the lungs or the skin, or both, a pound of liquid in the course of three hours. This rate of absorption would give eight pounds in the twenty-four hours: add to this the pint and a half of liquid allowed as a drink, and we have within a pint the amount of liquid that the boy actually passed within the period of twenty-four hours—namely, ten pints and a half. Now, since we have positive proof that a copious drain of liquid through the kidneys leads to the absorption of water from the air through the lungs and skin, it is probable that the same process of pulmonary and cutaneous absorption of water takes place in cases of profuse watery diarrhoea; and that this is one of the means by which the blood is enabled to maintain the normal proportion of its watery ingredients while water is rapidly escaping by the stomach and bowels.

We have a familiar illustration of the close relationship between the skin and the kidneys in the copious secretion of pale urine associated with suppression of the perspiration by the continuous application of cold to the surface; while, on the contrary, the urine is scanty when free perspiration results either from disease, as in the case of rheumatic fever, or from a high temperature of the air, or from active exercise. Again, the skin is dry and perspiration scanty when, as in a case of diabetes, an abundant stream of water is constantly escaping by the kidneys. In fact, as we have already indicated, the skin of a diabetic patient rather absorbs than secretes water.

It is manifest, from a consideration of the facts which we have now passed in review, that within certain limits, and while the circulation and respiration are unimpeded, the blood has a remarkable power of maintaining the normal proportion of its solid and liquid ingredients. Thus when, in consequence of defective action of the skin and kidneys, water is retained in the system, the excess of water, not being allowed to accumulate in the blood, is thrown into the tissues, which are thus flooded with water, and dropsy is the result. On the other hand, a copious drain of liquid from the blood, either through the alimentary canal or through the kidneys, causes a demand for water, which is met partly by the imbibition of liquids by the mouth, partly by the absorption of water from the tissues and through the pulmonary and cutaneous surfaces. Thus a copious drain of liquid may remove a dropical accumulation, or temporarily deprive the healthy tissues of their usual proportion of water; the blood meanwhile maintaining its normal composition.

In a paper on "Some Points in the Pathology of Cholera and Apnoea", which I published in the *British and Foreign Medico-Chirurgical Review* (April 1870), I have shown that the dark and treacherous condition of blood which occurs during the collapse stage of cholera is a consequence of the impeded circulation and respiration; this condition of blood being found alike in cases of cholera-asphyxia and in all forms of apnoea.

Thus it appears that, while circulation and respiration are unimpeded, profuse watery discharges tend to dry the tissues, but not to thicken the blood, on the other hand, blood-thickening results from impeded circulation and respiration—from asphyxia and apnoea—even when there has been little or no drain of liquid from the system.

SYPHILITIC INSANITY.*

By H. GRAINGER STEWART, M.D.,

Medical Superintendent of the Borough Lunatic Asylum, Newcastle-on-Tyne.

THE three following cases of syphilitic insanity, which came under my care in the Newcastle Asylum, are, I think, worthy of bringing before you as illustrative of the remote effects of the taint of syphilis.

CASE I.—J. S., a commercial traveller, aged 35, married, with children, was admitted into the Newcastle Asylum on April 16th, 1868. He had fair hair, blue eyes, and fresh complexion. His bodily condition and health were indifferent. He had led a very irregular life many years, and at one time suffered severely from syphilis. During the three months before admission, he had gradually become incapable of conducting business. He now believed himself persecuted by enemies, especially men residing at Bradford, with whom he had had business connexions. He said he heard them conspiring against him and wishing him ill. He was restless and irritable; frequently heard voices talking with him and about him; he understood all their plots. He slept fairly, but awoke much distressed, believing that he had been subjected to the most cruel processes during his sleep.

