

## **Painless operations in surgery.**

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London NW1 2BE UK  
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THE  
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OF

FOREIGN LITERATURE, SCIENCE, AND ART.

JULY, 1847.

From the North British Review.

PAINLESS OPERATIONS IN SURGERY.

1. *A Treatise on the Inhalation of the Vapor of Ether, &c.* By J. ROBINSON, Surgeon-Dentist, &c. London, 1847.
2. *Notes on the Inhalation of Sulphuric Ether, in the Practice of Midwifery.* By J. Y. SIMPSON, Professor of Midwifery in the University of Edinburgh. Edinburgh, 1847.
3. *The Medical Periodicals*, passim.

[The following article has an interest as deep and wide as human suffering, as a clear and entertaining description of one of the most remarkable discoveries of the age. The author's great familiarity with the subject, as well as his evident learning and experience as a surgeon, give his statements great authority; while the enthusiasm and humor which his graphic delineations evince, not only take away all professional abstruseness, but give the article extraordinary literary attraction.—ED.]

AT first sight, this subject may seem to lie beyond the strict range of our Journal, and to belong rather to those periodicals which treat exclusively of physic and surgery. But a moment's reflection makes it very plain how this is a matter which touches all members of the human family alike; or, if there be any difference, patients are more interested than practitioners—the laity more than the profession—the mass more than the medical section of mankind. No doubt, it is a boon to the surgeon to know that he can achieve what he knows to be essential for his patient's welfare, without, at the same time, inflicting on him an instant's pain. He will be very thankful

to find a fellow-being placid, and calm, and motionless, under an operation which used to cause much torture, as evinced too plainly by writhings, and shoutings, and groans. His hand is all the steadier; his head all the more cool and collected; his feelings are comparatively untouched; and his heart, all thankful, is incomparably at ease. But surely the boon is greater far to the victim—to the suffering portion of humanity. Injury and disease often require operations of dread severity; fearful in themselves, and still more fearful in anticipation. In war, the bravest hearts, who cared not for the foeman's steel, and scarce felt the wound it made, have yet shrunk back from the friendly knife which in kindness had to follow. 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. We remember the case of a gallant admiral—one of the bravest hearts that ever beat, in a service whose men of every grade are, to a proverb, dauntless—who, in the opening of his distinguished career, had been engaged in cutting out an enemy's frigate. From the gunboat, he climbed up the ship's steep side, and, foremost of his crew, had reached the bulwarks, when, receiving a stunning blow, he fell backwards into his boat again, striking his back violently on the tholepin. Many years afterwards, a tumor had grown on the injured part; and at length, the admiral—grey, and bent in years—found it advisable that this growth should be removed. The man that never feared death in its most appalling form, while in the discharge of duty, now shrank from the surgeon's knife; the removal, contemplated with a feeling almost akin to fear, was long deferred; and at length, half-stupified by opium though he was, a most unsteady patient did he prove during the operation. Women—mothers—who, for their kindred, have been at any time ready to sacrifice their lives, by watching and privation, in loathsome and tainted chambers of infectious disease—have, when themselves become victims of that which they know requires a surgical operation, and which, without this, they are well assured, must miserably consume them away;—even these noble minds, resolute in the fear of death, have yet quailed under the fear of suffering; they have studiously concealed their malady from their nearest friends, and deliberately preferred the misery of a fatal, and unchecked, and ever-gnawing cancer, to the apprehended torture of an operation, temporary though it be. We repeat it; even the best portions of humanity have an instinctive dread and shrinking from the pain of deliberate cutting of the living flesh. And does it not concern us all, that, in God's good providence, a remedy has sprung up for this?—that now a fair prospect is afforded

of even the most dreaded of these dire proceedings being performed during a happy unconsciousness of the patient? Not merely with little suffering, but absolutely with none.

Than the subject at the beginning of our page, we can conceive nothing more catholic;—it affects the whole human race. Even editors and critics must stoop to arrange themselves among the benefited; and in this question may well say—confessing their humanity, and throwing aside for once the almost supra-human obscurity in which they love to dwell—“*Homo sum: humani nihil a me alienum puto.*”

We do not propose to enter fully into the subject of Etherization, but shall content ourselves with little more than a narrative of the principal events connected with it; making also some observations regarding the application of the discovery, which it may be at once useful and interesting for the general public to know.

It has always been a leading object in practical surgery, to diminish as far as possible the amount of suffering during the manipulations of that art. Accordingly, in some operations, tight pressure has been made above the part to be cut, applied by a tourniquet, by bandaging, or by the powerful grasp of an assistant. Sometimes, but more frequently in obedience to the urgent request of the patient than of the operator's own free will, opium, or some other narcotic, has been given previously to the hour of operation, in the hope of producing thereby a comparative deadness to pain; always, however, with an imperfect and unsatisfactory result as to the object sought to be attained, and almost always with the effect of subsequent disadvantage accruing, in the form of headach, feverishness, or other general disorder. Each individual operation has had its details oftentimes considered and changed in the hope of accelerating the speed of operating, while safety might be retained; and many ingenious instruments have been invented with the like object in view; surgeons seeking in every way to arrive at a due combination of the “*tuto et celeriter:*” always giving to the former the first place in importance, and yet, perhaps, pursuing the latter with a great earnestness and perseverance. In this, it is gratifying to know, that surgery has, of late years, made no inconsiderable advance. The operation for stone, for example, used to average many minutes in duration, now it seldom occupies

above three or four ; often it is completed in two ; and, withal, the average mortality is found rather abated than otherwise ; the search for the "*celeriter*" has been successful, and the "*tuto*" has been retained. In like manner, the old method of amputating by "circular incision" has been, in a great measure, superseded by the modern operation by "flaps," and the cutting procedure, in consequence, has been abridged of fully one-half its period of duration ; while better stumps are formed, and the casualties affecting life are at least as few. Still, the results of such attempts, however successful, have been but imperfect ; pain has still been inflicted, with all its intensity unbroken ; the saving has merely been as to the tortures actually endured whilst under the knife, and that not with reference to acuteness or amount, but only as to the term of duration. And furthermore, no slight evil may well be supposed to have occurred, in the temptation to hurry in operating, held out, more especially, to those surgeons whose duty led them to public exhibition of their professional skill. A false criterion of operative power was apt to be raised—not merely in the vulgar mind ; the dexterity of the hand was apt to be estimated according to the rapidity of its movement ; the judgment and tact of the head, which planned an operation, were apt to be gauged by the time occupied in performance ; and, in consequence, the surgeon may not unfrequently have been urged, almost unconsciously, if not to precipitancy in the use of his knife, at least to an unwarrantable sacrifice of the "*tuto*" to the "*celeriter*"—in plain language, to a sacrifice of his patient's best interests in favor of his own precarious and ephemeral reputation. "If it were well done, when 'tis done, then 'twere well it were done quickly." But it were a poor economy, on the part of the patient, to obtain a moment's absolution from pain, at the cost of misadventure which may bring life into hazard, or which may entail weeks or months of protracted suffering. In a recent publication, Professor Syme has stated, in reference to a particular operation, "I have completed the operation in less than a minute, and on other occasions have found nearly half an hour requisite for the purpose. If all operators had paid as little regard to the time occupied, I believe that the unfavorable results on record would not have been so numerous as they are." And this, we doubt not, is just an indication of

the right feeling which pervades all truly good surgeons, who, as operators, are usually rapid—but rapid because skilful, and rapid only when safe ; and who well know that, in some procedures, attempted rapidity will not fail to prove injurious, and must ever be abstained from. Still, there is no doubt, the operative surgery of modern days is decidedly more rapid than that of the olden times, and, on the whole, fully as safe in its immediate results. In consequence, a real saving of pain *has* thus been achieved in favor of humanity.

And in another way has good progress been made in this direction. It has been the pride of modern surgery, as it has been its aim, not to multiply instruments and the means of using them ; not to enlarge the operative field, but to circumscribe it ; not to expend blood and pain, but by gentler means to arrest disease, and remedy disaster. Joints are saved, and made supple again, which used to be amputated ; growths are made to disappear by their own act, which used to be dug out or cut away ; and accidental wounds are brought to heal more rapidly and more kindly, with less use of the probe, sewing needle, and knife. The modern surgeon finds his mission to be "not to cut but to cure."

