

the sphincter. I at length thought that I might be able to break it down with a silver marrow-spoon, and made the attempt. I fortunately succeeded; and, after I had removed many pieces, an injection brought off the remainder of the indurated mass, instant relief being afforded. The patient is now in good health, and has not had the slightest return of this curious impaction of feculent matter.

Transactions of Branches.

BATH AND BRISTOL BRANCH.

DEATH FROM CHLOROFORM.

By AUGUSTIN PRICHARD, Esq., Surgeon, Bristol.

[Read February 25th, 1858.]

I VERY much regret that I have an opportunity of bringing before your notice a death from chloroform, that has recently occurred in my own practice.

William Howell, aged 49, was admitted as my patient into the Bristol Royal Infirmary, on Tuesday, February 9th, after a consultation recommending the operation of excision of the elbow for long continued disease of the joint. His elbow had been injured two years before, and he had suffered occasionally ever since. He had been under my care once before, and the disease had been arrested by treatment, and he resumed his work. Lately, it had again become worse; and about a month ago, I detected disease of the articular extremities of the bones, with ulceration of the cartilages, and effusion into all the tissues round the joint, with fistulæ leading into its cavity. His forearm was held almost extended in a line with the arm, and he carried it about with his other hand, as patients do when they have ulceration of the cartilages of the elbow. His health had suffered, inasmuch as he was greatly out of condition, from the discharge and constant pain; but he showed no sign of other organic disease.

The operation was fixed for Friday, February 12th; and at the appointed time, he walked into the operation-room, where all my surgical colleagues were assembled, with the house-surgeon and assistant house-surgeon, and most of the pupils of the Infirmary. I believe one or two visitors were also present; and some of the physicians came in afterwards. He got up without much help and lay down upon the table; and Mr. Powell, the assistant house-surgeon, examined his chest, as he invariably does before administering chloroform, but detected nothing abnormal. The patient had taken no food since his breakfast: this rule is always followed, when possible, to prevent the chance of vomiting, and the danger of solid food impeding respiration by obstructing the glottis when the patient is insensible from the effects of chloroform, and he is always kept in a reclining position. I should mention, in passing, that a boy had just been operated on for phimosis by Mr. Harrison, and the same chloroform and the same sponge that were used in the case of my patient, were used in his.

A drachm of chloroform (which had been obtained from Duncan and Flockhart, of Edinburgh) was poured upon the centre of a hollow sponge, and held over the patient's nose and mouth. He asked whether he was to breathe it; and was, of course, told to do so. I then found that he had still his waistcoat on, and directed him to sit up and take it off, which he did, the sponge being removed for the purpose; and after he lay down, I again made him sit up and remove the shirt-sleeve from the diseased arm, a process that took two or three minutes, at least, in consequence of the pain produced by any sudden movements of the limb. He then lay down again, and continued to inhale a portion of the same drachm of chloroform which had been evaporating all this time. I turned round to speak to some of the surgeons of the Infirmary, who were standing near the fire, and in about two minutes my attention was called to the patient, by the assistant house-surgeon saying: "This patient does not bear chloroform well". He was then gasping, but not breathing; his limbs were moving slowly and irregularly in the convulsive motion of death; the eyes were fixed, with dilated pupils; and his pulse had stopped; and he was, in point of fact, dead, as surely as and more rapidly than if he had taken a large dose of prussic acid.

We tried every available means of restoration. A powerful battery was at hand, and going, and was applied at once. I

opened his trachea; and we kept up artificial respiration for half an hour, by blowing into the tube and pressing the abdomen alternately. The battery was applied with sufficient strength to contract forcibly the muscles of the face, neck, and trunk, and to produce the movements of respiration, but without affecting the heart in the slightest degree; and, at the suggestion of some one present, I injected warm saline solution into the cephalic vein, to try to stimulate the heart; but all our efforts were in vain, for the man was dead.

The *post mortem* examination was made the next day. There was considerable *rigor mortis*. The vessels of the scalp were empty. The dura mater was pale, and the sinuses were rather empty. A good deal of clear subarachnoid fluid was effused, more especially posteriorly. The vessels of the pia mater were fluid, containing a good many very minute air-bubbles. The lungs did not collapse when the chest was opened, and they were slightly emphysematous at the edges, more particularly on the right side. The right side of the heart contained dark frothy blood; the left side was empty. The organ weighed a little more than eleven ounces. Its external surface was much covered with fat, especially in the right side; and the muscular structure generally was pale, and contained much fat, which showed itself, under the microscope, disposed in rows among the fibrillæ. There was also some atheromatous thickening of the mitral valve. The organ was not hypertrophied. There was a good deal of coagulated and fluid blood in the abdomen, effused from some of the vessels of the omentum. The liver, kidneys, and other organs, were quite healthy.

