amount as well as the character of the sediment in the urine. The most trustworthy prognostic indications are to be obtained by comparing the state of the urine with the general symptoms. When, with a condition of urine indicating advanced degeneration of the kidney, there is evidence of hypertrophy of the left ventricle, with an unspiring skin; when, with a diminishing secretion of urine, or even without a marked decrease, symptoms of uræmia begin to appear, the disease is generally not far from its fatal termination. You cannot be too cautious in giving a prognosis. The symptoms of chronic renal disease are sometimes much aggravated for a time by some imprudence in diet, by fatigue or anxiety, or exposure to cold. The patient may apparently be on the verge of uræmic coma, or he may have a fit of convulsions, yet, under appropriate treatment, these formidable results of his indiscretion or his misfortune, may pass away, and, in a few days, he may be apparently no worse than he was before the occurrence of this temporary disturbance. The uræmic symptoms which are not traceable to an obvious external exciting cause are, as a rule, more serious and intractable than those which result from influences capable to some extent of being removed or counteracted.

CHLOROFORM ACCIDENTS.*

BY AUGUSTIN PRICHARD, F.R.C.S.,

Consulting Surgeon to the Bristol Royal Infirmary.

I HAVE long wished and intended to lay before the Society some of my views on the subject of chloroform, and had already begun to write my paper, when Mr. Green introduced the subject at our meeting in October last. I have naturally, in the course of the last twenty years and more, had a good deal of experience of it; and I may state in the beginning, what you would discover as I proceeded, that my faith in it does not increase with years.

The late James Miller, the accomplished professor of surgery at Edinburgh, in the year 1848 introduced the subject of chloroform to his class with the utmost enthusiasm and eloquence; and I hope you will excuse my quoting some sentences of his lectures which treated the question of danger too lightly. While he helped to make the members of our profession blind to the risks of the agent, he introduced a most uncomfortable creed, the inconveniences of which meet us at every turn, and, by a public exhibition of one or two operations under its influence at the Edinburgh Infirmary, led the laity to think that it is a perfectly safe remedy.

On the 23rd December, 1846, Mr. Liston wrote to Mr. Miller on the new subject of anæsthesia. Mr. Miller says: "Its first sound had come from across the Atlantic; it fell on no dull or idle ears; it was taken up, tried, and speedily re-echoed, and in a few days it filled the island. Mr. Liston struck the key-note, and a pealing note it was." This of course had reference to the production of anæsthesia by ether. In October 1847, Dr. Simpson began his experiments with various other substances, and among them was chloroform. The following is Mr. Miller's narrative. Most of the experiments were performed after a long day's toil was over, and when the greater part of mankind was asleep. Each operator was provided with a tumbler, a finger-glass or saucer, into which the respirable substance was placed.

"Late one evening (November 4th, 1847), on returning home after a weary day's labour, Dr. Simpson, with his two friends and assistants, Dr. Keith and Dr. Matthews Duncan, sat down to their somewhat hazardous work in Dr. Simpson's dining-room. Having inhaled several substances, but without much effect, it occurred to Dr. Simpson to try a ponderous material, which had been set aside as of no likelihood whatever: that happened to be a small bottle of chloroform. It was searched for and recovered from beneath a heap of waste-paper; and, with each tumbler newly charged, the inhalers renewed their vocation. Immediately an unwonted hilarity seized the party; they became bright-eyed, very happy and very loquacious, expatiating on the delicious aroma of the new fluid. The conversation was of unusual intelligence, and quite charmed the listeners—some ladies of the family and a naval officer, brother-in-law of Dr. Simpson. But suddenly there was a talk of sounds being heard like those of a cotton-mill, louder and louder; a moment more, then all was quiet, and then a crash. On awaking, Dr. Simpson's first perception was mental. 'This is far stronger and better than ether,' said he to himself; his second, was to note that he was prostrate on the floor, and that among his friends about him there was both confusion and alarm. Hearing a noise, he turned round and

saw Dr. Duncan beneath a chair; his jaw dropped, his eyes staring, his head bent half under him, quite unconscious, and snoring in a most determined and alarming manner. More noise still, and much motion. Then his eyes overtook Dr. Keith's feet and legs, making valorous efforts to overturn the supper-table, or, more probably, to annihilate everything on it."

