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SURGICAL EXPERIENCE

OF

CHLOROFORM

BY

JAMES MILLER, F.R.S.E. F.R.C.S.E.

SURGEON IN ORDINARY, FOR SCOTLAND, TO HER MAJESTY, AND TO HIS R. H. PRINCE ALBERT ;

PROFESSOR OF SURGERY IN THE UNIVERSITY OF EDINBURGH ;

SENIOR SURGEON TO THE ROYAL INFIRMARY, ETC., ETC.

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TO

J. Y. SIMPSON

A TOKEN OF

PROFESSIONAL RESPECT

AND PERSONAL ESTEEM.



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P R E F A C E.

THE following pages contain the substance of three Lectures, introductory to my course of Systematic Surgery. In their present form, they are offered to my pupils rather than to the public. And this may, perhaps, be considered a sufficient apology for the familiar style of the Class-room not having been altered to suit the more formal character of the Pamphlet.

With regard to the observations directed upon the opponents of Chloroform, I have to remind the reader that I speak only of the Surgical application of the Anæsthetic, and leave altogether untouched its use in Medicine and Obstetrics. And, further, I should wish to be understood as not intending to apply a word of disrespect to those excellent and elderly members of the profession, who merely withhold their confidence and patronage from Surgical Anæsthesia. My controversy is with those who would cry it down, as a thing already tested and worthless.

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SURGICAL EXPERIENCE

OF

CHLOROFORM.

ON the 23d of December 1846, it was my privilege to read a letter in this class-room, from the late Mr. Liston, announcing, in enthusiastic terms, that a new light had burst on Surgery, and that on mankind a large boon had been conferred. The letter conveyed the writer's earliest and most lively impressions of a subject as startling as it was new ; and there was a large-hearted generosity about it that was sure to meet with a suitable response in all right beating breasts.

The subject was Anæsthesia. And 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. We followed here, with less power, but we hope in tune ; well pleased to find that, high as the note at first seemed to be, it was still within reach of an ordinary compass. The profession were surprised, excited, charmed in the mass ; and more especially those on the sunny side of the grand climacteric. The elderly gentlemen had their preconceived, and heretofore settled notions sadly jostled and disturbed ; not a few grew irritable, and resented the interference ; they closed their ears, shut their eyes, and folded their hands ; they refused to touch, or in any way meddle with the unhallowed thing ; they had quite made up their minds that pain was a necessary evil, and must be endured ; they scowled on the attempted innovation, and croaked that " no good could come of it." On, notwithstanding, sped the

movement. The thing was too vast, the first impulse too strong, and the promoters too numerous and nimble to be so obstructed. Once moved, the *vis inertiae* was great, and bore down all before it. The obstructors, scarce thinking it could come, were, gaping, taken unawares—upset, and ridden over; some may have been crushed fatally; but the majority, recovering from their surprise and shock, gathered themselves up again, and, with a run, mounted behind,—hurrahing and shouting with the best.

The public, as was naturally to be expected, were greatly excited, and rejoiced in the tidings. By some, they were scolded for interfering; but, to my mind, they might as well have been reprehended for showing great and personal concern in the wars of the Indian Punjaub, Repeal of the Corn Laws, or any other of the large and pressing questions of public interest at the time. At first they seemed somewhat incredulous, as if it were “too good news to be true.” Soon all became satisfied of there being “something in it,” on good hearsay evidence; and some had ocular demonstration of what they sought to know. Here, for example, a considerable number, not certainly the least intelligent of our citizens, sought admission to the operating theatre of our Hospital; and they were admitted. Their presence did not interfere with the business of the place; and a great point was gained, by imparting confidence to the public mind; not only as to the reality of the things bruited abroad, but also of the safety and propriety with which the experiments on our fellow-creatures, as affecting this great question, were being conducted. Like the Queen of old, they found it was “a true report they had heard,” but that “one half had not been told them.” And this reminds me of one august visitant who at this time honoured the Institution with his presence, the great, the good, the singularly humane Chalmers. No pruriency of sight-seeing brought him there. No man, it is well known, was ever more tender of eye, as regards blood and pain. But he had heard of humanity’s boon, and sought to know the truth; and it was one of the early triumphs of Anæsthesia here, to see that man of large and

tender heart witnessing a bloody and severe operation, with composure and serenity; feeling little, because the patient felt not at all; and the little that he himself did feel, far more than compensated by the thought, that a brighter day for that suffering humanity, with which he so closely and continually sympathized, had at length dawned, and that, from henceforth, throughout the domain of surgery, injury and disease were shorn of half their terrors.

By and bye, however, a panic threatened. A "fatal case" was announced; and it was whispered that there were many more, coming and come. The isle, for a time, was frightened from its propriety—or, at least, from its ether. The dead woman of Grantham, like Banquo's ghost, was supposed to hold a glass which "showed them many more." The alarm was laid hold of, and worked, by the sexagenarians formerly spoken of. They had foreseen it all. "Did we not say this would happen? Wait a little. This is only one; the beginning of the end. He will be a bold man now, who shall venture to repeat the ether on a capital occasion." Fortunately, however, there were bold men, not a few; and what is of more importance, men devoid of prejudice, and possessed of common sense, who saw through the clamour; who saw that the "Crown's Quest Law" was miserable law, and at variance with both fact and experience; who saw that the "fatal cases" were neither fatal *to* ether, nor fatal *by* ether,—but were, in all probability, only fatal *with* ether, just as they might have been fatal without it. Undeterred, therefore, by public panic, or professional prejudice, they held the even tenor of their way,—rendered doubly cautious doubtless,—but not a whit swerved from their honest and foregone determination to sift truth to the bottom, and, in such a cause, to suffer no vain discouragement. The trial proceeded, and the safety as well as suitableness of Anæsthesia, by ether, became more and more established.

But a new phase was at hand. My friend Dr. Simpson had long felt convinced that some anæsthetic agent existed superior to ether; and, in the end of October 1847, being then engaged in writing a paper on "Etherization in Sur-

gery," he began to make experiments on himself and friends, in regard to the effects of other respirable matters—other ethers, essential oils, and various gases: chloride of hydrocarbon, acetone, nitrate of oxide of ethyle, benzin, the vapour of iodoform, &c. The ordinary method of experimenting was as follows:—Each "Operator" having been provided with a tumbler, finger-glass, saucer, or some such vessel, about a teaspoonful of the respirable substance was put in the bottom of it; and this again was placed in hot water, if the substance happened to be not very volatile. Holding the mouth and nostrils over the vessel's orifice, inhalation was proceeded with, slowly and deliberately; all inhaling at the same time, and each noting the effects as they advanced.

Most of these experiments were performed after the long day's toil was over—at late night, or early morn; and when the greater part of mankind were soundly anæsthetized in the arms of common sleep. Late one evening—it was the 4th of November 1847—on returning home after a weary day's labour, Dr. Simpson, with his two friends and assistants, Drs. Keith and J. M. 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 he had formerly set aside on a lumber-table, and which, on account of its great weight, he had hitherto regarded 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 resumed 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 the 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. And then his eyes overtook Dr. Keith's feet and legs, making valorous efforts to overturn the supper-table, or more probably to annihilate everything that was on it; I say, more probably; for frequent repetitions of inhalation have confirmed, in the case of my esteemed friend, a character for maniacal and unrestrainable destructiveness—always, under chloroform, in the transition stage.

By and bye, Dr. Simpson having regained his seat, Dr. Duncan having finished his uncomfortable and unrefreshing slumber, and Dr. Keith having come to an arrangement with the table and its contents, the *sederunt* was resumed. Each expressed himself delighted with this new agent; and its inhalation was repeated many times that night—one of the ladies gallantly taking her place and turn at the table—until the supply of chloroform was fairly exhausted. In none of these subsequent inhalations, however, was the experiment pushed to unconsciousness. The first event had quite satisfied them of the agent's full power in that way. Afterwards, they held their wits entire, and noted the minor effects on themselves and each other. Though the specimen of chloroform was by no means pure, yet they found it much more agreeable and satisfactory in every way, than anything else which they had formerly tried; and it required no vote of the party to determine, that at length something had been found "better than ether." "The festivities of the evening did not terminate till a late hour"—3 A.M. The latter part of the time, however, had not been devoted to inhalation. The small stock of chloroform having been speedily exhausted, research was busy, among chemical authorities, to find the best formula for making more. The formula was found; the same morning, Mr. Hunter, of Duncan, Flockhart, and Co., was pressed into the service of restoring the supply: and from

that day and hour there was, for many months, no respite for that gentleman. Working with an ordinary retort, he could not make chloroform fast enough for the consumption of Dr. Simpson and his friends; and relief came only with a better mode and larger scale of production.

Satisfied, by the first experiments, of the safety and suitability of the agent, Dr. Simpson lost no opportunity of extending its application. And one day, early in November, I had myself the privilege of witnessing a striking example of its success. Dr. Simpson, having not yet had an opportunity of trying it in Surgery, came over to the Hospital in search of one. It so happened that three minor operations stood for the day; two by myself, the other by Dr. Duncan. My patient, a Highland boy, four or five years old, affected with necrosis of the radius, came first. He knew no tongue but the Gaelic; and it was, of course, out of our power to explain to him what he was required to do. "On holding a handkerchief, on which some chloroform had been sprinkled, to his face, he became frightened, and wrestled to be away. He was held gently, however, by Dr. Simpson, and obliged to inhale. After a few inspirations, he ceased to cry or move, and fell into a sound snoring sleep. A deep incision was now made down to the diseased bone; and, by means of forceps, nearly the whole of the radius, in the state of sequestrum, was extracted. During this operation, and subsequent examination of the wound by the finger, not the slightest evidence of the suffering of pain was given. He still slept on soundly, and was carried back to his ward in that state. Half an hour afterwards, he was found in bed, like a child newly awakened from a refreshing sleep, with a clear, merry eye, and placid expression of countenance, wholly unlike what is found to obtain after etherization. On being questioned, by a Gaelic interpreter, who was found among the students, he said that he never had felt any pain, and that he felt none now. On being shewn his wounded arm, he expressed much surprise; but neither cried, nor otherwise expressed the slightest alarm."*

* Dr. Simpson's Pamphlet, November 15, 1847.

A soldier came next, who required a painful operation on the face. By chloroform, it was done painlessly, although some difficulty occurred in the inhalation, on account of the existence of a large hole in the cheek. This patient shewed *his* marked approval of the new agent very plainly; immediately on emergence he seized the sponge, with which administration had been made, and thrusting it into his mouth again, resumed inhalation more vigorously than before—as if it were too good a thing to be stopped so soon.

Dr. Duncan's patient was a man of 22, with a doomed toe, of extreme sensitiveness to touch. In half a minute the patient was asleep; every student in the theatre might have handled his toe with impunity; and amputation was undergone without the slightest perception of pain. In these three operations, not more than half an ounce of chloroform was used altogether.

