this prominent part of the gut with the largest sized trocar, and thus, at all events, to secure temporary relief. The operation was precisely that of paracentesis abdominis, except that it was not performed in the median line, and had therefore to pierce muscular fibre, an incident not without a favourable bearing on the after issue of the case as affecting the patency of the opening. The situation of the puncture was about three inches to the right and one inch below the umbilicus. The immediate result of the withdrawal of the trocar was the escape of an enormous quantity of flatus, followed by fluid faeces, producing instant tranquillity, and a decided general improvement in our patient's condition. It was an essential part of our plan that the canula should be retained in the bowels at least for three days, as by that means the parts were pinned together, and extravasation rendered mechanically impossible. This state of parts would also favour the surrounding and isolating of the puncture by lymph, and the limiting of peritoneal inflammation, should such be set up. The operation was unattended by any difficulty or after complication; the system was relieved from the moment of the puncture, not having to rally from the shock of a long and severe operation; nor did any symptoms whatever arise from the simple procedure adopted, except a slight local irritation, due rather to the dressings and apparatus than to the operation itself. For three days the canula was retained in the wound, and a moistened bladder was attached, into which flatus and faecal matter were freely repelled, and removed from time to time. Afterwards a gutta percha tube was inserted into the opening, and closed by a plug. A saline aperient was administered to keep the faecal matter in a semi-fluid state, and the bowels generally emptied themselves spontaneously when the plug was removed. Some difficulty was experienced in fitting the opening with a tube, which should be large enough to retain its position and to discharge the contents, and not too large to pass readily into the bowel. Sponge-tents were found of very great use in dilating the opening, which might have been increased in this manner to any desirable extent. Eventually the patient managed the opening herself with a tent or rolled linen plug well greased. The course of the recovery was two or three times retarded by coughs, febrile attacks, and nervous debility; but these conditions were successively overcome as the summer advanced. She acquired more skill and confidence in managing her tents and bandage, and regulating the condition of the bowels; she left town for the sea-side for a few weeks, and returned in good health. She now (thirteen months after operation) is able to walk several miles, and to attend to her household duties; her functions are naturally performed: she is as stout as usual, and is free from local or general uneasiness. She takes a small quantity of Epsom salts every morning, and has a free semi-fluid discharge with much flatus daily. There is a tendency in the opening to close; it is of about the size of the little finger, and might doubtless be much increased if the patient could be prevailed upon to use sponge-tents for a week, and then adopt a permanent tube instead of the linen plug, which she still uses on account of its easy manipulation. There is some permanent enlargement of the abdomen, probably from over-distended bowel, which has lost its tone. No faecal matter has ever passed *per anum*, only a little flatus and inspissated mucus occasionally.

REMARKS. In reviewing this case, and the ease and freedom from danger with which relief was afforded and life saved, one cannot help feeling that the simplicity of the procedure has been one cause why it has been hitherto overlooked, at least as a recognised operation. The disadvantages are: the wounding of both layers of peritoneum, and of the bowel itself. With the precautions described, however, the chances of peritoneal inflammation do not seem to be materially greater than in ordinary tapping; and a wound of the intestine is implied in every case where an artificial opening is formed. The uncertainty as to the part of the intestine perforated is a disadvantage shared in common with other operations. The part chosen is the most distended part, and therefore of necessity a point *above* the stricture, and certain to give relief: so that there need not be any hesitation or delay in searching for particular portions of the intestine. The opening is of necessity small; this is a serious objection, but it may be obviated by the size of the trocar and canula used, by the free use of sponge-tents, and by maintaining a mouldable state of the faecal mass.

The advantages I have already partly pointed out in the course of my remarks; they are briefly, that the puncture is momentary, and unattended with pain or shock to the system at the time, or with any after constitutional effect; a

most important consideration where the patient is already in the last stage of an exhausting malady; the certainty of immediate relief if the prominent part is selected; and hence the absence of any doubt or difficulty in determining the site of the obstruction; and if the puncture does not succeed, the patient's death is at least not accelerated. There are some advantages also as regards the management of the opening afterwards; it is altogether under the patient's control; it is not liable to the prolapse and tension of the mucous membrane or closure by septum which interfere with other artificial openings; and, lastly, it is not so deep seated as the lumbar anus, and therefore not so liable to obstructions and infiltration between the inner opening and the skin.

The operation is applicable to any form of intestinal obstruction where there is great distension (and this condition is rarely absent); and is particularly indicated in the later stages of schirro-contracted rectum, or other malignant disease, where the object is to prolong life for a few days or weeks, and mitigate suffering at little or no expense of vital power.