After residing in the asylum for a short time, he continued to be the subject of the most extraordinary hallucinations. He heard voices

which communicated to him the most foolish and absurd things, all which he firmly believed. He said he underwent nightly a kind of torture, which he called the "cylinder finish", and which he described as an excruciating process, by which his brains were whirled round with extreme velocity, mixed into a pulp, and replaced in his skull just in time for his awaking. This, he believed, was ordered by the doctor, who knew of everything that was done to him, and had the power of regulating the amount of his sufferings. He was also, he said, frequently put upon the wheel and drugged during the night; and, though he really slept well, he averred that all the time he was vividly sensitive to all the tortures which he thought he underwent. Gradually he became extremely irritable, fancied that insults were offered to him by all about him, secluded himself from the society of his fellows, refused food, was inclined to lie in bed, and threatened to commit suicide. He referred to his head as the seat of his sufferings, and complained of pain at the vertex. Occasionally he was persuaded to take the iodide of potassium in two-grain doses three times daily, but never so continuously as to give it a fair trial.

In the second year of his residence in the asylum, phthisis pulmonalis became developed, and then some improvement in his general health took place. He began to occupy himself in the joiner's shop, making toys for his children; and his actual sufferings seemed to obscure the abnormal sensations which so strongly affected him in the earlier period of his disease. Two years after his admission, he died. No *post mortem* examination was allowed by the friends.

CASE II.—D. T., a woman aged 50, married, without children, was admitted on April 10th, 1868. She was said to have led a dissolute life. She was very much emaciated and unhealthy; her nose was marked by cicatrices. She had suffered from syphilis, and had a bad sore on the leg. The circulatory and respiratory systems were healthy. She was of fair hair and complexion, ate well, and was said to sleep well. It was stated that she had been only a week insane.

On admission, she was in a state of dementia. She was perfectly bewildered, and evidently could not understand the events taking place about her. She answered very slowly any questions that were put to her, and seemed unable to understand when she was spoken to.

Shortly after admission, her mind became filled with singular and painful delusions. She fancied herself constantly persecuted by certain individuals, who day and night made it their business to annoy and hurt her. This they did by using the most ingenious machines, which were specially invented to torture. They were introduced into her body and brain, and worked by means of wheels. She averred that they burnt her brain, drew out her inside, cast her into the air, put their fingers into her, and so tormented her. This for the most part took place in the night; but, if she were allowed to remain in bed during the day, she complained of similar though not such severe treatment. At the same time she heard her tormentors talking together, consulting as to which was the most painful process they could invent. She also heard others remonstrating with them for treating the poor woman so cruelly. She as well saw faces which she recognised as old neighbours, and particularly the face of her principal tormentor, whom she supplicated to desist. The head was referred to as the seat of the pain.

During her residence in the asylum, she has every morning bitterly complained of her treatment during the previous night; and sometimes she gets into great excitement, and threatens to destroy herself occasionally. She refuses her food for days together, with that intent; and once, about a year after admission, was found by the night-nurse nearly strangled by a garter which she had twisted round her neck. She has often prayed the doctor to give her poison to end her sufferings.

She now (August 1870) continues to suffer from the same or similar delusions and hallucinations. At night, when the nurse shuts the door on her, the operations of her tormentors commence, and so they continue to persecute her all night. She says she is placed on a table and dissected; that her head is opened; and that all the time she sees and hears her tormentors inciting each other to treat her more and more severely. She occasionally receives her medical attendant with a storm of abuse, averring that he was present during the night, and aided her tormentors. The sores on her legs healed up under treatment by a solution of the bichloride of mercury. There has been no improvement of the mental symptoms of any duration, although she has undergone long courses of the iodide and bromide of potassium. The hydrate of chloral, in forty-grain doses, produces deep and long continued sleep, and seems to relieve the symptoms at the time; but there is no material change in the mental state of the patient.