Next day, a young lady came to my own house, soliciting removal of an encysted tumour from the neck. About a drachm of chloroform was given. "In considerably less than a minute she was sound asleep, sitting easily on a chair, with her eyes shut, and with her ordinary expression of countenance. The tumour was extirpated, and a stitch inserted, without any pain having been either shewn or felt. Her sensations, throughout, as she subsequently stated, had been of the most pleasing nature: and her manageableness during the operation was as perfect as if she had been a wax-doll, or a lay-figure."*

From that day to this, I have never ceased to employ chloroform, in almost every case which possessed importance enough to demand its use; in every case, indeed, except a very few, whose peculiarities, as will afterwards be explained, rendered the employment of it either unsafe or inexpedient. I have done everything I could to advance the anæsthetic use of chloroform; I have carefully abstained from doing anything which might bring it into danger or disrepute. I have held but one opinion of it throughout—an opinion which has been growing, and now stands confirmed; namely, that it is

* Op. cit.

by far the best anæsthetic agent as yet known ; that in almost all cases of surgical operation it may be given, as an anæsthetic, *when given well*, with perfect success and with perfect safety ; that the knowledge of its use, in this way, is a boon to both the profession and the public of incalculable benefit ; and that, in the words of Sédillot, "its marvellous power of suspending pain transcends all that the imagination had ever conceived of the charms and enchantments of a bygone age."

As a surgical Anæsthetic, Chloroform has now spread itself over Europe, America, Australia—and even over the greater part of London. I do not propose to follow it through that wide and varied range. Nor shall I attempt to overtake now all the points of its relation to Surgery. I shall content myself with stating to you what occur to me as the chief points of its connexion with our art ; with a reference to those circumstances in which I have myself been convinced of its great value, and which have forced me into the favourable opinion which I have just expressed. And to this circumscribed task I proceed with much pleasure, for two reasons. *First*, because I conceive it to be my duty, as occupant of the Surgical Chair in this University, to give forth an early and no uncertain sound on this subject of largest importance ; and, *secondly*, because, honestly convinced as I am in favour of the agent and of anæsthesia, it fills me with indignation to find that there are in some quarters attempts being made to prejudice the profession, and especially the public, against both, and to make it appear as if chloroform, having already run its short day's course, had been quietly gathered to the tomb of all ephemeral innovations. Many of those who labour in this ungracious task, I believe, possess at least one good reason, if not any excuse, for their conduct ; namely, absolute and profound ignorance of the subject. Others either have but imperfectly informed themselves, or have their minds so warped by prejudice, as to be incapable of forming a fair impartial opinion on the matter. But the existence of themselves and their opinions need cause no wonder. The same opposition has always met great advances of truth ; yet they have not retarded such onward movement long, if at

all. And I gladly make them over to my friend and colleague, who may be said to be the maternal parent of this anæsthetic, and who has already given ample evidence that with such opponents he is more than able to cope, successfully, and single-handed.

I. THE IMPORTANCE OF PURITY IN THE CHLOROFORM.

This has been especially observable in Hospital practice : it being sometimes possible to tell where the article had been obtained, by witnessing its effects. The more pure the chloroform, the more bland and speedy its influence. When impure, irritation seems to be produced in the air passages ; the patient coughs, and is unwilling to inspire the vapour ; when becoming stupid, muscular excitement is apt to be troublesome, and tendency to talk may be very marked ; after recovery, there is sickness, probably vomiting, and the nausea is likely to prove of prolonged duration. Pure chloroform, on the contrary, does not irritate the air passages, and is much less liable to cause vomiting ; the patient breathes it readily, sometimes greedily, enjoying its fragrance and sweetness very much ; muscular excitement does not always occur, and, when it does, proves both manageable and transient ; the patient seldom speaks, or attempts to do so, before the stupor ; this arrives speedily, and is of a less apoplectic look ; emergence is calm ; and all disagreeable consequences are of rare occurrence.

II. MODE OF ADMINISTRATION.

Much depends on this. Many machines have been invented. I believe they are all useless, and not a few decidedly mischievous. None expedite, or in any way facilitate, the induction of stupor ; the only advantage they can possibly obtain, is the saving of chloroform, by preventing waste ; and this will be found but "a poor economy," at the cost of risk to the patient by asphyxia. *With an*

inhaler, it is very easy to choke the patient; *without one*, it is not easy to avoid, if one were willing, the admission of a very considerable amount of atmospheric air, along with the chloroform vapours—an amount quite sufficient to avert asphyxia. The explanation of the fact that in Edinburgh there has not yet been one untoward case, though chloroform has there been in constant use, by a majority of the profession, ever since its first introduction—rests very much, in my mind, on two circumstances, namely, the purity of the chloroform, and the absence of machines for administering it.*

The apparatus for inhaling need be of the simplest kind; anything that will admit of chloroform in vapour being brought fully in contact with the mouth and nostrils; a handkerchief, a towel, a piece of lint, a worsted glove, a night cap, a sponge. In obstetric practice, and in the private practice of surgery, a silk pocket handkerchief is perhaps most frequently used; in Hospital surgery, we more commonly see a large dossil of lint, folded up somewhat conically—or not folded up at all. In the winter season, the glove of a clerk, dresser, or onlooker, has been not unfrequently pressed into the service. But the lint has one very obvious advantage over the others; impregnated with vapour, and soiled with sputum, its want of intrinsic value does not prevent its being summarily thrown away; whereas a good glove or handkerchief will be parted with regretfully. All possess the obvious and paramount advantages of being always at hand, of admitting a sufficiency of atmospheric air along with the vapour, and of not proving either alarming or irksome to the patient. Most children, and many timid adolescents and adults, of

* I have, within these few days, seen an inhaler invented by Dr. Protheroe Smith. It is very ingenious and very pretty. Still I prefer the handkerchief or lint. The instrument is not very portable, cannot be very cheap, may not be always at hand, is likely to seem formidable to the patient, is not so easily breathed through; composed partly of glass, it is liable to be broken (as by an unlucky accident my own hands have demonstrated); valvular, it is apt to fall "out of gear;" and, along with all of its class, it has this great disadvantage,—the mouth-piece, once used, is soiled by sputum, and one's ideas of cleanliness are somewhat outraged by its promiscuous employment. Without an instrument, each patient has his own inhaler.

both sexes, will have a great dread of any instrument, however simple in itself, being adjusted to the face, and buckled on there. The young will kick, yell, struggle; and in resisting, will help to choke themselves immaturely and fruitlessly; the old will sustain excitement or shock, inimical to the result desired; or may at once and firmly decline the ordeal altogether. Whereas the most timid, at any age, are little likely to be afraid or resent the presence of a handkerchief, or something like it, which is simply held before their face, and gradually approximated to the mouth and nostrils. And when in the alarmed child it is necessary to use a little compulsion, there is no instrument whatever that will follow the boisterous movements of the little head so certainly and so safely. The struggle proves a very brief one; and, like a hooked trout, the more splutter it makes at first, the sooner is it quiescent and helpless.

The handkerchief, lint, or glove—arranged somewhat after the fashion of a cone, the interior of which suffices to hold mouth and nostrils comfortably—saturated with pure chloroform, is held at the distance of a few inches, and then gradually brought nearer until mouth and nostrils are fairly included. And there it is held loosely on the face—unless rapidly changed for an increase of dose—until the desired stertor and unconsciousness have occurred; close contact and thorough drenching of the handkerchief or lint being avoided, otherwise the chloroform is apt to trickle down and irritate the skin. As in remedial bleeding we do not think it necessary to be telling off the ounces as they flow, but are regulated entirely as to the amount drawn by the effects produced, so we as little think of dropping, or otherwise measuring the chloroform. The object is to produce insensibility as completely and as soon as we can; and there is no saying, *a priori*, whether this is to be accomplished by fifty drops or five hundred. We begin with generally two or three drachms spilt on the handkerchief or lint; and we refresh that, or not, from time to time, as circumstances require.

With the general instructions for application given by Dr. Simpson, I most fully concur; more especially as to the in-

halation being proceeded with gently and quietly, without talking or other noise, whether directed to the patient or not. Rapidity as well as thoroughness of effect are thus decidedly favoured. To talk to or at the patient during inhalation "puts him off his sleep."

III. CHLOROFORM NEVER FAILS TO PRODUCE ANÆSTHESIA.

Some patients certainly require much more than others. But I do not believe that any ordinary humanity is proof against it. There is much constitutional variety in this respect, as in other things. One man may not take three glasses of wine with impunity; another will scarce wince under as many bottles. But as I believe that no man yet withstood a steady continuance of glasses or bottles, as the case may be, without in the long run succumbing inebriated, so am I of opinion that no man, woman, or child exists, who, by perseverance, caution, and skill, may not be brought, and that safely, under the full influence of chloroform. I have been *told* of impracticable patients; but I have never seen them, and I do not expect that I ever shall. I have seen patients who resisted it long, and, from imperfect inhalation, as well as from peculiarity of constitution, proved not only slow to sleep and snore, but swift to speak and struggle and strike. I have fancied such patients occurring to a dentist, or in private practice, when assistance happens to be inadequate, and I have made no doubt that these circumstances might favour the idea of constitutional impregnability; but—assistants being both plenty and experienced—I have looked on in these same cases, and found the ordinary result sooner or later obtained. One man may be "put over" with fifty drops of chloroform, and one administrator; another man may scarce yield to less than ten times that dose, and may require a stout assistant at every limb. There is no uniformity of dose; and assistance should always be sufficient to effect thorough control of the involuntary and unconsciously exerted violence which may occur. It is seldom that anything more is needed than a

hand laid lightly on each wrist, and sometimes a straightening of a restless limb; but with an untried patient we can never be secure against anomalous results, and ought to be provided accordingly. In Hospital practice, assistance is always ample; and that is one reason why the success of chloroform is always so apparent there.

IV. A TRANSITIONAL PERIOD OF MUSCULAR EXCITEMENT FREQUENTLY OCCURS.

Some patients go to sleep, and "make no sign," not even stirring a finger, scarce moving an eyelid. Such are likely to be found among composed females, and amiable children of the tenderest years. Most patients, however, do evince muscular excitement; although, as already stated, if the chloroform be good and well given, this may be expected to prove both slight and transient. After sundry inspirations have been made, the eyes begin to wink with marvellous vigour and rapidity, and the slight glances one can catch of the eyeball show it to be rolling about wildly; the muscles of the arms and legs are felt stiffening; those of the face are distorting the features, often pursing the mouth very closely; the head is gradually raised up from the pillow, and a very stiff neck is felt attached to it; the fingers are stretched out, separated, and perhaps emulating those of Ole Bull in swiftness of movement; very commonly the hands are raised to the face, and an attempt is made to remove those of the administrator; the head may be rolled to a side, apparently with the view of escaping from the now fast overwhelming influence; the toes move, the thighs are bent upwards, and the limbs may be made to play about pretty freely. But none of this is any sign that the chloroform is unsuitable, or that convulsions are threatened, as might appear to the uninitiated. We know it is only what frequently occurs—a physiological effect of the agent, and one that we do not object to see, because by experience we know that such movements are

the sure prelude to the deep stupor that we desire. A hand is placed on the wrist, the limb is levelled, the rebellious neck is brought gently back to the pillow; and this has scarce been done when we find the muscles thoroughly relaxed, the eyelids motionless, the eye fixed upwards, the face somewhat suffused, the breathing stertorous, and the state of anæsthesia complete. In some cases, however, the progress is not so smooth or simple: the patient becomes loudly obstreperous, and exerts such muscular force as would speedily clear away one, or even two administrators, and free himself from their grasp; he kicks like a man in a fit. Nevertheless, this is still no sign of chloroform being unsuitable. The cue is—not to desist, but to be still *more* liberal in the administration. While assistants control the limbs and trunk, a large addition is rapidly made to the contents of the handkerchief; and in no long time the mouth is silent, attempted speech is succeeded by undoubted snore, the limbs grow supple, and the whole frame is passive as a corpse. Strangers visiting our Hospital and witnessing such cases, have repeatedly stated that, in their own experience, they had failed in similar circumstances, simply from having desisted in alarm, when they should have proceeded fearlessly. Seeing that the apprehended fit proved to be no fit at all, that the excitement was speedily followed by prostration, and that the onward movement of the administrator was not only efficient but safe—they have gone away, resolved to be no more foiled in the future. And two elements of success we have ventured to commend to them: first, to make sure of a pure chloroform; and second, when struggling commences, not to desist, but to go on with an increase of dose.

