

PRACTICAL REMARKS,  
ON THE  
INHALATION  
OF THE  
**Vapour of Sulphuric Ether,**  
ILLUSTRATED WITH CASES,  
AND THE  
LATEST METHOD OF APPLICATION,  
WITH  
**REMARKS**  
As to the proper period to commence Operations, &c.

BY  
W. PHILPOT BROOKES, M.D.

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BY  
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Midwifery Charity.*

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## P R E F A C E.

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I have endeavoured, in the following pages, to bring before the Profession and the Public a few plain facts, illustrated with cases that have come under my notice, of the wonderful application of the Inhalation of Sulphuric Ether.

And in so doing, my object has been chiefly directed to the importance of giving this remedy its proper place amongst our means of alleviating suffering, and the necessity of allowing the Public candidly to judge for themselves as to its virtues. I have never, in any way, endeavoured to shroud this question with mystery; for I have freely and willingly invited any Professional or Non-Professional Gentleman to view the operations that have fallen under my notice: in fact, the number who have attended at them (I may say more than ninety) will speak for my candour on this point. These few pages have, therefore, been written as much for the general as for the medical reader.

I have used some interesting cases which did not come under my own observation, in order to illustrate an important one of my own; and for these I am indebted to the pages of the *Lancet*, and other periodicals.

TO  
THOMAS EVANS, ESQ., MD.,

SENIOR PHYSICIAN TO THE GLOUCESTER COUNTY  
INFIRMARY, &c. &c.

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MY DEAR DR. EVANS,

*Allow me to dedicate this little Work to  
you, as a tribute of respect for many acts of kindness and  
friendship, from which I trace much of the professional know-  
ledge I acquired while your Pupil at the Gloucester Infirmary.*

*Believe me ever to remain,*

*Dear Dr. Evans,*

*Yours very sincerely,*

WM. PHILPOT BROOKES.

ALBION HOUSE, CHELTENHAM:

FEB. 16, 1847.

## PRACTICAL REMARKS, &c.

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### CHAPTER I.

THE Public have lately been much aroused by a novel and extraordinary remedy for rendering operations on the human body painless; and the interest that has been caused by this wonderful process continues daily to increase, and I do not doubt will do so, ere long, in a tenfold degree. We cannot view this production of our trans-Atlantic brethren, Drs. Jackson and Moreton, but as one of the greatest blessings that has ever been given to suffering humanity, and second to none of the great discoveries of modern times; no, not even that of the *famed and illustrious Jenner* (Vaccination). The American papers, in first noticing this invention, state limbs and breasts have been amputated, arteries tied, tumours extirpated, and many hundreds of teeth extracted without any consciousness of the least pain on the part of the patient. Having been the first to use this remedy for capital operations in Cheltenham, I have carefully watched its progress, both on the healthy and diseased subject: and from the number of cases in which I have availed myself of its use, I am bold enough to suppose the following facts and illustrations will not be deemed unworthy of perusal.

The degrees of Etherization which patients undergo appear to me *various*: we generally have a state of complete unconsciousness, and in which no expression takes place, either of the countenance or otherwise. Again, another form is that of great excitement, similar to the effects of Nitrous Oxide (or laughing gas), but which gradually lapses into a state of placid quietness. Another form is that in which the patient appears to suffer much pain and cries out, yet afterwards declares he has had no pain of any sort. I am inclined to think much depends on the Ether used, the purity of which must vary considerably in different instances, and of course give rise to varied symptoms in the inhaler.

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## CHAPTER II.

### ON THE COMPOSITION OF SULPHURIC ETHER.

This liquid, Sulphuric Ether, has been known since the 13th century. It is an artificial product.

It is ordered to be prepared by the London College of Physicians in the following manner:—

Take of rectified Spirits of Wine, three pounds; Sulphuric Acid, (commonly called) Oil of Vitriol, two pounds; Carbonate of Potash, previously ignited, one ounce; pour two pounds of the Spirit into a glass retort, then add the Acid and mix it, afterwards place it in sand and raise the heat so that it may boil, and the ether passes over into a receiver which is kept cool with ice. To the liquor which



remains in the retort, after the heat has subsided, pour the remainder of the Spirit, that Ether may distill in the same manner. Mix the distilled liquors, then pour off the supernatant portion, and add to it the Carbonate of Potash, shaking them frequently during the greater portion of an hour. Lastly, let the Ether distill from a large retort, and be kept in a well stoppered vessel with a cap. At ordinary temperatures the Ether is a colourless, very limpid, liquid, having a penetrating peculiar fragrant odour, and hot pungent taste; it is extremely volatile, its evaporation causes intense cold, and its specific gravity, according to the London College, is 0.750 when pure and recently prepared. Ether possesses neither acid or alkaline properties, but by exposure to air and light, it absorbs oxygen, and becomes acid from producing acetic acid and water, and, of course, it would be highly improper and dangerous to use it for inhalation. It is very combustible, and this has been urged by a French journal (the *Journal des Débats*) as rendering it dangerous to use by candle light or even with a fire in the room, they have gone so far as to state combustion may take place and tear asunder all the minute ramifications of the bronchial tubes, and, of course, cause the death of the inhaler; this I think very unlikely, and far from the truth, as the air mixed with it in the lungs renders it quite innocuous to combustion. I grant, if you place a lighted candle to a bottle containing Ether, it will explode, and an instance is related of a French chemist who had his house blown up by this means, but that differs much from the case cited when a great quantity of air is impregnated with it in the lungs. Pereira, in his elements of *Materia Medica*, and

to whose work I am indebted for the chemical properties of Ether, gives its effects on man in the following manner : It is analogous in its operation to that of alcohol, but is much more rapid and transient, it neither augments the heat of the body or the frequency of the pulse. Its first effects on the cerebral functions are those of an excitant, but subsequently they are of a depressing character ; in large doses it produces intoxication, like that caused by alcohol, and in very excessive ones it excites nausea and copious flow of saliva giddiness and stupefaction. Its long and continued use diminishes much its effects.

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## CHAPTER III.

### EFFECTS OF INHALATION.

The effects of inhalation on patients, pupils dilate, eyes turn up *in the orbit*, a sense of coldness in the hands and legs, and occasionally in the chest, in some excitement, and in others a tranquil state of rest, pulse lowered in most cases, but in some increased, rarely nausea or vomiting, and in general they require the immediate use of stimulants from depression it causes. I cannot see from inhalation any chance of injurious consequences.

Dr. Christison mentions a case in which an old gentleman took sixteen ounces a day for Asthma, and the Chemist, Bucquet, (who died of Scirrhus of the Colon, with inflammation of the stomach, and of the intestines, generally took

before his death) a pint of Ether daily to alleviate his great and excruciating pain. This shows us the properties of Ether, when taken internally have been known for many years as an assuager of agony, and now we get it in a less noxious and simple form to alleviate suffering, and, I may say, to save valuable lives, for I have known many patients die with limbs on, rather than submit to amputation, on account of the great agony they must undergo; not only so, but the effect of the mind on the body was frequently shown to an alarming extent when a poor sufferer was told he must have a leg or arm taken off; *now* you do this not only safely, but also with satisfaction, for who can help feeling, even as if it were himself, when obliged to tell a patient he must sacrifice one of the most important members of the body.