DEATH FOLLOWING THE INHALATION OF CHLOROFORM IN SURGICAL OPERATIONS.

By T. HOLMES, Esq., F.R.C.S.

[Concluded from page 68.]

As a summary of the preceding tables, I would adduce the following facts.

They contain the records of 50 deaths under chloroform, occurring during the eight years 1848-1855 inclusive, in 39 of which *post mortem* examinations were made; in the great majority, the chloroform was given by qualified medical men.

1. *Sex.* This is noted in 44 cases: 21 were males, 23 females.

2. *Age.* All were persons in the middle period of life; no children, and only one man above the age of 60.

3. Most of the operations were of a comparatively trifling character.

4. The chloroform was given on a handkerchief, cloth, towel, or piece of lint, in 27 cases; on a sponge in 4; on an inhaler or other apparatus (not described) in 8; on Dr. Snow's inhaler in 3. In 8 cases the apparatus is not specified.

5. The quantity used was 3j and under in 13 cases; 3ij and under in 12; 3ij-3ss in 3; a larger quantity in 8; not specified, 14.

6. The time is noted in 32 cases: 2 minutes and under in 15 cases; 2-5 minutes in 6 cases; 5-10 minutes in 6 cases; above 10 minutes in 5 cases (in one of them, 40 minutes).

7. The symptoms are intelligibly described in 36 cases.

In 19 there was no previous struggle; in all of these, except one, the pulse ceased before or at the same time with the inspiration.

In 17 there was previous struggle; in 4 of these lividity and failure of respiration was next noticed; in 13, failure of the pulse, or of the bleeding from the wound, generally preceded by pallor.

8. Of 33 cases in which *post mortem* examinations were made:—

(a) Eight, viz., Nos. 15, 22, 31, 32, 34, 42, 46, 50, showed no appreciable morbid appearances, *i. e.*, referrible to chloroform: for one (No. 34) is said to have presented extravasation of blood in the spinal canal.

(b) The heart is reported *soft or flaccid* in 10 cases, Nos. 3, 9, 16, 19, 20, 23, 24, 27, 30, 46; *fatty* in 9, Nos. 26, 29, 33, 35, 36, 37, 38, 41, 45. The cases marked thus * were two of the oldest patients in the list, and the morbid appearance seems not to have exceeded the traces of fatty degeneration usually found at that period of life. The heart was *flaccid* and *empty* in 7 cases, Nos. 2, 5, 8, 9, 10, 14, 48; *full* in 1, No. 1.

The blood was usually fluid; air was found in it in 3 cases, Nos. 2, 5, 24.

(c) The lungs were congested in 14 cases, Nos. 1, 2, 5, 8, 9, 10, 16, 19, 20, 23, 28, 45, 46, 50.

(d) The brain was congested in 7 cases, Nos. 1, 14, 16, 20, 23, 28, 44.

(e) Other viscera were congested in 6 cases, Nos. 1, 10, 16, 20, 24, 30.

(f) There was organic disease in 4 cases besides that of the heart, viz., aneurism, No. 39; phthisis, No. 3; atheromatous arteries, Nos. 33, 38. The latter had also granular degeneration of the kidneys. It will be observed that the latter two had also fatty degeneration of the heart; but to a slight extent.

In considering the results of the tables of which a summary is here given, there is one thing which must, I think, attract the attention of every reader: I mean the fact that no child or any old person died from the administration of chloroform. This is a forcible confirmation of the view which I was endeavouring to enforce in my previous communication; viz., that most of the fatal accidents from chloroform have arisen from some imperfection in the method of its administration, and are not to be regarded as unavoidable results of its continued use, when that method shall have become better understood and more carefully followed. Otherwise, what cause can be given for the exemption which children have enjoyed? Chloroform is given even more frequently to children than to adults, as the intractability of the former renders its use necessary or expedient in many minor operations (such as passing sounds, exploring diseased parts, etc.), where it is not employed in the latter. Children, again, are affected by a less quantity of chloroform than adults, and are generally more exposed to the influence of narcotics; so that, on all accounts, we should have expected a more than proportionate mortality among them; instead of which, no case is found reported in eight years. I can hardly imagine any cause for this, except that which is found in the fact that every one is aware of the facility with which children are narcotised, the danger of an overdose, and consequently the necessity of caution: and it is not an unfair inference, that, if this caution were more generally exercised, the number of deaths would be much reduced. The same observations apply to the other extreme of life. At any rate, we may say that our present experience negatives the doctrine which has been sometimes propounded, that the extremes of age are contraindications to the use of chloroform.