V. THE AMOUNT OF MUSCULAR EXCITEMENT DISPLAYED
SEEMS TO BE ALMOST A TEST OF THE PURITY OF THE
AGENT EMPLOYED.

Setting aside constitutional idiosyncrasies, I am strongly inclined to think this true. The more pure the chloroform,

the less muscular excitement—less both as to intensity and duration; and *vice versâ*. There is no doubt that there are great differences in the chloroform obtained from different manufacturers, or even from the same manufacturers at different times; and that the impure forms are most specially prone to cause undue muscular excitement. The evils of this have been repeatedly witnessed; and it is to be hoped that the distinguished promoter of chloroform as an anæsthetic, as well as all others who have the power and opportunity, will interest themselves so that this agent may be produced not only at a diminished cost, but also of a purity, and consequently of a power, hitherto unknown.

VI. THE ADMINISTRATION MUST BE WATCHED BY A COMPETENT PERSON.

It will not do to make over this duty to an ordinary bystander. The administrator must be professional, expert, and, if possible, accustomed to the work. And the value of such an one points chiefly to two things; first, the adroit superinduction of anæsthesia, also maintaining it of the requisite intensity and duration; second, the watching of its play, as it may be called, with a view towards guarding against all chance of accident. The latter is obviously the more important. The administrator's eyes should never be off the patient's face. He wishes to see him snoring—perhaps “smoking a pipe,” his eyes fixed, his body pliant and motionless; he expects to see him bluish in the face, sputtering saliva rather freely from the mouth, and seeming to the inexperienced eye on the very verge of apoplexy; but on the instant that this latter sight presents itself, the chloroform is withdrawn, not to be reponed till all such signs of complete and indeed extreme impression shall have passed away. The simulated apoplexy does not *alarm* him; he knows it as a safe sign of the full effect of his agent; but it *warns* him that he has gone far enough, and that for a time inhalation must be discontinued. With

scarcity of assistants, I have repeatedly, during an operation, been startled by the stertor becoming unpleasantly loud ; looking up, I have found the handkerchief or lint lying unwatched on the face, and, on removing it, have discovered a nearer approach to the external signs of asphyxia than was at all agreeable. Had the chloroform been continued a short space longer, very serious results would doubtless have ensued. In plain language, I do not hesitate to admit that I have seen patients, by an accidentally undue protraction of the application, brought to the very door of death by chloroform ; but that was not the fault of the agent, only of its administrator. And, indeed, these very cases speak loudly in favour of the agent—of its safety and manageability ; for, on simply removing the cloth, and permitting the best antidote—atmospheric air—to play freely on the face, all unpleasant symptoms have speedily disappeared ; and excepting, perhaps, a decided fit of vomiting, nothing afterwards marked the overdose. I can conceive nothing more dangerous than chloroform administered without a watcher, or with one who is inept. It will kill just as certainly as carbonic acid, if respired beyond a certain point. Some time since, I had occasion to perform a domestic operation on two favourite black cats of my own ; and wishful that they should suffer no pain, I placed a small sponge, saturated with chloroform, in the bottom of a boot, and then thrusting in the victim head foremost, left nothing but his tail and perinæum presenting at the calf. Though the operation was over in an instant, and the patient immediately withdrawn from his incasement, there was scarcely a spark of life in him : thoroughly relaxed in every fibre, and unconscious as if a week dead, he breathed, and that was all ; yet after a few minutes' exposure to air, he rallied, reeled up, and ran away. Very little more of the chloroform would have rendered all restorative efforts thoroughly unavailing ; and what may happen to a cat in a boot, may happen also to a man on an operating table. Surgery requires that the patient should be placed *deep* in the stupor ; and depth must be maintained, else the operation is neither quiet nor painless ; but there is a degree of depth beyond which experience tells us it is not safe

to go ; and it is the peculiar office of the administrator to see that that line is never transgressed.

Occasionally it happens, during a protracted operation, when the inhalation has required frequent repetitions, that the patient, still unconscious, and perhaps deeply so, grows very sick, and the contents of the stomach come welling up, almost without apparent effort. This gives another important duty to the watcher. The head must be held aside and a little raised, so as to permit the grumous stream to pass outwards ; else portions may find their way into the windpipe, or become impacted in the glottis, and asphyxia must inevitably result. And this constitutes a very good reason why chloroform should never be administered, if possible, on a full stomach, or after recent taking of food even in small quantity ; for then sickness and vomiting are almost certain to occur, especially in the young.

VII. THE BEST RESTORATIVE, OR ANTIDOTE, IS ATMOSPHERIC AIR.

Sometimes the patient remains inconveniently long in a state of deep sleep, refusing to awake after all necessity for unconsciousness has passed. Friends are apt to become alarmed ; and to save time, as well as their fears, the window and door are opened, bystanders are removed to a distance from the patient, and, by means of a fan, handkerchief, book, or some such thing, a strong play of air is maintained upon the face. And this is all.

Should syncope occur, in addition to the fanning ammonia may be put to the nostrils, and artificial respiration established, by strongly compressing the chest with the hands. But the giving of brandy, wine, or anything other than air by the mouth, must not be thought of. The patient has no power of swallowing, and, what is worse, no power of expectorating ; the fluid is as likely to pass into the larynx as into the gullet, and death may result—not from the chloroform, but from its antidote. At least one “fatal case” may be explained in this way.

In evidence of the great extent to which inhalation of chloroform may be carried, with safety to life, I may mention, that a patient afflicted with intense neuralgia, and accustomed to use chloroform as an anæsthetic during the paroxysms, lately consumed thirty-two ounces within twenty-four hours; and the only evil of this overdose (for an excess it certainly must be considered) was a degree of nausea which the patient did not shake off for some days.

VIII. THE YOUNGER THE PATIENT THE EASIER THE INDUCTION OF ANÆSTHESIA, UP TO ADULT AGE.

To this general statement of course there are exceptions; but in the main I believe it true. With children and adolescents, I have never seen any considerable postponement of the desired effects; and the premonitory muscular excitement, if it occur at all, is slight, and especially transient. On young children its effects are extremely beautiful. They may give one or two cries, when the stimulus of the vapour is first felt; for a very brief space of time there may be a clutching of the hands and kicking of the feet; then they fall into a soft, deep sleep, seldom truly stertorous; in that state they may be long retained, with very slight reapplication of the agent; and during it, the otherwise most painful and alarming surgical doings may be proceeded with, without a shriek or shiver on the part of the unconscious innocent. I have repeatedly, in my own house, for example, applied red-hot cauteries to the interior of erectile tumours, thrusting them, one after another, into various parts of the morbid tissue; and the patient has left the house almost without having given utterance to a single sign of pain or discomfort. There is, perhaps, nothing so painful to the operating surgeon—more especially if he happen to be himself a father—as the being compelled, in the exercise of his profession, to inflict tortures on young children, and to have his ears stunned with their piercing cries. To be saved from all this now, is felt a boon of no slight magnitude.

IX. THE ANÆSTHETIC SHOULD BE GIVEN IN BED RATHER THAN ON THE OPERATING TABLE.

• This applies especially to Hospital practice. It is a great matter to avoid the excitement which in most cases is produced, and sometimes to a very inconvenient extent, when a patient is brought, with all his nerves screwed to a pitch of unnatural tension, and his senses preternaturally acute, into an operating theatre. The impression made on him by the glare of light, the hum of voices, the movement of feet, the glance of instruments, the ominous table, vacant till he comes, the steam from pitchers of hot water, dressers in their aprons, the suspicious extent of clean linen in the shape of towels, and the crowd of eager faces in the benches around, all staring at him—the impression of these things is anything but favourable. Some patients there are, doubtless, of the harder sex, who care not one whit for such display. But the majority of either sex quail under it. Alarmed before, they are more than frightened now, and either lose heart wholly, and flee the room; or submit to the preliminaries of operation, already labouring under an amount of *shock* equal to that which the operation itself might have been expected to produce. Even the apprehension of dreadful sights and doings causes much distress. The removal of an alarmed adolescent, from his bed to the operating table of the theatre, was, under the old regime, an undertaking by no means of easy accomplishment. Sometimes his progress might be traced, from its very first movements, by frightful yellings, or at least by sobs of deep distress; and occasionally a plurality of stout assistants scarcely sufficed to prevent, on the way, a self-effected rescue and escape. All this was bad; painful, injurious, and unseemly. All is now done away.

The time for operation is come. The patient, in bed, is approached by a single assistant, who requests him to breathe slowly and fully from a handkerchief held loosely before the face. He breathes, becomes sensible of strange noises in his ears and head, grows giddy, sleeps, snores; and snoring and insensible he is carried off to the operating table; there

inhalation is kept up from time to time, as may be necessary; his leg is amputated, stone cut out, artery tied, tumour removed; the wound having been leisurely and carefully dressed, he is carried back and comfortably arranged in bed; and then, awaking to consciousness for the first time, he remembers only the handkerchief and the sounds in the head; by some magic, while sleeping in his bed, and without disturbance therein or removal therefrom, it would seem that the dreaded ordeal has been gone through, he knows not how. But "when ignorance is truly bliss, 'twere folly to be wise." It is enough for him to become gradually well satisfied that the bloody stump, or other wound, is no dream or vision of the night; and that there is no fear, shock, or pain by operation, now before him; nay, nor indeed *for* him at all; inasmuch as in his deep sleep, no pain, fear, or shock had he.

Recumbency is always the best position for administration. If the operation require a sitting or other posture as more suitable, let the patient be changed to that after the sleep has been fairly induced. To administer in the sitting posture, is to court a tedious and imperfect result, with a transitional period of considerable muscular excitement.

X. ANÆSTHESIA PERMITS THE PERFORMANCE OF OPERATIONS OTHERWISE INEXPEDIENT.

It is well known to the operating surgeon, that the shock of his capital manipulations is twofold. 1. Mental; dependent on alarm and fear. 2. Corporeal; independent of all mental working and influence; an impression made on the nervous system, probably by the abrupt and decided interference with the circulation—yet not necessarily connected with great loss of blood. The anæsthetic removes the former in toto; and I think that I have seen the second, of course not averted, but favourably modified by it also. For example, some time ago I was called, out of hours, to a very severe compound fracture, or rather mangling, of the arm and fore-

arm, in the Hospital. The limb had been crushed to a pulp by a railway waggon. The patient, a strong, athletic, middle-aged man, lay in a state of collapse, and there seemed little prospect of his coming further out of it than he had done ; a state quite low enough, under ordinary circumstances, to prevent operative interference. Confident in the virtue of chloroform, however, I proceeded (with it) to amputate close to the shoulder. And, on the conclusion of the operation, I had the satisfaction of noting, by the state of the pulse and other tests, that the condition of collapse had not only not been increased, but that the man positively had begun to rally. And rally he did ; making an excellent recovery. Without chloroform, my impression is that this patient would not have been operated on at all ; or if he had, rapid and fatal sinking would speedily have followed ; and in either event, life would have been lost. I believe that the body actually acquires, under the full influence of chloroform, a positive *tolerance* of operation, superior to what it possesses under ordinary circumstances.