We cannot but admire the courage of the experimenters; and my belief is, that at that period of the evening, after supper, and in an upright position, they ran as much risk of their lives as our soldiers did in the middle of the battle of Inkermann.

I had the misfortune to witness one fatal case in my own practice, where a man aged 49, healthy except for a diseased elbow brought on by injury, walked into the operation-room, and lay down on the table and died, after taking one or two inhalations of a drachm of chloroform, which had been poured on the sponge two or three minutes at least before. The case was published in the *BRITISH MEDICAL JOURNAL* for March 13th, 1858. Death was clearly the result of sudden stoppage of the heart's action. Since that time there have been three deaths at our infirmary; one since our last meeting in October; and, I believe, besides, there have been two or three others in Bristol—a small number, perhaps, in proportion to the vast number of cases where chloroform has been administered. There have been, however, in my own practice, and, I presume, in that of others, a number of marvellous escapes and terrible alarms, where the patients have ultimately recovered, but where the furious struggle made by the medical men present for the preservation of life, and the excessive anxiety of the time, have been almost unbearable. Some present here have been at such scenes with me and have aided in the fight; and, were it possible to weigh these dangers and calculate the risks, and gauge and compute their amount, and add the whole in due ratio to the deaths, we should have more to lament than even the dreadful and fatal score of one death per week in Great Britain, admitted recently by our *JOURNAL*.

I have already in some of my published cases given accounts of persons in whom the slightest inhalation of chloroform caused collapse, and almost death, and where I have had to perform extirpation of the eye or removal of the breast, or some other serious operation, without the use of the anæsthetic. My late colleague, Mr. Bernard, had a case requiring amputation in a boy, where for a similar reason he was obliged to put off the operation, and afterwards amputate the thigh with the aid of brandy and opium, without the evidence of much suffering. We must also admit the uncomfortable fact, that the *post mortem* examination in most instances gives no clue to the fatal result. When chloroform was first introduced, I had a bottle of it, and, in speaking of its properties, for about two seconds held it to the nose of a member of my own family, who was so weak and faint afterwards as to give me some alarm. If I were asked what cases, according to my own experience, were most likely to cause anxiety under chloroform, I should say those who were affected with organic disease of the brain, lungs, or heart. With your permission, I will narrate one or two of these cases, with the preface that no words of mine, however vivid, could ever represent faithfully the anxious and painful strain which accompanies this wrestling with death for the victim claimed by chloroform; and first I will give you, in the words of my friend Dr. Shingleton Smith, the excellent house-surgeon of the Bristol Royal Infirmary, an account of the fatal case which has happened there since our last meeting.

CASE I.—R. W., aged 51, a labourer, was admitted on November 4th, with Pott's fracture, caused by a fall in the street while drunk. His wife stated that he had been drinking excessively for six weeks. Dupuytren's splint was applied to the leg, and removed the next day and a weight attached to the foot. On November 6th, he was restless and talkative in the morning, and had not slept much during the night. The leg had become swollen and again displaced, with the heel drawn up, in consequence of his having moved about. At nine in the evening, he was talking incessantly, with muscular tremor, and resisted any interference. One third of a grain of morphia was injected. At thirty-five minutes past nine, the weight was to be removed and the limb placed on the MacIntyre splint. One drachm of pure chloroform was poured on the sponge and held over his mouth. He struggled violently. After two minutes, another half drachm was poured on the sponge and applied. Struggling soon ceased; the breathing and temporal pulse were regular; no stertor. The sponge was handed to the dresser, but not applied to the face, and attention was given by the house-surgeon to the leg: the apparatus was removed, and the other splint placed under the leg. His breathing was then noticed to be very full and slow, not stertorous; and the pulse could not be felt, nor could the heart's impulse be detected. The pupils were dilated. He continued to breathe at long intervals, and deeply; several efficient respirations occurred, but no heart's action could be induced. The wet

* Read before the Bath and Bristol Branch.