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#### CHAPTER IV.

I am inclined to think great danger may arise from Asphyxia, Coma, and other unfavourable symptoms, by using impure Ether. The description of the sensations given of the effects of this remedy have been various, and the London and provincial press have of late teemed with cases, some being operated on apparently quite sensible, yet feeling no pain; others again crying out most lustily; and others in a complete state of sleep, yet perfectly aware of any one talking around them, and relating all that has taken place after the effects of the inhalation have passed of.

I intend, when performing any operations in future, to instil on my visitors the necessity of the utmost silence, for I have, in one or two instances, seen patients, almost in a complete state of unconsciousness, suddenly rouse themselves when any one spoke aloud. The first effect of the inhalation appears to give the patient a disagreeable sense of choking; but afterwards it passes away, and he gets confidence and continues the process, which varies considerably in the time it takes to get the patient under its influence, some going off in less than a minute, others requiring nearly half an hour. The plan I adopt is to allow the first two or three ethereal inspirations to take place without holding the nostrils, afterwards I compress them, and let the patient inspire through them occasionally.

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## CHAPTER V.

### PREPARATION OF ETHER AND DESCRIPTION OF APPARATUS.

Great care ought to be taken to have the Ether quite pure, and to do so you must have it well washed in lime-water, or redistilled through Carbonate of Potash. The Ether I have generally used with very good effect has been always treated in this way. Mr. Squire, Chemist, states that the effect produced by washed Ether and unwashed has been very different, he tried it on himself, and found, on inhaling the washed he felt a pleasurable sensation, and on taking the ordinary rectified Ether it produced

unpleasant feelings followed by a trembling, but on inhaling the washed again shortly afterwards, the pleasurable ones returned. Its taste is also not nearly so disagreeable, which removes the objections which I find some persons have to inhale; it does not leave such an unpleasant taste on the palate for a long time, and is less likely to induce coughing, or irritation, or inflammation of the lungs, small quantities of Sulphurous Acid and Alcohol being contained in impure Ether, also the inhalation of the Alcohol may induce a prolonged state of coma, and a degree of reaction, which would prove unpleasant. The apparatus I have in use was made for me in very excellent style by Mr. R. E. Marshall: it is a simple round tin box two inches deep by five in diameter; on the inside a plate of tin winds round it four times dividing it into compartments; on the outside a foot and a half of common gas pipe coils once and a half round entering it at the lower part, the upper part of the pipe turns up with a small hole in it to admit fresh air. There is on the centre of the top of the box a pipe to pour in the Ether, and also to screw on the elastic tube, which is a foot and a half long, ending in an ivory mouth nipple, surrounded by a mackintosh padded mouth-piece, which completely straps around the mouth, and prevents the admission of fresh air. The valves for inspiration and expiration are entirely new for this apparatus, for after ineffectually trying the ball and socket, which was a constant source of failure to us, we fitted the present ones which are merely made of oil-silk in the same way as the breast pump, and act most admirably. I have heard it asserted they will easily get out

of repair, but even granting this, which I much doubt, they are just as easily put all right again by merely tying on a fresh piece of oil-silk, which any novice can do. I always take particular care to place my tin box in water, of at least 70 degrees of heat, for at 45° the weight of vapour of Ether and air are the same, and at a little above 70° the volumes are equal or nearly so, and by this means you produce the desired effect more rapidly. The compartments in the tin box allow the air to pass completely through the Ether, before it comes to the mouth-piece, and the pipe for the admission of fresh air, after coiling once and a half way round the box, permits it to be perfectly warm before it enters the Ether. This box, I believe, was first invented by Dr. Snow, and I am inclined to give it the preference to any other form of apparatus, although it has been said the Ether will act upon tin; this, I am convinced, will not take place unless it is very impure, and then it is not fit for a patient to inhale. I believe I am borne out in this assertion of the chemical action of Ether on tin by some of the first chemists of the day. In most of my cases the Ether was kindly administered for me by Dr. Smith, and with a very simple form of apparatus, and which acted, I think, better than any since used, although it was liable to present symptoms of a disagreeable nature, and, perhaps, produce more coma than would be pleasant; this is the opinion of Mr. Liston, the first surgeon who used Ether in this country for any capital operation, and who, in a letter I lately had from him, called my attention to this unpleasant symptom, which he feared, if a supply of fresh air were not kept up. The

apparatus named was a damp bladder, to which an elastic pipe of one foot long was attached, with an ivory tube for the mouth; about one ounce of Ether was placed in the bladder, it was then put in a basin of warm water, the pipe put into the mouth, and a towel held tightly round it so that the patient could only expire and inspire in and out of the bladder, and this was the great objection, although it acted very well, and we had no unpleasant symptoms in either of the cases in which it was used. The same kind of instrument was used by Mr. Herapath, of Bristol, at the first operation performed in that city. In using a new remedy of this valuable nature, it is wise never to run the slightest risk of any disagreeable consequences, and, therefore, I have given up the use of the bladder, and would advise no one to use an instrument that is not perfectly safe, for so fully convinced am I of the innocent nature of etherization, if judiciously and properly administered, and of the great risk, if given incautiously, that I would urge great care in the selection of instruments.

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## CHAPTER VI.

I have already seen symptoms produced on healthy subjects which would alarm any one but the practised eye of a medical observer, and we have only now to establish and gain public confidence for this remedy, taking care that the failures shall not take place with the profession, for it seldom

occurs that great good is unmixed with evil, and it is as much the duty of a surgeon to warn from danger, as to relieve suffering or cure disease. In connection with this subject, the following passages, written above twenty years ago by Charles Fourier, will prove of more than ordinary interest ; it is translated from "La Phalange Revue Sociale," tome iv., page 301, and shows a great degree of foresight on the part of the learned author with regard to the existence of some peculiar agent, capable of deadening sensibility during some of the severest trials to which human nature is liable :—

"Our bodies will become impregnated with the unitary athermal fluid, which will produce in them the transcendent harmonies in the sense of feeling, as well as in the other senses. We shall owe it to the chord of the 7th in feeling.\* This chord is perhaps the most desirable of any for the present race, so exposed to pain. This chord is a transition into a state of things which seems contrary to human nature, as is somnambulant intuition in the scale of sight. This same chord will elevate us to ultra-human faculties, such as security against pain, and the reduction of suffering to a very trifling proportion, or about one-eighth of what it is at present. I do not say reduction of diseases, which would be a different result, I mean that in any illness, fracture, or amputation, the intensity of pain will be reduced from what it is now in a similar operation, and so on in all illness. Fish seem to enjoy, in high degree, this

\* Peculiarities of diction are inseparable from all new sciences ; but to those who are acquainted with the theory of Music this phrase will offer no difficulty, as they will know that the chord of the 7th serves to modulate into another key, and is therefore what Fourier terms "the transitional ambiguous or exceptional term."



faculty, which I have named *Ichtyonevrism*, in allusion to the class of beings which are endowed with it. *Polypi* are in full enjoyment of this property; we are subject in full health to an effect of partial numbness when we touch the *Torpedo*. If nature can produce in us this momentary insensibility by the contact of an animal, and communication of a fluid or aroma of which this animal is a conductor, has she not the means of providing us with the fluid for cases in which it might serve to render insensible the part exposed to pain?

