing after the nose and throat have been cleared of adenoids. I have had a case where constipation was the cause and cascara the cure. Osler mentions a case where an undescended testis was the cause of epilepsy; pressure on it produced an attack; its removal cured the disease. Gynaecologists have seen the origin of epilepsy in ovarian irritations. Oculists have found it in eye-strain. Dietetic specialists have traced it to the Sunday dinner, while the genito-urinary surgeon accounts for it all by a floating kidney. They are each and all right in their observation if they would only allow that causes might be found outside their area requiring treatment outside their routine.

TREATMENT.

Treatment of epilepsy is to remove the cause where this can be done, and, where it cannot, render it inoperative. The need of classification is again obvious; there are some cases that must be ruled outside the hope of much betterment by any treatment—developmental cases, cases arising in imbeciles, in the microcephalic, in inoperable tumour cases, and probably the confirmed epileptic, the individual who has had severe epilepsy for twenty or thirty years, and whose mind, brain, and body are hopelessly wrecked by repeated fits. His time for treatment is past. Peripheral, traumatic, emotional, and toxic causes give rise to about 60 or 70 per cent. of all cases in childhood and youth, and are, in my opinion, curable if treated early and long enough.

Bromide treatment is necessary and curative in peripheral, traumatic, emotional, and toxic cases. I think it was Sir T. R. Fraser who first demonstrated that the action of bromide was one of allaying reflex action. A stimulus of given strength was applied to the leg of a frog, general muscular contractions followed; under bromide the same stimulus produced less contraction, while more bromide limited the contraction to the side of the body that was stimulated. A larger dose of bromide limited the contraction to the leg only.

Epilepsy being due to severe, prolonged, or repeated sensory stimulation of brain, I use that amount of bromide that is necessary to stop the sensory stimulation. The amount required to do this varies exceedingly. Eighty grains a day is the average, but so small a dose as 60 grains has been sufficient to arrest epilepsy of an intensity that was to be estimated by the occurrence of 267 "grand mal" seizures a year. Among the boys at the colony now, 130 grains a day has been the highest dose given so far; but I have given 320 in private practice and arrested the disease. The method is to give 20 grains night and morning, and increase by 10 grains

per day as often as fits recur. Epileptic boys stand bromide very well, 80 or 100 grains per day are taken without them showing any sign that they are taking a drug; 150 or 200 grains per day begins to interfere with the equilibrium—their walking becomes uncertain, and they ought to be kept in bed. With larger doses, swallowing and organic reflexes are interfered with. Adults do not stand bromide nearly so well. The boy that had 320 grains had sordes on his lips and gums, his breath was foul, swallowing was difficult, there was slight hæmatemesis and melaena, respiration was shallow, and râles were heard. The fits, which were numbering eight and ten a day, stopped, the bromide was gradually reduced, and the boy had no more fits for two years. I detected no toxic action on the heart; it remained regular throughout, no dilatation, little loss of clearness about the sounds. The toxic action of potassium salts on the heart to me seems a myth. I use citrate of potash in large doses—60 to 90 grains per day—for long periods for gravel, migraine, and some eczemas, and fail to find the slightest evidence or hear patients (often old) complain of any symptom of heart weakness. On the other hand, with bromide I find respiration does get embarrassed, slow, shallow, or at times halting and deep, and accompanied with râles and rhonchi. I find in Martindale's *Extra Pharmacopoeia*, 1906, Dixon is quoted as follows: "Potassium salts administered per os are non-toxic; they are excreted faster than they are absorbed."

Bromide rash may well be ignored. I use the best English-made bromide, and rashes have never given me any trouble. Of 40 cases taking bromide now, only 3 show any rash; in 2 it is very faint, a few papules on the forehead. In 1 it is severe—takes the form of boils, forming ulcers with purpuric-looking surrounding skin. This particular boy had an attack of the same thing about a year ago, and it disappeared in three weeks without the bromide being knocked off, and without anything in the way of treatment except a soothing antiseptic ointment. Other objections to bromide are that it makes them look blue and blotched, and miserable, starved, dazed, and ugly. This is a gross libel; such appearances are not due to bromide. I had an epileptic under my observation, but not under my treatment, who very well illustrated this description, but he never took bromide. He died a suicide, and the coroner's jury returned a verdict of death due to temporary insanity arising from business worries.