REMARKS. I need hardly say, that to witness a scene of the kind which I have described impresses most forcibly upon us the grave responsibility we incur when we use chloroform for any but the most severe operations, and makes us realise the dangers which we have up to this period escaped. In the present instance, the patient was about to undergo a very painful, and possibly tedious operation; and his disease was of that nature that, if unrelieved by treatment, it would have worn down his strength and destroyed his life; and therefore in this case, if ever, chloroform was justifiable. I can imagine no case where, when danger presented itself, aid was more immediately at hand; viz., plenty of surgical help of the best kind, and experienced assistants, used to deal with great and sudden professional emergencies; a powerful galvanic battery, and instruments of all kinds, on the table within reach; and the assistant house-surgeon, who administered the chloroform for me, was accustomed almost daily to use it, and had his hand on the patient's pulse; and yet he died in two or three minutes from the time when the exhibition of the chloroform was begun, and probably before he had inhaled *one-fourth of a drachm*, in spite of all our precautions, and all our anxious endeavours to keep him alive.

The *post mortem* examination, moreover, was of no help whatever in explaining the cause of this sudden death. With the exception of the fat in and upon the heart, there was no abnormal appearance of any kind; and the fatty degeneration, although tolerably well marked, was not sufficient to produce any sign or symptom during life by which we might have been able to guess that there was even the slightest deviation from healthy structure. There was no sign of *arcus senilis* in the cornea. The man was a quiet, steady, sober workman, and seemed in good spirits before he began to inhale the chloroform; and thus, as far as I can see, from this most unfortunate case we get little or no assistance or hint for guidance, or additional experience of practical value for the future.

In conclusion, I may perhaps be allowed to record my present opinion respecting chloroform, and to repeat what I said when I had the honour of reading the annual address before the members of the Branch last summer. I then said, and still think, that "if we are in the constant habit of using any agent which destroys life once in the course of some thousand cases, it is a very grave matter," and that "we are not justified in using it in all trivial operations"; and that "no agent which can so control the nervous system as to make it insensible to every kind of stimulus can be considered as devoid of danger." I believe that to some constitutions chloroform acts as a poison, and that at present we have no means of knowing what are their peculiarities. The drug acts upon the heart in these cases (and I believe in all others where it acts prejudicially), and we should therefore avoid its use when there are symptoms of diseased heart or brain. It should never be administered when the stomach is full; and it should be given, as has been recommended by others, diluted with alcohol or ether, and, of the two, the former is to be preferred. The horizontal position should always be maintained; and I

believe that the danger would be lessened were the patient to take, immediately before the inhalation of the chloroform, a glass of wine or brandy and water, or some other effective stimulus.

Discussion. Dr. HERAPATH inquired if the sponge was used wet or dry; the evaporation from a dry sponge being very rapid; also if there were any spasm of the glottis. He also asked if the condition of the heart had been ascertained before the patient was in the operating theatre; the most careful examination of the heart's action being essential in every case. The sponge should not be wrung dry, but be kept cool to lessen the too rapid evaporation of the chloroform. The vapour should be taken at first in a very small quantity, and well diluted. He had kept up the influence of this remedy for eight hours without injurious effects, taking care that the chloroform was removed before the coma came on. He had experimented on himself a hundred and fifty times with chloroform, ether, amylene, and other anæsthetic agents. He preferred ether to all others. Dr. Herapath objected to the dilution of any of these by alcohol or methylic ether, as tending to produce headache after the sedative effect had passed off.

Dr. ROBERTSON observed that cases of fatty degeneration of the heart were most unsuitable for the inhalation of chloroform. Though it was impossible to diagnose with certainty all such cases, it was needful to guard against accidents (such as that narrated) by the most careful auscultation previously to the operation. In all fatal cases the quantity of chloroform taken had usually been very small.