XI. ANÆSTHESIA PERMITS THE PERFORMANCE OF OPERATIONS OTHERWISE IMPRACTICABLE.

Its great advantage is very evident, in operations which require great nicety of manipulation along with great steadiness on the part of the patient. Tumours, deep in the neck, for example, may come under this class ; especially in the young.

At every age, we occasionally meet with cases wholly impracticable, from want of courage and self-control on the part of the patient. Mr. Liston, long before his removal to London, had arranged to cut out a tumour from the neck of a lady of rank. Many times the operation day had been fixed ; but as often was it broken. At length, one forenoon, all was ready. The patient, loosely attired, had sat her down ; every one, anxious, was at his post ; an experienced surgeon, enacting the part of principal assistant, kneeled in front, ready with eye and hand. The knife had just been entered through the skin, when

there was a shriek; the table was overturned; hot water upset, flowed smoking along the floor; the assisting surgeon, kicked in the abdomen, lay sick on the carpet; by the door the patient was disappearing—finally; all the work of an instant.

I remember, many years ago, having to sew up and bandage a soldier's foot, from which I had partially dissected out two metatarsal bones; he became so uncontrollably turbulent during the operation, and so determined that it should not be completed, that there was positively no alternative between this proceeding and allowing the risk of perhaps fatal hæmorrhage.

Not long ago, a stout young lad, with a very decided squint, came to be relieved of this. His narrative was, that before the days of chloroform he had made an attempt to submit to the operation of division of the rectus; but had lamentably failed. The operation had been begun; but all the skill and experience of the operator could not bring it to a conclusion. Under the cover of loud cries and much wriggling, the patient had effected his escape—his eye cut indeed, but the muscle untouched. Laying him down on a sofa, chloroform was administered; speedily he was in a sound sleep; and, during that, all the muscles of the orbit might have been divided as easily as on a dead subject. He went away, looking very straight as well as very happy; the only unpleasant remembrance of his visit being a soiled condition of his jacket, which had come inopportunately in contact with some half-digested mutton-pies—which had been taken rather close upon the chloroform. Operating for strabismus in the young, with and without chloroform, always suggests to me as an illustration, the attempt to shoot a lively and perhaps experienced rabbit, jerking itself like lightning through furze, as contrasted with the deliberate slaughter of a sleeping innocent on the sunny face of its burrow. The latter, though a tolerably sure event, is doubtless unsportsmanlike. But it is almost needless to say that we do not look for *sport* in surgery.

In most operations on the eye, chloroform is likely to prove a great assistance. For, when the patient is placed in com-

plete snorting stupor, the eye will be found not only quite motionless, but also perfectly regardless of the stimulus of knife, scissors, hook, and forceps. And should repetition of inhalation be necessary to maintain the required depth of stupor, this can be quite well managed through the mouth and nostrils, leaving the eye free to the operator. For obvious reasons, however, when operating on the globe—as for cataract—the occurrence of vomiting is as far as possible to be guarded against.

XII. ANÆSTHESIA AFFORDS GREAT RELIEF TO THE OPERATOR AS WELL AS TO THE PATIENT.

This requires no illustration. To no ordinarily constituted man is pain otherwise than repugnant; whether it occur in himself or in another. And, hitherto, there can be no doubt that his being compelled to inflict pain, and witness the infliction of it, has always been esteemed by the surgeon as the hardest portion of his professional lot. Now this is gone. He proceeds to operate with a mind wholly unoccupied with regard to the *feelings* of his patient; for he knows that all the while he will be in unconscious sleep; and the surgeon's mind, thus undistracted, is, of course, so much the more competent to deal with the details of the operation—its planning, execution, and completion. Mr. Abernethy, on proceeding to perform an important surgical operation, was accosted by a colleague, who said, "How are you? How do you feel to-day?"—"Sir," replied Mr. Abernethy, "I feel as if I was going to be hanged." Cheselden thought his reputation dearly earned at the cost of such personal distress; and he has left it on record that he always, before an operation, "felt sick at the thoughts of the pain he was about to inflict." The late Mr. Liston, who was second to none, living or dead, in true courage, has, I well know, lost many an hour's sleep, and many a meal, by mental anxiety in the prospect of operation. No doubt that anxiety, in many, if not in most, may be composed of various ingredients; the pain about to be caused to the patient, the difficulty of the operation, the unforeseen

complications that may occur, the risk of failure, the danger to the life of the patient, the risk to the reputation of the surgeon. These, doubtless, all contribute to unhinge equanimity, even in the most resolute and practised; but, judging from my own experience, I should say that the first named was certainly not the least oppressive; and that any surgeon, finding that portion of his burden removed, would be sensible of a vast relief, and be prepared for much greater freedom and energy of action. Whence was it that students, dressers, and even surgeons grew pale, and sickened, and even fell, in witnessing operations? Not from the mere sight of blood, or of wound; but from the manifestation of pain and agony emitted by the patient. And, now-a-days, this patient—whatever his age, or sex, or however nervous, timid, and apprehensive—gives not one sign of pain, or even discomfort, but lies in happy slumber all the while. A snort is the worst sound that he makes.

XIII. THE OPERATING SURGEON SHOULD NEVER BE IN A HURRY. NOW HE HAS NO EXCUSE FOR THIS.

Formerly he was tempted to over-haste. He may have imbibed the absurd idea, that dexterity is commensurate with rapidity of performance; and a sense of his own self-interest may have unduly urged him to despatch, in public practice more especially. But it is more charitable to judge that the true reason, in the great majority of cases, was actually that which would probably have been given by the operator himself to an inquirer—to save pain to the patient, to abridge the moments of suffering, for even moments of these are of huge import. Now, such moments exist no longer; they are unknown with chloroform. And as there is no cause or excuse for haste in operating on a dead body stretched on a dissecting-table, so there is as little cause or excuse for haste in operating on an anæsthetized body of a living patient. Formerly it was thought that a stone-patient, by enduring less shock, was more favourably circumstanced for recovery, the

more rapidly the operation was performed. With chloroform, however, all is changed; and in this, as in all other operations, the surgeon is left at liberty to be as deliberate and painstaking in every movement of the knife as if he were dealing with textures truly inanimate. From such deliberation in procedure, there results, as already stated, no increase of shock or other evil; all is pure benefit—an operation conducted in all its parts with certainty and precision, and therefore more promising of a successful issue.

XIV. ANÆSTHESIA DOES NOT FAVOUR HÆMORRHAGE.

The converse has been an objection urged. In my experience and belief it does not hold good. Take amputation, for example. 1. Anæsthesia does not favour flow of blood during the incisions—on the contrary. The tourniquet, or compressing finger of an assistant, is not liable, as before, to be jerked off the vessel; for the patient is lying in thorough stupor, with lith and limb supple as a willow and motionless as a log. The absence of alarm and excitement in the patient, saves quickening of the *general* circulation. The absence of writhing and contortion, in the limb, saves from *local* acceleration of the blood's flow, more especially from the venous trunks.* 2. Neither does anæsthesia favour bleeding during deligation of vessels on the stump's face. On the contrary, the quiet state of the stump favours quick despatch in securing these; and the orifices untied, abiding their turn, will exude all the more sparingly on account of the quiet state of the general system. 3. Nor does anæsthesia favour hæmorrhage after the stump has been arranged, and the patient replaced in bed. For, in the first place, such ample

* In bloodletting, at the bend of the arm, if the limb be kept steady and motionless, the blood may flow slowly, if at all; and to accelerate its escape, the muscles of the forearm are put into constant motion. The former condition—quiet, with feeble flow—corresponds with anæsthesia; the latter—muscular movement, with full bleeding—corresponds with the active and unsteady limb of an unanæsthetized patient.

leisure is given for sponging and scrutinizing every part of the stump, once and again, as to render the overlooking of any likely vessel, however obscure, extremely improbable; and, in the second place, reaction after emergence from anæsthesia is not sudden, but gradual; neither is the state of quiet followed by one of excitement; the patient continues tranquil and composed, the general circulation suffers no arousing, and, in consequence, Nature's hæmostatics are not likely to be undone in any of the minute arterial twigs. I remember that, at one time, hæmorrhage, within a few hours after operation, used to be very frequent in Mr. Liston's practice; and the reason assigned, I have no doubt most justly, was an imprudent haste in "doing up" the stump or other wound. The main vessels were tied as rapidly as possible—and not a little rivalry existed among us assistants as to who should tie them fastest—then the lips of the wound were brought at once together, and the patient despatched to bed. This was to save protraction of pain. At every firm wipe of the sponge over the raw surface—perhaps studded by the truncated ends of large nerves—there was seen contraction of the muscles, and there was heard a loud complaint; and, not unfrequently, each catch of the forceps and noosing of the ligature were marked by a shriek of suffering. Of all this the surgeon naturally wished to inflict as little as possible; and he was thereby tempted to unwise expedition in arranging the wound. But now there is no such temptation; every vessel is sought out and secured deliberately; and the occurrence of bleeding within twenty-four hours after operation is almost unknown.

XV. ANÆSTHESIA TENDS TO SAVE BLOOD.

This follows as a corollary from the preceding. The general circulation is quiet and gentle; the muscles are at rest; and ample leisure is given for looking for and securing every bleeding point, and every point likely to bleed. Besides, there may be a decided saving in venous blood; more especially in the neck, axilla, or other parts near the organs of respiration.

Thus, one day, in dissecting out from a child a tumour which overlaid the pectoral muscle, and bulged freely into the axilla, I had occasion to lay bare the large axillary vein for an inch or two; and in cutting closely upon it, one of its feeders had been injured. At that moment, the patient began to emerge from the deep stupor of anæsthesia, and cried lustily. Immediately a gush of venous blood took place, and filled the axilla. Chloroform was reapplied as rapidly as possible; so soon as the gentle breathing, as of sleep, was restored, the cavity was found bloodless as before; and the dissection was leisurely and safely completed. Had there been no chloroform there, the struggling and cries of the patient might not only have caused much loss of venous blood, but would have both retarded and complicated the operation most untowardly.

XVI. IT IS NOT AT ALL UNLIKELY, THAT ANÆSTHESIA WILL ALSO BE FOUND TO LESSEN THE RISK OF ENTRANCE OF AIR INTO VEINS DURING OPERATION.

We know that this accident is in part caused by deep and laboured inspirations, which a patient, alarmed and straining, naturally makes under fright and pain; and one mode of obviating the occurrence, is to compress the chest tightly by bandaging, or otherwise to prevent those deep inspirations, and secure a *shallowness* of breathing. Now, it is very obvious, that the easy sleep of chloroform will overtake this indication in a much more comfortable and effectual way.

XVII. DELICATE DISSECTIONS ARE RENDERED MORE SIMPLE AND SAFE.

This must inevitably be the result, if the necessary depth of stupor be produced and suitably maintained—as it always can be. Excepting the flow of blood, the anatomy is as plain as in a dissecting room. The patient is perfectly steady; nerve, artery, vein, muscle, fascia, may all be freely manipulated without causing any muscular jerk, voluntary or involuntary. And this absence of muscular movement also secures another

very important matter; namely, non-displacement of the relative position of the parts. Most certainly, however, unless the surgeon have a determination of effecting and maintaining the required depth of anæsthesia, he had better let chloroform alone, whenever he has a large and deep vessel to tie, or a difficult tumour to dissect away; for the muscular excitement, which invariably attends on imperfect anæsthesia, must inevitably tend to render such operations both tedious and unsafe, if not indeed absolutely impracticable. At the same time, let me again repeat, that the effecting and maintaining of the required depth of anæsthesia is always at the command of good chloroform and experienced administration.