“That Paralysis would indeed be a blessing which could attack a leg during the time of amputation, and maintain itself in the seat of pain until a perfect cure were effected. How desirable this local Paralysis would be for the gouty during their attacks!

“We shall acquire this faculty by the use of the fluid transmitted to us by the *Torpedo*, which in this communication acts contrariwise since it deadens a healthy part. The effect is not the less precious, speculatively, since it shows us that there exists in nature an agent capable of absorbing pain. *Ichtyonevrism*, or Harmonic Paralysis, will be the opposite to Subversive Paralysis, or Torpidness, resulting from the weakness or rarity of the nervous fire, or vital fluid which maintains the sensibility of the nerves, they are not yet in a state of Paralysis, since the benumbed part does not mortify, and continues to receive alimentation; nevertheless it is in a state of accidental death deprived of feeling and sensibility. This lethargy of feeling, which is generally an effect of weakness, would take place in the contrary

case, or case of extreme force which would give the vital fluid sufficient activity to resist pain. This fluid, when in the requisite degree of activity, will become for our bodies a preserver, an intrepid defender, which will fly to all those parts where pain attacks us, and will be sufficient to keep it in check and neutralise its assaults."

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## CHAPTER VII.

We have now, I trust, solved the important problem in medical science of mitigating pain in surgical operations, and I hope the public generally will hail this discovery as it deserves, and promote it in every way in their power by convincing themselves of its value, and not run away with the idea, after hearing of a few failures, that of necessity all will turn out nothing. It is, I am well aware, no easy matter to establish any new theory or doctrine ; you have many prejudices to overcome, not only in the general observer, but I am sorry to be obliged to say too frequently in the professional one also, who, from motives difficult to construe, will often blink the truth instead of judging boldly for himself. The following cases show some of the effects of Ether in a peculiar manner, and how the symptoms vary in different individuals as to the extent of Etherization, just as stimulants, brandy, wine, opium, and tobacco, produces different effects on some persons from these found to follow their use on ordinary occasions ; in these three

cases the Ether acted as an excitant, it was also quite clear that the effect was not produced from the Ether being impure, as the same quality of Ether was used in the last four of my own operations, it must, therefore, in my case have depended solely on the peculiar constitution of the patient. I believe he had been rather given to drink spirituous liquors, and that may have given rise to some of the difficulties in effectually getting him under its influence. I certainly reported this case as a failure in the Medical Periodicals, but I am now fully of opinion the man had no sensation of pain until the bone was sawed through. I see no reason why we should not believe him, and he positively asserts he felt nothing after he heard Mr. Eves tell me to proceed with the amputation until he felt the bone sawed. It has been stated, by some persons who have had experience in inhalation, that healthy patients are more rapidly affected than unhealthy, and robust constitutions than weaker ones; but from this opinion I am inclined to differ. I have always found the more debilitated my patients were the more rapidly they became Etherised. The temperature at which the Ether is inhaled considerably modifies its effect, and this circumstance may account for some of the failures which have taken place. I have below given Dr. Snow's table which shows the different temperatures and the quantity of vapour of Ether contained in one hundred cubic inches of air, which, from the great value of this scale of Etherization, I have given fully, as reported in that excellent periodical, "The Pharmaceutical Times."

TABLE OF THE QUANTITY OF THE VAPOUR OF ETHER IN  
ONE HUNDRED CUBIC INCHES OF AIR,*Saturated with it at various Temperatures.*

Temp. Fahr.	CUBIC INCHES.		WEIGHT IN GRs		Temp. Fahr.	CUBIC INCHES.		WEIGHT IN GRs	
	Ether.	Air.	Ether.	Air.		Ether.	Air.	Ether.	Air.
40°	24.3	75.7	19.1	23.1	66°	45.3	54.7	35.7	16.6
42	25.6	74.4	20.1	22.7	68	47.4	52.6	37.3	16.0
44	27.0	73.0	21.2	22.2	70	49.4	50.6	38.9	15.4
46	28.3	71.7	22.3	21.8	72	51.5	48.5	40.6	14.7
48	29.7	70.3	23.4	21.4	74	53.6	46.4	42.2	14.1
50	31.2	68.8	24.6	20.9	76	56.0	44.0	44.1	13.4
52	32.7	67.3	25.8	20.5	78	58.4	41.6	46.0	12.6
54	34.3	65.7	27.0	20.0	80	61.0	39.0	48.1	12.0
56	36.0	64.0	28.3	19.5	82	63.7	36.3	50.2	11.0
58	37.7	62.3	29.7	19.0	84	66.6	33.4	52.5	10.1
60	39.5	60.5	31.1	18.4	86	69.5	30.5	54.8	9.3
62	41.4	58.6	32.6	17.8	88	72.5	27.5	57.1	8.3
64	43.3	56.7	34.1	17.3	90	75.6	24.4	59.6	7.4

At about 45° the weights of vapour of Ether and of Air are equal, and at a little above 70° the volumes are equal.

The weights are calculated with the barometer at thirty.

Dr. Malgaigne has used etherization extensively in France, and found re-action after surgical operations longer in being established and weaker than under ordinary occasions. This I particularly observed to be the case in the woman who had her breast extirpated, in which re-action did not come on for nearly an hour after it was dressed; and, in consequence, I had much coagulum to contend against, so that the wound only partially united by the first intention. I now always allow my patients to remain full half an hour before the final dressing. In the poor man, John Coombs, the hand only bled very slightly when first amputated; but afterwards, before dressing it, re-action was thoroughly established, and

we had profuse hemorrhage. Contortions of the face and limbs, as observed in these three cases, do not physiologically prove pain ; they may take place during operations from mere reflex-action. Patients may also scream with pain, as these did, and yet be quite unconscious of any. How often do we see epileptic and hysterical females cry out as if in the greatest agony, and yet they have no subsequent recollection of any pain. Intoxication, delirium, and sleep walking, all furnish examples of powerful mental suffering, or sensations of which afterwards the individuals are quite unconscious. We are all familiarly aware of many instances, in our own recollection, of persons jumping up in bed, and screaming dreadfully ;—awake them, and ask what they felt,—they will tell you they were quite insensible. This proves to us the fact that Ether is not rendered less useful or needful although the patients may cry out loudly, and appear as if suffering great pain, yet afterwards assert they have had none whatever.

I have not as yet had any means of trying the Ether on young children. It has been stated they are not fitted for inhalation ; nor should I be inclined to give it to any child under two or three years of age. We may get excitement which would be dangerous, and re-action would not easily come on after the extreme depression that would follow.

As yet, the Ether has not been extensively tried in Tetanus, Hydrophobia, Neuralgia, or other spasmodic diseases ; but from what I have seen of its effects, I shall certainly give it a trial the first opportunity I have,—and from its sedative properties, I do not hesitate to say I imagine it will be found a very valuable addition to our list

of remedies. I have alleviated suffering in a young lady who had constant attacks of excruciating pain from Tic Doloureux, and had tried several remedies without effect; but after inhaling the Ether, without carrying it to a state of unconsciousness, she was greatly benefitted, and has since had but very slight return of pain.