towel was used vigorously. The jugular vein opened and blood flowed. The magneto-electric machine was applied to the cardiac region; needles were also introduced through the chest-wall, and the current passed through them. Inflation by mouth, and then Silvester's method of artificial respiration, were also tried, but all to no purpose. The wet towel seemed to incite respiratory attempts, but nothing had the least influence on the heart. No impulse could be perceived at the cardiac region; no pulsation could be felt; no heart's sounds were heard after it was first noticed that the chloroform was affecting him injuriously; but, on the other hand, several very efficient respiratory attempts were noticed, and artificial respiration, commenced at once, was continued for twenty minutes. The heart must have ceased to beat about one minute after the administration of chloroform had been discontinued, and about three minutes after it was commenced. About six ounces of very dark blood dribbled away from the jugular vein, which had been opened. The electricity excited powerful muscular contraction of both arms, of the neck, and of the walls of the chest; but it did not in the least degree influence the respiratory act or the heart.

Post-Mortem Examination Fifteen Hours after Death.—Rigor mortis was well marked; the superficial veins were full. The brain-sinuses were empty; there was no congestion internally; there was an absence of bloody points, but a slight excess of fluid in the lateral ventricles. Both lungs were universally adherent with old adhesions; there was some emphysema along the anterior border and at the apices of both. The liver was large, and in the early stage of fatty conditions. The kidneys were healthy. The heart was decidedly small, compared with the size of the body; the right ventricle was dilated, and, with the auricles, full of black fluid blood; the walls of the right cavities were thin. The left ventricle was contracted and empty; its walls were of a normal thickness. The coronary arteries were slightly atheromatous, and patulous when cut across. The valves were all healthy. The muscular tissue was healthy looking, red, firm, with no mottling. There was no excess of fat on the surface of the heart. Microscopic examination showed numerous dark granules along the centre of many of the muscular fibres. The striæ were mostly distinct, but broken by a single or double row of minute oily granules in their centre. There was no accumulation of fat between the fibres, and no morbid change beyond the commencing granular degeneration of the fibrillæ themselves.

In the following cases the patients came to life again.

CASE II.—A courageous and energetic old lady, who was to undergo removal of the breast for cancer, took leave of her husband—a poor feeble-minded old clergyman, in the dining-room, and walked up to her bedroom for the operation. Our former house-surgeon, the late Mr. G. Cooper, was with me, and gave her chloroform; and I had plenty of assistance, and felt no special anxiety about the case: Dr. Budd was also present. During the operation, which was more than usually difficult, in consequence of adhesions to the fascia and muscle, she suddenly ceased to breathe, and instantly became quite pulseless. I looked up to Mr. Cooper and said, "She is dead"; to which he, in his quiet way, as briefly replied, "Yes, she is". We had recourse at once to the battery, which in those days we always had at hand, and in a short time she gasped, and afterwards breathed again. Her state appeared to us to be one of excessive and almost fatal faintness, and the use of the battery was marked. I hastily completed the operation, and she did well. There was no local return of the disease; but she died suddenly, it was supposed from cancer of the lung, three or four years afterwards.

CASE III.—A woman, aged 40, was under my care for a mammary tumour, as large as an orange, of four years' growth. When chloroform was administered, she suddenly became faint and collapsed, and appeared dying; but, although she was quickly revived, she was so weak that the operation was postponed until a future day, when it was done without chloroform. She recovered from it satisfactorily and went out, taking cod-liver oil and tonics. About three months afterwards she had become florid and very stout, and died suddenly of apoplexy. She had cancerous growths in the cerebrum, cerebellum, and liver and lungs.

CASE IV.—An old man, aged 74, was admitted under my care, suffering from large strangulated scrotal hernia. After trying the taxis, I gave him chloroform, and made more attempts to reduce the mass, when our attention was suddenly called to the state of the patient, whose pulse ceased while the house-surgeon had his finger on the wrist, and all respiratory movements stopped at the same time. The old man appeared to be dead for half a minute; but the battery being at hand, the handles were applied to his epigastrium and the back of his neck, and he immediately started into life and struggled to sit up. The hernia was reduced.