Mr. GODFREY had been the first to use chloroform in the West of England, and had watched its use with much interest. In this case, he thought every precaution had been taken; but, notwithstanding all our care, death from its use will sometimes occur. The precautions to be attended to in its exhibition were, the utmost quietude during its administration, and the careful maintenance of the horizontal posture. The chloroform must be given slowly, and the apparatus not be in contact with the skin, so as to allow of the vapour being well diluted with atmospheric air.

Mr. MICHELL CLARKE observed, that in this case the sponge had so long been exposed, and thus the quantity inhaled was so small, that it seemed scarcely possible that so small a dose could prove fatal. This case established the fact that chloroform in such cases proves fatal by its immediate action upon the cardiac ganglia, as there had not been time enough for it to influence the head through the brain or nervous centres.

Dr. DAVEY considered that, in cases having such a fatal tendency, a stimulant applied over the solar plexus was the most effective remedy. A piece of tow or rag, dipped in brandy, placed on the epigastrium, and then set fire to, was a most effective stimulant of the solar plexus. Chloroform should be administered so gradually as to affect only the cerebro-spinal system. As fatal cases would occasionally occur, we must beforehand be prepared with remedies to relieve the otherwise fatal syncope. The more effective were stimulating enemata, cold affusion, and rapid vesication of the skin.

Dr. BUDD observed, that every member of the profession must keenly feel the importance of such cases as this just detailed. The singular features were the smallness of the dose inhaled (the smallest ever known), and the utter absence of any adequate cause to account for death even after the closest examination. Such an occurrence made the administration of chloroform to any case a matter of the gravest importance. To the surgeon the condition was indeed a fearful one: a living being walked into the room, to be relieved of his malady, and within a moment he was reckoned among the dead. Such a history must cause uneasiness to all the profession. This case he had scrutinised with the utmost care, and could detect literally nothing to explain the fatal issue. In the heart, there was nothing in the slightest degree to account for it. The mode of death was very marked and perfectly clear. There was no spasm of the glottis; then artificial respiration would have resuscitated the dying man. There was no stupefaction of the nervous centres; he died from the primary action of the chloroform on the cardiac ganglia, whereby the action of that single muscle, on which all the functions of life depend, was instantaneously stopped. The fatal cases by use of chloroform must be divided into two groups: in one, death arose from the prolonged use of the remedy, the whole tissues of the body being permeated by the poison; in the other group, it was fatal by the impression on the nerves of the heart. The whole quantity of chloroform had to pass through the heart before being distributed to the system; and, if these nerves were

sensitive to the agent, the action of the muscle ceased. The influence on the system ought to be very gradual; but the danger in this second group of cases was the very small dose of the agent that might prove fatal.

Mr. PRICHARD, in reply, said that the sponge had been used for another patient; that there was no spasm of the glottis; and that the sponge was not in contact with the face.

SUGAR AND DIABETES: FURTHER REPORT OF THE CASE OF JOSEPH SNAILUM.

By WILLIAM BUDD, M.D., Senior Physician to the Bristol Royal Infirmary.

[Read February 25th, 1858.]

At a meeting of this Branch on the 24th September last, I gave some account of a case of diabetes, in which the patient, a young man of the name of Snailum, had not only recovered from a state of wasting and extreme weakness to one of good condition and comparative health, but had exhibited a permanent and large reduction in the quantity of saccharine matter passed in his urine, while under a treatment which included, among other things usually forbidden in this disease, the daily consumption of a large amount of sugar in substance. (See BRITISH MEDICAL JOURNAL for Nov. 14th, 1857.)

On the present occasion, I wish to communicate some particulars relating to the subsequent history of the same case.

The patient continued steadily to improve under the same plan, from the date of my former communication up to the 20th October last. During this period, only one circumstance occurred to call for remark. In the latter part of September and beginning of October, he was taking eight ounces of sugar candy and six ounces of honey daily. On October 6th, the honey was left off at his own desire, he having, as he said, "become tired of it". The week before it was given up, he gained one pound in weight. In the fortnight that followed, he gained four pounds and three-quarters. Whether this increase in the rate of improvement was due or not to giving up the honey, I will not pretend to determine. The register which was kept of the state of the urine at that time has unfortunately been mislaid; but I am enabled to say, from memory, that neither the specific gravity of this fluid, nor the quantity passed, were sensibly affected by the withdrawal of this article of diet.