Before entering on my cases, I think I cannot do better than give the following paper, read before the Boston Society on the first introduction of Ether. It is an ably written article, and can at all times be referred to with pleasure: it is taken from the "Boston Medical and Surgical Journal."

*"The following Paper, by HENRY JACOB BIGELOW, M.D., one of the Surgeons of the Massachusetts General Hospital, was read before the Boston Society of Medical Improvement, November 9th, 1846, an Abstract having been previously read before the American Academy of Arts and Sciences, November 3rd, 1846.*

"It has long been an important problem in medical science, to devise some method of mitigating the pain of surgical operations. An efficient agent for this purpose has at length been discovered. A patient has been rendered completely insensible during an amputation of the thigh, regaining consciousness after a short interval. Other severe operations have been performed without the knowledge of the patients. So remarkable an occurrence will, it is believed, render the following details relating to the history and character of the process not uninteresting.

"On the 16th of October, 1846, an operation was performed at the hospital, upon a patient who had inhaled a

preparation administered by Dr. Morton, a dentist of this city, with the alleged intention of producing insensibility to pain. Dr. Morton was understood to have extracted teeth under similar circumstances, without the knowledge of the patient. The present operation was performed by Dr. Warren, and though comparatively slight, involved an incision near the lower jaw of some inches in extent. During the operation, the patient muttered, as in a semi-conscious state, and afterwards stated that the pain was considerable, though mitigated; in his own words, as though the skin had been scratched with a hoe. There was probably, in this instance, some defect in the process of inhalation, for, on the following day, the vapour was administered to another patient with complete success. A fatty tumor, of considerable size, was removed by Dr. Hayward from the arm of a woman, near the deltoid muscle. The operation lasted four or five minutes, during which time the patient betrayed occasional marks of uneasiness; but upon subsequently regaining her consciousness, professed not only to have felt no pain, but to have been insensible to surrounding objects—to have known nothing of the operation, being only uneasy about a child left at home. No doubt, I think, existed in the minds of those who saw this operation, that the unconsciousness was real; nor could the imagination be accused of any share in the production of these remarkable phenomena.

“I subsequently undertook a number of experiments, with the view of ascertaining the nature of this new agent, and shall briefly state them and also give some notice of the

previous knowledge which existed of the use of the substances I employed.

“ The first experiment was with Sulphuric Ether, the odour of which was readily recognized in the preparation employed by Dr. Morton. Ether inhaled in vapour is well known to produce symptoms similar to those produced by the nitrous oxide. In my own former experience, the exhilaration has been quite as great, though perhaps less pleasurable, than that of this gas, or of the Egyptian *haschish*. It seemed probable that the Ether might be so long inhaled as to produce excessive inebriation and insensibility ; but in several experiments the exhilaration was so considerable that the subject became uncontrollable, and refused to inspire through the apparatus. Experiments were next made with the oil of wine, (ethereal oil.) This is well known to be an ingredient in the preparation known as Hoffman’s anodyne, which also contains alcohol, and this was accordingly employed. Its effects upon the three or four subjects who tried it were singularly opposite to those of the Ether alone. The patient was tranquillized, and generally lost all inclination to speak or move. Sensation was partially paralyzed, though it was remarkable that consciousness was always clear, the patient desiring to be pricked or pinched, with a view to ascertain how far sensibility was lost. A much larger proportion of oil of wine, and also Chloric Ether, with and without alcohol were tried, with no better effect.

“ It remains briefly to describe the process of inhalation by the new method, and to state some of its effects. A small



two-necked glass globe contains the prepared vapour, together with sponges, to enlarge the evaporating surface. One aperture admits the air to the interior of the globe, whence, charged with vapour, it is drawn through the second into the lungs. The inspired air thus passes through the bottle, but the expiration is diverted by a valve in the mouth-piece, and escaping into the apartment is thus prevented from vitiating the medicated vapour. A few of the operations in dentistry, in which the preparation has as yet been chiefly applied, have come under my observation. The remarks of the patients will convey an idea of their sensations.

“A boy of sixteen, of medium stature and strength, was seated in the chair. The first few inhalations occasioned a quick cough, which afterwards subsided; at the end of eight minutes the head fell back, and arms dropped, but owing to some resistance in opening the mouth, the tooth could not be reached before he awoke. He again inhaled for two minutes, and slept three minutes, during which time the tooth, an inferior molar, was extracted. At the moment of extraction the features assumed an expression of pain, and the hand was raised. Upon coming to himself, he said he had had a ‘first-rate dream—very quiet,’ he said, ‘and had dreamed of Napoleon—had not the slightest consciousness of pain—the time had seemed long;’ and he left the chair, feeling no uneasiness of any kind, and evidently in a high state of admiration. The pupils were dilated during the state of unconsciousness, and the pulse rose from 130 to 145.

“A girl of sixteen immediately occupied the chair. After

coughing a little, she inhaled during three minutes, and fell asleep, when a molar tooth was extracted, after which she continued to slumber tranquilly during three minutes more. At the moment when force was applied, she flinched and frowned, raised her hand to her mouth, but said she had been dreaming a pleasant dream, and knew nothing of the operation.

“A stout boy of twelve, at the first inspiration coughed considerably, and required a good deal of encouragement to induce him to go on. At the end of three minutes from the first fair inhalation, the muscles were relaxed and the pupils dilated. During the attempt to force open the mouth he recovered his consciousness, and again inhaled during two minutes, and in the ensuing one minute two teeth were extracted, the patient seeming somewhat conscious, but upon actually awaking, he declared ‘it was the best fun he ever saw,’ avowed his intention to come there again, and insisted upon having another tooth extracted upon the spot. A splinter which had been left afforded an opportunity of complying with his wish, but the pain proved to be considerable. Pulse at first 110, during sleep 96, afterwards 144; pupils dilated.

“The next patient was a healthy-looking middle-aged woman, who inhaled the vapour for four minutes; in the course of the next two minutes a back tooth was extracted, and the patient continued smiling in her sleep for three minutes more. Pulse 120, not affected at the moment of the operation, but smaller during sleep. Upon coming to herself, she exclaimed that ‘it was beautiful—she dreamed

of being at home—it seemed as if she had been gone a month.' These cases, which occurred successively in about an hour, at the room of Dr. Morton, are fair examples of the average results produced by the inhalation of the vapour, and will convey an idea of the feelings and expressions of many of the patients subjected to the process. Dr. Morton states, that in upwards of two hundred patients, similar effects have been produced. The inhalation, after the first irritation has subsided, is easy, and produces a complete unconsciousness at the expiration of a period varying from two to five or six, sometimes eight minutes; its duration varying from two to five minutes; during which the patient is completely insensible to the ordinary tests of pain. The pupils in the cases I have observed have been generally dilated; but with allowance for excitement and other disturbing influences, the pulse is not affected, at least in frequency; the patient remains in a calm and tranquil slumber, and wakes with a pleasurable feeling. The manifestation of consciousness or resistance I at first attributed to the reflex function, but I have since had cause to modify this view.