XVIII. THE ADVANTAGES CONFERRED BY ANÆSTHESIA ON THE PATIENT ARE VERY OBVIOUS, AND SCARCELY REQUIRE EVEN ENUMERATION.

Absence of alarm and excitement, and of shock, previous to the operation; freedom from pain during it, and during the arrangement and dressing of the wound—which may be tedious; a greater readiness to undergo operation—rendering this, therefore, because early, all the more likely to prove successful; the prospect, at all times, of a better recovery—all the circumstances of the operation (absence of shock, sparing loss of blood, accuracy of incision, &c.) having been rendered conducive thereunto. Tumours were wont to grow for many years undisturbed, till at length, from bulk or pain, they compelled interference—at least to be thought of; stones lay and rolled in the bladder, inflicting years of sore agony, and attaining to a bulk, perhaps, wholly incompatible with safe extraction; aneurisms grew, and grew, till on the very verge of bursting, till all textures had been damaged and compromised, and till hope by operation had waxed faint and feeble; diseased joints hung useless on the limbs, gradually exhausting the frame by sure hectic, till probably, at length, there was but a slight chance of saving life at the cost of the limb's sacrifice. And all this fatal procrastination, because the sufferer could not brook the thought of pain *under the knife*. “In disease, the sternest minds, and the most possessed, have looked death

steadily in the face, day by day, week by week, and month by month; they have reasoned calmly of that which they believed to be surely carrying them onward to their grave; and yet they have turned, trembling and appalled, from the thought of an operation which a turn of their malady may have rendered expedient or imperative. Many a wise, as well as many a bold man has refused to submit to what his own conviction told him was essential to his safety; and many a valuable life has thus, in one sense, been thrown away, which otherwise might have been saved, or at least prolonged. And why? Simply because, in the operations of surgery of a graver kind, there has hitherto been such cruel pain as frail humanity, even of the highest class, is fain to shrink from." * Now there is no such bugbear; and, in the sure prospect of enduring *no pain whatever*, the patient at once, with little or no hesitation, is found ready to submit to what the surgeon tells him is necessary to his welfare. There is no postponement till a time that is too late; all may not only be done well, but done also in its proper season; and it need not be matter of surprise, consequently, that success comes more plentifully than before.

There was at one time a small party in the surgical profession who stood up for the rights of pain; maintaining pain to be good in itself, and especially good in surgery. A Dr. Gull (ominous name) wrote a paper, showing the injury which ether did by abolishing this blessing; Mr. Bransby Cooper reasoned himself into an "aversion to the prevention of it;" and Mr. Nunn could not see how surgeons or surgery were to get on without it. It was a "great safeguard" against much risk. Propped and guarded by it, in his surgical walk hitherto, he had felt much comfort; its sudden removal, leaving him all to himself, must cause him to fall "hourly"—at least into danger. Dr. Pickford took up a strong position, and defended both its sides; "pain was desirable," its "prevention or annihilation hazardous to the patient." Magendie lent his name to the cry of "Pain for ever!" but no wonder of that; his experiments on living animals—his vivisections—had long since disqualified him as a judge in such a question. The party, as a party, is

* North British Review, May 1847, p. 169.

dead ; died of anæsthesia—an undoubtedly “fatal case.” The component members, it is to be hoped, are cured, or in progress towards being so ; some cured themselves, by their own reason and observation ; some were cured in the general advance of public opinion ; a few are yet under treatment—by Dr. Simpson.*

Pain, the attendant on *disease*, does some good ; by directing attention to the affected part, enforcing disuse of it, &c. But the pain of *knives* and *caustics*, *et id genus omne*, is surely an undoubted evil.

XIX. BY ANÆSTHESIA DURING OPERATION, THE PAIN WHICH IS FELT AFTERWARDS IS PROBABLY CONSIDERABLY MODIFIED.

I am sure I have seen this, and often. A patient has been removed from the operating table to his bed, and laid all comfortably there, in a sound sleep. Left alone, and not teased by injudicious questions, he may dose for some time—ten minutes, half an hour, or even more. Awake, at length, he is not at once conscious of pain, or of something having been done to cause this, but may require some reasoning, as well as observation, to satisfy himself that the operation, which he knew to be imminent, has actually been performed. And then he may very probably express the uneasy sensations, which he now knows to have got a cause—sensations which consequently he, as it were, looks for, and finds that he does experience—as very much under what he had conceived as at all possible in such circumstances. In children, the matter is better tested. Take the operation for phymosis, for hare-lip, or for nævus. Without chloroform, the patient gives ample token of acute suffering, not only during the operation, but for long afterwards ; for hours the constant sob and tear, and the occasional scream, testify very plainly that pain is still endured. With chloroform, the same operations may not only be completed without a sound or struggle ; but, positively, for hours afterwards the child may take the breast, or fall asleep, or

* Vide his paper on Etherization in Surgery, Monthly Journal, September 1847, p. 162.

wake and laugh, and scarcely show any sign of suffering even then. In fairness, however, I must admit that, hearing sounds of pain from wards, whither patients had been carried on an operating day, and inquiring the cause, I have been told that they proceeded from patients recovering from anæsthesia. Repairing to their bedsides, I have found most of such raving, still under influence of chloroform; but some, broad awake, and in possession of their full senses, have certainly been crying out on account of actual pain. Still my own conviction certainly is, that anæsthesia not only saves from pain during operation, but that the after-pain is both slow of coming on, and is of a mitigated character when it does come.

Besides, as will afterwards be stated, a minor use of the anæsthetic will succeed in effectually subduing after-pain, should it prove severe.

XX. SICKNESS, ON EMERGENCE, IS ONLY OCCASIONAL.

As already stated, it will scarcely fail to occur, if the stomach be occupied by food, or ingesta of any kind, recently taken. And if a very large quantity of chloroform have been consumed, by reason of long protraction of the operation, a certain degree of nausea may be expected. But if the chloroform be strong and pure, quickly given, and not often reapplied, the occurrence of either sickness or vomiting will certainly be the exception rather than the rule. When these do take place, they seldom prove troublesome, either by intensity or by persistence; the stomach having been thoroughly cleared, the patient rallies, often quickly; and, though feeling somewhat different from his wont, and rather uncomfortable than otherwise for a time, yet he cannot be said to be either "sick or sore."

XXI. SYNCOPE IS PROVED TO BE RARE.

This is regarded, and justly, as probably the chief risk of chloroform: namely, that the patient may faint, and that so

thoroughly, as to refuse resuscitation under all available stimuli. And "fatal cases" of this nature are recorded. On this subject I have just two observations to make. 1. In this city, where anæsthesia has been employed to an immense extent, both in surgical and in obstetric practice, no "fatal case" has as yet occurred; in only one example, so far as I am aware, has any trouble or anxiety been occasioned by the supervention of syncope. And this gratifying fact, as formerly stated, I attribute mainly to two things—namely, the purity of the chloroform, and the careful mode of its administration. 2. In the "fatal cases" which have occurred elsewhere, it is by no means *proved* that the anæsthetic agent was the cause of death. The records of the practice of surgery, before the days of chloroform, contain numbers of cases precisely similar to those of the present day, in which latter all the blame is sought to be laid on anæsthesia. And there cannot be any doubt, I think, among unprejudiced men, that the argument, "*post hoc, ergo propter hoc*," has been as unwarrantably as unsuccessfully employed against this new agent. Its opponents were not contented with assigning a *portion* of the blame to chloroform, but insisted upon its bearing *all*; it must be sole agent, and not merely art and part in the mischief. In our school-days, we may remember something like this. A knot of juveniles are busy in rough romps: and all are plying hands and feet with wonderful energy and quickness; a casualty happens—a blackened eye, a bloody scone, a sprain, a riven garment; and the authorities—master or parent—come then to play their part. The question is put, "How came this?" "It wasn't I: 'twas he;" and from "me" to "him" it goes, until it settle on some unlucky "him," who lacks either the will or the power of exculpation; and *that* "he," perhaps the least guilty of all, is in danger of bearing the whole brunt and punishment. Again; a man is unpleasantly situated, by something of his own doing. Say, he has lost a patient, rapidly, after operation. He has a secret misgiving that it was an act of his own that did the mischief, yet he is tempted, by one of the many evil influences that waylay men's hearts, to fix the blame on something else, which itself shall take no harm, and yet set

him free. Just as a man may try to deceive others, if not himself, after having dined out and taken too much. Next day he is ill—thirst, nausea, fever, mental misery, a racking headache. A visitor of condolence reaches him, and just ventures to hint that perhaps his libations had gone somewhat beyond the limits of prudence and propriety: “Oh no; certainly not. It was some roast beef, imprudently eaten without mustard.” This caused the whole evil. It never was the wine or the whisky; always the salmon, the pudding, or the beef, “disagreeing with the stomach.” And, in like manner, may it not have been said, “Not the operation, not the operator, not the knife—the anæsthetic, the ether, the chloroform—alone it did it.”

I would be far from saying that chloroform *may* not, single-handed, cause death; by syncope, or in some other way. But it has not yet been *convicted* of this. And the cases of syncope which have occurred, *during its use*, are few indeed, when compared with the vast number of cases in which this agent has been employed. In this city, as already stated, there has been, so far as I know, but one example of syncope, and no “fatal case” at all. The fair inference seems to be—that, while aware of the risk of hazardous syncope being so induced, we employ the agent with all due caution—yet, aware that due caution is able to render that risk extremely slight, we are not deterred from having recourse to the agent in all suitable cases and circumstances.

XXII. ANÆSTHESIA DOES NOT SEEM TO FAVOUR THE ACCESSION OF ERYSIPELAS.

At one time I had a suspicion that erysipelas was more frequent than it ought to be, after operations in which chloroform had been employed, in the Hospital. A careful observation, however, not only of my own cases, but also of those under the care of my colleagues, convinced me of the groundlessness of this suspicion. Erysipelas certainly prevailed to a very unpleasant extent when chloroform was first

employed; but not more frequently did it attack patients who had used chloroform, than those with whom it had never come in contact. Our operation-cases did not suffer more from this epidemic—for epidemic it certainly was then—than did ulcerated legs, sinuses, accidental wounds and bruises, &c.

XXIII. CHLOROFORM OCCASIONS BUT LITTLE TEMPORARY AND NO PERMANENT IRRITATION OF THE AIR-PASSAGES.

If it is *good*. But that is indispensable. If patients are made to inhale vapours from a bottle which smokes when the stopper is removed, and the contents of which stain or even corrode the handkerchief, there need be no wonder if the lungs suffer, and that seriously. Pure chloroform, however, if cautiously administered—not holding the handkerchief too close at first—very seldom occasions coughing. Sometimes there is a slight tickling of the throat; but very rarely. And the full inspirations are carried on without any sign of irritation. On emergence, and afterwards, I do not remember to have ever heard a patient complain in this respect. It was otherwise with ether. On its inhalation, coughing, with a disagreeable sensation in the throat and chest, was invariably, or almost invariably produced; and a profuse mucous secretion became established, sometimes continuing for days afterwards. And so decided were these marks of faucial and pectoral irritation, that for some time we had quite laid it down as a rule, never to administer *that* anæsthetic in cases where pulmonary disease was either already threatened, or likely to be so. With chloroform we have no such dread, and consequently no such restriction.