For those few cases that may have their origin in absorption of toxic products from over-eating, from unsuitable food, or from constipation, diet is of importance, but for the bulk of cases diet might be summed up in—three meals a day, everything fresh, everything limited, flesh never oftener than once a day and three times a week is ample. In the salt-free or purin-free diet I see no likelihood of good being done.

A few more years of Starnthwaite experience will prove whether epilepsy in the young, when taken early and treated assiduously, can be permanently arrested. The outlook at present is very hopeful, and, if we succeed, then the question becomes a very large one, and one, I think, for the State to deal with.

A CASE OF HYSTERICAL SOMNAMBULISM, SHOWING ABNORMAL ACUITY OF VISION IN THE SOMNAMBULISTIC STATE.

By JAS. W. RUSSELL, M.A., M.D. CANTAB., F.R.C.P. LOND.,
ASSISTANT PHYSICIAN TO THE BIRMINGHAM GENERAL HOSPITAL.

A GIRL, aged 21, a teacher, typewriter, and now a student of music, was sent to me on July 29th, 1907, complaining of sleep-walking of a month's duration. Having at that time temporary charge of beds in the Birmingham General Hospital, with the consent of her doctor I took her in for the sake of observation, and it was during her stay in that institution that the events recorded below took place.

Family History.

The patient's mother died aged 29, but the cause of death was not known. Her father, at the age of 26, committed suicide by shooting himself in her presence. Two brothers are living; one is in good health, the other

"suffers from abscesses." Another brother died at the age of 4 years.

Previous History.

Menstruation began at the age of 12, and has always been irregular. She has had an "abscess in the ear"—probably of the external meatus only—and suffered in childhood from "brain fever" and three attacks of measles; she has also had influenza three times. She has always been of a reserved and nervous disposition, and has latterly been exposed to some amount of worry of a family nature. Though only a child at the time of her father's death, the event—of which she has a perfect recollection—naturally made a great and lasting impression on her mind. She has always been averse from speaking of it, and I only obtained a knowledge of the fact from a friend who accompanied her on her visit to my rooms.

History of Present Complaint.

The first attack of sleep-walking occurred three years ago, soon after taking up her residence in a Belgian convent. It lasted for a period of three months. A year later a recurrence took place, and a third attack occurred for a short time at Christmas, 1906. She has now been troubled in the same way for about a month, and the somnambulism has occurred nearly every night throughout that period. The friend who accompanied her, and with whom she lives, made the discovery by noticing that her bedroom was in a state of disorder every morning; the drawers were "turned out," and things were displaced. She then began to come downstairs in the middle of the night; she played the piano, tuned her violin and put new strings on it. For the last week or two her friend has slept in the same room, and has locked the door on going to bed. She sleeps quietly for the first few hours, but about 1.30 or 2 a.m. she gets out of bed. She does not seem to be asleep, but it is impossible to arouse her to a sense of her surroundings, and she does not know her friend. On the first occasion on which she found the door locked, on attempting to go out of the room, she went at once to a table and wrote a letter in German, and then threw it away. Some days later—she had not tried to leave the room in the interval—on again finding the door locked, she looked up the note written on the previous occasion, read it, and then tried again to go out of the room. On the other nights she takes books down and reads them, studies harmony, and does crochet work, although the room is in darkness; and it is noticeable that, if there is a faint light from the gas, she takes her book or work away to the window and reads or crochets in the darkest part of the room. These occurrences last "for a few hours"; then she goes back to bed and often cries and knocks her head against the bedstead, or with her hand. In a short time she goes to sleep and remains quiet for the rest of the night. She awakes next morning feeling tired and always with a bad headache. She has never passed urine in bed. Occasionally in childhood she has walked in her sleep on individual nights, especially if working hard or reading for an examination at the time.

Observations in Hospital.