Two years and a half after this occurrence, he was again admitted with symptoms of acute strangulation, and I saw him about midnight. After trying the usual means, it was determined to operate; and the death-like syncope into which the old man fell at the first inhalation of the chloroform, at once reminded me of what I had not recognised before—viz., that I had my former old patient to treat. He was recovered by galvanism in the same way, and I operated without chloroform. He died three days afterwards of sphacelus of the scrotum and integuments around. This was, no doubt, also a case where the heart's action ceased from the effects of chloroform.

CASE V.—This is the case alluded to by Dr. Marshall at our last meeting. A little boy at school thrust a small bullet into his neighbour's ear, and I was sent for, as surgeon to the school, the next day. The boy was about ten years old. I could see the shot and feel it, but could not grasp it, and left with the intention of bringing chloroform and syringe, and other instruments to try and dislodge it. His parents lived at Clifton, and it was arranged that he was to go home, and that I was to see him with their family medical adviser, Dr. Marshall. They were warned, I believe, to give him no food before the time of our visit; and he went home on Sunday morning, where they instantly prepared him with a large breakfast of fish and other good things, which are thoroughly appreciated by a boarding-schoolboy. Dr. Marshall, I need not say a disciple of the Edinburgh school, undertook the chloroform, and gave it on a towel, pouring it out without measurement, which I consider a grievous mistake, and merely judging by the effect produced. The boy became speedily insensible, and I tried to remove the bullet with a forceps; but after a few attempts, I was obliged to desist, for the patient became restless and then vomited, and his respiration stopped, and he became blue and moribund. We turned him over, and tore open his clothes and smacked him with a towel, dripping with cold water, thoroughly and harshly over his chest, and after a time, what might probably be counted in a very few minutes, but which seemed to be interminable, he gave a gasp, and after awhile another, and began to breathe, and, in fact, gradually came to life again, and I was well satisfied to go and leave him alive with the bullet in his ear. His father was not at home, but his stepmother was kneeling at the table all the time, in perfect stillness, waiting the result of our desperate attack on the boy, and apparently fully appreciating the awful emergency. I believe that the bullet presented itself at the outer orifice of the canal in a few days, and was removed by Dr. Marshall. For myself, I know that I incurred a considerable amount of odium and a definite loss of credit among a certain set at Clifton for maltreating the boy, whereas it must have been a very large sum of money that would have repaid me for the trouble and anxiety of that time; an anxiety and risk entirely brought on by the disregard of the friends to our injunctions as to food. This was, of course, not a direct risk from chloroform; but the case is worthy of notice, as illustrating one of the perils of the agent.

CASE VI.—I went a journey some distance into the country to see a patient, and, if necessary, to remove his eye, which had been injured; and, as the region was rural and remote, I took my son with me as my assistant. The case was one requiring operation, and the surgeon informed me that he had made a puncture in the eye, under chloroform, the day before. Our patient was a healthy, active young farmer, who had destroyed one eye recently by injury; it was acutely inflamed and hopelessly lost, and affecting the other. We made a table of a box and couple of chairs, and my son began with the sponge, on which was poured a drachm of the mixture of ether and chloroform, namely, two parts of the former to one of the latter; and I sat on the edge of the chair with my instruments ready to proceed with the operation. Suddenly the respiration and pulse stopped, and the patient seemed in a very dangerous state; but he speedily recovered, and I tried to go on with the operation, but could not, as he was so restless and unsteady. The gentleman whom I met then volunteered to give the chloroform, and began by pouring some pure chloroform, unmeasured, on a towel, and, putting it over the face, our patient became at once insensible, and I removed the eyeball in a very short time; and then suddenly all bleeding ceased, he became white, and his lips blue and pallid, and the pupil of his remaining eye became dilated and fixed, and his pulse and breath quite stopped; in fact, he looked like a corpse. We instantly set to work and beat him with a wet towel, and the surgeon presently worked the Silvester method with great zeal, but we declared him dead. In the middle of this warfare the box broke down, and my son had to hold his body in a horizontal posture, while we worked the wet towel and the Silvester method. My colleague became worn out and gave in, saying that he was dead; but at that moment, after a hearty smack in the face with a wet towel, I fancied that I saw a slight change in the livid hue of his lips, and urged him to go on; the blue became more red, and after awhile the working of the arms seemed to