“It is natural to inquire whether no accidents have attended the employment of a method so wide in its application, and so striking in its results. I have been unable to learn that any serious consequences have ensued. One of two robust patients have failed to be effected. I may mention as an early and unsuccessful case, its administration in an operation performed by Dr. Hayward, where an elderly woman was made to inhale the vapour for at least half an hour without effect. Though I was unable

at the time to detect any imperfection in the process, I am inclined to believe that such existed. One woman became much excited, and required to be confined to the chair. As this occurred to the same patient twice, and in no other case as far as I have been able to learn, it was evidently owing to a peculiar susceptibility. Very young subjects are affected with nausea and vomiting, and for this reason Dr. Morton has refused to administer it to children. Finally, in a few cases, the patient has continued to sleep tranquilly for eight or ten minutes, and once, after a protracted inhalation, for the period of an hour.

“The following case, which occurred a few days since, will illustrate the probable character of future accidents. A young man was made to inhale the vapour, while an operation of limited extent, but somewhat protracted duration, was performed by Dr. Dix upon the tissues near the eye. After a good deal of coughing, the patient succeeded inhaling the vapour, and fell asleep at the end of about ten minutes. During the succeeding two minutes, the first incision was made, and the patient awoke, but unconscious of pain. Desiring to be again inebriated, the tube was placed in his mouth and retained there about twenty-five minutes, the patient being apparently half affected, but, as he subsequently stated, unconscious. Respiration was performed partly through the tube, and partly with the mouth open. Thirty-five minutes had now elapsed, when I found the pulse suddenly diminishing in force, so much so, that I suggested the propriety of desisting. The pulse continued decreasing in force, and

from 120 had fallen to 96. The respiration was very slow, the hands cold, and the patient insensible. Attention was now, of course, directed to the return of respiration and circulation. Cold effusions, as directed for poisoning with alcohol, were applied to the head, the ears were syringed, and ammonia presented to the nostrils and administered internally. For fifteen minutes the symptoms remained stationary, when it was proposed to use active exercise, as in a case of narcotism from opium. Being lifted to his feet, the patient soon made an effort to move his limbs, and the pulse became more full, but again decreased in the sitting posture, and it was only after being compelled to walk during half an hour that the patient was able to lift his head. Complete consciousness returned only at the expiration of an hour. In this case the blood was flowing from the head, and rendered additional loss of blood unnecessary: indeed, the probable hæmorrhage was previously relied on as salutary in its tendency.

“ Two recent cases serve to confirm, and one, I think, to decide, the great utility of this process. On Saturday, November the 7th, at the Massachusetts General Hospital, the right leg of a young girl was amputated above the knee, by Dr. Hayward, for disease of this joint. Being made to inhale the preparation, after protesting her inability to do so, from the pungency of the vapour, she became insensible in about five minutes. The last circumstance she was able to recall was the adjustment of the mouth-piece of the apparatus, after which she was unconscious until she heard some remark at the time of securing the vessels—one of

the last steps of the operation. Of the incision she knew nothing, and was unable to say, upon my asking her, whether or not the limb had been removed. She refused to answer several questions during the operation, and was evidently completely insensible to pain or other external influences. This operation was followed by another, consisting of the removal of a part of the lower jaw, by Dr. Warren. The patient was insensible to the pain of the first incision, though she recovered her consciousness in the course of a few minutes.

“The character of the lethargic state which follows this inhalation is peculiar. The patient loses his individuality, and awakes after a certain period, either entirely unconscious of what has taken place, or retaining only a faint recollection of it. Severe pain is sometimes remembered as being of a dull character; sometimes the operation is supposed to be performed by somebody else. Certain patients whose teeth have been extracted, remember the application of the extracting instruments; yet none have been conscious of any real pain.

“As before remarked, the phenomena of the lethargic state are not such as to lead the observer to infer this insensibility. Almost all patients under the dentist's hands scowl or frown; some raise the hand. The patient whose leg was amputated, uttered a cry when the sciatic nerve was divided. Many patients open the mouth, or raise themselves in the chair, upon being directed to do so. Others manifest the activity of certain intellectual faculties. An Irishman objected to the pain, that he had been promised an exemption

from it. A young man taking his seat in the chair and inhaling a short time, rejected the globe, and taking from his pockets a pencil and card, wrote and added figures. Dr. Morton supposing him to be affected, asked if he would now submit to the operation, to which the young man willingly assented. A tooth was accordingly extracted, and the patient soon after recovered his senses. In none of these cases had the patients any knowledge of what had been done during their sleep.

"I am, as yet, unable to generalize certain other symptoms to which I have directed attention.\* The pulse has been, as far as my observation extends, unaltered in frequency, though somewhat diminished in volume, but the excitement preceding an operation has, in almost every instance, so accelerated the pulse that it has continued rapid for a length of time. The pupils are, in a majority of cases, dilated; yet they are in certain cases unaltered, as in the above case of amputation.

"The duration of the insensibility is another important element in the process. When the apparatus is withdrawn, at the moment of unconsciousness, it continues, upon the average, two or three minutes, and the patient then recovers completely or incompletely, without subsequent ill effects. In this sudden cessation of the symptoms, this vapour in the air tubes differs in its effects from the narcotics or stimulants in the stomach, and as far as the evidence of a few experi-

\* Since the above was written, I find this irregularity of symptoms mentioned in the case of poisoning by alcohol. Dr. Ogston, according to Christison, has in vain attempted to group together and to classify the states of perspiration, pulse, and pupil."

ments of Dr. Morton goes, from the ethereal solution of opium when breathed. Lassitude, head-ache, and other symptoms, lasted for several hours when this agent was employed.

“But if the respiration of the vapour be prolonged much beyond the first period, the symptoms are more permanent in their character. In one of the first cases, that of a young boy, the inhalation was continued during the greater part of ten minutes, and the subsequent narcotism and drowsiness lasted more than an hour. In a case alluded to before, the narcotism was complete during more than twenty minutes; the insensibility approached to coma.

“The process is obviously adapted to operations which are brief in their duration, whatever be their severity. Of these, the two most striking are, perhaps, amputations and the extraction of teeth. In protracted dissections, the pain of the first incision alone is of sufficient importance to induce its use; and it may hereafter prove safe to administer it for a length of time, and to produce a narcotism of an hour’s duration. It is not unlikely to be applicable in cases requiring a suspension of muscular action, such as the reduction of dislocations or of strangulated hernia; and finally, it may be employed in the alleviation of functional pain, of muscular spasm, as in cramp and colic, and as a sedative or narcotic.

“The application of the process to the performance of surgical operations, is, it will be conceded, new. If it can be shown to have been occasionally resorted to before, it was only in ignorance of its universal application, and im-



mense practical utility, that prevented such isolated facts from being generalized.

“It is natural to inquire with whom this invention originated. Without entering into details, I learn that the patent bears the name of Dr. Charles T. Jackson, a distinguished chemist, and of Dr. Morton, a skilful dentist, of this city, as inventors,—and has been issued to the latter gentleman as proprietor.