CASE III.—P. H., aged 58, single, an Irish labourer, a Roman Catholic, was admitted into the Asylum on January 22nd, 1869. He had served some years in Portsmouth, and had led a very irregular life. He has fair hair and eyes, and is ruddy; he is blind of one eye from wound of the cornea. He has suffered from syphilis; but his general

* Read in the Psychological Section at the Annual Meeting of the British Medical Association in Newcastle-upon-Tyne, August 1870.

health is fair. He believes that his brother was murdered in the work-house, and that the assassins are now after himself. He fancies that they are constantly watching him, hiding themselves in the ceiling and under the floors and even suspended in mid-air over head. He heard them constantly plotting how they may kill him. One of their favourite modes of attack is by shooting vitriol, ammonia, and "black poison" at him, besides using to his injury other magic and black arts. These persecutions go on principally at night, and the arrangements which he makes for warding them off are worthy of remark. He secures small pieces of wood in the day-time, by which he wedges the door of his room at night, and places his bed so that, should anyone attempt to enter, he must be awakened. He envelopes his head with his pillow-case, which drops over his face, stuffs his ears and nostrils with cotton-wool and his mouth with a pocket-handkerchief, and thus, he believes, he keeps out any drug or vapour when he is asleep. All the key-holes, ventilators, and open spaces about the doors and shutters are also carefully covered with blankets or sheets. It takes him more than an hour every night to complete these arrangements, and when he lies down under his mattress he considers he is in circumstances of comparative safety. He frequently complains of pains in the head and burning sensations on his skin, which he attributes to his unseen enemies shooting poison on him. He complains during the day, but is worse at night, and every morning recounts some new plan of attack that his tormentors have been attempting. He has been under treatment for eighteen months; but in his, as in similar cases, it is almost impossible to carry out a system of treatment, and no improvement has taken place in the case. He threatens to commit suicide, to put an end to his sufferings; but has never made any actual attempt.

REMARKS.—These cases have several characters in common. 1. They all occur on subjects who have suffered from syphilis. 2. The character of the delusion is similar. They all believe themselves the victims of conspiracy, persecution, and cruelty undeserved. 3. They are all subjects of hallucinations of touch, hearing, and sight. 4. They are all suicidal, two of them having made actual attempts on their own lives. 5. They are all dangerous to others when under the influence of their delusions, and were quite unsafe to be at large. 6. They are all worst at night, which circumstance may be dwelt upon as indicating the syphilitic nature of the disease. 7. They all suffered severely from cephalalgia: their abnormal sensations were in the brain. 8. The treatment produced but little effect, and it is feared they can only be looked upon as incurable; but still, by the relief of symptoms, much of the distressing character of the disease may be assuaged.

ON THE TREATMENT OF GUN-SHOT WOUNDS BY CHLORIDE OF ZINC.

BY CAMPBELL DE MORGAN, F.R.S.,
Surgeon to the Middlesex Hospital.

THE present war affords a great opportunity for testing the merits of the various antiseptics which have of late been recommended and adopted. Carbolic acid has, so far as I can learn, been as yet almost exclusively employed. It would be impossible, amidst such scenes of wholesale destruction, to use this agent with the care and nicety on which its undoubted benefits largely depend. Profuse and foul suppuration, with its constant attendant, pyæmia, is but too common. I should much like, under these circumstances, that a trial should be given to the chloride of zinc—an agent which I still employ, in preference to all others, in a large number of cases, and to which I often return after the use of others.

Like other antiseptics, it often prevents suppuration, and allows the most rapid and quiet healing in cases which would appear at first incapable of running a favourable course. It never acts on the system at large, and it can be used by any ordinary nurse without other qualification than that of attention to orders.

In recent wounds, where the skin is not much thinned, I use a solution of from thirty to forty grains to the ounce of distilled water. I use this freely, especially in the crevices and dark corners of a wound, in the cavities of bone, as well as elsewhere; and I sponge it into the wound until the whole surface is creamy. This causes an exudation of blood for a time. Any large vessels which bleed in consequence of the application may be secured; the small ones need not be cared about. The wound may be put together in the ordinary way; and it should be covered with linen or lint wetted with a solution of five grains of chloride of zinc to the ounce of water. Care should be taken that the covering is kept constantly wet. If the wound be a crushed one, which will not unite, it may be sponged out as before, and then covered with the weak solution.