By the skill and diligence of surgeons, then, and by the advance of improvement in their art, operations have been reduced in frequency, and shortened in performance. Still, however, they are almost everyday occurrences in each extensive practice ; and, until within these few months, they were still inseparable from such suffering as even the bravest minds would fain recoil from.

"Pneumatic medicine," as it was called, was in vogue at the end of last century ; that is, the treatment of disease by the inhalation of gases or vapors. The names of Drs. Beddoes, Thornton, and Pearson, are prominently associated with this ; and it is well known that Sir Humphry Davy, in his early years, repeatedly risked his life in recklessly inhaling gases which are now ascertained to be poisonous. His experiments were not without their fruit. Advances in the general sciences of chemistry were attained ; and, as will afterwards be shown, a very near approach to the present discovery was also made. Indeed, a very fair question may be raised, as to whether Sir Humphry be not actually entitled to rank as the discoverer of what has been

termed "the Letheon"—or, at least, of the system of "Letheonizing."

Dr. Pearson, in 1795, recommends the inhaled vapor of sulphuric ether as "remarkably serviceable in phthisical cases. It abates the hectic fever, checks the sweats, removes the dyspnoea, and greatly improves the smell, color, and other qualities of the expectorated matter. . . . Patients who have inhaled it two or three times, find it so grateful to their feelings that they are disposed to have recourse to it too often, and cannot readily be prevailed upon to lay it aside when it is no longer necessary." His mode of applying it was to pour "one or two teaspoonfuls of ether into a tea saucer, holding it to the mouth, and drawing in the vapor with the breath," continuing the inhalation till the saucer became dry, and repeating it "two or three times a day, or oftener if necessary." His ether, too, was duly rectified. The best having been got, "lest it should contain any loose acid, it is advisable to put a little alkaline salt into the bottle in which it is kept, and to shake them together now and then." And he was not content with using ether alone: he impregnated it with musk, camphor, opium, assafoetida, and the like, and squill seemed a favorite addition with him; for, says he, "the finer particles of the squill applied to the lungs in this manner, along with the vapor of ether, gently stimulate the secreting surfaces of the bronchia, and promote the mucous discharge; and if applied in sufficient quantity, produce sickness, which takes off the spasm, and is otherwise serviceable in such (asthmatic) cases."

Nysten, in 1815, published a strong commendation of ethereal inhalation as an anodyne, especially in pulmonary complaints, and described suitable inhaling apparatus.

In Brande's *Journal of Science and the Arts*, 1818, an author writes "on the effects of inhaling the vapor of sulphuric ether," showing how it may be conveniently managed, what risks may be expected, and how these may be avoided.

The medical use of gaseous inhalation, however, fell into desuetude. The profession let it slip, empiricism took it up, and between the neglect of science and the favor of quackery, it lapsed not only into disuse, but also into disrepute.

And yet it has been reserved for the simple inhalation of a gas,—a revival of the crewhile forgotten and despised "pneuma-

tic medicine,"—to achieve in surgery that for which surgeons have for centuries labored, and labored in vain.

Sulphuric ether,—a subtle fluid, obtained by the action of concentrated sulphuric acid on rectified spirit, colorless, very volatile, pungent in taste, and of a penetrating odor,—has long been used in medicine; narcotic, when taken in large doses, either by the mouth or by inhalation; in smaller doses, stimulant, anti-spasmodic, and carminative. "In hysteria, asthma, palpitation, gastrodynia, nervous colic, and the like, it is an invaluable remedy, especially when united with opium."\* Many a time has the vapor of ether been inhaled for the relief of oppressed lungs; many a time has the sought relief been thus obtained; and just so many times has the discovery of the wonderful anodyne properties of this gas, as affecting all bodily suffering, been brushed past and overlooked. Philosophers may often be likened to men diving into deep waters in search of what is floating on the surface, and against which, as they emerge, they may often almost brush their cheek. Medical philosophers were busy seeking to alleviate pain, prosecuting search after search, and devising scheme after scheme, and yet were in the daily or at least familiar use of what, if pushed only a little further, would have gained the end in view. And something less than medical philosophers had gone a step nearer the discovery. Certain medical chrysalises, commonly called apothecary shop-boys, have long been in the habit of testing each new comer to their sphere of labor, by his power of sustaining the vapor of ether. The novice may have passed an inductive examination satisfactorily as to general acquirements, the indenture may have been duly signed and lodged, the fee may have been duly paid, the apron may have been donned, and a place at the counter appropriated; but an ordeal had still to be passed through. In some remote corner of the shop, and at some lone hour, his impish brethren of the craft resolve themselves into a mysterious tribunal, to elicit his grade of manliness. They form a circle round him, and, holding to his mouth and nose a sponge, handkerchief, or towel, saturated with ether, through which he must breathe, they watch the effects. If he soon faint and fall, he is placed low in the list, as freeman of the shop; but if he long resist the vapor, he rises in estimation, and

at once has assigned to him a high place among his compeers. It is odd that such tricky atoms of humanity never thought of pinching, puncturing, or cauterizing their hapless victims that fell and lay in a swoon. If they had, some one of them might have proved the lucky stumbler on the strangely anodyne properties of what they, as well as their betters, had so long regarded, in full doses, as a mere narcotic.

An old gentleman, too, was near it, some forty years ago.\* He had discovered that the fumes of ether could lull him into forgetfulness of the pains and discomforts of a bustling and a chequered life. He was a man of research, in his way; curious in beds, and baths, and professing to cure disease better than his fellows. But he was loose in principle, as well as weak in science, and no doubt, most deservedly, had many roughnesses in life which he could wish to rub away. His mode was this. Obtaining an ounce or two of ether, he leisurely sniffed up its vapor, according to the plan of Dr. Pearson; sitting softly the while, and manifestly enjoying a time of calmness and repose. And, on being interrogated, he was in the habit of answering, "soothing, sir, soothing, to an immeasurable degree." In this placebo for the cares of life, he was in the habit of indulging many times a day; and again, it is to be regretted that some experimental pinching or puncturing had not been applied, in his listless moments—the more especially as there seems good reason to believe that no fitter subject could well have been got for such experimenting, according to the old adage, of "*in corpore vili*," &c. He had discovered that the fumes of ether could relieve, temporarily, from the pains of a mind ill at ease; but he was not deemed worthy of knowing that it could still more wonderfully assuage the body's worst suffering.

This discovery Providence has, in inscrutable wisdom, held back till the present day; and with its divulgement the names of two Americans are prominently associated, Doctors Jackson and Morton, the one a physician and chemist, the other a dentist, in Boston. To the former, the chief merit of the discovery seemed due, the latter having been but auxiliary to the testing by actual experiment. On the 13th of November, 1846, Dr. Jackson writes to the French Academy of Sciences, stating that he wished to communicate to that body

a discovery which he had made, of much importance, as a means of relieving suffering humanity, and very valuable to the art of surgery. Five or six years before, he had observed that inhalation of the vapor of pure sulphuric ether had the power of inducing a peculiar state of insensibility. He had inhaled it himself, partly for the mere purpose of experiment, and partly for the relief of a very unpleasant affection of the chest, which had followed the inhalation of chlorine. Struck with the thought that this trance or insensibility might be turned to a good account, he advised Mr. Morton to make trial of it in the pulling of teeth. This Mr. Morton was not slow to do, and had the satisfaction, by means of the ether, of pulling teeth without pain, and of finding no unpleasant consequences attendant on his experiments. Mr. Morton subsequently, at the request of Dr. Jackson, proceeded to the public hospital of Massachusetts, and there administered the vapor to a patient about to undergo a painful surgical operation; and the result was again prosperous—no pain during the operation, and a good recovery. Then came further trials in the hospital; fast enough, and all successful—no pain, and "the recoveries remarkably good, apparently on account of no shock having been sustained by the nervous system."

On the 28th of November, Dr. Bigelow writes to his friend Dr. Boott, in London, announcing the "new anodyne process," and giving instances of its success.

On the 14th of December, Dr. Boott sends Dr. Bigelow's letter to Mr. Liston, naturally anxious to make so important a communication without loss of time to one so pre-eminent in the operative department of surgery. And that distinguished surgeon, worthy of the confidence reposed in him, speedily put the matter to test in the hospital of University College. His success was most complete, on the 21st of December.