“It has been considered desirable by the interested parties that the character of the agent employed by them should not be at this time announced; but it may be stated that it has been made known to those gentlemen who have had occasion to avail themselves of it.

“I will add, in conclusion, a few remarks upon the actual position of this invention as regards the public.

“No one will deny that he who benefits the world should receive from it an equivalent. The only question is, of what nature shall the equivalent be? Shall it be voluntarily ceded by the world, or levied upon it? For various reasons, discoveries in high science have been usually rewarded indirectly by fame, honour, position, and occasionally, in other countries, by funds appropriated for the purpose. Discoveries in medical science, whose domain approaches so nearly that of philanthropy, have been generally ranked with them; and many will assent with reluctance to the propriety of restricting by letters patent the use of an agent capable of mitigating human suffering. There are various reasons, however, which apologize for the arrangement which I understand to have been made with regard to the application of the new agent.

"1st. It is capable of abuse, and can readily be applied to nefarious ends.

"2nd. Its action is not yet thoroughly understood, and its use should be restricted to responsible persons.

"3rd. One of its greatest fields is the mechanical art of dentistry, many of whose processes are by convention, secret, or protected by patent rights. It is especially with reference to this act, that the patent has been secured. We understand, already, that the proprietor has ceded its use to the Massachusetts General Hospital, and that his intentions are extremely liberal with regard to the medical profession generally ; and that so soon as necessary arrangements can be made for publicity of the process, great facilities will be offered to those who are disposed to avail themselves of what now promises to be one of the important discoveries of the age."

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## CASE I.

## REMOVAL OF DISEASED BONE FROM THE LEG.

The patient was a middle-aged Irishman, a "navie," who had sustained a compound fracture of the leg, nine weeks before. The fracture had not united, in consequence of the presence of a dead piece of bone, and it became necessary to remove this by a very painful operation. The patient was seated on a table, and the inhalation by a Squire's apparatus took place. At first, little effect was produced, but after some minutes, the patient fell backwards, as if in a swoon. The operator (Professor Miller, of Edinburgh,) was then about to proceed, but the man immediately objected, saying, "that he was not asleep."

For full 20 minutes more, the inhalation went on; the man confused and talkative, but wide awake, and occasionally expressing, very emphatically, that "it would not do." At length, however, while in this *wakeful* state, the operation was begun.

Incisions were made in the skin, and flaps were dissected off, so as to expose the bone beneath; a portion of this was sawn and clipped through, and then the dead bone was removed.

Only during the clipping of the bone with strong clipping pliers, did any expression of pain escape from the patient, who was busy inhaling all the while, and now and then protesting "it would not do." The operation occupied about ten minutes, and from the highly sensitive nature of the parts implicated, must have been attended with excruciating pain under ordinary circumstances. After it was over, the Professor said to the patient, "I suppose you

won't let me operate to-day." "Certainly not," said the patient, "it won't do; I must be asleep. The thing hasn't succeeded with me, and I am sure it cannot succeed with any one else, for I did everything I could to get asleep for my own sake, and I'll do anything to please you." "You won't even let me make a cut into the leg?" "No; I must be asleep; we can try it another time." This plain proof of his utter unconsciousness of the operation having been performed, was acknowledged by the spectators in a hearty round of applause. The patient then sat up, and seeing the wound, burst into an immoderate fit of laughter, saying, "No doubt there's blood, or something very like it, but I have not felt a single thing done to my leg: that *bates* the globe." And on being asked decidedly as to his having felt anything, he repeatedly answered, "Not a ha'porth." He got into amazing spirits, and refused to leave the table until he had told all about the toldrums of the business; and then with the manner of a tipsy man, and very happy, he kept surgeons and students in a roar of laughter for some minutes, with a narrative of his condition during the inhalation, which, Irish like, seemed to have been a strange medley of imaginary fights and killings going on around him, but wholly irrespective of his own leg and the operation. On being carried out, he declared triumphantly, "This is the very best thing that has ever happened in the three kingdoms." The operator stated he considered this case quite conclusive as to the powers of the ether, for there was no more painful operation in all surgery, and because the patient had been avowedly a hard and habitual drinker of spirits. The whole proceeding gave great satisfaction to the medical and surgical officers of the Hospital.

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## CASE II.

AMPUTATION OF THIGH, ON THURSDAY, JAN. 28.

An interesting and delicate girl, of nervous temperament,

fifteen years of age, dressmaker, suffering from disease of the knee-joint, which had existed nearly seven years, various remedies having been used of no avail. Having been told that a female, aged sixty-three, had had a leg amputated without pain, for disease of the bones of the ankle, she consented to have the operation performed. After inhaling the Ether a few minutes from a mere bladder and pipe, she became quite insensible, when the operator, Mr. Lansdown, commenced. The instant, however, the knife touched her, she cried out, put her hands down to the part, and betrayed other marks of uneasiness. After half a minute to a minute, the operation was proceeded with, and signs of apparent suffering were not to be mistaken, so much so, that it induced some gentlemen who witnessed its effects, to imagine the operation was felt, and the patient was aware of what was going on, and conscious of pain.

The pulse remained unaffected, the pupils dilated and fixed, and did not act during the whole time; the breathing laborious two or three times, but the withdrawal of the tube from the mouth, and the administration of some wine occasionally, soon removed the comatose state. The inhalation of the Ether was prolonged for twenty minutes, with an occasional intermission; the skin not sensible on being sharply pinched. After the operation was completed, and on awakening to a state of consciousness, and being asked if she had suffered any pain, or had any knowledge or recollection of what had been done, she expressed no knowledge; was not aware of what had passed, and said she had a dream, and thought she was at the bar of judgment, pleading for mercy, and God Almighty was punishing her for her sins. The first thing she was conscious of, was seeing the gentlemen standing round her bed. After being removed to her bed, several hours afterwards, and repeatedly since in the presence of several persons, she declared she suffered no pain or other inconvenience, and that she was not aware she cried, screamed out, or struggled with her hands. The only thing she recollects, is the dream before mentioned. All this she states with an air of sincerity;

and there can be no reason for questioning her veracity, as she bears a very good moral and religious character, and the dream is that which might be expected from such an individual.

For the particulars of this case, I am indebted to that most excellent medical periodical, the *Lancet*. The two foregoing cases I have given as greatly illustrating and bearing on the following one, which, by the number of gentlemen who were present, was viewed as, in a great degree, a failure.

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### CASE III.

