rarely destroys life by its immediate effect, must be welcome ; and they will speak lightly of the choking sensations and headache, and even of the vomiting, which ether excites. Others, who have found chloroform safe, and believe they can account for the fatal cases by circumstances which may be avoided, must object to an agent which is less readily applied, and more complained of by the patient and bystanders than chloroform is ; but this will not account for such differing reports on the occurrence of vomiting. One surgeon reports eleven cases of vomiting out of twelve ether cases, and another says that only one patient vomited out of a much larger number to whom he gave it. I think that the amount of the anæsthetic which entered the blood, the way it was given, and the time it was kept up, must have differed widely, and would go far to account for the different results. I believe chloroform is safe if due precautions are taken, and that ether is unsafe without them ; but inasmuch as ether destroys animal life less quickly, it does not need so much care in using it.

To insure safety in producing the complete quietude of a patient by chloroform, we ought, besides watching the effects produced, to use an apparatus which will render it impossible for a patient to have within his chest as much as four per cent. of the vapour of chloroform ; and this can only be effected by measuring both the air and the chloroform by a special apparatus. The inhalation of ether is made less irritating by the same apparatus ; but I do not now use it for ether, except in operations about the mouth, as I have succeeded in supplying the ether-vapour with sufficiently uniform dilution by the inhaler which I am about to describe. It consists of a face-piece without any valves ; a metal box measuring six inches by four, and five deep ; and an elastic tube, five-eighths of an inch in diameter, to connect them. The box is either suspended by a ribbon from the administrator's neck, or placed upon the patient's bed. Inside the box is a tube of very thin copper, which conveys the expired air through it, and is then provided with a valve which opens only during expiration. This tube is broad enough to extend across the box, and undulating, in order to present a large surface, which is covered with cloth to absorb the ether. Plates of metal are so disposed as to direct the current of air, which enters through a valve during inspiration, over the surface of the tube. The following diagram represents a perpendicular section of the inhaler.

The flexible tube leading to the face-piece joins it at B. The part of the vessel containing ether-vapour is marked E. When the patient inhales, air enters at A and follows the course marked by the arrows ; when he exhales, the current in the flexible tube is reversed, and enters the metallic tube marked R, and escapes at the valve S. The opening for supplying and removing the ether is at C.

It will be observed that the part where the greatest cold is produced, by the current of fresh air passing over the ether, corresponds with the termination of the exhaling tube, and will condense much of the ether-vapour breathed back by the patient ; also, that the current of air towards the patient goes over a surface which has been warmed by the patient's breath as it passes outwards through the tube. A sliding shutter at O regulates the admission of air, without passing through the ether-chamber ; but the egress of the patient's breath at the same opening, in expiration, is prevented by a valve. A similar valve and shutter are placed at the end of the flexible tube, near the

face-piece. Both should be open at first and closed gradually, that coughing and struggling against the pungency of the ether may be avoided.

After supplying about six or eight ounces of ether, the inhaler should be shaken, to diffuse the liquid over the cloth which covers the exhaling tube. At the conclusion of the operation, a considerable quantity of ether and some water will be found condensed inside this tube, and may be poured out at S by inclining the inhaler. The ether thus saved can be rectified and used again. As, under ordinary circumstances, it would have been diffused through the room, it is a measure of the extent to which the odour of ether about the house is prevented.

The chief advantage of this apparatus is, however, in the comparative uniformity of mixture with air which it effects, and which, whilst securing complete quietude of the patient, prevents the unpleasant results of an over-strong dose. Although this double current-inhaler could be modified so as to make it useful for other anæsthetics, it is for ether that I have now introduced it. I still recommend chloroform to be given by means of a bag containing a known proportion in every cubic inch of air.

The apparatus can be obtained of Messrs. Mayer and Meltzer, of Great Portland Street, or of Messrs. Coxeter.

ON THE ADMINISTRATION OF CHLOROFORM.*

By HENRY MARSHALL, M.D., F.R.S.Ed., F.R.C.S.Ed.,
Consulting-Surgeon to the Bristol General Hospital.

It is now nearly a quarter of a century since the late Sir James Simpson discovered the anæsthetic properties of chloroform ; and since then, up till a very recent period, it has in this country, and indeed throughout Europe, been considered so superior to any other anæsthetic, as to be practically the only one used. There has, however, of late, been an uneasy feeling current that its dangers have been underestimated, and a re-action against its use has in many quarters set in.