On the morning of the 23d of December, his former pupil, Professor Miller of Edinburgh, was not a little surprised, doubtless, to receive the following epistle, which, having obtained, we venture to make public, availing ourselves of the permission of one of the parties at least. It is very characteristic of the writer, dashed off in hurry and excitement, and showing a fine generous enthusiasm; moreover, it may be regarded with something of historic interest, under the circumstances. The writer will, we

\* *Lancet*, No. 1123, p. 164.



hope, pardon us for the liberty we take with a private communication, which bears the form, indeed, rather of a despatch than of an ordinary letter. It is verbatim, as follows:—

“HURRAH!

“Rejoice! Mesmerism, and its professors, have met with a ‘heavy blow, and great discouragement.’ An American dentist has used ether (inhalation of it), to destroy sensation in his operations, and the plan has succeeded in the hands of Warren, Hayward, and others, in Boston. Yesterday, I amputated a thigh, and removed, by evulsion, *both* sides of the great toe nail, without the patient’s being aware of what was doing, so far as regards pain. The amputation-man heard, he says, what we said, and was conscious, but felt neither the pain of the incisions, nor that of tying the vessels. In short, he had no sensation of pain in the operating theatre. I mean to use it to-day, in a case of stone. In six months no operation will be performed without this previous preparation.\* It must be carefully set about. The ether must be washed, and purified of its sulphureous acid and alcohol. Shall I desire Squire, a most capital and ingenious chemist, to send you a tool for the purpose? It is only the bottom of Nooth’s apparatus, with a sort of funnel above, with bits of sponge, and, at the other hole, a flexible tube. Rejoice!

“Thine always,

“R. L.”

This was read by Professor Miller to his class, within an hour after its receipt; and a somewhat similar announcement was also made by Professor Syme, in the after part of the day. A few days afterwards, Professor Simpson had occasion to visit London; and, witnessing the effects of either in hospital practice, obtained the best instrument for inhalation he could then procure. This apparatus, speedily after his return to Edinburgh, was put to the test in an amputation performed by Dr. Duncan in the Royal Infirmary of that city, and proved entirely successful; the operation having been completed without the infliction of any pain. In due time Mr. Liston supplied Professor Miller with the promised “tool;” and that apparatus also proved eminently successful in sundry cases in the

\* Of course, this is not to be considered as Mr. Liston’s deliberate opinion; but just the first flash of enthusiasm, at once natural and becoming, in the circumstances.

Infirmary, astonishing both patient and practitioner. Professor Simpson was, with accustomed energy, not slow to prosecute the discovery in connexion with his own peculiar department; still with success. Professor Syme seemed less eager than his colleagues to lend confidence to the ether, and his first public trials were unsatisfactory. On the use of efficient apparatus, however, he too became a painless operator. Instrument makers, medical practitioners, and medical students, seemed struck with a fever of invention as to inhaling apparatus; in rapid succession many varieties were constructed and tried; some with unsatisfactory results, but the great majority all succeeding in the main object—procuring the forgetfulness of pain. From the metropolis the news quickly spread throughout the provinces; for the papers of the day, not unnaturally, had lent their power towards dissemination of the good news for humanity; and in Glasgow, Dundee, Aberdeen, Inverness—by this time, doubtless, throughout all Scotland—the truth of the at first scarcely believed reports became speedily attested by the voice of actual experience. Already, by many hundreds of cases, the efficiency of inhaled ether in averting or subduing pain, its applicability to the majority of cases for operation, and the safety with which it may, in proper hands, be administered, are facts—assailed, but not overthrown.

Thus went the narrative of the discovery, up to the beginning of March. Then, however, a little new light dawned upon the subject. A Mr. Horace Wells, of Connecticut, United States, dentist, is announced as having practised letheonizing since October, 1844; beginning upon himself, using both nitrous oxide and sulphuric ether in his inhalations, and ultimately preferring the former. At the first it excited, as “the laughing gas” is well known to do; but after some time a thoroughly sedative effect was induced, less transient than that of ether. He did not stumble on the thing by accident, but was led to it by a process of reasoning, as he thus explains:—

“Reasoning from analogy, I was led to believe that surgical operations might be performed without pain, by the fact that an individual when much excited from ordinary causes may receive severe wounds without manifesting the least pain; as, for instance, the man who is engaged in combat may have a limb severed from his body, after

which he testifies that it was attended with no pain at the time; and so the man who is intoxicated with spirituous liquor may be treated severely without his manifesting pain, and his frame seems in this state to be more tenacious of life than under ordinary circumstances. By these facts I was led to inquire if the same result would not follow by the inhalation of some exhilarating gas, the effects of which would pass off immediately, leaving the system none the worse for its use. I accordingly procured some nitrous oxide gas, resolving to make the first experiment on myself by having a tooth extracted, which was done without any painful sensations. I then performed the same operation for twelve or fifteen others, with the like results; this was in November, 1844."

His discovery he had no wish to keep concealed, or to cover by a patent. He at once disclosed it to the members of the profession with whom he came in contact, and, amongst others, to Drs. Jackson and Morton; making a journey to Boston for the express purpose. Dr. Warren of that city made trial of the experiment; but, somehow, his first attempts failed, and he desisted. Drs. Jackson and Morton professed themselves incredulous; Mr. Wells fell sick; and so the discovery lay dormant for awhile. Drs. Jackson and Morton, however, though incredulous, were not oblivious; they seem to have been brooding over the matter; and at length emerged from obscurity in the borrowed light of their more single-minded countryman. What degree of *credit* attaches to these gentlemen, we shall leave others to judge. The first mention of their names in this country was associated with very qualified praise, on account of their seeking to trammel, for their own pecuniary interests, a discovery which plainly interested all mankind, and which was declared to have emanated from a liberal and enlightened profession, the members of which—in this country, at least—are not in the habit of so "protecting" their inventions and discoveries which affect the life and death of their fellow-men. That praise will be still more qualified now, when it is understood that what they sought to patent, was not their own, but had been filched from a professional brother; one who had been generous enough to make it known to them, and who had wished to publish it to the wide world.

Has regret ever arisen within the breast of any Briton, that so important a discovery had not originated in his own land? Or are our transatlantic brethren self-elated, at so large a boon in favor of humanity

having come from the New World? Surely both feelings, if they exist, will receive a healthful chastening, by the reflection how untowardly the boon has been ushered into operation. Really, Gentlemen, it is too bad. Must you have both a patent and a piracy? *Proh pudor!*

We need not stop here to describe the various forms of apparatus employed; nor, among so many, shall we attempt to decide the question of comparative merit. Most are efficient; some are strikingly so; and the simplest is the best. To children the vapor is efficiently enough applied, by laying over the mouth and nostrils a cambric handkerchief dipped in ether—a method long ago recommended by Dr. Pearson. We shall rather attempt to describe the effects, when suitably inhaled. The first mouthful or two is felt to be harsh, and unpleasantly pungent; but, in continuance of inhalation, that feeling gradually disappears, and the sensation becomes rather grateful than otherwise—sometimes intensely so, as in the case of the nitrous oxide gas, the inhaler obstinately and violently refusing to forego his delectation, if attempts be made to take the tube from him. Coughing is not always produced; but more frequently than not; and, in some cases, it proves so distressing as to impose on the practitioner a great difficulty in proceeding, even with the best assistance on the part of the patient. In general, however, by letting on the full supply of ether gradually, the coughing proves slight, and speedily ceases. Sometimes a profuse discharge of saliva takes place from the mouth; in almost all cases the secretion from the lining membrane of the windpipe and lungs seems to be very considerably increased; and, from this latter cause, a cough with expectoration may come on, during the latter stage of prolonged inhalation, quite independently of any direct irritation by the pungency of the ether. In the course of some time, varying from one to twenty minutes, but usually within two or three minutes, when the inhalation is duly conducted from the first, the patient shows signs of a departure from his ordinary condition. His face grows pale and leaden, sometimes with a livid congestion about the mouth and nose; his eyes are less brisk in their movements, and their glance is less keen; the eyelids move sluggishly over the eyeballs, and tend to droop; the hands and feet grow cold, and so do the legs and arms

by and bye; bent positions of the limbs gradually relax themselves; the patient breathes more slowly and fully; his chest is seen to take in large supplies at each inspiration, and his cheeks blow like a bellows; if previously seated, the trunk of the body now falls back; if previously recumbent, a change may be observed indicative of still further relaxation. The pulse has been all along becoming more and more rapid in its beats, it is now very frequent; and soon it may run away to nothing, almost ceasing to be felt. The eyelids are now motionless; on elevating the upper one, it falls slowly down again, evidently under no control of muscle. The pupil of the eye began to dilate early; and the dilatation has kept pace with the progress of inhalation. The eyeball is now glassy, fixed, often turned upwards, and thoroughly "void of speculation." Then is the evidence of full etherization complete; and the operation may be proceeded with.