#### AMPUTATION OF THE ARM.

Lot Organ, aged thirty-six, residing in Grove street, Cheltenham, had been under my treatment for a scrofulous disease of the bones of the left elbow joint, for the last year or two. I had constantly urged on him the necessity of an operation, but he could not make up his mind to have it performed, until I told him I would endeavour to do it without pain; and hearing of my other cases, he gained confidence, and consented. On Monday, Feb. 6th, 1847, in the presence of nearly thirty gentlemen, both professional and non-professional, I amputated the arm above the elbow joint. The Ether was given him with the apparatus before described; but the mouth piece not being nicely adapted to the mouth, he could draw in some fresh air at the side: the nostrils were held and loosened occasionally, after nearly four minutes, he appeared quite unconscious, pupils dilated, eyes turned up in the orbit, eyelids closed, arm, when lifted up, dropped involuntarily to the side. I now commenced my incision, which was a circular one; this he did not appear to shrink from, but he cried out most loudly, and frightened many of my non-professional spectators away by the noise he made: he continued crying out

through the whole stage of the operation, which occupied about three minutes. The Ether was left off being inhaled immediately I commenced my first incision. The man could not be persuaded to inspire, for it caused him a suffocating sensation, and he got rather excited when he first commenced it. This patient had been an inveterate smoker and, I believe, spirit drinker; and that cause, I am inclined to think, prevented him getting so well under the influence of the remedy. When the operation was over, and the stump dressed, he told me he felt or heard nothing, after I was told by Mr. Eves to commence, except my knife making the first incision, which he said was no pain; in fact, he still, both to myself and several gentlemen who have visited him, persists he had no kind of pain until the bone was sawed, which he felt slightly. He says he was in a dream, "and dreamt some one was endeavouring to knock him down, and take the pipe he was smoking away from him." This dream, from his habit of smoking, would not be at all an unlikely one for him to have. I can see no reason which could induce him to tell an untruth, and I am inclined to believe the history of his feelings given by himself.

I did not dress this stump for fully an hour after it was amputated, yet re-action was not even then perfectly established, and I had some little secondary hæmorrhage. I am happy to say the poor fellow has gone on very well, and now walks about in the open air quite recovered, having freed himself from a very troublesome limb. Case I. and III. clearly show that persons accustomed to drinking or smoking are less susceptible of the influence of this remedy, than those who are not.

It now becomes a question whether in these three cases the talking, screaming out, and writhings, are to be considered as proofs that the operations occasioned agony, or whether these were merely instinctive movements. In all of these they positively asserted they felt no pain or knowledge of the operation. I certainly at first was inclined to think in my case (Organ) that he felt pain all through the operation, but

on carefully reviewing the facts and bearings of his statements, and watching the feelings in other cases, particularly the two I have given, I freely confess I have now changed my opinion, nor do I think he had any suffering until the bone was sawed, and then only trivial. The pulse, in his case, did not alter much either during the inhalation or afterwards. In Case II, there was one feature which I have elsewhere named as likely to occur from the use of the bladder, and that is the coma being longer than we could desire. The man Organ had a strong taste of the Ether, and also smelt strongly of it for many hours after its inhalation. In Case I, from the man Lane being so wide awake and talkative, and yet, during the whole time, so insensible to pain, renders it a very singular feature in the history, and shows the effect of Etherization in an extraordinary manner.

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#### CASE IV.

##### EXTIRPATION OF THE BREAST FOR A SCHIRRUS TUMOUR.

Elizabeth Whidborne, aged 44, residing at Lime-kiln Row, Cheltenham, had suffered for some time with a disease of the left breast, which did not give way to any treatment adopted. The glands in the axilla, and the skin covering the tumour being in a healthy state, I urged on her the necessity of an operation, to this she willingly consented, and I gladly availed myself of this case as the first opportunity of trying the Ether in Cheltenham. It was kindly given for me by Dr. Smith, from a damp bladder, with an elastic pipe attached to it, ending in an ivory tube for the mouth. At first we had some trouble to persuade the patient to inhale properly, but after a short time, and becoming herself anxious to have the operation over, she did so vigorously, and the Ethereal effect was produced in about four minutes from that time. She fell back in bed—the



arms dropped involuntarily to her side—the pupils were much dilated, eyes turned up in the orbit, and sensibility apparently gone. I now commenced my operation, which was performed by two elliptical incisions of about six inches in length, extending fully round the nipple to the border of the axilla, dissecting out the disease, one small artery having to be tied, the operation occupied about two minutes. After the lapse of nearly six minutes the poor creature recovered her consciousness, and when asked if she had felt any pain, said “None whatever; you have not done the operation; you are only deceiving me,” and I had some difficulty to persuade her to the contrary, in fact she would not credit it, until I gave her the breast into her hand to look at. Since the operation she has been much questioned by several ladies how she felt, and her answer is “It was a pleasant sensation, no pain of any kind;” and she said she would not believe it possible the disease was extirpated with the knife, and even to the present day, I am inclined to think, she is incredulous on this point.

The patient had not any bad symptoms from the Ether during its inhalation, or afterwards; she slept well at night, and had but little pain for the first two or three days. The pulse rose from 80 to 125 during the inhalation. She complained shortly after it was all over of a little pain in the region of the heart, but this quickly passed away. One wine-glassful of brandy and water was given her after the effect of the narcotism had left. At night the pulse was soft 100, patient very tranquil, skin quite moist, tongue soft.

She continued going on well, had no unpleasant symptoms of any kind, and is now, I am happy to say, quite restored to health.

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## C A S E V.

### FISTULA.

Ann Weston, residing at No. 1, Burton-street, Cheltenham, had been suffering from a fistulous sore, for the last

year or more, and never would consent to an operation being performed, on account of the great suffering that an examination of it even gave her, during the whole of the time she had been confined to her bed. She was of a nervous, debilitated habit; and now hearing she could have it performed without pain, she sent for me, and desired I would relieve her suffering. The sore was fully four inches in depth, and this had to be divided through its entire length; the walls of it were of considerable thickness. The inhalation was, in this case, also undergone from a bladder and tube, and she was put in a complete state of unconsciousness in two minutes. The bistoury was introduced, and the fistula divided in its whole length, near six inches, without her showing the least symptom of pain or uneasiness.

When it was over, I asked her if she had quite made up her mind to have it performed. She said, "Yes; please go on with it as quickly as possible;" and when told it was all finished, and she may go to bed, she uttered great surprise, and thanked me most sincerely. She had no bad symptoms of any kind afterwards.

## CASE VI.

### AMPUTATION OF THE MIDDLE FINGER IN THE PALM OF THE HAND.

John Coombes, aged 56, residing at Charlton, a labourer on the roads; of a strong plethoric habit of body,—whilst at work he met with an accident (three weeks back) to the middle finger of the right hand; mortification took place, the first joint sloughed away, and the whole hand was very much inflamed and becoming implicated in the disease, as it now involved the metacarpal bone. Still I could not persuade him to have it removed. On the following Sunday, he heard of the painless cases, and consented to have it done on the morrow morning. The Ether was inhaled from an

apparatus made by Dr. Smith, and the man put under its effects in less than six minutes; he remained so for nearly five more. The hand was laid on the table, and the finger removed by a **V** shaped incision, laying bare the metacarpal bone half way down, and this was cut through, not with a saw, but by Liston's bone nippers, in general a very painful proceeding. He did not move the hand in the least degree, nor show, in any way, the slightest symptom of pain;—afterwards stated that he heard the bone cut, but positively asserted he felt no uneasiness of any kind, and grumbled much at the suffering he said we gave him when tying a small artery, and dressing the finger half an hour afterwards. The pulse varied during the etherization from 60 to 70. The man has continued going on well, union of the hand took place by the first intention, and he will, in a very short time, be able to follow his usual occupation.