Believing the present panic to be quite uncalled for, I venture to bring the subject of chloroform administration once more before you. My contention is, that in careful and competent hands the danger to life is so slight as hardly more requiring to be taken into account than the risk run in the performance of some minor surgical operation, which, though usually perfectly safe, may, under unusual and untoward circumstances, at times prove fatal. It is a fact full of significance, that those who have had the largest experience in giving chloroform have had the greatest immunity from fatal results, a strong *primæ facie* argument against unavoidable death being at all common. Mr. Syme's practice gives 7,500 cases of chloroform administration without a single fatal result ; and Mr. Clover, with an equally large experience, has been alike uniformly successful. Dr. Snow computed he had given it in upwards of 4000 cases, with one death while under the influence of chloroform, but very doubtful if in any way due to it. Dr. Jones has given it in upwards of 6000 cases, with one death ; Mr. Lister in some 4000 cases, with no death. So also the experience of particular hospitals goes far to show that, where it is most extensively used, "accidents" are least frequently met with. This is notably the case in the Edinburgh Infirmary, where chloroform was first publicly administered, and since then has been given with a frequency unknown in other hospitals ; and I am glad to add the Bristol General Hospital bears similar testimony.

My own experience of chloroform dates almost from the time of its introduction, having administered it early in the year 1848. A few years subsequently, I gave it with extreme frequency for the late Mr. Syme, in his private and public practice, and then learned that perfect confidence in its safety as an anæsthetic which subsequent experience has only tended to confirm. At that period, it was no uncommon occurrence for patients to come to Edinburgh for the express purpose of having operations performed under the influence of chloroform, after being refused it in London and other parts of England, on the score of heart-disease and other disorders, which were deemed incompatible with its safe administration. Acting under Mr. Syme's direction, I gave it in these cases with the same confidence as if no disease were present ; his maxim being, that a case suitable for surgical operation was suitable for chloroform, an empty stomach being the only condition insisted on. The same principles as were then enunciated by Mr. Syme continue to be taught by his distinguished successor, Mr. Lister, and are successfully practised by innumerable pupils in all parts of the world.

The mode of administration which we adopt is extremely simple. The

* Read before the Bath and Bristol Branch.

patient being placed in the recumbent position on his back, from one to two drachms of chloroform are poured on a towel, folded six or eight times, distributing it over a surface of about the size of the palm of the hand. The towel is then held a few inches from the face, and gradually approached nearer the mouth, as the patient becomes accustomed to the vapour, another drachm or two being from time to time added, as the previous supply evaporates. The administrator should give his undivided attention to his responsible duties, and pay special and unremitting regard to the respiration, and, in case of that function being interfered with, take prompt measures to restore it.

As regards the use of the towel or handkerchief as the vehicle for administration, no form of apparatus is capable of more effectually insuring a free admixture of air with the chloroform vapour, or of so easily regulating the amount, while it has the unspeakable advantage of being always ready at hand, is free from complication and cumbersome, and, what is also no slight recommendation, it in no way alarms the patient. Mr. Lister's experiments show that, when the towel is used, the amount of chloroform vapour does not exceed four-and-a-half per cent. of the air inspired, even immediately after fresh chloroform has been added; but the average percentage must be less than four per cent.

The necessity for the chloroformist giving his whole and undivided attention to his responsible duties seems at first sight so obvious as hardly to require to be insisted upon, yet its neglect I believe to be one of the most common causes of danger. In looking over the recorded cases of death from chloroform, it is worthy of notice how large a proportion of them have occurred where it was administered for some trifling operation. The presumption is, that in very many of these cases the chloroformist rendered assistance to the operator (no one else being present), and thus had his attention distracted from his primary duties, while in too many cases the operator has himself been the administrator of the chloroform. A suspension of respiration may, under such circumstances, easily occur without being noticed, and the subsequent cessation of the heart's action may be believed to have been the first symptom, and to have "suddenly" occurred.