Such is a sketch of the ordinary effects as observed; but there is great variety. Sometimes the pupils are but slightly dilated, if at all; and sometimes the pulse, too, is slow to alter. Sometimes the patient withdraws the tube from time to time, to tell his feelings with great volubility and energy. Sometimes, but rarely, he expresses a strong dislike to it, and is with difficulty coaxed to resume its use. Sometimes he mutters through the tube, sometimes incoherently, sometimes sanely enough, in reference to circumstances which he observes. Sometimes he laughs immoderately, as if under the influence of nitrous oxide gas, and yet without recollection of any ludicrous idea after recovery. Sometimes he twists his limbs about, and sometimes he rolls his head from side to side, with a wild motion of his eye, and with a stupid yet strong expression of inquiry in its gaze. Sometimes he takes to low moaning or whining through the tube; more especially if he has been much agitated by previous apprehension. Sometimes he comes to breathe more heavily, and with more snorting noise than is quite agreeable. Sometimes a tendency to convulsions manifests itself, requiring instant disuse of the inhalation.

Supposing the trance complete, the phenomena educed by the operation vary. In general the patient remains quiet and motionless, as if inanimate,—the muscles often quivering slightly, however, at each play of the knife, as if by the mere physiological stimulus which their contractility receives;

and knitting of the brows, occasional or fixed, is extremely common,—giving an expression, by frowning, rather of annoyance than of pain. Sometimes there is slight shrinking of the part from the knife, the patient seeming to make some little effort to move it away. Sometimes the part is violently contorted, requiring more than the usual complement of assistants to restrain it. Sometimes the patient gives sundry abrupt, loud exclamations, as if in pain; sometimes he moans and breathes hard; sometimes, though rarely, he roars lustily. And all this may happen without any sensation, or at least without any subsequent remembrance of pain.

The effects, as indicated by the patient's own recollection, are also very various. In general they are somewhat as follows:—A pleasing sense of soothing succeeds the first irksomeness of the pungent vapor,—a soothing of both mind and body. Ringing in the ears takes place, with some confusion of sight and intellectual perception. The limbs are felt cold and powerless; the hands and feet first, then the knees; and the feeling is as if these parts had ceased to be peculiar property, and dropped away. This sensation may gradually creep over the whole frame,—the patient becoming, in more senses than one, truly etherialized,—reduced to the condition of no body and all soul. The objects around are either lost sight of or strangely perverted; fancied shadows flit before the eyes, and then a dream sets in,—sometimes calm and placid, sometimes active and bustling, sometimes very pleasurable, sometimes frightful as a nightmare. Emerging, the figures and scenes shift rapidly, and grow fainter and fainter; present objects are caught by the eye once more, the ringing of the ears is heard again, consciousness and self-control return, a tendency to excited talking is very manifest, movement is unsteady, and, both in mind and body, very unequivocal signs of intoxication are declared. In plain language, as in plain fact,—there is no disguising it,—the patient is drunk. The tipsiness, however, is of a light and airy kind,—very pure, very pleasant, and very passing, and, when gone, leaving very little trace behind. If the ether be good, "there is no headache in a gallon of it."

Sometimes the dream is exquisitely charming, and the patient seems passed into another and a better world. Sometimes the opposite state obtains, the patient betraying manifest uneasiness while in the

trance, by restless, staring, anguished eye-balls, by groaning, and by wrestling movements of the body. And these are not loath to emerge from the effects of the drug, while the former part with them grudgingly. One poor girl, we well remember, had struggled hard during an amputation, yet felt no pain; and, on coming to herself, thankfulness was expressed in every feature, as well as by her blithe tongue, for she "thocht the deil had a grip o' her a' the time." Sometimes the dreamer is falling from a great height rapidly, down and down into some unfathomable abyss. Very often the dream is connected with the operation,—may be said to be the operation embellished and disguised,—done into poetry,—and all without pain. Sometimes, again, the dream is the most opposite thing possible to the operation: the otherwise most painful things may be doing, and all the while the patient, without swerving a hair's breadth, may be grinning, and nodding, and winking, and chuckling, and making various nautical-looking observations, with his fingers on his nose, industriously endeavoring to convey to the bystanders some notion of the exquisite treat of which he himself is then in the full enjoyment. Sometimes an obscure perception of something being done to the part, suggests, as if by association, the idea of accidents and injuries there of another kind. Sometimes the dream is warlike,—personal to the dreamer,—or of bygone days, implicating Napoleon, or Soult, or Wellington; and the crack of tooth-pulling has sometimes passed off as the din of ordnance. Sometimes it is a contention with unearthly things,—a tugging or battling with gnomes, and spirits of an evil mien, victory swaying now one way, and now the other. Sometimes, in youth, the dream has been "all fun," and the dreamer has been anxious to be back into the midst of his pleasant pastime again, even at the cost of another tooth-drawing. The patient, if a wanderer, and then in a strange land, may dream pleasantly of home: "she had been home,—it was beautiful,—and she had been gone a month." So said one poor woman in the midst of what, without the ether, would have been agony. Sometimes the dream is of drowning: a gushing in the ears, a choking, and a sense of being lost, without pain, or struggle, or effort to save one's self;—a rapid, smooth, and pleasing descent beneath the waters of deep oblivion. Sometimes the complex, circumstantial details of years, as in other

dreams, are condensed into one lucid glance: the events of early youth have seemed compressed into a circle. Sometimes the dream passes steadily on to completion; sometimes it is abruptly closed by some critical procedure on the part of the operator,—the extraction of a tooth with a wrench, for example. Some go "with their uncle to Gravesend;" some "have been they don't know where: all they know is, they felt nothing."

Sometimes, too, the dreaming has connexion with previous habits and tendencies. A soldier dreams of guns, and bayonets, and strife, and clamor; a sailor, of ships, and storms, and grog; an Irishman, of whiskey, and shilelaghs, and a "skrimmage;" a boy, of marbles, tops, and "lots of fun;" a mother, of home, and children; a girl, of gala-days, and finery,—"bonny, very bonny," one kept ever saying, with her eyes fixed and straining, evidently on a print or bonnet. A tippler fancies he is in the grog-shop, and there he may enjoy himself rarely,—or he may dream "his wife came to fetch him." Quarrelsome men grow pugilistic, and coats may be doffed with appropriate accompaniment of word and action. Young men, having some one in their list of female acquaintance dearer than the rest, grow active lovers, and in lone walks, earnest conversations, or soft whisperings, seem to make rare progress in their suit. The swearing and dissolute may indulge in oaths, and profane jests. The man of fervent piety, who is habitually looking heavenward, may not only suppose himself translated to the realms of bliss, but may take part in imagined exercises there. We have seen a patient thus employed immediately after a painful operation: four verses of a psalm were sung by him very loudly, with his eyes fixed, his body in a tremor, and intense fervor shown in every movement. He would not be interrupted, and could scarcely be prevailed upon to leave the operation-room, seeing that he found himself so wonderfully happy there; he said he had been in Heaven, and had seen his Saviour; on reaching his bed, he fell on his knees, and was rapt in prayer. Not always, however, is the dream consistent with the character. For we have heard, among other instances, of one young, simpering, and innocent damsel, who, addressing a most amiable and excellent dentist, knitting her brows into something more than a frown, clenching her fist, and scowling defiance, vowed, in the voice of a Stentor, that

if he ventured near her with his profane touch, "big blackguard, as he was, she should certainly knock him down,"—doing him, no doubt, some grievous bodily harm. And staid, demure, elderly gentlemen,—lawyers, too,—have, in most abandoned gaiety, insisted upon the operator forthwith joining them in a joyous "Polka."