On October 20th, I allowed the patient to go home for a few days. He was at that time better than he had ever been since the commencement of his illness. He looked strong and well, and weighed 130½ lbs., being more than twenty pounds heavier than when he commenced the new treatment. The average daily urine was five pints, of specific gravity ranging from 1031° to 1034°.

It may serve as some indication of the amount of improvement that had occurred under the sugar plan, to mention that, finding no conveyance at hand, he walked the whole way to his father's house on Oldland Common, a distance of nine miles from the Infirmary. This journey, he assured me, he accomplished without the slightest fatigue. While at home, he took his meals with the rest, and his fare was the common fare of a farm labourer. All special treatment was for the time left off. Unfortunately, he took advantage of his freedom from restraint to drink freely. During his absence, he never took less than three quarts of cider daily, and once, by his own confession, he was "the worse for liquor". Although he was only three days away, it was obvious, on his return, that he was not nearly so well. His skin had become harsh; his tongue was dry and brown; he was very thirsty; had lost his appetite, and had grown rapidly weak. The day after his return, he passed more than eight pints of urine, of specific gravity 1036°. In the week that began with his three days of absence, he lost more than five pounds in weight. In the week following, his weight fell still further from 125 lbs. to 120 lbs. During this interval he never passed less than eight pints of urine, and more commonly ten pints, daily. On one day the quantity rose to eleven pints. In specific gravity, it ranged from 1035° to 1038°.

On his readmission, he was placed, as to common articles, on the same diet as before—a diet which included a liberal allowance of bread and butter, meat and eggs, and some malt liquor. In the way of sugar, he was now confined to cane-sugar, of which I gave him eight ounces daily. Finding, at the end of ten days, that he did not improve, this quantity was increased to twelve, and soon after to sixteen ounces, daily.

At the end of a fortnight, he began again to mend. His

tongue became moist, his thirst abated, and he began to recover his lost flesh. On December 8th, he weighed 126 lbs. On the same day he passed eight and a half pints of urine, of specific gravity 1034°.

On January 8th, he complained of having more sugar than he liked, and four ounces were accordingly struck off at his own request, and six other ounces on the 12th of the same month, leaving only six ounces for his daily use. This reduction in the quantity of sugar seemed to have a beneficial effect; for, on the week following, his weight had risen to 127½ lbs., and his urine had fallen to six pints and a half, of specific gravity 1036°.

Since this last date, with the exception of slight fluctuations in weight from week to week, his condition has undergone little variation.

From January 10th to the present date, the daily average urine has been five pints and a half, the extremes during the same period being four pints and a quarter on the one hand, and six pints and a half on the other. The average specific gravity of the urine during the same period has been 1034°, the extremes being 1031° and 1040°. The last figure was only observed on a single occasion. I may add, that the specific gravity has always been taken on the mixed urine of the twenty-four hours.

During the greater part of the time to which these notes refer, the patient's dietary has consisted of the following articles: sixteen ounces of bread, three ounces of butter, three eggs, three chops, and one pint of beer, besides the sugar, which has been given in varying quantity, as already indicated. I have considered it as an essential part of the treatment that the food should be nutritious and substantial. It is quite conceivable that, under opposite conditions, the result might be widely different.

It will be seen from the memoranda given above, that, although the patient has not quite regained the point at which he stood before the relapse that occurred during his temporary absence from hospital, the resumption of the sugar treatment has been followed by exactly the same result as before; *i. e.*, an increase of weight, great improvement in general health, and a very considerable diminution in the quantity and specific gravity of the urine, and by implication, therefore, in the quantity of sugar excreted by the kidney. The general state of the patient is now very satisfactory. His appetite is good; he does not suffer from thirst; his muscular power is considerable; his complexion is florid, and his look altogether that of a healthy young man. He is still diabetic, but much less so than he was; and the system seems now to be protected from the waste and deterioration which the disease was so rapidly producing before he began to make sugar a principal article of diet.

I am enabled, by the kindness of my colleague Dr. Brittan, to add to these particulars some brief notes of another case which was treated for a short time on the same principle.

The subject of it, a man named Jones, and 47 years old, was admitted into Ward 7 of the Bristol Royal Infirmary on September 3rd, 1857. His health had apparently been failing for some time; but, by his own report, it was not until about three months before his admission that the characteristic symptoms appeared. When he became Dr. Brittan's patient, the emaciation was already very considerable and rapidly progressing. He was passing ten quarts of urine, of specific gravity 1035°, daily. His thirst was ardent, and his tongue brown and dry.