The patient was admitted into the Birmingham General Hospital on August 12th, 1907, and up to the time of going to bed appeared to be in a normal mental condition. About 10 p.m. the night nurse noticed that she was restless, she tossed her arms about, beat them against her head, and talked to herself. After a few minutes she sprang out of bed and began to walk round the ward. She then went back to bed of her own accord, and continued her restless movements for about half an hour. The house-physician, Dr. Hincks—to whom I am indebted for a very careful observation of the case—was sent for and made the following note: "As she was making a considerable amount of noise and there seemed no sign of her going to sleep again, I spoke to her. She took no notice, except to become rather more excited. After a time I was able to rouse her and she became very hysterical, crying and hiding her face in the bedclothes. She was then left alone and soon fell asleep." I may add here that all her attacks were preceded by a period of restless sleep, in which, to judge by her actions and moaning, she seemed to be suffering from severe headache; and she always complained of headache on being roused.

On the three succeeding nights she slept quietly, but in the early morning of August 17th, between

1 and 1.30 a.m., she sat up in bed and began to do crochet work. She did not talk. The ward was dark, except for two single and well-shaded electric lights far away from her bed, and both the house-physician and nurses were convinced that they would themselves have been quite unable to do work of any sort. The crochet, however, was well and correctly done. After a few minutes she put the work away, got out of bed, took a post-card from her locker, and wrote upon it, addressing it to a relation in Canada. The card was well and evenly written, and there were no mistakes. She then got into bed and went to sleep. The following night, that of August 17th, she again started her crochet work, but after a few minutes began to take it to pieces again. She then got out of bed, took paper and pencil from her locker, wrote a letter in German to the same relation (an Englishman), put it in an envelope, enclosing a sovereign, and addressed it. She headed the letter with the address of her own home, not that of the hospital. "She then took the letter and walked towards the door. The nurse and I (Dr. Hincks) followed her, but she took no notice of us, although we carried a lamp. As she was going out of the door I took her arm and led her back to bed. She came quite quietly, but after getting into bed she became very excited, as on the first night. After coming to herself, I showed her the letter. She did not remember having written it, but recognized the address as correct and the writing as her own." Dr. Hincks then gave her a piece of paper and pencil and asked her to repeat the address, taking the lamp away, so that the light was the same as that in which she had previously been writing; but she was quite unable to see, and wrote her lines one over another. The two following illustrations show, first the

Mr. B

7

C/o Mr. D

M

L

skeleton of the address written during the attack of somnambulism, and then her attempt to write the same words in the dim light of the ward when thoroughly awake. I have suppressed all but the initial letters of the

Mr. B. D. Hincks

words of the address, in order to avoid possibility of identification, but the evenness of the spacing between the lines is evident, and the individual words were quite clearly written and spaced. I have also suppressed the surname in the second illustration. It therefore seems that during the hysterical condition the patient's sense of vision was abnormally acute, and this confirms the account of the events noticed by her friend before her admission to the hospital.

On the night of August 18th, at about midnight, she got out of bed and tore up all her old letters. She then walked down the ward, taking no notice of those about her, and tried to open the door leading on to the balcony overlooking the street. On finding it locked she pulled the blind aside and looked out. She then walked back to her bed. All this time she was moaning and seemed in great distress; and on this occasion she clearly referred to her father's death, saying, "Take it away; don't let him do it," etc.

We spoke to her and turned the lamp full on her face, but she took no notice. Her pupils were widely dilated and only slightly responded to light. After some shaking and repeated questions, she came round and said she knew where she was. Her pupils were then more contracted.

As usual, on coming to herself she complained of severe headache.

On the night of August 18th—the last night of the present series of attacks—she wrote a short letter to her

in the waking condition. In this respect, the case differs from many of the instances of hysterical somnambulism

music teacher together with the following essay, putting it into an envelope and addressing it correctly, as she afterwards informed us:

SONATA FORM.

Sonata Form is divided into three forms:

1. Introduction.
2. Development.
3. Recapitulation.

(Here follow two lines crossed out.) The Introduction consists of two simple themes both written out shortly (? strictly) on the Tonic. The Development is sometimes very long and in it both themes are worked out thoroughly at great length. The Development is always written in the Dominant. Recapitulation is a brief summary of the whole piece which is written again in the Tonic. Some sonatas also contain a short Introductory Theme, and snatches of this Theme will be found are generally found running all through the Sonata. A good instance is the "Pathétique" of Beethoven.