When the illusion is very pleasant, the dreamer almost always evinces a strong aversion to being interrupted: all questioning he deems impertinent, and he answers snappishly, and in monosyllables,—if at all. It is no uncommon thing for him to say that "an answer will be given *to-morrow*;"—plainly implying that he is busy, well employed, and will not be disturbed. On coming out of the trance, whether this have been pleasurable or not, hysterical crying is very common in the young, and especially in the female. Grown men, however, are not exempt from this frailty. On recovering from their unconsciousness, and for the first time beholding a raw stump, where a leg or thigh had been, even they are very apt to lapse into most unsentimental blubbering.

The effects, as already said, bear a strong resemblance to those of excess in strong drink. Sometimes the patient seems to be made aware of this, by the sensations which are induced in the early period of inhalation. "You'll have me drunk!" cried one. "Oh, you blackguard! I know what you are,"—evidently supposing that he had fallen into loose society, and that his companions had a design on him. But it is in the state of emergence that the intoxication shows most. The eye, mouth, general expression of features, the walk, articulation, and pantomime, are all those of the tippler. He sways as he tries to stand, and reels as he walks; is garrulous and sprightly, often effectively humorous; and his leer and gesture are meant to be diverting. Often he insists on shaking hands with all and sundry; often, as already stated, he grows lachrymose, like one who, in Scottish phrase, might be termed "greetin' fou." The unsteadiness of gait, and lightness of head, sometimes have an inconvenient length of duration. One lady we have heard of, who, leaving the dentist too soon, had to grope her way along the railing of the street, in noonday, and ran no slight risk of losing all reputation for sobriety. Sickness, too, is not uncommon, very like that of a debauch. And next day, though it brings not its headache, brings some un-

comfortable feeling in the interior, with a strong desire, usually, for more of the deluding vapor. This desire for more, indeed, occurs at two periods,—immediately after the affair is over, just as a man not fully drunk, but only excited, is eager to have "one glass more;" and, again, next day, just as a man drunk over night seeks for "a hair of the dog that bit him." In Dr. Pearson's time it was the same, though with him the ether was not pushed to unconsciousness; for, in the passage formerly quoted, we find him complaining that he found difficulty in preventing his patients who had once tasted the sweets of ether, from recurring to it far too frequently. Patients themselves, too, liken it to drink: they call for "more grog," and declare it to be "glorious," "good stuff, better than pop."

The duration of the ether's influence is an important matter. It is brief; and yet it is odd that the ether itself seems to remain long in the system; being plainly, and even offensively, felt in the breath, not merely for hours, but even positively for days, after protracted inhalation.\* The full effect seldom lasts above a few minutes; time enough for the performance of some operations; such as that of tooth-drawing. When more protracted procedure is contemplated—as in amputation, stone, rupture, removal of tumors, &c., the inhalation is proceeded with during the operation, at what in steaming is termed "half speed." The ordinary signs having evinced attainment of the full effect, the operation is begun; and then the inhalation may be for a few moments discontinued, to be afterwards renewed; or, what is better, the mouth-piece is kept continuously applied, with the valve in the tube, for entrance of atmospheric air, either partially or wholly open, so as to dilute the vapor. And if at any time the patient show signs of prematurely returning consciousness, the valve is shut, and the full power of ether restored; the patient being made to breathe much or little of the vapor, according to the effects observed.

At first, it may seem that this brief duration of the ether's influence is a disadvantage. The operator soon learns, however,

\* The rapidity with which the ether pervades the whole system is also well shown, by amputated parts retaining a strong flavor of ether, even for many days after removal; although perhaps not more than two or three minutes had been spent in inhalation previous to the making of the incisions.

that it is the contrary. Prolonged duration is readily within his power, by continued inhalation; and much of comfort and safety resides in the fact of the effect being transient. The manageability of the ether is not its least virtue. Were the period of duration ordinarily less brief, the inhaler would be a dangerous instrument, even in the hands of the skilful and prudent. But, as it is, in the hands of the duly qualified it seems perfectly safe. Repeatedly have we observed unpleasant effects beginning to show themselves, during an operation; and, to prevent or remove them, it was only necessary to discontinue the inhalation. There was no necessity to fly hither and thither in search of antidotes or restoratives, or to annoy the patient and interrupt the operator by the administration of them. It was enough to cease to administer the ether. Repeatedly have we seen an operation begun, without any sign of pain; by and bye some wincing and moaning came; the ether was let on;—a lull followed, the limb becoming passive and dead-like as at first—in more senses than one, the patient “breathed again;” once more sensation revived, and again it was lulled asleep; and so, several times in succession, until all was safely and painlessly completed. Repeatedly have we seen the tedious process of stitching a wound illustrate this manageability of the ether’s influence; one stitch accompanied with some sign of pain, the next as if placed in a dead part; and so on in varying succession, just according to the cessation or continuance of the ether’s administration.

Sometimes, however, the effect is not transient; a heavy stupor remaining, with small pulse, perhaps, and an unpleasant expression of countenance. Cold water, dashed on the face, or a current of cold air applied to it, are good restoratives. Indeed, their power of bringing the patient out of the trance is often exhibited unintentionally, and inconveniently, during the operation. If a wound be sponged with cold water, for example, the patient who had borne cutting without a wince, will often complain of the cold lustily. One victim of a severe operation, when asked if she felt any pain, said she “felt that window”—which, happening to be open, had to be shut. The internal restoratives are wine, spirits, or ammonia; the last, probably, to be preferred. Should respiration and circulation still flag, heat to the surface, friction of the chest, and ammoniated

stimulation of the nostrils, will naturally be resorted to. If opportunity serve, oxygen gas may be inhaled, to arterialize the blood; it being supposed that etherization, when extreme, tends to evil, by sending venous blood through the general circulation.

When the patient does awake fully to consciousness, it may be supposed that he awakes to much misery, because to much pain. But it is not so. Not unfrequently, every sense is fully restored except the sense of pain. The patient sits up, talks rationally and calmly, is aware of every circumstance, knows of his wound, by seeing and hearing of it, and yet feels no pain; the smarting of a raw wound is often averted for some hours in this way; and when it does supervene at length, there is good reason to believe that in many cases it comes in a mitigated form. Often the patient sobs and cries, immediately or soon after return to consciousness—a state resembling hysteria, or else very like the maudlin grief of a drunken man; but such tears are no sign of suffering; on the contrary, they are not unfrequently the offspring of dreamy joy and gratitude.

For the successful administration of ether, certain things are very essential. The instrument must be suitable, and in good working order; and, especially, there must be sufficient width of bore to admit of a free draught for the trachea. The ether must be strong and pure; washed with water, to remove any acid that might remain, and which would cause irritation to the lungs and fauces; afterwards decanted from the water, and distilled over chloride of calcium. A mixture of chloric ether with the sulphuric has been tried, but with unsatisfactory results; the mixture proved more grateful to the patient at the time of inhalation, but the stupifying result was longer of being produced, and the after effects were not only protracted, but disagreeable. There was a loss of power; and, as with many compound things, what was pleasant to the taste, at first, became bitter afterwards. The patient should be comfortably and conveniently arranged: he should be as warmly clothed as circumstances will admit of; and the temperature of the room should be little if at all below 60°. The warmth is obviously favorable to the production of ethereal vapor, and it is also favorable to the due effect on the recipient. In a room of low temperature, a cold shivering is apt to come on shortly after inhala-

tion has been begun, disturbing and impeding the process. The patient should be spoken to kindly, and reassured, in the first instance; the mode of inhalation should be illustrated and made plain to him; and it may be well to make him breathe through the tube, experimentally, before the ether is poured into the apparatus. A position is arranged suitable to the operation, and also as suitable as possible to the inhalation. Recumbency, with the head slightly elevated, is usually to be preferred. All arrangements as to securing limbs, denuding the part to be operated on, sorting pillows, stationing attendants, &c., should be completed before inhalation is begun; for, quietude is very essential to success. The patient should not be spoken to, or touched, or in any way have his attention taken from his self-intoxicating occupation. A question, the fall of a jug or basin, a tap at the door, a sneeze, or other accidental noise, may interrupt the process very seriously; rousing the patient from the advancing stupor, perhaps rendering him restless and unmanageable. The respiration should be steady, slow, and full; the patient filling his chest completely, and emptying it completely, at each inspiration and expiration. To prevent coughing, or other disagreeable consequences of the pungency of the vapor, a considerable dilution by atmospheric air is expedient at first; the amount of dilution being gradually diminished, as the patient is found to bear it. And to effect this very important part of the procedure, the tube is provided with a valve, which, when open, admits a full stream of atmospheric air, and which can be opened or shut—gradually or suddenly—at pleasure. The merit of inventing this important part of the apparatus is due, we believe, to Mr. Squire, chemist, London, who constructed the instruments first used successfully by Mr. Liston. The operator, or some duly qualified assistant, watches the pulse, breathing, countenance, and eye; careful to note the time when the operation may be begun, and equally careful to observe any untoward sign which might render temporary abstraction of the ether necessary.