The absolute amount of chloroform used in any given case is of little importance. I have on some occasions given as much as six ounces at one time without any bad result. The administrator has to watch the results, the same quantity which in one case hardly confuses the intellects, will in another cause profound stupor. Mr. Prichard, in his paper on "Chloroform accidents," strongly condemned the practice of not measuring the amount of chloroform, but he failed to support his condemnation by argument. If the administrator act as a mere machine, incapable of using judgment and discretion, I can understand the importance of measuring the amount; but, as he ought intelligently to watch the effect of the agent, and judge when enough has been given, it is of no practical importance whether this result be brought about by a drachm or an ounce, any more than if it be in two minutes or in ten minutes. In the records of fatal cases, the amount is generally carefully notified; but, though of some scientific interest, this is of little practical importance; and it is well that the administrator should have no unnecessary duties to distract his attention from carefully watching the effects of the anæsthetic, noticing more particularly the respiration. I do not consider it necessary to pay any very special attention to the pulse, believing that almost invariably the breathing is first affected. I must admit, however, that the reports of competent observers on this point are very conflicting; but death beginning at the heart can hardly in the nature of things be common, or fatal results would be more frequent in those hospitals where disease of the heart is considered no barrier to the administration of chloroform, and the observation of the state of the pulse held of little or no importance. In the reports of fatal cases, it is frequently stated that "the heart suddenly ceased to beat;" but, in the words of Mr. Lister, "the evidence of bystanders is apt to be conflicting with regard to the precise succession of highly important events that are crowded together in the brief period of excitement immediately preceding death, and there is also the strong tendency that exists in the mind of any one in whose hands such a case has occurred, to twist the evidence, unconsciously to himself, in favour of inevitable syncope rather than preventable asphyxia."

The usual phenomena attendant on the administration of chloroform are—first, a period of excitement which gives place to a state of complete repose, which, by a careful regulation of the amount inhaled may be prolonged for an indefinite period; but should the system get yet more under the influence of the agent—where, in fact, an overdose is given—the respiration becomes affected, as usually indicated by stertorous breathing (not to be confounded with mere snoring), followed by a complete suspension of respiration. At the commencement of stertor, the inhalation should be discontinued; and if the respiration cease, prompt measures must be taken to restore it, the most important

being pulling forward the tongue. This procedure restores respiration under two very different conditions. First, there are cases where, from relaxation of the lingual muscles, the tongue falls back and causes a mechanical impediment to respiration. To remedy this, it is not necessary to pull forward the tongue with forceps, but simply to raise the chin, or pull forward the beard, while it is well at the same time to turn the head on one side. There are, however, other cases, happily not so frequent, in which this is not sufficient; and any one who has had occasion to use chloroform frequently must have observed cases in which a moderate projection of the tongue, amply sufficient to remedy any physical obstruction, fails to give relief; but, if the tongue be pulled forcibly forward with forceps, this act is immediately succeeded by a long inspiration, the firm traction evidently acting not mechanically, but in a reflex manner, through the nervous system. The rationale of this procedure has been very clearly demonstrated by Mr. Lister, who has shown that the deep stertorous breathing is caused by vibrations of portions of mucous membrane surmounting the apices of the arytenoid cartilages, and that although stertor, pushed even to complete obstruction, may exist when the tongue is protruded beyond the teeth, it becomes impossible if the protrusion be carried so far as to somewhat painfully stretch the *frænum lingue*. Any one can, with a little practice, test the accuracy of this statement in his own person. If firm traction of the tongue be not at once followed by a free respiration, it should be supplemented by dashing cold water on the face, and slapping the face and chest with a wet towel, and, if necessary, by artificial respiration.

There would appear to be a rare form of death, where chloroform kills almost instantaneously by shock, from its paralyzing influence on the heart through the cardiac ganglia; but it would be unfair to blame chloroform for every death which occurs while under its influence. Sudden death from shock, during or immediately after an operation, was a well-known occurrence before the days of anæsthetics. In the very first operation in the Edinburgh Infirmary in which it was intended to try the power of chloroform, accidental circumstances prevented the experiment from being made, and the operation (for hernia) was begun without the use of any anæsthetic: and most happy that it was so, for after the first incision was made through the skin, the patient suddenly expired. Had the sudden and unexpected failure in the heart's action that occurred shortly before the death of the late Emperor Napoleon been delayed so as to have permitted the intended operation, fixed for that morning, to take place, it is but too probable that chloroform would have been blamed for the fatal result, to the great augmentation of the panic regarding its use.