The wound, which has been brought together, may become in twelve or twenty-four hours filled with fluid. This should be let out by loosening a stitch; it will be found to consist of fluid bloody exudation. The wound may be brought together again, and the weak solution used as before.

With no more care than this, I have had rapid cure without suppuration in crushed and lacerated wounds; perfect union by first intention in large operations, as high amputation of the thigh, etc.; and very commonly union with only slight suppuration in the course of the wound, and this where ligatures have been placed on all the vessels requiring them.

When a wound becomes foul in the interior, it should be syringed out several times a day with the weak solution.

No doubt pyæmia will ensue, in spite of all these applications; but it is rendered much less prevalent. This must be so, when the discharges are kept a great degree free from putrefaction.

RECENT IMPROVEMENTS IN THE PELVIC BAND (AN INSTRUMENT FOR AIDING LABOUR).*

BY PROTHEROE SMITH, M.D.,
Physician to the Hospital for Women, etc.

HAVING fully described the pelvic band in a paper read before the British Medical Association at Leeds last year, and having exhibited it at meetings of the Obstetrical Societies of London and Edinburgh, as well as before the Société de Chirurgie of Paris, etc., it will only now be necessary to mention certain alterations and improvements in the instrument by which the end proposed—viz., to give efficient aid in labour—is better and more readily attained. I stated last year my views as to the dual character of the force employed in parturition: since then, Professor Haughton has demonstrated, by a series of ingenious experiments, that, of the two forces engaged, that of the lumbo-abdominal voluntary muscles exceeds that of the uterus in the ratio of nearly ten to one.

I claim this first principle as the basis of my argument for the expediency of supplying an artificial force to subsidise that of the lumbo-abdominal muscles, when impaired or lost by the constriction of dress or by anæsthetics. My own experience proves that my conclusions from these premises are just. It has enabled me to practise midwifery with infinitely less labour and anxiety to myself, and with greatly diminished peril to my patients. Moreover, it has lessened the duration of parturition and the consequent attendance of the accoucheur. It has relieved the uterus of the undue demands on its powers through absence of the voluntary muscular forces; it has induced efficient contraction of the uterus after speedy expulsion of the placenta; it has prevented and controlled *post partum* hæmorrhage; it has readily rectified the anteverted condition of the uterus when it has depended on laxity of the abdominal walls and want of lumbar curve. It prevents, if worn during the later months of pregnancy, the separation of the sheaths of the recti, and the distressing hernia which follows such separation.

It may be well here to enumerate a few of the advantages claimed for the pelvic band in labour. By it a fixed point is secured for the exercise of mechanical force, from which, by the aid of powerful springs, with a well-adjusted belt, it supplies a power which no circular bandage, whether tightened by springs or otherwise, is able to effect. By these means supplemental expulsive force can be employed during the pains, and relaxed in the intervals or employed permanently, as *post partum* and otherwise is often needed, thus simulating the action of the abdominal muscles in a normal state during parturition. It will readily be seen how, when the voluntary muscular force is wanting permanently from the result of pressure, or temporarily from the abuse of anæsthetics, the want of this paramount force throws the burden of the act of expulsion on the overtaxed uterus. Thus this overworked viscus succumbs to the undue strain, and does not recover itself as do the other muscles after their efforts during parturition. Hence the long period necessary for the "getting up", the risk of subinvolution, prolapsus, and other displacements and disorders of the uterus, which often follow the accouchement of the civilised woman.

It will doubtless be remembered, both from my paper read at Leeds and also from the more complete description which was published this year, together with woodcuts and illustrative cases, in the *Lancet* of June 4th, that the principle of the pelvic band consists in a steel band fitting and grasping the pelvis immovably, and connecting two pads, one on the sacrum, the other on the pubes; and these two antagonistic points of sup-

* Read in the Midwifery Section before the Annual Meeting of the British Medical Association in Newcastle-upon-Tyne, August 1870.