In general, no unpleasant sign showing itself, the inhalation is carried to the point of complete stupefaction; and this, as already stated, is sought to be maintained by a continued, though minor use of the ether. An odd fact, however, comes now to be stated; namely, that stupefaction is by no means essential. Experience has fully

shown that the brain may be acted on so as to annihilate for the time what may be termed the faculty of feeling pain; the organ of general sense may be lulled into profound sleep, while the organ of special sense and the organ of intellectual function remain wide awake, active, and busily employed. The patient may feel no pain under very cruel cutting, and yet he may see, hear, taste, and smell, as well as ever, to all appearance; and he may also be perfectly conscious of everything within reach of his observation—able to reason on such events most lucidly, and able to retain both the events and the reasoning in his memory afterwards. We have seen a patient following the operator with her eyes most intelligently and watchfully, as he shifted his place near her, lifted his knife, and proceeded to use it; wincing not at all during its use; answering questions by gesture, very readily and plainly; and after the operation was over, narrating every event as it occurred—declaring that she knew and saw all; stating that she knew and *felt* that she was being cut, and yet that she felt no pain whatever. Patients have said quietly, “you are sawing now,” during the use of the saw in amputation; and afterwards they have declared most solemnly, that though quite conscious of that part of the operation, yet they felt no pain. We have seen a patient enduring amputation of a limb without any sign of suffering, opening her eyes during the performance, at its most painful part, desiring a country practitioner at some distance—under whose care she had formerly been, and whom she had not seen for some considerable time—addressing him by name, and requesting that he might not leave town without seeing her. And one of the first successful operations in the Royal Infirmary of Edinburgh well illustrates the same point;—the patient managing all the details of the inhalation himself, loudly insisting that the experiment was quite a failure, and would never do, that the matter must be deferred to another opportunity—and all the while the painful operation being busily proceeded with, preparing an agreeable surprise for the talkative sceptic. More examples to the same effect might be adduced, if necessary: the fact is undoubted. And physiologists, accordingly, are somewhat puzzled as to the exact statement of the effects produced by ethereal inhalation on the nervous system. Of the brain proper, the spinal system, and the ganglionic system—as the

different parts of the nervous system are termed—which is the part affected? Strychnine is supposed to influence the spinal system mainly; digitalis, the ganglionic;—which does the ether affect? It is probable that the brain proper is the part mainly influenced; and sometimes only a portion of it; for, as has already been stated, the intellect may be active, and the special senses, too, may retain all their acuteness, while the patient is wholly unconscious of a procedure which otherwise could not fail to be accompanied with the severest torture. General sense may be asleep, while intellectual and special sense may be wide awake.

The first effect of the inhalation would seem to be decidedly stimulant; afterwards it becomes powerfully sedative. Just as other things may be stimulant, in small doses, or lightly applied;—sedative in large doses, or long continued. Opium is a familiar example of this; causing excitement in small doses, and proving the most powerful of all narcotics when largely administered.

But it is now time that we speak somewhat more fully of the evil consequences which ether, taken by the lungs, may produce. 1. It may produce coughing, expectoration, or other sign of irritation of the air passages. And this irritation may sometimes prove so embarrassing, as to frustrate the attempt at letheonizing. 2. It may produce excitement; just as the nitrous oxide gas does; the patient becoming talkative and restless, or violent, and intolerant of restraint. 3. In females, or in males of highly nervous temperament, it may induce hystèria. 4. It may cause sickness and vomiting; and the younger the patient, the more liable is this to occur—more especially if the inhalation have been protracted and imperfect. More than once we have seen the tube untowardly saturated with the fluid contents of the stomach. 5. Convulsions may occur; slight or violent; transient or protracted. Of course, the first appearance of them is, the signal for discontinuance of the ether—to be resumed, if the operation be not completed, so soon as the system has again become quiet. 6. Fainting may take place, the pulse becoming very rapid, and at last imperceptible; and the faint may prove of such intensity and duration as to cause serious alarm. But this is not likely to occur, except in the case of diseased heart. 7. Signs of congestion in the brain may manifest themselves; the patient threatening to

pass into what is technically termed the condition of *coma*; as indicated by complete insensibility, dilated pupils, relaxed muscles, snoring and labored breathing. 8. Lastly, the experiment may fail; the patient becoming excited and confused, but not dead to pain. This result, however, we feel convinced, will seldom if ever occur, *when good ether is well administered by means of a suitable apparatus.*

Such are the immediate results of an untoward kind; and the most of them, we believe, may be averted by a graduated, rapid, and quiet exhibition of good ether; should they threaten, inhalation is discontinued for a time, and warily resumed. Others may possibly show themselves at a more remote period. There may be a condition of system induced, resembling what is termed *irritative fever*; and by this recovery may be delayed. It is possible, also, that irritation of the air passages may leave some permanent traces behind; threatening to pass on into bronchitis or pneumonia.

A direct proof, however, of such casualties is, happily, still wanting. In one fatal case of amputation below the knee, in the Edinburgh Infirmary, in which ether had been successfully used, bronchitis and pneumonia were both discovered; but the woman died of inflammation of the veins, with acute abscess in the wrist and knee joints; and, besides, she had been for years in bad health, and at the time of the operation had a chronic affection of the lungs. In another patient, a boy, who had his thigh amputated, recovery was delayed by the occurrence of a slight attack of pneumonia; but then it did not show itself till a fortnight after the operation; and, at that period, the ether could certainly not be justly blamed.

Some seem to entertain a fear that a state of system untowardly favorable to inflammation of the veins, to erysipelas, and to tedious successive suppurations in various parts of the body, may be engendered by the ether. And some cases in the Edinburgh Infirmary may have lent some coloring to the fancy, and, we honestly believe, nothing more than coloring—certainly no proof. It so happened that, in several cases of operation, in which ether had been used, these affections did occur, and proved both troublesome and dangerous. But it also happened that these same diseases, with similar dangerous and troublesome results, were occurring in other patients, in



the same wards, and at the same time, to whom no ether whatever had been in any way administered. In fact, the season, at that time, was very unhealthy; and these affections prevailed then in the hospital, in an epidemic form, attacking patients who had ether and who had not, indiscriminately. A "fatal case" has been reported in England; a coroner's inquest has sat on it, and the decision has been, "death by ether." But we will venture to say, that no unprejudiced surgeon, of experience in such matters, will think the verdict just or warranted. The woman had a large "osteosarcomatous, malignant" tumor extirpated by tedious dissection from the upper part of the thigh; the operation lasting, according to the statement, 25 minutes, according to another, 55 minutes; the etherization proving quite ineffectual, the patient wincing under each stroke of the knife, and saying afterwards that she felt it. After the operation, a state of great depression was observed; and this continued. The operation was performed on a Tuesday forenoon, and the patient, sinking, died on the morning of Thursday following. Now, what is there in all this, but what has been observed again and again, in ordinary practice, before the days of ether? Under the shock of less severe operations than this, susceptible frames have sunk in less time. And though it was very natural for the surgeon, in this case, to lay the blame on the ether, shifting it from himself and his knife, we suspect that he will find but few competent judges in the profession to agree with him. Obviously, had ether been even pushed in the case, the result could not have attached blame to its use; for the result is none other than what has been often seen without ether. But there is another question. The ether here was ineffectual; so far as the anodyne effect is concerned, the operation may be said to have been without etherization, and the patient sank by continuance of the shock. Had ether, by due administration, proved effectual as an anodyne, the painful and emotional part of the shock would have been averted; and might not the patient, in consequence, have been still alive? The "Crownor's Quest" verdict is, in truth, imperfect. It was "death by ether." Ought it not rather to have been, "death (by want of) ether?"