That deaths do occur not unfrequently from chloroform must be admitted; but is it not better to face the difficulty and question the accuracy of the stereotyped verdict of coroners' juries, "Death from chloroform, but no blame is attached to the medical men," and consider, without prejudice or bias, whether a large proportion of these deaths are not preventable rather than inevitable? By all means let the giver of chloroform feel he has a serious and responsible duty to discharge, but one which, with due care and under ordinary conditions, is practically safe. Yet I marvel how often those who are most persuaded of the dangers of chloroform, are the least careful as to the qualifications of the administrator. Mr. Prichard considers that the use of anæsthetics "adds 100 per cent. to the anxieties and responsibilities of the surgeon"; but the responsibility of the chloroform should rest with the administrator, and if he be a competent man and attend to his duties, there need be little anxiety on the part of the operator. But if its administration be entrusted to ignorant or careless hands, there is, without doubt, very direct danger—the more so, if the proper remedies be not employed in case of untoward symptoms arising. The reader of a paper (Mr. T. Green) at a recent meeting of our Branch, characterised pulling forward the tongue as a frivolous proceeding. I can only rejoice that under these circumstances he has expressed his intention of not voluntarily giving it again; and I trust his teaching on the subject will find no followers.

It is not my intention on this occasion to enter at any length into the comparative advantages of chloroform and ether, my experience of the latter being very limited: judging, however, from the reports that have recently appeared in the *BRITISH MEDICAL JOURNAL*, which has strongly espoused the cause of ether, I think there is little inducement to use it in preference to chloroform. Its claim to greater safety has not been satisfactorily made out, and in all other respects it seems greatly its inferior. It takes a longer time and a larger quantity to produce its anæsthetic effects; it is much more distasteful to the patient, as well as disagreeable to the bystanders; excites the system at the time of administration more than chloroform, and has the still graver disadvantage of causing excitement at a subsequent period. Sickness after its use is as frequent as after chloroform, or even more so;

and, altogether, unless it be shown to be unquestionably less liable to induce dangerous symptoms, I see not a single point in its favour.

Finally, I would beg those who are waning in their faith in chloroform, to place against the deaths that may truly be attributed to its use the many cases in which there is good reason to believe it has saved life, both by removing the dread of the tortures of the operating-table in anticipation, and by preventing shock and mental strain during the operation; also to remember what it has done for the alleviation of suffering during the last twenty-five years; how much surgery is indebted to it in making operations practicable which formerly could scarcely have been thought of, on account of the amount of suffering entailed; and, lastly, how every surgeon owes it a deep debt of gratitude, in enabling him calmly and deliberately to perform delicate operations on a perfectly quiet and unresisting subject, instead of rapidly and hurriedly on a struggling frame writhing with pain. Mr. Prichard has described this as a mere sentimental argument; but surely most men, however prepared to steel their feelings, when necessary, to cries of anguish in others, must be thankful to be spared the inflicting pain on a fellow-creature. Habit may, with some, so far change their natural sympathy with the sufferings of others as to make them callous to the cries of a patient enduring the agonies of a surgical operation; but it is narrated of no less a surgeon than Cheselden, that "he always before an operation felt sick at the thoughts of the pain he was about to inflict"; and other surgeons may be excused for sharing his feelings, even at the risk of being accused of indulging in "mere sentiment".

OBSTETRIC MEMORANDA.

THE FORCEPS.

At the meeting of the Dublin Obstetrical Society (published in the JOURNAL of March 1st), the President is reported to have said that "the use of the forceps before the complete dilatation of the os was novel and suggestive." That this practice, now apparently for the first time having received the sanction of the Dublin School of Obstetrics, is no novelty in English practice, can be seen on reference to a paper "On the Use of the Forceps," which I published in the JOURNAL in 1867. At page 532 of the first volume for that year, is this passage: "I altogether discard the rule that, before the forceps are applied, the ear should be felt, *neither is it always necessary to wait until the os uteri is fully dilated*; for with ordinary care the blades may be passed beyond the os uteri without inflicting the least injury, and with properly constructed forceps the os uteri is not stretched until the head itself is brought down to assist the dilatation in the natural way." In the course of a long and large experience as obstetric physician to the Maternity Charity in this town, I have on several occasions—the necessity for it is not frequent—amply verified the safety and advantage of this practice, especially in primiparous labour where uterine energy is exhausted before dilatation is completed.

I congratulate our Dublin confrères on their somewhat tardy recognition of the superiority of the double-curved forceps, which, in accordance with the teaching of Ramsbotham, Simpson, Barnes, Robertson, and others, I hold to be the instrument best adapted in all cases. When the Association visited Dublin, a few years since, the straight forceps appeared to have the preference in that city.

A. B. STEELE, L.K.Q.C.P.,

Physician to the Lying-in Hospital, Liverpool.

CLINICAL MEMORANDA.

SEQUELÆ OF PNEUMONIA AND PLEURISY.