XXIV. THERE NEED BE LITTLE DREAD OF HYSTERIA.

I have seen the most hysterical females subjected to anæsthesia by chloroform, with perfect impunity; and never in any case have I seen untoward complications by hysteria induced, either during inhalation or afterwards. Imperfect exhibition of chloroform I can easily conceive to be a very

excellent mode of exciting hysterical disturbance; but, duly administered, I should never dream of ranking tendency to hysteria as a contra-indication. Often I have seen paroxysms of violent hysteria, induced by other causes, calmed down to the stillness of soft sleep by means of chloroform.

In order to prevent hysterical or other excitement, on emergence, it is of much importance to allow the patient absolute quietude. To talk to, joke with, or interrogate the patient after the operation, while stupor still remains, is certainly reprehensible. Seldom, if ever, does it fail to produce excitement. Recovery of consciousness should, in ordinary circumstances, be entirely the patient's own doing. Touch his eyelid, or say but a word, and he may spring up, wild; but leave him quite alone, in silence, and, if possible, in darkness also, and he may sleep on for an hour or more, awaking at last as if from a common slumber.

Another little matter of some importance is, to have all dressing and handling of the wound completed, before the patient is permitted to emerge from stupor. And the reason for this is twofold:—1. That the patient may be saved from unnecessary pain, and the risk of troublesome excitement. 2. That the surgeon and attendants may be themselves exempted from harm; for, by a neglect of such precaution, unpleasant blows may be sustained from a muscular leg or arm excited to involuntary aggression. It was only last Saturday that I was removing hæmorrhoids and loose skin, by scissors, from a gentleman under chloroform. During emergence, a little bleeding showed itself; and I stooped to sponge, and look for a vessel. In this occupation, I was disturbed by feeling a smart shock of air on my head and face, accompanied with a noise like that of a bird or bullet in swift flight. Looking up, I saw my assistant, convulsed with laughter, endeavouring to restrain some wild movements of the patient, who had become angry and pugilistic in his sleep. I had been grazed by a backhanded blow of his fist, delivered with such intensity of half unconscious purpose, as would certainly, if it had struck, have made me as recumbent and perhaps as unconscious as himself.

XXV. IN OPERATIONS ON THE MOUTH AND NOSE, ANÆSTHESIA
MUST BE USED WARILY, IF AT ALL.

The obvious and urgent cause of prudence here, is the risk of asphyxia by blood escaping into the air-passages. Blood trickles down into the fauces. There, in ordinary circumstances, its presence excites, by reflex action, the function of swallowing; and on it passes to the stomach. Or if some do find its way into the glottis, it is quickly ejected again, by the violent and uncontrollable efforts of coughing, which the presence of all foreign matter there never fails to produce. But, in the deep stupor of Surgical Anæsthesia, the patient is "too far gone" for either the receiving or the rejecting function; he is alike dull to swallow or to cough; the fluid blood gravitating downwards, as if in a dead body, is as likely to make its way into the air-passages as into the gullet; and accumulating in the former site, because not rejected, it chokes the patient as effectually as if a rope had been drawn tight round his neck, or his lungs injected with plaster of Paris. "Fatal cases" may be satisfactorily accounted for in this way, now and then; more especially if dissection show the bronchial tubes tolerably well "filled with coagulated blood." Operating once for cancer of the nose, and having to remove a large amount of vascular texture, incisions in which I knew must be accompanied with extreme pain, I began with anæsthesia. From the track of the scalpel blood burst forth in large quantity; and, although I had placed the patient in a sitting posture, I soon found that my sleeping victim was placed in imminent jeopardy of his life. The blood actually boiled and gurgled in his throat; and I was glad to find that consciousness speedily returned, so far as to admit of strenuous ejecting efforts on the part of the thorax. I had to wait until the anæsthesia had passed wholly off, or at least until consciousness had been thoroughly restored; and then completed a bloody and painful, but safe operation.

In operating for polypus of the nose, I have employed chloroform; but always took care to have the patient seated very erect, and ever and anon to have the head stooped forwards

so as to get the mouth and throat cleared of blood. Notwithstanding the latter precaution, a good deal of blood has reached the stomach, with perhaps a polypus or two from the posterior fauces; but I have never been troubled with the entrance of either into the air-passages.

A patient, labouring under formidable necrosis of the lower jaw, presented herself; anxious for relief, yet so timid and nervous as scarcely to permit a look upon the part—touch was out of the question. Without removing her consciousness, the operation necessary for cure was quite impracticable. Chloroform, accordingly, at her urgent request, was consented to; and, under the skilful management of Dr. Simpson, it proved a most admirable adjuvant. She remained as still throughout the operation as if dead; and by laying her on her side, with the head well turned forwards, the blood escaped freely by the mouth, proving in no way troublesome.

And this case reminds me of another way in which blood may be saved by chloroform, in addition to those formerly stated. On dividing the facial artery, its contents poured out in vast volume, and with a loud whizzing noise. Had this been felt and heard by a nervous female, such as this *was*, her alarm would have been probably uncontrollable; she would have become violent and unsteady, till exhausted by hæmorrhage; whereas, with the chloroform, if alarm there was, it was only in the bystanders. And yet, with all the assistance given by the motionless condition of the patient, it proved no easy matter to staunch the flow; the vessel being surrounded by textures transformed into a resemblance of cartilage, and refusing the ligature.

Another case bearing on the same point was told me by Mr. Liston. He was operating for tight stricture in the perineum, and had made a free incision through it. The perineum was that of an elderly gentleman, very intolerant of pain. The operation had been conducted under anæsthesia comfortably enough; but, by and bye, hæmorrhage was discovered. The patient having been laid back again, as for lithotomy, a vessel of considerable size was seen spouting deep in the wound, and attempts were made to secure it. All

these proved ineffectual, however, through the restlessness of the patient; and some apprehensions began to be entertained from the serious loss of blood. Mr. Liston plugged the wound hastily, had anæsthesia reproduced, then removed the plug, and at once secured the vessel by ligature. His deliberate conviction was, that without anæsthesia that patient ran no slight risk of loss of life by hæmorrhage. During consciousness, his struggles rendered even sight of the vessel difficult; during anæsthesia, the perineum was fully exposed, and the vessel was seized and tied at once. And thus these two cases warrant us in saying, that chloroform tends to save blood in operations, by facilitating the securing of arteries awkwardly situated.

But to return to the proper subject of this head—it is obvious that if chloroform be employed in operations on the mouth or nose, it must be used very cautiously. The patient is laid recumbent during the administration; for that posture, as formerly stated, is very favourable to the desired result being rapidly and satisfactorily obtained. In operating, the position must be changed to that of sitting; or the patient is arranged on his side, so as to make the orifice of the mouth dependent.

XXVI. CHLOROFORM LULLS PAIN AFTER OPERATION; AND
MAY BE ADVANTAGEOUSLY EMPLOYED THUS, ALTHOUGH
INEXPEDIENT DURING THE OPERATION ITSELF.

In removing a tumour from the palate of a lady, anæsthesia was abstained from during the operation, for the reason stated in the previous section. But when the operation was over, and the bleeding had stopped, great relief was afforded by gentle inspiration of chloroform; not pushing it so far as to cause deep sleep, but just maintaining what may be termed its *deadening* effect on pain. The actual cautery had been used, as well as the knife; and the patient emphatically declared, that, without chloroform, the after-pain would have proved absolutely insupportable. As it was, she lay in a state of comparative, if not of absolute comfort, for hours. I may add, that this lady was subject to catalepsy, and had been attacked by this on the occasion of a former operation. At

this time no fit occurred; and the exemption was attributed by her to the chloroform.

But it is not to such cases alone that this minor use of chloroform applies. It extends to all in which severe pain continues, after operation. After the deligation of hæmorrhoids for instance, excruciating suffering often persists for hours; intolerable in itself, and exhausting in its effects on the system. By means of chloroform, used much more lightly than during operative procedure, such untoward consequences may be obviated quite. It is not necessary that the patient should be thrown into stupor; a less dose of the anæsthetic suffices; and, indeed, the patient might—so far as consciousness is concerned—himself conduct the administration.

And this reminds me that the operation for hæmorrhoids does not necessarily belong to a class of cases, in which chloroform is supposed to be unsuitable, on account of the patient's will having to act consentaneously with that of the surgeon. A continued straining of the patient, by causing the tumours to protrude, no doubt, facilitates their removal; and this co-operating effort is lost in anæsthesia. But "where there is a will, there is a way;" and it may be managed thus: Let the patient strain fully, when arranged recumbent; the tumours having been thoroughly exposed by straining, let them be secured by a volsella, or by means of more than one of these instruments; then let anæsthesia proceed; and, however deep the stupor, no difficulty will be found in bringing down the doomed parts at least as thoroughly as in any other circumstances. By means of this instrument the surgeon has them completely in command.

XXVII. IN OPERATIONS ON THE SKULL AND BRAIN ANÆSTHESIA IS NOT CONTRA-INDICATED.

If anæsthesia be but asphyxia, as some contend, it should be otherwise. Congestion of the brain should be an untoward attendant on such operations. And yet it is not so. A boy between eight and ten years of age was brought to the Hospital, having fallen from a height of several stories on hard ground. On the left side of the head there was a depressed

fracture, with comminution of the parietal bone; the surface of fracture extending to about two inches square, and the amount of depression at the centre of the injured bone being about half an inch. On careful examination, I came to the conclusion that it was expedient to raise the bone. Accordingly, I began with the ordinary incisions; trusting that the "head symptoms" would be sufficient to render the operation both quiet and painless. In this, however, I was disappointed. At the first prick of the knife, the boy rose, and writhed, and roared; and immediately chloroform was administered—not, however, without much watchfulness, and some anxiety for the result. It had the ordinary effect. The boy was thrown into deep sleep, and maintained so, until all the details of the operation were completed. With Hey's saw I removed a triangular portion of sound bone, to admit the lever; and then, by means of this instrument, brought the depressed portion to the normal level. It was interesting to observe, that in raising the depressed bone, I seemed to raise the head with it—so manifest and immediate was the relief to the compressed and soporose brain. Emergence from the anæsthesia did not differ from the ordinary run of cases; and the boy scarcely had a bad symptom afterwards. By dint of rest, low diet, purging, and a few leeches, he made a most excellent recovery.

In removing a tumour (spina bifida) from the loins of a child, and in performing paracentesis capitis in another child, on account of chronic Hydrocephalus, I also had recourse to anæsthesia, with impunity. Although in both cases the result was unfortunate, that certainly was not attributable to the anæsthetic.

But Surgery derives most important advantages from anæsthesia, independently of those connected with operation. And these I shall proceed shortly to consider.

I do not think it necessary to dwell on the obvious benefits that accrue from chloroform's use, in the ordinary painful manipulations of our art; as—opening abscesses and sinuses

in the young or timid, inserting setons or issues, applying the actual cautery, probing or otherwise examining diseased joints, &c. In the one set of cases, pain and fright are saved; in the other, accuracy of diagnosis is manifestly favoured besides.