This essay, as well as the accompanying letter, was written quite clearly in pencil, and was indited in the dim light in which, in her waking state, she had previously been unable to write with any degree of legibility.

From this time onwards there was no recurrence of the sleep-walking, and the patient was discharged a week or two later in good health. Her doctor has recently informed me that "she is much better and earning her living as a typewriter, but has occasional night wanderings."

The physical examination showed little of importance. The chest, heart, and abdomen were normal, nutrition and digestion were good, the urine was free from albumen and sugar, and there was only a slight degree of constipation. The superficial and deep reflexes were, if anything, a little exaggerated. I could myself detect no areas of altered tactile sensibility; but Mr. Jameson Evans, who kindly made the examination of the fields of vision here recorded, discovered a small patch of anaesthesia just above and to the outer side of each upper eyelid. The accompanying figures show the fields of vision in each eye and the colour field in the right eye. These were taken on August 29th, and Mr. Jameson Evans informs me that they give practically normal results, though the colour fields are perhaps a little small.

I think that there is evidence in this case of the existence of abnormal acuity of vision during the somnambulist state. It is of course possible that, after coming to herself on the night of August 17th, the patient might have recognized the object of the test to which she was subjected, and that a desire to arouse interest might have led her to voluntarily make the unsuccessful attempt at writing shown in the second illustration. The house-physician and the nurses, however, were fully convinced that the light in the ward was quite insufficient to allow of any writing or work to be carried out by any normal individual, and I believe that the results of the test may be accepted as reliable. It is worthy of note that the events which apparently occupied her mind during the sleep-walking were not forgotten when awake. Her father's death, the circumstances of the relation to whom she wrote, and the musical interest, were all fully realized

recorded, especially in France, in which the ideas present during the somnambulism have been entirely forgotten in the waking state.

A CASE OF MERYCISM.

By H. F. LECHMERE TAYLOR, M.A., M.B., D.P.H. ED.

IN view of Dr. Brockbank's paper of February 23rd, 1907, it may be of interest to record the following case of merycism in a boy seen recently as an out-patient at the Mission Hospital, Jalalpur Jattan, Punjab.

A boy of the village farming class, said to be 14 years of age, but hardly looking so much, was brought by his mother for pains in the arms. She herself is a leper, showing a perfect clinical picture of the unmixed nervous form of the disease, from which she says she has suffered for twenty-five years. She was afraid that her son might be developing the same condition and wished to have him examined. In the course of the investigation it came to light that he was a habitual ruminant. He and his mother, though questioned and cross-questioned in various ways, both gave a perfectly consistent account of the condition.

About four years ago he began to have return of food into his mouth immediately after meals. This seems to have begun when he was attending school and was in the habit of running home and eating a meal hurriedly during school hours. What came back was slightly bitter in taste, and at first he used to spit it out, with the result that he had a great feeling of nausea and his mouth became "as bitter as poison," to use his own words. Soon he learned that by swallowing the mouthfuls as they came up he could escape the unpleasant symptoms, and the habit of doing so was speedily established. He attended school for only a few months, and then went back to work on the farm, having a good deal to do with cattle; "imitation," however, does not seem to afford a sufficient explanation of the habit.

His present condition is that his food, which he now chews well and eats at the usual rate, begins to regurgitate in mouthfuls as soon as the meal is finished; he does not rechew it as it comes up quite soft; it is still slightly bitter in taste, but not enough so to be unpleasant; on the other hand, he derives no great pleasure from the process. If, however, he spits out a mouthful, he still suffers from a very bad taste in his mouth, associated with so much nausea and giddiness that he says he is unable to stand without support. The action is quite automatic, and goes on regularly till he begins to feel hungry for his next meal, when it ceases. He has no control over it whatever, nor has he any power of producing emesis at will. He does not suffer in the least from dyspepsia, but is usually somewhat constipated, a very common complaint in the Punjab.

His food, taken twice a day according to the custom of the country, is that of the men of his class, consisting chiefly of thin unleavened cakes of wheat or barley flour