My attention has been recently directed to a class of cases in which failure of health occurs, and for which the patient is unable to assign any particular cause. Such patients thus describe their illness. For some weeks previously to seeking medical advice, there has been a gradual loss of appetite, accompanied by dyspeptic symptoms; a feeling also of being "ill all over," shortness of breath upon exertion, and sometimes considerable loss of flesh ensuing. Upon inquiry, cough is admitted to have occurred, and pleurodynia to have been present, at times in an acute form. I have made careful stethoscopic examination of the chest in some thirty adults associated with such an indefinite history as above-mentioned. In every case I have found one or other of the following conditions to account for the state of ill-health; either pneumonic consolidation at the base of one of the lungs, or pleuritic effusion to such an extent as to distend one-third or one-half of the right or left side with fluid.

The application of a moderate sized blister (three by four inches), followed by small doses of the tincture of the sesquichloride of iron and an occasional aperient, generally afford the requisite relief. The compound ipecacuanha and squill pill removes an irritative cough which usually follows the application of the blister, and which is due probably to the lung taking on increased action after having been abnormally inactive. If the consolidation or effusion be tardy of resolution, the reapplication of a blister, after an interval of a fortnight or ten days, or the friction of the side each night and morning with the liniment terebinthine aceticum will expedite the convalescence.

H. CRIPPS LAWRENCE, L.R.C.P.Lond., etc.,

Surgeon to the Westbourne Dispensary.

ETIOLOGY OF HEART-DISEASE.

ON February 22nd, 1873, at 1.15 P.M., E., aged 18, while undergoing active exertion, suddenly fainted. I was summoned at once; and he was carried to bed, and revived in a few minutes, and asked for water. He then dozed a short time, and he vomited twice. At 2 P.M., I examined the heart. At the base, the heart-sounds were healthy. At the apex, there was a *very loud systolic murmur*, disappearing towards the base, but still loud in the axilla. On February 23rd, at 9 A.M., no *bruit* was to be heard. The heart's action was quite normal in development and rhythm. He was quite well in every respect.

This observation may interest many who are concerned in studying the etiology of heart-disease.—CLEMENT DUKES, M.B., B.S.Lond.

Rugby, February 25th, 1873.

REPORTS

OF

MEDICAL AND SURGICAL PRACTICE IN THE HOSPITALS OF GREAT BRITAIN.

GUY'S HOSPITAL.

OPERATIONS, TUESDAY, FEBRUARY 18TH.

Medullary Tumour of the Wrist.—Mr. Bryant removed a tumour from the front of the wrist of a boy, aged 14. It had been growing for four years, and had infiltrated all the flexor tendons. It first appeared as a wart, which was accidentally torn off by a butcher's hook, but from its apparent root a tumour began to grow. This had been treated by the actual cautery, by lotions of all kinds, and by various caustics, but still increased. Mr. Bryant had it bound upon a splint for some months to ensure perfect rest to the joint, but no improvement took place. On examining the main portion of the tumour after removal, it was an inch and a half in diameter, and medullary. There was no history of cancer in the boy's family.

Excision of the Ankle-joint.—The patient was a boy, aged 9, who four months ago while running sprained his ankle. This was followed by swelling, with great pain on both sides of the joint. Suppuration took place on the inner side, where a free incision was made and a large quantity of pus evacuated. This relieved the pain, but the disease still made progress in the joint, the bones being clearly enlarged. There was still some movement in the joint, and no grating; but Mr. Bryant was satisfied that there was necrosed bone, probably covered with granulations. He accordingly made two free incisions, one on each side down to the bones, and excised the ends of the tibia and fibula, and the greater part of the astragalus. These were quite diseased, and as soft as putty. Mr. Bryant remarked after the operation that the case was not a very favourable one, although the child was only nine years of age and in fair health. There might be good repair in the ankle-joint, but there must necessarily be great shortening of the limb in consequence of the epiphysal ends of the tibia and fibula having been taken away. The bones of this boy's limbs were bent in consequence of having early suffered from rickets; but Mr. Bryant's experience led him to think that such bones united as readily and progressed as favourably as those that had never been diseased. The inner wound was stitched up carefully in the hope of union taking place by the first intention, and covered with compound tincture of benzoin; the outer wound was left partly open to allow a free discharge.

Excision of the Shoulder-joint.—The patient was a man under the care of Mr. Durham. Five years ago, after an attack of cholera, he had inflammation about the left shoulder-joint. Matter formed; and the abscess had been discharging ever since from a wound made behind the joint. The joint was now perfectly fixed, and from want of