XXVIII. ANÆSTHESIA IS OF MUCH SERVICE IN CASES OF DISLOCATION.

Not only does it remove all pain from the efforts of reduction; reduction, itself, is wondrously facilitated. If a man is found immediately after infliction of the injury, he is pale, sick, and faint; every muscle has lost its energy; he cannot, even by strong will, call up a muscular effort; and, in consequence of the thorough state of muscular helplessness, the surgeon has seldom any difficulty, even though single-handed, in reducing the displacement. But if this favourable period of depression pass by unimproved, and the man recover his general vigour, while the muscles regain their ordinary contractility—and something more—it is well known that much difficulty must be looked for, in many cases, ere replacement can be effected. And this is not achieved—that is to say, the main obstacle to reduction, namely, muscular contraction, is not overcome—without the infliction of much pain on the patient, and the expenditure of much exertion on the part of the surgeon and his assistants. The object is—to succeed not by mere brute force, in hauling by ropes or sheets; but to imitate that state of prostration which occurs at the time of the accident, and which is so manifestly favourable to success. Many *auxiliaries*, therefore, to the mere physical force, have been devised and practised: tobacco—but that does too much; bleeding—but that also is faulty, for it is but seldom that blood in quantity can well be spared; opium—but the effects are not very transitory, and all systems do not equally well agree with the drug. Antimony, pushed to complete nausea, and the warm bath kept up to complete prostration—these latter have hitherto been the most frequently employed; achieving the object desired, not very persistent in their effects, and

leaving no permanent damage in the system. But all are inferior to chloroform. Did this do nothing more than merely obtain thorough muscular relaxation, it would be a great matter; but when, in addition to this, it removes all pain of manipulation too, the value of the boon is unspeakably enhanced. The stupor must be deep, however, and deep it must be maintained; otherwise the effect on the muscles will be the very opposite of what we seek. The patient is laid down, and all arrangements made for extension; the chloroform is given, the legs and arms begin to move, and the muscles will be found then as stiff and hard as boards; nothing is done until the eyes fix, the limbs are at rest, and the muscles grow soft and supple as if a week dead. Then the extension and coaptation are made; and it is truly wonderful to see with what facility, in most practicable cases, the bones find their place again. The object is achieved without much trouble to either party, and without even the knowledge of the one principally concerned. A friend of mine used to say, that he liked travelling in a steamboat very much, because in the night they made such progress; during every minute of his sleep the paddles were busy, the ship moving on and on; and, awaking in the morning, it was a great satisfaction to find oneself perhaps a hundred miles nearer the journey's end, or even snugly moored in port. It must be a still greater comfort to the victim of a dislocation, to sleep unconsciously all the while that his limb is handled, pulled at, and reduced; and on awaking to find that the object of his anxious desire—the means towards the attainment of which caused him no little dread—has been thoroughly secured. The awaking, or rather the knowledge obtained on awaking, is in both cases delightful; in neither case, is the sleeper the worse of his sleep; and in this latter respect it is, that the anæsthetized enjoys a great advantage (besides that of anæsthesia) over him who has been subjected to any other “auxiliary.” From tobacco, he is helped up sick unto death, utterly heedless of any benefit either immediate or prospective; from bleeding, he rises, recovered from his faint, but a worse man than he lay down—valuable fluid spent from his veins, which he has no

sure prospect of ever fully replacing ; from opium, he staggers up, confused, and giddy, and headachy, and perhaps with the sure seeds in him of a week's dyspepsy ; from antimony, he is assisted to bed or couch, still sick and vomiting—with a certain conviction that the drug has given him "a shake" that will last at least for four-and-twenty hours ; from the warm bath, he has to be aided, for he is weak in every limb, incapable of any considerable exertion, and well satisfied for once of the possibility of having "too much of a good thing." But, let him have his sleep out ; and from the chloroform he springs up as good a man as ever, and often without one single feeling, mental or corporeal, adverse to comfort and exhilaration. Even should sickness come, it is light and soon over ; and the stomach once cleared, he is "himself again." And, besides all this, the injured limb is not only easier at the time, but likely to remain so. Muscular relaxation has been more complete than under any other "auxiliary ;" from want of consciousness, all muscular exertion, voluntary and involuntary, has been thoroughly guarded against ; and, consequently, much less force and manipulation have been required to effect reduction. And this is just equivalent to saying, that muscles, ligaments, arteries, and nerves have been less strained and torn ; and that consequently, inflammation, paralysis, debility, neuralgic pain, aneurism, and the other possible contingencies of forcible reduction, are less likely to result.

One day, I was lecturing on Clinical Surgery, and a dislocation of the shoulder, in a stout muscular man, opportunely arrived. The shoulder, he said, had been dislocated more than once before ; that sometimes it went back easily, sometimes with great difficulty. There happened to have been a "run" of shoulder luxations at that time ; and my object was, to exhibit to the class a variety of modes of reduction. Expecting no difficulty in this case—for the accident was not eight-and-forty hours old—I sat him on a chair, and by means of stout assistants made strong extension of the arm in a rectangular direction, while my knee in the axilla was directed on the head of the bone. It happened to be the *turn* of that mode of reduction. After much exertion on our part, and not

a little suffering on that of the patient, failure proved most signal. We had to take to the chloroform accordingly. The mattress was arranged, the patient laid down, and anæsthesia set a going. Just as he had begun to snore, I was fixing the laque on the arm, preparatory to ordering extension to begin; but on slightly turning the wrist, in went the joint with a snap. Chloroform there was very triumphant.

Another day, a strong man, of thirty-five, came to the Hospital, "holding his jaw" in that awkward way which so surely betokens dislocation. He begged wistfully for an anæsthetic; for, according to the narrative of his friend, he had come from some distance, and his morning had been spent (it was by a nocturnal yawn the accident occurred) in fruitless, protracted, and very painful attempts, on the part of himself and a surgeon, or surgeons, to effect reduction. Chloroform was given. While in deep sleep, he was raised from recumbency to a sitting posture, and, standing on the table, above him, I effected reduction most easily. The only pain in the process fell to the lot of my own thumb, which did not happen to get sufficiently soon out of the way of the molars.

Similar cases might easily be multiplied; but it is unnecessary. The experience of every surgeon goes to prove that chloroform, duly managed, is greatly superior to other auxiliaries to reduction; by removing all pain, and facilitating replacement; also by rendering comparatively little force and manipulation necessary, and so saving texture, and promoting complete recovery.

XXIX. ANÆSTHESIA IS OF MUCH USE IN THE EXAMINATION OF INJURIES.

The surgeon is not unfrequently sensible of strong inward discomfort, when called on to make a searching examination of a hip, elbow, or shoulder joint, recently injured. And his discomfort arises from two distinct causes: 1. There is the apprehended difficulty of the inquiry, with uncertainty of diagnosis; and the consequent risk of reputation in himself,

as well as of disadvantage to the patient. 2. There is a strong reluctance towards inflicting such pain, as he knows is inevitably associated with the thorough manipulation necessary to secure accuracy of diagnosis. From both these, chloroform relieves him. From the latter, thoroughly; for the patient feels no pain, if duly placed and maintained in anæsthesia, let the surgeon handle him as long and as roughly as he may. From the former, he is likely to be also saved; inasmuch as the anæsthesia, while it admits of unlimited manipulation, creates also such a thoroughly passive condition of the parts, by reason of muscular relaxation, as greatly to facilitate a perception of the degree and kind of injury at once quick and accurate. Many and many a time have I felt myself sorely beset, in encountering hip and shoulder joints, especially in children; my brain urging my hands to work freely, regardless of everything but diagnosis; my heart upbraiding me for causing the poor patient such agony, and counselling me to desist. Many and many a time, during the past twelve months, have I thankfully found myself spared such inward discord; the patient unconscious of everything, and the surgeon's head and heart left to their own proper functions in perfect harmony. Furthermore, a third advantage may result from chloroform here. Not only is pain saved, and diagnosis facilitated. Suppose that the joint is found to be dislocated. Why, no sooner, almost, is this truth arrived at, than back the bone may be placed in its proper site again; and that with no greater effort on the part of the surgeon, than what is usual in mere detective manipulation—so thoroughly favourable is the condition of the part for reduction. Lately, I was called to see an elderly gentleman who had sustained a recent injury of the shoulder; and I learned that the same joint had been dislocated and unreduced, many years before—some of the eminent surgeons who then saw him believing the injury to be dislocation, others maintaining it to be fracture. Under chloroform, recent fracture of the neck of the humerus was at once detected; and so loose and tractable did the now isolated head of the bone feel in the axilla, as to suggest the idea that, if there had been anything to pull it by, reduction

of the old and original injury might even at that date have been effected.

XXX. ANÆSTHESIA LENDS MUCH ASSISTANCE IN THE TREATMENT OF IRRITABLE STRICTURE.

Every surgeon has had ample proofs given him of there being often much irritability and much spasm in the male urethra, when the seat of an old standing and tough stricture; and he knows full well, that he and his bougie find these depraved conditions most troublesome as well as most obstinate foes, in the treatment of the main disease. So sensitive sometimes is the part, that the patient cannot bear the instrument, and insists on its removal, ere ever it has reached the strictured portion. Or, again, it may painfully pass a certain length; and then a spasm comes, quite insuperable—with safety—as if declaring that though the patient might bear the instrument, the stricture will not. In such cases, there are a variety of means whereby we may seek to overcome the difficulty. But there are none so good as chloroform. A gentleman, of the naval profession, about midlife, had long laboured under such a stricture. In London, and elsewhere, he had made many attempts at cure; always being compelled to stop short, however, by the intense suffering and spasm, which the use of bougies, however cautiously employed, never failed to induce; and, besides, the pain was apt to continue long, accompanied with shivering, fever, and general distress. At last, he gave up all thoughts of cure; and tended himself as he best might, with a view only towards palliation. Hearing of chloroform, hope revived; and he came to Edinburgh. He was thrown into a state of deep anæsthesia, and with but little trouble I at once introduced a bougie—No. 5 of the scale. The urethra felt ragged and rough; and two tight strictures were found to exist, one at the turn of the penis, the other at the membranous part. There was no pain, no spasm, no resistance; it was like passing a bougie in the dead body. On awaking, his first emo-

tion was that of horror, at the sight of such a huge instrument being *tenus capulo* within him ; and he stared at it incredulously. Afterwards, the emotion was that of extreme thankfulness that such good progress had already been made, and that without pain or suffering of any kind. The instrument was allowed to remain for about half an hour. No bad consequence occurred at the time ; but, in the evening, there was some fever, and a threatening of retention : both yielded to the warm bath. Eight or ten repetitions of the bougie were made at proper intervals, under chloroform ; until No. 9 passed freely. Then typhus fever occurred, unfortunately ; and during its tedious progress, all instrumentation was of course abandoned. Convalescence having been completed, however, the bougie was taken up again ; and now No. 6 passed readily enough, without chloroform. The spasm and the irritability had been broken up and subdued. And the case then progressed in the ordinary way.