We are further told, "the patient who underwent the Cæsarean operation died." No wonder. How many have lived after

such procedure? "Another patient, on whom extirpation of the eyeball was performed, sank." Is that anything new? "A clergyman, whose leg was amputated, never rallied after the operation." Have there not been thousands of such cases before the days of ether?

It is worth while, in connexion with this subject, to look to Travers on Constitutional Irritation—an old and valued authority. There we find many examples of sudden death after operations and injuries, some of them slight and trivial, which, had they occurred in these days, with the use of ether, would have placed in the hands of that agent's enemies, much more plausible arguments and facts for denouncing it as the cause of misadventure.

Let us not be mistaken. We do not say that fatal and formidable results may not happen, and have not happened, from ether's use in surgery. All we mean to assert is, that formidable and fatal results from ether's use in surgery have, in no one case as yet, been proven. And we go a step further. Ether, as an anodyne in surgery, is on its trial; it has been openly accused of fatal and formidable results; we seek for a thorough and impartial sifting of the evidence, *pro* and *con*; and we confidently claim, so far as the present state of evidence goes, a verdict very different from that of the "Crownor's Quest;" not merely a "Not proven," but "Not guilty."

Obviously, etherization ought never to be practised but by, or in presence of, the faculty,—it being essential that a competent person should be at hand, to detect the signs of coming evil, and to apply those remedies which circumstances may demand. Like other powerful agents for weal or for woe, it will no doubt be found,

"Sacra vitæ anchora, circumspecti agentibus  
Cymba Charontis, in manu imperiti."

As obvious is it, how the ether's use may be turned to sinister purposes. Persons may be lulled into unconsciousness, for the purpose of nefarious acts being committed on their person or purse. Should itinerant tooth-drawers take to ether, and the public foolishly take to them, we advise the unhappy victims to look to their pockets, and leave all their personal movables, of any value, at home.

Is it necessary to recount the advantages which the use of ether affords in surgery? Not surely at great length. 1. The most obvious benefit is that which accrues direct-

ly to the patient by the annulling of pain. 2. And, from this, again, there results an important matter; namely, that patients, coming to have little or no dread and apprehension of operations, will readily submit to them when assured by their medical advisers that their performance has become necessary, or even expedient; and they will not be tempted to conceal diseases, in the cure of which they imagine that operative measures may be required. In many operations, heretofore, it has been the experience of all operators that the patient has often been "more afraid than hurt." Now, we may almost say, in none will he be either hurt or frightened. 3. Heretofore, also, the *shock* of all serious operations has been formidable. The patient, however resigned and courageous, was deeply depressed in system: the pulse became feeble, the surface cold and pale, the eye dim, respiration troubled, and the whole powers of life were brought low. With ether we expect to see less of this; and much less we do see. Thighs may be amputated, stones extracted, and tumors removed, with little sign of shock imparted; the chief deviations from the normal characters of health being such as are known to be the effects of ether,—and, accordingly, both manageable and transient. Of course, we do not expect all shock to be removed. Shock may be said to consist of three parts,—mental or emotional,—the effect of the suffering of pain,—and an impression, independent of pain and emotion, made on the ganglionic and spinal systems of nerves. Removal of the two first is certainly within the power of etherization; but the last,—often formidable,—will still remain. 4. What is termed *reaction* from the shock used to be troublesome; of two kinds; strong and active, tending to inflammation; weak and tumultuous, tending towards irritative fever, and equally important,—perhaps the less manageable of the two. Now, by the avoidance of shock, wholly or in great measure, it is not unreasonable to suppose that such untoward consequences of shock may be avoided, also, wholly, or in great measure. And experience, on this point, has already spoken favorably. 5. Some observers have thought that rather more blood flowed from operations conducted with ether, than from those without it. And some seem tolerably confident that there is a greater tendency to what is termed secondary bleeding;—that is, bleeding taking place some hours after the opera-

tion, when the patient is warm in bed. As to the first objection, our own observation tends rather the other way; and we do not well understand how it should be otherwise; for, when the ether's charm works well, the placid condition of the part and patient is surely favorable to a gentle circulation, and to a moderate flow of blood from cut vessels. Should the patient and part become excited and unruly,—as *sometimes* happens,—then, no doubt, some trouble by many bleeding points may be expected. But such an event ought to be the exception to the general rule. As to the secondary bleeding,—this may be explained in another way, without placing blame on the ether. In many operators, using ether without much experience of its effects, there is a natural desire to hurry over the work as rapidly as possible, lest the patient wake up and complain of pain; and, in consequence, there is a temptation to close the wound, and dress it finally, after having secured the main vessels only, without looking narrowly for minor points, or waiting to see if fresh bleeding orifices show themselves, as is ordinarily, and ought always to be done. And when this is not done, bleeding, by and bye, can scarcely fail to occur, to a greater or less extent,—obviously the fault, not of the ether, but of the ether's employer, the surgeon. With skilful etherization, and the ordinary precautions of deliberate operating, we are inclined to believe that a saving of blood will be the result. 6. Instead of hurry being imparted to the surgeon's hands, by the ether's use, they ought, on the contrary, to move with greater steadiness and deliberation. There is one operation in surgery which is always done slowly, because thus, and thus only, it can be done well,—and that is trephining. There is, indeed, no excuse for haste, the sawing of the skull,—the patient ordinarily insensible,—being a painless operation. And, in like manner, during the painless operations of these days, the same deliberate movements should be practised; the more especially, as we know that the manageability of the ether is such, as to enable us to maintain the desired state of unconsciousness almost for an indefinite period. It is very plain, however, that such increased steadiness, deliberation, and consequent perfection of operating, is not to be expected until the surgeon has become familiar with the ether's use, and confident of the power with which he can thereby command the sensibilities

of his patient. In fact, so manageable is the agency, that we have often been forced mentally to liken it to the power of steam, which may be turned off or turned on as we list. Working a vessel up a difficult channel, how often is the power of progression increased, slackened, turned off, or reversed! In ether, we have no reverse in the power itself; but, during an operation, it would be no great misapplication of terms to find the superintending surgeon regulating his anodyne powers by "Set on!" or, —as it is an American discovery,—"Go a-head!" "Ease her!" "Stop her!" Unfortunately, there is no "Back her!" or "Astern!" But, if a bright look-out is kept, and no rash way made upon the vessel, the necessity for such a cry, we fondly think, will not often arise. How many operations with ether must have now taken place,—many, too, it is no want of charity to suppose, with bad ether, bad apparatus, and want of caution; and yet, so far as we know, there is not one instance of fatal casualty which can be ascribed directly to the ether's use.

But it is not in *cutting* only that ether is of use. As an opponent of muscular resistance, it promises to be of great service in surgery. In dislocations of old standing, more especially of the larger joints, as the hip and shoulder, it is well known that great difficulty is experienced in effecting reduction; and this mainly on account of the resistance which is afforded by the muscles, whose spasmodic action is partly involuntary and partly in obedience to the will. However resolute and calm the patient may be, and anxious to assist the surgeon in every way, yet, so soon as violent extending force is applied to the limb, he cannot help straining himself greatly, fixing his chest during deep inspirations, and rendering the muscles connected with the displaced joint as rigid as if they were of wood or plaster. Now, all this straining, the effect of the will, etherial inhalation is calculated to avert entirely; and we have seen it so averted. Consequently, one great obstacle to reduction may, by the ether, be overcome. We are not so sanguine of its proving a successful opponent of involuntary spasm; having repeatedly witnessed much and violent spasmodic movement during amputations, of the pain of which the patient felt nothing. In hernia, too, the remedy promises well, in preventing the straining of the patient, which every experienced surgeon knows is so greatly obstruc-

tive of reduction. In a recent case of rupture operated on, the bowels were constantly protruding from the wound, and could not be replaced, on account of the great and uncontrollable action of the abdominal muscles; ether was administered, the patient became unconscious, the abdomen lay quiet, and the protruded parts were then, without the slightest difficulty, replaced and retained. Even supposing, therefore, that etherial inhalation be found ineffectual in allaying involuntary spasm, it promises much aid, by the averting of voluntary muscular action, in the reduction of dislocated joints, and in hernia—which may not inaptly be regarded as a dislocation of bowel.