be followed by a slight gasp or respiratory effort, which encouraged us to still further efforts; and we worked on until we were exhausted, and at last he breathed and the pulse came, and he returned from death to life. The father and mother were waiting in the next room to hear the result of the operation, little thinking of the strife in which we were engaged. If they had been present the scene would have been terrible, and I believe the patient would have died. This man was healthy in every respect; no sickness, no disease; in fact, he called on me in Clifton a fortnight afterwards, looking perfectly well, and requiring advice about an artificial eye. He did not know, until I told him, that he had run such risks; and yet he had most decidedly been killed by a small dose of chloroform, with this little exception, that he did not die, but our exertions saved him. Without a third pair of hands he must have died: I never saw a person so corpse-like come to life again.

These and numberless other instances prove that there are without doubt two sets of cases in which lives are endangered or lost—viz., where the heart's action is stopped, and when the breathing ceases. To see the struggles and congested state of many patients while chloroform is being administered, the wonder is that we cannot add to these two a third series, where death occurs from apoplexy or some cerebral damage; and I have seen many instances of lengthened operations on persons severely hurt, where they have not died at once, but have lingered in a half-conscious state for a day or two and then died. I do not remember this class of case as having occurred, at any rate so frequently, before the days of chloroform, and they are not unfrequently in reality deaths from chloroform, affecting the brain in patients so depressed by disease or accident that they cannot get rid of the drug. In private practice we have no sufficient means of testing a question of this kind, and I should like to draw the attention of some of our acting hospital surgeons here present to its solution.

I have in the cases above narrated sufficiently indicated the treatment to be pursued in a similar emergency: a battery, the wet towel, the Silvester method, and the drawing forward of the tongue to relieve the larynx, seem to be the only reliable means.

I must agree, of course, with the universally received opinion that the artificial induction of anæsthesia is a great boon to mankind; but I am not opinion that it is a very safe one, nor that chloroform is its safest medium. I have for many years used a mixture of chloroform and ether, two of the latter to one of the former, under the impression that it is safer than pure chloroform. I think, too, that care in the administration of anæsthetics, and due preparations for restoring life in cases of danger, are important elements in the successful use of these agents; but I also believe that the anæsthetic state itself is dangerous, and that if you were to take 2,500 sick or wounded, or weak and diseased persons, and make them all so drunk with wine or brandy that they could neither feel nor move, a certain considerable percentage would never wake up to life again in this world. We are repeatedly urged to admit to our patients that chloroform is quite safe, but this I never will nor can do.

I have often tried, but I fear hitherto in vain, to impress on my infirmity colleagues and other professional friends, that the meaning of the word anæsthesia is the state where no pain is felt, and that they have no right in every case to push it so far as to destroy the power of motion for their own comfort in operating. If the patient cannot feel, that is all that he wants; your assistants must keep him quiet by force of arms.

The lithotomy position, with the hands and feet strapped together, is very unfavourable for chloroform, because of the fixed state of the chest; and I have seen some very uncomfortable cases from this cause. Chloroform and other anæsthetics act on young children fairly; but the little patients are apt to fall into a deep stupor after the operation has been finished, if it be not very long, and I have had not unfrequently considerable, but probably uncalled for, anxiety from this cause. Before the time of chloroform, patients made up their minds to necessary operations as readily, I believe, as they do now. It is a common and popular, but most erroneous idea, first started by Professor Miller, that the use of anæsthetics affords great relief to the operator as well as to the patient. Never was a greater mistake. It is a mere sentiment, likely to catch the mind of the public, and to be brought forward as a sign of the great tenderness of the surgeon's heart; but I must say that my own opinion agrees with that of Mr. Erichsen, which I saw quoted some time ago—viz., that the use of chloroform, at any rate in private practice, adds at least a hundred per cent. to the anxieties and responsibilities of the surgeon. In serious or delicate operations, such as ligature of arteries, or removal of the eyeball, or lithotomy, or hernia, it is a great evil to divide the operator's attention between the state of the patient from the chloroform and his own manipulations. In one of my earliest operations for removal of the eyeball, I was told afterwards that at one period of the operation

the patient had uttered a piercing shriek; but I was so much in an anæsthetic state, as far as hearing was concerned, from my attention to my own share in the proceedings, that I did not hear it.