XXXI. ANÆSTHESIA RENDERS THE OPERATION OF SOUNDING SAFER FOR BOTH PATIENT AND SURGEON.

All surgeons are familiar with the fact, that simple as this manipulation seems, yet it is in itself not free from hazard to life. From it, alone, patients have perished ; by a cystitis, by suppression of urine, by fever, or otherwise. Surgeons are as familiar with the equally painful fact, that they are liable to be deceived in the results of the operation, and to fall into sad disaster in consequence. In short, many a surgeon has thought he felt a stone, when in reality he did not ; and stoneless lithotomies have followed. This untoward event has been especially frequent in children ; and the reason is obvious. So restless and so noisy do they prove under the operation, that both hand and ear have great difficulty in saving themselves from erroneous perception, in regard to sound and touch elicited through the sound. Now, with chloroform, the patient—whatever his age or timidity, however irritable and sensitive his bladder, however protracted

and careful the sounding—lies as steady and as quiet as if dead; the touch and ear of the surgeon have it all their own way, and, in ordinary cases, he is sure of avoiding error in diagnosis. And not only so, he is at the same time placed in circumstances extremely favourable for ascertaining all about the stone—besides determining its actual presence—its size, probable shape and hardness, its smoothness or roughness, the state of the bladder's coats and capacity, &c.; all matters very relevant, and important to be known. Not long ago, I sounded a boy, under chloroform, and at first believed I had come against a stone. Carefully continuing the perquisition, however, and repeating the collision of the sound against what was deemed the foreign body, I became quite satisfied that no stone existed; and that what I at first took to be such, was only a bold projection from a fasciculated bladder, coated perhaps with sabulous deposit. Had it not been for the anæsthetic, I should have had a roaring and restless patient, might have been deceived in diagnosis, and might have added another to the list of those who have cut into the bladder and found nothing. What happens in one case, in this way, is likely to happen in many; and thus safety to the surgeon, in sounding, comes by chloroform. The other half of the proposition is equally manifest. By anæsthesia, the pain and shock of sounding being removed, that operation is thereby rendered safer to the patient, both in its immediate and in its remote consequences.

XXXII. BY ANÆSTHESIA, LITHOTOMY, IN CASES OF DISEASED KIDNEY, MAY BE RENDERED BOTH WARRANTABLE AND HOPEFUL.

If a stone patient have coagulable urine, which is also purulent-looking, thick, and foetid; if he be thin, pale, exhausted, and suffer much from pain in the loins—the surgeon is sadly averse to cutting him: for this simple and sufficient reason—“He will die.” That is the ordinary prognosis, in such cases; warranted by experience. The risk is, that the shock of the operation will act untowardly on the renal symp-

toms; and that, by aggravation of these, life will speedily be overborne. By chloroform, is it not more than probable that this risk will be either in great measure or wholly obviated? And in consequence, may not surgeons be warranted in affording relief, by their art, to patients who otherwise would have been left a helpless prey to the most miserable disease. Formerly, no surgeon would meddle with him, for a two-fold reason; one half selfish, the other humane; risk to reputation, and risk to life. Now, he is cut as another patient; but, if possible, with still greater care; and the result hoped for is, not that the operation, by its primary effect, acting unfavourably on the renal disease, will kill; but that the operation, by its secondary effect, successfully removing the irritating and disease-engendering stone, will act *favourably* on the kidneys, and tend to give the patient a double delivery; first from the stone, and then, more gradually, from renal trouble also. And the same kind of reasoning may also be applied to cases of diseased bladder, complicating calculus. Here is an example to the point. A boy, eleven years old, was admitted, under my care, in the Hospital, on the 29th of January last. Since four years of age, he had suffered constantly from "stoppage in his water;" but the complaint had become much worse during the last two years. In addition to the ordinary symptoms of stone, he had a wasted, wan, miserable look about him, very suggestive of kidney disease; his water continually dribbled from him, his prepuce was angry and long through much pulling, he stank urinously, and his face wore an unbroken expression of pain. There was pain over the kidneys, as well as in the vesical region; the urine was coagulable by nitric acid and by heat, occasionally bloody, almost always turbid, depositing a white sediment; and this sediment was found to contain both blood globules and pus, besides abundance of the phosphates. A day or two after admission, I made an attempt to sound him; scarcely expecting to find a stone—so marked was the *renal expression* in the case. Stupidly I did not employ chloroform, and I had at once to desist. The entrance of the instrument caused a shriek of agony; and, clasped tightly by spasm of both

urethra and bladder, the sound could not be moved. Some days afterwards, under chloroform, I made a deliberate examination, found a stone of some size, and diagnosed also disease of the bladder's coats; the boy, on awaking, did not know that anything had been done to him. The stone detected, the serious question arose—what to do with it? Allow it to remain, and miserably wear out the patient; or remove it by operation, and give the lugubrious chance of permanent relief or speedy death, preponderance bearing strongly on the latter? The result of consultation was—to delay operation in the meantime, and to treat the case medically. This was done; and under the ordinary remedies, both renal and vesical symptoms became very decidedly subdued. Still, however, there remained the pain, incontinence, bad urine, and misery. The boy begged to have the stone away, the friends submitted to the alternative, and, trusting to chloroform, (I speak of earthly trusts,) I determined on operating; although still dissuaded from it, as a hopeless undertaking, by at least one of my colleagues. On the 12th of April (the boy had thus been nearly three months in probation) I performed the ordinary operation of lithotomy, with full anæsthesia of the patient; and was extremely careful to limit the prostatic incision as much as possible. A stone was removed, composed chiefly of lithic acid, about the size of a walnut, and marvellously rough and sharp on the surface. The boy awoke after having been some time back in bed, felt no pain or distress, and expressed great delight and comfort in the change of condition—of which he seemed to become very speedily aware. The narrative of after treatment need be but short. He never had a bad symptom. On the 17th of May he was “dismissed cured;” little or no pain in the back, micturition almost natural, urine still slightly coagulable; fat, plump, rosy, laughing—a very different boy from him who entered the Hospital. Some time since I heard of him, through my friend Dr. Small, whose patient he was in the country; and I am glad to say he reported him “quite well.” Now, without chloroform, or other anæsthetic, I believe that boy would have been this day in his grave; either worn out slowly and miserably by com-

bined renal and vesical disease ; or perished, very speedily, under an abortive lithotomy.

XXXIII. CHLOROFORM IS A MOST VALUABLE AUXILIARY IN THE TAXIS FOR HERNIA.

The former paragraph was a digression, and took us back to the region of operations. Now we return, and find our agent preventive of the knife's use. We praised it highly as an auxiliary in the reduction of dislocated joints. Hernia is a dislocation ; and in the displacement of bowel, chloroform will be found almost as efficient as in displacement of bone. The observations need not be repeated. It saves pain, produces thorough relaxation, does not aggravate the already begun collapse, is perfectly manageable, quickly passes off when no longer wanted, and leaves no untoward effect behind. One qualification I would however make. In the case of ordinary dislocation, I placed chloroform foremost in the list of auxiliaries—in all respects decidedly superior to its colleagues. Here I am not prepared to advise that opium should give way. I would place both on a par ; both excellent ; chloroform superior, in being more rapid and certain in effecting muscular relaxation ; opium having the advantage of conferring a power on the general system, of sustaining itself under the otherwise overwhelming depression caused by the strangulation. They will do excellently, conjoined.

XXXIV. ANÆSTHESIA IS OF UNSPEAKABLE ADVANTAGE IN SAVING THE FEELINGS OF DELICACY AND MODESTY IN WOMEN.

I was first made sensible of this long ago, thus : A lady had a middle aged maid, unfortunately affected at the same time with morbid sensitiveness of mind, and a disease of the rectum. The two were ill assorted ; for the former, prevailing, kept the lower affection unattended to for many a day. At length, matters became so bad that they would no longer

brook delay ; and the patient consented to *see* a surgeon. Having previously been made acquainted with the peculiarities of the case, I was sent for ; and arming myself with chloroform, and the armamentarium necessary for the more common operations on the rectum, I went. The patient I found in bed ; curtains closely drawn ; blinds down ; everything as dark and close as possible. She would scarcely allow me to speak to her, or feel her pulse. However, with a little persuasion, chloroform-inhalation was begun ; and very soon, she was snoring. I had the curtains drawn ; the blinds raised ; the patient's position suitably shifted ; and while the sick nurse kept up the needful amount of unconsciousness, I examined the fundament, found a fistula, probed it, cut it, dressed it ; had the blind down, the curtains closed, the patient re-arranged, all as before the commencement of this rapidly shifting drama ; and when the patient awoke, it was to find the nurse, the bed, the room, and herself, all unchanged ; the only difference being, that the fistula was somehow cut, instead of being whole.

This was a morbid sensibility, it may be said ; a *mauvaise honte*, which should have been broken through ; and that, consequently, a case is not yet made out for chloroform. Take then this other. A lady is recently married ; young, delicate, inexperienced, modest, newly severed from parental ties, a stranger, in lodgings, almost without a friend. It becomes necessary to make an examination of the os uteri, with a very serious object in view ; there is a suspicion, in short, of venereal disease there : and this examination must be made painfully by speculum, and by ocular inspection, and that not by one medical man, but in the presence of three. Can you picture a more frightful position for the female ? Without chloroform, she might scarce live through the ordeal ; with chloroform, all is passed in deep sleep, and, at the time, costs neither a blush nor a pang. This is no fiction.

In obstetric surgery, the amount of saving which may thus daily be made, in favour of female delicacy, must be truly incalculable. The point is so plain as to need no illustration.

XXXV. CHLOROFORM, AS AN ANÆSTHETIC, HAS A DECIDED ADVANTAGE OVER ETHER.

This is very obvious. The odour is much preferable; no inhaling machinery is required; there is little or no stimulation of the air-passages, no cough in inspiring, no mucous secretion, no risk to the lungs; the effect is more speedy and thorough, the transition stage more satisfactory; the after effects are free from hazard, and almost from discomfort; the quantity employed is very considerably less. Patients who have tried both, give a decided preference to the new agent.

XXXVI. IN WHAT CASES IS ANÆSTHESIA INADMISSIBLE?

That question has been in part answered; by excluding such operations on the mouth and nostrils, as are likely, by downward hæmorrhage, into the air-passages, to cause death by suffocation. In cases of undoubtedly diseased heart also, or when from any cause we have reason to apprehend unusual risk from syncope, as well as proneness to it, it may be a question whether chloroform be wisely given or not. And yet in many undoubted examples of diseased heart, it *has* been given, harmlessly. Tenderness of age need be no bar. Indeed it may almost be said, that the younger the patient the better suited for this anæsthesia. In the child of days or months, however, it is very obvious that extremest caution must be observed in regulating the dose.

XXXVII. IS LIFE SAVED AS WELL AS PAIN?

We cannot yet tell with certainty; but my own hopes and thoughts, and observations, are clear on the affirmative. Even, however, if anæsthesia made *no difference* in the result of operations, as regards life, still the mere absence of suf-

fering would be a large boon to humanity. But how much larger, if it be found that *there is a difference* as regards life, and that by chloroform LIFE IS SAVED. That such will *ultimately* be found to be fact, I have no doubt ; in what proportion, we can, as yet, of course, do little more than guess. The great question is in good hands. Dr. Simpson still continues his statistical inquiry.

And this leads me, in conclusion, to attempt, however feebly, to express something of the respect and gratitude which all right thinking people, both in and out of the profession, cannot fail to entertain towards my esteemed colleague, whose rare fortune it has been to introduce this wonderful agent. Gifted with talents that are given to few ; armed with a zeal and enthusiasm which are absolutely indefatigable ; restless and eager ; yet withal careful ; and scrupulous in research for truth ; full of a pure and large-hearted benevolence—he has made many discoveries and improvements, in his profession, which are of themselves well capable of transmitting his name safe and honoured to posterity. But all are eclipsed in this, his latest and his best. We admire his talents ; we praise his zeal ; we rejoice in his success ; and while we honour his genius, we love the man.

And there is one duty more. “ Let us cease not to extol Him who is all bountiful, as He is omniscient and almighty ;” who has been graciously pleased, in these latter days, to mitigate in part the temporal punishment which sin had brought into the world ; who “ is of great kindness, and repenteth Him of the evil ; who retaineth not His anger for ever, because He delighteth in mercy.”