But, further, the ether's use is not to be limited to the province of surgery alone. It is applicable to every department of the healing art. In the practice of medicine, and in midwifery, we may expect its cautious employment to be followed by signal benefits, in certain circumstances. In the latter department, Professor Simpson has already reaped no slight success. His first application of ether was to a difficult case of turning, in a deformed mother. A painful operation had to be performed within the womb; and then the child had to be pulled forcibly away. Much force was necessary; in ordinary circumstances, much pain must have been endured, and the after recovery would in all probability have proved tedious. As it was, no pain whatever was felt; there was no shock, or lowering of the system; and "on the fourth day she had walked out of her room to visit her mother." In several cases of extraction by forceps, the results of etherization have been equally satisfactory. In every case, "the uterine contractions continued as regular in their recurrence and duration after the state of etherization had been induced, as before the inhalation was begun. . . . Indeed, in some cases the pains have appeared to me to have become increased as the consciousness of the patient became diminished. This has more particularly occurred with one or two patients, who breathed ether combined with tincture of ergot, or containing a solution of its oil."\* And thus, though in some cases of surgery, ether may seem to labor under a disadvantage in not proving a successful opponent of involuntary muscular action, here, in the obstetric art, the greatest possible advantage is derived from that circumstance. Parturition is shorn of pain, and yet not retarded.

\* *Monthly Journal*, March, 1847, p. 724.

Our own impression is, that etherization will ultimately be found more available in the obstetric, than in any other department of the healing art.

In medicine, the inhalation of ether has been applied with success to relieve the painful paroxysms of asthma, and to assuage the intense suffering attendant on neuralgia. And to other diseases, attended with much pain, we have no doubt that in due time the application will be extended. "Pneumatic Medicine" is revived.

In tetanus, we do not look sanguinely for success; for, as already stated, etherization is not likely to control involuntary spasm, and it acts but slightly, if at all, on the true spinal system—unless pushed very far. When, however, in tetanus, amputation is deemed expedient, etherization will then prove unspeakably valuable in averting an aggravation of suffering, during the operation, which might otherwise prove almost beyond the limit of human endurance.

In public practice, etherization has been found very useful in detecting feigned diseases. The patient having been, *volens*, thrown into helpless unconsciousness, stiff joints have become supple, crooked backs have grown straight, and various other decrepitudes have thawed into normal shape and form—unmasking the impostor.

One field of inquiry, vast and important, seems just opening up to the profession; namely, the inhalation of other remedial agents, in the form of vapor, with or without ether—as practised by Dr. Pearson and others, in the end of last century. And who knows, but, by the resuscitation of "Pneumatic Medicine," many diseases may be brought more thoroughly under control; the remedies, in small quantity, being directly mixed with the circulating blood—borne along thereby, rapidly pervading the whole system, and both speedily and effectually exercising their remedial agency.\* Professor Simpson has already used the ergot in this way, as formerly stated; and we doubt not this is but the commencement, by him and others, of further investigation in this important, interesting, and hopeful direction.

And not merely to the human being is the ether's use to be limited. The lower

animals partake also of its benefits. Already, horses and dogs have been relieved from troublesome and dangerous affections, by operations rendered painless.\* Vicious horses have been shod, too, with safety and comfort to themselves and others. In the department of Van Amburgh, there is no saying what may be achieved.

And as if Medicine did not afford a wide enough field for ether, that of Law has been slightly broached upon. A proposal has been made to extend etherization to the Justiciary Courts; and a convict, lately, we see, has begged to be executed while under the Letheon's influence. Hanging-made-easy, however, is scarcely to be expected. The innovation would hardly be consistent with justice, however it might be regarded in law.

But we must hasten to apologize for indulgence in aught jocular, in a matter so grave and important as etherization; which in this and other countries has already removed all pain, and no little danger, from thousands of operations of every grade and kind in surgery; which has already made some progress in the successful treatment of disease; and which has already brought no slight help to the most interesting portion of mankind, in those hours of heavy trial which they have hitherto borne, with the greatest fortitude, indeed, but also with the intensest agony of pain; from which, in short, within a few brief months, a vast amount of good has already come, and from which we still, not unreasonably, hope for good, to an extent that is almost incalculable.

Do not let us be carried away, however, by enthusiasm, natural in the circumstances. All new discoveries run as much risk of damage from the unwise zeal of their partisans, as from the hostility of their opponents. Let our advance in this hopeful path be cautious and sure. Let wisdom, honesty, and candor attend on every observation. And let every man, old and young,

\* We observe that a recent experimenter on horse-flesh has been making an ingenuous exposé of his adventures with ether. His first trials, instituted apparently for no earthly purpose, except just to see what would happen, did not satisfy him; and the want of success he attributed to "the too free entrance of atmospheric air" in inhalation. Accordingly, in his next experiment, he determined to prevent, if possible, the ingress of one particle of that fluid, so dangerous and unsuitable for lungs; and he succeeded marvellously; choking his victim as thoroughly as if he had hanged him by a halter. Perhaps he thinks that the ether had something to do with the casualty!

\* According to Wagner, vaporizable substances thus applied to the bronchial cells "seem to make their way into the blood through the unbroken vascular membrane, with the same certainty and ease as when they are injected directly into the veins."

casting aside all prejudice, and anxious only to know the truth, do what in him lies to ascertain how much of actual good there is, or may be, in the ether's use; how much of possible evil may attend on it; how the latter is to be averted or subdued, and how the former may be best secured and still further extended.

And in conclusion—should our fond hopes be realized, and etherization perform all that it offers—let us not forget from whom the favor has really come, and to whom our thanksgiving is really due. What lay hid for ages, eluding the anxious search of the wisest, has been unexpectedly revealed, under humble and unlooked-for agency. And in such an event there is surely a manifest declaration of the sovereign power

of Him who doeth all things wisely and well,—“The author of every good and of every perfect gift.” Let us humble ourselves at the thought of man's weakness, and shortness of sight; powerless even when strengthened by experience, or when enlightened by philosophy. 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, while He hateth sin, yet loveth the sinner; who is “of great kindness, and repenteth Him of the evil;” who “retaineth not his anger for ever, because he delighteth in mercy.”\*

From the Dublin University Magazine.

### LEAVES FROM THE LIFE OF PRINCE TALLEYRAND.

It is a remarkable fact that the three individuals who have rendered themselves most conspicuous in history, as the first movers of the great Revolution in France, all belonged to that class against which that political catastrophe more especially directed its thunders. MIRABEAU, TALLEYRAND, and LAFAYETTE, were severally members of the *ancienne noblesse*.

These illustrious persons entered life almost all together. *Mirabeau* was born on the 9th March, 1749, *Talleyrand* on the 13th February, 1754, and *Lafayette* on the 6th September, 1757. The first lived only to speak the prologue of the drama; the last two were upon the stage at the fall of the curtain.

The family of Talleyrand was ancient and noble. It preserved among its traditions, alliances with the Bourbons themselves. In the middle ages the *Perigords* were petty sovereigns, who, not unfrequently, resisted even the monarch in arms. Before the Revolution, the elder branch was extinct, and the younger consisted of two stems, one of which is at present represented by the Princes of Chalais, and the other by the grand nephew of the celebrated diplomatist, the Duke Archambaud de Perigord.

Although CHARLES-MAURICE was the eldest of his branch, he was, for some rea-

sons now unknown, an object of neglect with his parents. Abandoned in infancy to the mercenary care of a nurse in the Faubourgs of Paris, he suffered an accident which rendered him lame for life, before he completed his first year. Either from this or some other cause, he was, by the arbitrary will of his family, deprived of his birth-right, stripped of those advantages to which, by primogeniture, he was under the then existing usages entitled, and saw the wealth, titles, and honors which should have been his, transferred to his younger brother, Archambaud. In fine, he was consigned to that receptacle then reserved for the younger members of noble families—the CHURCH.

From the roof of his nurse he passed to the College of D'Harcourt, from whence, in succession, as he grew in years, he was transferred to the Seminary of St. Sulpice, and the Sorbonne. From his birth to his adolescence, he never once slept under the paternal roof—a circumstance which he never afterwards ceased to remember, and which assuredly mingled in no small degree with the incentives which prompted him

\* Since writing the preceding pages we have seen the new Number of the *British and Foreign Medical Review*; and are delighted to find the accomplished Editor of that influential Journal upholding the same general views in regard to etherization, as we, more feebly, have ventured to advocate.

Accession no.

Author Ecclectic

Magazine:

Painless operations