Among other contraindications which have been mentioned, the one most frequently admitted is disease of the heart, especially fatty degeneration. I think our tables will show that, at any rate, too much stress has been laid upon this point.* We may at once admit that extensive disease of the heart, or of any other important organ, contraindicates surgical operations, either with or without chloroform; in fact, contraindicates anything which by its reputed danger may alarm, or even by its novelty unduly excite, the patient. Unfortunately, however, operations are sometimes necessary on such subjects, and then only a choice of evils remains. The statistics, however, only show nine cases, out of thirty-nine examined after death, in which a fatty condition of the heart is asserted to have been observed; and in two of these it seems quite evident that it was not more than the trace of degeneration almost always found at that age (an age, be it observed, in which chloroform is safely given every day); and in only one is it stated that the disease was extensive. The evidence, therefore, that the fatty degeneration which was found in this small minority stood in the relation of cause to the fatal result, is very deficient. The common sense view of the matter would appear to be, not to incur the risk of giving chloroform to a person evidently the subject of extensive disease (fatty or otherwise) of the heart, unless the severity of the operation or the fear entertained of it should threaten an even more dangerous shock to the system; and, in the latter case, to watch its administration carefully, stopping just beyond the point where reflex motions are abolished.

Again, disease of the lungs is mentioned as a contraindication; but there is little evidence on the point, and that little does not give much support to such an opinion. In a case of fracture of the spine in the cervical region (where all the muscles of respiration, except the diaphragm, would be paralysed, and where, as the fracture had existed for many days, the lungs would be much congested), Mr. Jones of Jersey submitted the patient to the full influence of chloroform during the space of half an hour or more, without any detriment (*V. Medical Times and Gazette*, 1856, vol. ii).

Still less reason have we for regarding disease of the brain as an absolute contraindication. In functional disease of this organ (delirium tremens, epilepsy, etc.), chloroform is known to exercise a highly beneficial influence; and I have seen it administered with safety in a case of extensive fracture of the skull and laceration of the brain during an operation which would otherwise have been difficult from the patient's restlessness. We should not forget, however, that, in most of the

cases where *post mortem* examinations have been made, the prominent morbid appearance has been congestion; and that, therefore, all diseases or morbid states of the system which predispose to congestion are so far contraindications to the use of chloroform. The most usual, as well as the most dangerous of these conditions, is that which accompanies habitual intemperance. It will be seen that many of the patients whose deaths are recorded in the above table were known to have been persons of intemperate or otherwise dissolute habits; and I have no doubt that, if more accurate information were attainable, we should find this to have been the case in a much larger proportion.

Does chloroform exercise any secondary effect unfavourable to the healing of wounds? This is a question asked by no less an authority than the College of Surgeons in their last examination for the Fellowship, and it is a point which has been mooted elsewhere. It is a matter of considerable interest, and one which well deserves attention and dispassionate investigation. I must confess that I have watched many hundreds—I may say thousands—of cases of wounds made under the influence of chloroform, without seeing any proof of such effect; and, further, I have questioned many men of large experience in operative surgery, without meeting with any person who has observed this supposed secondary action. Nor does it seem, *a priori*, probable that a single dose, however strong, of so volatile a substance as chloroform, should permanently modify the healing process, while all other effects of its administration are allowed to be transitory. As to its other subsequent effects, every one knows that it frequently produces sickness. This effect, however, is much less common when it is given in the way above described, than when administered without precaution, and therefore irregularly and in unnecessarily large doses.† Sometimes, also, alarming fainting fits follow its administration. The cases of this nature which I have seen have occurred to weakly females; but I have heard of a similar instance in private practice, in the case of a well known member of Parliament—a man of considerable mental and physical vigour. I have never heard of a fatal termination to these fits, nor of any subsequent ill consequence.