He was put at once on a liberal and substantial diet, and on September 6th he was ordered to take six ounces of sugar-candy daily. On September 23rd, this quantity was doubled, and some honey also was allowed. On September 7th, four days after beginning the sugar treatment, he passed only seven quarts of urine. His thirst was less urgent, and he felt altogether better. On the 12th, the urine had further fallen to six quarts, which continued to be about the standard quantity during the remainder of his stay in hospital. On September 18th, he passed six quarts, of specific gravity 1031°. At this date, he was also nearly a pound heavier than when he was admitted, and was better in every respect. On September 28th, having been allowed to go out for the day, he returned with a black eye and very drunk, and was in consequence dismissed from the Infirmary.

Although this untimely lapse prevented the further prosecution of the treatment, it will be seen that the result, as far as it went, was in precisely the same direction as in the former instance.

The cases now related, together with the interesting case

lately published in the JOURNAL by Dr. Corfe, serve to establish the following important conclusions.

1. That, in certain cases of diabetes, at least, sugar may be given in large amount without deleterious effects.

2. That, in the same cases, the administration of this substance, when conjoined with nutritious food, is sometimes followed by very great improvement in the general health, and a large increase in the weight of the patient.

3. That, as far as observation yet goes, these changes are attended by a considerable and permanent reduction in the quantity of sugar excreted by the kidney, as measured by the amount and specific gravity of the urine.

The facts are, no doubt, too few as yet to warrant any general conclusion; but they seem to indicate that the administration of sugar in large amount, with the view of supplying to the system what is running to waste (although this would by no means necessarily be the sole mode of action), is very probably the true principle in the management of these cases.

Should further experience confirm this, many collateral questions would remain, which could only be answered by careful and extended experiment. Such, for instance, would be the proportion which the sugar ingested should bear to that discharged by the kidney. Such, again, would be the question as to whether grape-sugar or cane-sugar, or a mixture of the two, would be the most proper to administer. All these are matters which careful observation alone could decide.

Discussion. Dr. HERAPATH joined issue with Dr. Budd in the use of cane-sugar. If there was anything in the use of sugar as part of treatment, cane-sugar should be used. In honey or cider, grape-sugar was present; and then the patients got worse.

Dr. DAVIES and Dr. ROBERTSON gave the histories of cases that had manifestly improved in weight, appetite, and every particular, under the free use of sugar; but these cases had left the hospital after a short sojourn, and so had been lost sight of.

Dr. BUDD observed that, to expect success in this mode of treatment, it was needful to follow the plan laid down in his original paper, not partially to follow, and then to deny the whole as wrong and injurious. The whole subject was at present a matter of experiment, which must be carefully watched. He had not made up his mind whether grape-sugar or cane-sugar was the best; but, when taking large quantity of honey, some had done well.

Reviews and Notices.

RHEUMATISM: ITS NATURE, CAUSES, AND CURE. GOUT: ITS NATURE, CAUSES, CURE, AND PREVENTION. By JAMES ALEXANDER, M.D., Member of the Royal College of Physicians, etc. pp. 266. London: John Churchill. 1858.

To the numerous works and essays on Rheumatism and Gout, we have now to add one by Dr. ALEXANDER. The main point in the book, as regards pathology, is that he regards both gout and rheumatism as dependent "on the formation of the same morbid matter, generated under different circumstances, and acting on opposite conditions of the blood." A comparison of the two diseases, drawn up from the work, will serve to make the views held by the author more plain.

In the first place, both acknowledge a common starting point in the hereditary tendency; but this is more remarkable in gout than in rheumatism. Out of 522 gouty persons, of whom Sir Charles Seudamore collected information, 322 could trace the disease from their father, mother, grandfather, grandmother, uncle, or aunt. In the remaining 200, the disease could not be traced to any progenitors. Rheumatism does not acknowledge so strong an adhesion to the hereditary tendency. Out of 246 cases, registered by Dr. Fuller as having occurred at St. George's Hospital, the hereditary transmission was traced in 71; in 137 it could not be traced; 15 were uncertain; and 23 unrecorded. This hereditary tendency is interpreted to mean the lithic acid diathesis. The excess of uric acid and urates in gout is due to an excess of malassimilated nitrogenous food, which, owing to defects in the various processes of pri-