Although it is presumptuous in such an assembly as this for me to touch on the midwifery question, I will nevertheless give my experience, which has been little, but very satisfactory. I have mixed about two drachms of chloroform with six of eau de Cologne, and given it, with a minim-glass armed with a cork, to an assistant, with the direction to keep ten minims in the glass, and to pour this quantity as often as I direct on the handkerchief held by the patient. This she presses over her mouth and nose; and if it be repeated at every pain as soon as it becomes necessary, and more frequently at the last pains, the sufferings of childbirth are relieved without risk. She takes only about two and a half minims of chloroform at each dose, and with this I have known a patient delivered in a state of complete unconsciousness.

In conclusion, while we are ready to give our patients the benefit of anæsthetics, and to take every possible precaution and care against any mishap, I think the entire responsibility should rest on the public who call for their use, and who choose to run a risk of life in cases where the operation itself and its consequences are entirely free from danger: and, practically, the public does take the blame; at any rate, the stereotyped verdict, in fatal cases, is "Death from chloroform, but no blame is attached to the medical men."

THE ORIFICES OF THE UTERUS AND THEIR SURGICAL TREATMENT.

By J. HENRY BENNET, M.D.,

Late Obstetric Physician to the Royal Free Hospital, London.

IN Dr. Matthews Duncan's last communication on the above subject, he dismisses my criticism on his former papers in a very few words, merely stating that I have misunderstood and misrepresented him, and that I am wrong anatomically, physiologically, and pathologically in my views respecting the uterine orifices. I may mention, what my old and esteemed friend Dr. Duncan does not, that the words which he used constitute the title of the paper I read last August at the meeting of the British Medical Association at Birmingham, which was published in the *BRITISH MEDICAL JOURNAL* the following month. I would add that, great as is the authority of Dr. Duncan, it is not sufficiently great to stamp, by a mere assertion, as a tissue of errors an elaborate paper, deliberately written, founded on thirty-five years' experience, and brought before the profession with a view to debate and discussion, and to prevent uterine surgery from running riot, as I conscientiously believe it now is doing.

My criticism of Dr. Matthews Duncan's scientific and interesting papers is this. Throughout his exhaustive discussion of the mechanical power, of the actual force used in the various modes of dilating the cervical canal, and especially the os internum, he never once even alludes to the nature of the obstruction which he is endeavouring to dilate or overcome. What is meant by all this surgical cutting and dilatation? What is the pathological condition which the dilatation or force is meant to overcome? What is the pathological condition that resists so as to bend a strong silver sound, or which can only be overcome by a pressure of four pounds? We know what a stricture is in the male urethra, the fibrous glistly nature of the contraction, and the antecedent pathological conditions; we know that, if we resort to forcible sounding or catheterism, we break through these fibrous glistly structures, and that without probably using a pressure of four pounds. What I wish to know is, what is the actual pathological condition of the cervical canal or of its orifices, external or internal, which leads one physician of eminence in London to divide the os internum with a double metrotome three hundred times in two years in his consulting-room, and another in New York to divide the os externum and entire cervix down to its vaginal attachment in five hundred cases in the same period of time? Indeed, I come upon traces of these operations constantly in my practice in all kinds of cases, without finding a clue to the motive that dictated them. These serious operations, not to speak of forcible dilatation of all kinds, appear to me, judging from what I see and hear, to be rashly, blindly carried out, as a kind of surgical panacea for anything and everything—sterility, dysmenorrhœa, displacements, etc.

This wild confusion in practice—this constant recourse to severe surgical treatment and operations in women—originates, in my opinion, in the failure to recognise the facts which I laid down in the second edition of my work on *Uterine Inflammation* in 1848, twenty-five years ago. I therein say and now repeat: 1. That, if the os externum will admit a