It being admitted, then, that chloroform is in some degree dangerous to life; that it has an irritating effect on the stomach; that it sometimes causes severe nervous symptoms, especially in hysterical females; and that, in persons disposed to congestion of the brain, it increases that tendency to an extent which is often at least unpleasant, if not alarming,—we have next to inquire what is the value of the means which it has been proposed to substitute for it. The undoubted superiority of chloroform to sulphuric ether may be considered established by the fact of its having so rapidly and so entirely superseded that drug. The question of the value of amylene as an anæsthetic is one which can hardly be answered confidently without more information than our present experience supplies us with. As to the congestion induced by chloroform, which is, in my opinion, the principal drawback to its use, I cannot say that, in the cases which I have seen of the administration of amylene, I have observed much improvement in that respect. Many of the patients have shown even more lividity of the face and more struggling than is usual under chloroform. The number of those who suffer from sickness is indeed, as it appears, less when amylene is used. Out of sixty-two patients, only two had suffered from sickness, and that only of a trifling character. The recovery is undoubtedly more speedy; but it may well be questioned whether that is an unmixed advantage; and the action of the drug in producing anæsthesia cannot always be depended on. Among the small number of cases as yet submitted to its action, I have heard of several in whom no anæsthetic effect has been produced. This, however, might have been from the inefficiency of the apparatus; for I believe that, without a properly contrived inhaler, whereby a sufficiently powerful mixture of the vapour and the atmospheric air is induced, this failure will be constant. On the whole, I am inclined to suspect that chloroform will hold its ground against the newly introduced agent, the peculiar odour of which will alone prove a powerful obstacle to its introduction into private practice. The local application of freezing mixtures, as recommended by Dr. Arnott, is the only substitute that I know of for chloroform to which no sound objections have been hitherto made; but this is only applicable in superficial operations, and

* The observations here made with respect to fatty disease of the heart, apply also to valvular lesion and other morbid states of that organ. It will be noticed that no such cases are reported in this table.

† I have no doubt that, in some of the cases in which the heart is reported soft or flabby, microscopic examination would have shown traces of fatty degeneration.

* At St. George's Hospital, the average quantity for the ordinarily severe operations is 3ij, and for others a less quantity. I have noted amputations of the thigh and arm in lads about the age of puberty, done (and without hurry) with the expenditure of only 3i of chloroform. I speak, of course, of the quantity expended. Far less than this passes into the blood.

has certainly the drawback that, as it leaves the patient perfectly conscious of all the preparations for the procedure which he dreads, nervous people suffer under its use nearly all the terror which they would without an anæsthetic; and this terror is perhaps the most painful part of these trifling operations. I cannot help thinking that the limited extent to which a method so easy, so free from danger, and so confessedly effective in these minor operations, has been adopted, is a proof that the profession at large have come to a different conclusion as to the dangers of the plan it was intended to supersede, from that adopted by its ingenious author.

I must now bring these observations to a close. My object in them has been to show what the mortality after chloroform has really been, and to inquire whether the results of *post mortem* examination have given us any clue for assigning it to its efficient cause. In reference to these two points, I believe the facts before us show—

1. That the reported mortality in the British Islands has been less than six *per annum*; that a great number of these cases occurred in private practice; and that, as many of them were disclosed by means of coroners' inquests, it seems probable that we do really hear of most of the fatal cases which occur in the United Kingdom.

2. That the *post mortem* appearances have not been sufficient to indicate any uniform cause of death; that the importance ascribed usually to fatty degeneration of the heart is greater than experience would warrant; that, from the number of cases of persons previously in perfect health, and the rapidity with which death was produced, there is a strong presumption that the result was due to imperfect methods of administration, or carelessness on the part of the administrator. Further, from the experience of hospitals in which a rational method has been adopted and due caution exercised, we are justified in believing that chloroform is as safe in its action as any drug which produces narcotism by mixing with the circulating blood, can in the nature of things be expected to be.

4, Vigo Street, February 1857.

CLINICAL OBSERVATIONS ON THE TREATMENT OF FRACTURES BY THE IMMOVABLE APPARATUS.

By JOSEPH SAMPSON GAMGEE, Staff-Surgeon of the first class, and Principal Medical Officer of the British Italian Legion during the last war; late Assistant-Surgeon to the Royal Free Hospital, etc.

"PERHAPS there is no subject more interesting to the practical surgeon than this of fracture of the limbs. . . . This is one of those subjects which has fallen into almost inextricable confusion: none, I believe, requires more to be historically explained. . . . It is, I fear, but too certain, that, while more has been written on the subject of fractures than on hernia, lithotomy, amputation, or trepan, yet no two books correspond, no two authors agree, even on the general points of practice; and every surgeon, whether in the army or in the navy, in a village or in a city, sets a broken limb, as he writes his name, after a fashion of his own." (John Bell's *Principles of Surgery*, pp. 490-1. London, 1815.)

This is not the first time I quote* the above passage from the eloquent chirurgic treatise of John Bell;—a passage so pregnant with truth of the greatest practical moment, that instead of apologising for repeatedly referring to it, I would recommend its insertion in the commonplace-book of every diligent seeker after truth. Fractures are the surgery of every surgeon's every day. They often involve the life, always the comfort, of the large number of individuals who are afflicted with them; they are a department of practice in which the very greatest manual dexterity is often called for, without such opportunity for display as is afforded by cases in which cutting instruments are employed; and it is to be feared that not sufficient importance is attached to their study, in the period more especially allotted for acquiring a fundamental knowledge of practical surgery. The large amount of valuable experience which might be collected from the fractures in our out-patients' rooms, is but very inadequately availed of, while any one "walking the hospitals" must be struck by the fact that house surgeons and dressers, but more especially the former, monopolise the learning to be

derived from fractures admitted into the wards. At the surgeon's visits, the limb is seen "done up," and in due course, the amount of information acquired by the majority of students is, that A. B. was admitted such a day with a fracture, oblique or otherwise, with shortening, reduction effected, apparatus applied, and patient discharged with the result witnessed, be it good or bad. Supposing the case to have been one of oblique fracture through the trochanters, above the femoral condyles, or through both bones in the small of the leg, how many times during the progress of the cases has there been cause for anxiety, and call for the nicest manual dexterity! How much has depended on the surgeon's head and hands, altogether apart from the merits inherent to the apparatus adopted!

My desire is to be brief; and yet I have been obliged to submit these introductory general reflections, from a conviction that the considerations of cases and principles into which we are about to enter would be comparatively valueless, unless it were borne in mind how essentially this subject is one of practical importance, admitting only of solution on the basis of experience, acquired, as experience to be valuable must be, by the exclusion of all prejudice, by a clear and accurate appreciation of facts, and by an appropriate use of the ambassadors and agents of the understanding—the hands.

I reflect with satisfaction that my first publication on this subject was concluded in the following terms:—"That the system I advocate does possess real advantages in a large number of cases, can no longer be matter of doubt. Whether or not all my anticipations respecting it admit of realisation, is a question well deserving future clinical observation for its solution." The subject was one which had been so complicated by vague assertion and practical inconsistencies, that I determined it should not, for my part, be further imperilled by partial observation or illogical argument. I had learned from the immortal genius in and for whose memory my little treatise had been prepared, that "years are not the measure of experience; that it does not follow, that the older the surgeon is, the more experienced and trustworthy he must be; that it is the greatest number of well assorted facts on a particular subject which constitutes experience, whether those facts have been culled in five years or in fifty."† It will, I trust, appear from a perusal of the serial communications now prefaced, that faith has been kept with the great master's teaching; and I shall not hesitate even to seem tedious in minutely analysing every particular which can exercise even the most remote influence on the demonstrative truth of tenets which are to form a code of experience. The question is one of fact, and *by fact it must be solved*.

Necessitating, as do the facts which I have to contribute, some knowledge of the plan under discussion, I beg to refer the readers of this JOURNAL to its volume for 1855, for a series of papers on the Treatment of Fractures by Mr. Benjamin Hunt of Birmingham. Those papers are in my opinion some of the most valuable contributions to periodical surgical literature; and since it is the fate of memoirs in journals to become buried with time, the present communication will at least have had the effect of again directing attention to a series of clinical facts, which have not been studied and put to the test of experience in proportion to their weight.

[To be continued.]

16, Upper Woburn Place, Russell Square, February 18th, 1857.

SALE OF POISONS. Last week a servant-of-all-work, named Anne Boxall, resident in the house of Mrs. Adams at Petersfield, committed suicide by taking a dose of "mouse powder" (Battle's "vermin-killer"), which contains the deadly drug strychnine. It was purchased by a fellow-servant at a druggist's shop. The doctor found the wretched girl in a state of spasm. On endeavouring to raise her head (to which she strongly objected), in order to introduce the tube of the stomach-pump, he found it impossible to force open her mouth. She repeatedly expressed a wish to have her legs rubbed, and also her feet. He was about to use chloroform, when she expired in great pain. The stomach was found to be very much inflamed, and showed the results of an active poison. (*Sussex Express*.)

* Chapter on the Relative Merits of the different Methods of Treating Fractures of the Lower Limbs, at p. 134 *et seq.* of "Researches in Pathological Anatomy and Clinical Surgery," by Joseph Sampson Gamgee, with six plates. London, 1846.

* "On the Advantages of the Starched Apparatus in the Treatment of Fractures and Diseases of Joints," being the Liston Prize Essay for 1853, by Joseph Sampson Gamgee, p. 69.

† "Elements of Surgery," by Robert Liston. Second edition. London, 1840. Preface, p. vi.