#### CASE VII.

William Guy, residing in Duke-street, of a pale exsanguineous habit of body. He has a very painful operation to undergo, to cure him of a disease from which he has long been a sufferer. The Ether was inhaled with the same apparatus as the last, and produced its effects in less than three minutes. The operation was then performed, and it was one of extreme pain, yet he stated he did not feel anything of it. Pulse, when under the ethereal state, was 75 and soft, and before that time it was 90. No unpleasant symptoms of any kind followed its use.

#### CASE VIII.

James Bartleet, aged 25, residing at Burton-street, has been suffering from a disease, (Phymosis,) which renders it

necessary to perform an extremely painful operation, this was done on Thursday, February 18th. He was put under the influence of the Ether in about two minutes, and remained so nearly five. He inhaled during the time I performed the operation; the skin was completely divided to a great extent, without the slightest sign of pain; when it was over he was asked if he was willing to submit to the operation, he said "Yes; I came here on purpose." When the wound was shown him bleeding, he expressed himself very much astonished, and looked around him with utter surprise, and said "This is really wonderful, I have not felt pain of any sort, only I am just as if I had been drinking."

This man had no after symptoms from the Ether, and went on well in every way. The apparatus used in this case was that of the tin box and pipe.

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### CASE IX.

William Scotford, a publican, living at Crediton, aged 55, had been under the treatment of a surgeon for the last two years with a cancerous sore, involving nearly the whole of the lower lip, and finding it did not yield to any treatment, he was sent to me for my advice, and if necessary to perform the extirpation. Thursday, February 18th, the operation was performed by removing nearly the whole of the lower lip.

After inhaling the Ether, from my apparatus, for some few minutes, he apparently became in some degree affected, and forced the pipe out of the mouth. It was again placed on, and he inhaled it for nearly five minutes, when he adopted the same proceeding as before, and cried, and talked, very incoherently, evidently much under the influence of the remedy.

We then told him we would not do it, but he begged to try it once more, after a few minutes the pupils became dilated, eyes turned up, and the arms dropped to the side; the mouth-piece was now taken away, and I commenced

extirpating the disease; he did not move in the slightest, but moaned a little. After it was all over, he said he felt a little pain, but I do not think he did, for on putting the sutures in with the needle, which is very trifling pain compared with what he had undergone; he cried out very much, and when asked if that gave him more suffering than the other, said "Oh, yes; very much more." I must state this man was a publican and given to drink beer and an inveterate smoker.

On reviewing Cases IV, V, VI, and VII, we find they were all quite painless, and as complete as they possibly could be. Case IX, I consider the man had little or no suffering, and under ordinary circumstances, without the Ether, it would have been a very painful operation. The fact of the crying out on the sutures been applied, and complaining so much, goes far to convince me he had but little uneasiness before. I may also add, this man was very faint-hearted, and had a great dread of the operation. In dislocations of long standing, or even of short, I think this will prove a valuable adjunct to our means of reduction, for under its influence, muscular action seems greatly alleviated, and the depression will be a serviceable thing to us, besides getting rid of the pain, and the patient thinking of what he undergoes, and frequently straining all his muscles against the surgeon; so much is this the case, that we frequently, by various means, endeavour to divert attention, by accusing the party of being intoxicated, &c., and so take their attention to another subject.

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## CASE X.

### CATARACT IN BOTH EYES.

Walter Cook, aged fifty-six, residing in Long's Cottages, Cheltenham, has had two hard lenticular cataracts, (one in each eye,) which have been gradually making their appear-

ance for the last two years. On first presenting himself to me in November, 1846, I found vision entirely gone; he could discern nothing, and was compelled to be led about by an assistant. Had lippitudo in the right eye from a burn, since he was a child, and the conjunctival membrane was very abundant and thickened. The cataract in the left eye was reclined, and did not again appear, (last December) but from the trouble (arising from the former disease, together with the irritation in the eyelids) with the right eye, it was not satisfactorily done, and rose again. Having regained very excellent vision with the eye first operated on, he was anxious to have the operation on the right again performed. On Tuesday morning, March 2nd, 1847, he walked up to my house to have the cataract removed; feeling anxious to give the Ether in a case of this description, Dr. Smith kindly administered it for me, with a sponge: he was at once completely under its influence, as far as being unconscious to all around him, and talking incoherently, seeing ships sailing, "I am dreaming I am a sailor;" but this was followed by a state of great excitement, and it was deemed prudent not to persist with its administration. The eye was afterwards operated on by reclinacion, and the cataract did not again rise, and he has gone on very well since the operation, and will, I have no doubt, regain vision. I am inclined to think, from the painless nature of these kind of cases, that it will be advisable not to persist with Etherization, unless your patient very readily gets narcotised, but should any excitement be produced, it is prudent to desist from its use. In the above case, from what I can now learn of the man's former mode of living, he was an inveterate tobacco smoker, and occasionally given to gin drinking. Still, had we persisted in giving the Ether, I doubt not we could have entirely narcotised him; but he had been subject to bronchitis and some cough came on, making it disagreeable for him to continue inspiring Ether.

## CASE XI.

## A CHILD TEN YEARS OLD.

A little girl, aged 10 years, the daughter of a lady visiting in Cheltenham, was anxious to have the last molar and second bicuspid teeth extracted under the ethereal influence. This was done on Wednesday, March 3rd. I applied the inhalation with the simple sponge, and after two or three inspirations she cried, and would not proceed, on account of the unpleasant taste. Her mother at last persuaded her to go on, and after about two minutes she was completely narcotised, and then had the molar tooth extracted. We again applied the Ether, and she was under its influence in less than one minute, and had the bicuspid taken out. She said she felt no pain, but had a pleasant dream.

This being the youngest patient upon whom I have had an opportunity of trying the effect of etherization, I carefully noted the symptoms. The pulse was very quick through the whole progress, the pupils of the eye much dilated, conjunctival membrane congested, great stupor,—in fact, she was nearly ten minutes before she could rise or walk, or even after all symptoms had passed comparatively away, she was very drowsy and listless. From what I observed, I am fully persuaded it would not be wise or prudent, as a general rule, to etherise very young subjects.

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## CASE XII.

## DENTAL OPERATIONS.

R. M., aged twenty-one, wished to have the last molar tooth extracted under the Ethereal influence; she is of a plethoric, full, and excitable habit.

In one minute and a half she was in a state of unconsciousness from the Ether, and became quite unmanageable from

the excitement she underwent, her face flushed, and it required two persons to hold her. The gum was lanced without pain, and she recovered her sensibility immediately. As she was very anxious to have it taken out, she again inhaled, and when under its influence some excitement returned, and, on drawing the tooth with the claw, she cried out "Oh ;" but on coming to herself, stated she had had no pain, and having had out nine teeth before she could judge of its effects, and said "I will never have another tooth out except I am under the Ether, so as to have no suffering."

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### CASE XIII.

A servant had four stumps extracted by Mr. Tibbs, Surgeon-dentist, of this town, without showing the slightest symptom of pain. They were raised by the elevator; the Ether was given with the apparatus described, and it produced its effects in less than two minutes, and she remained unconscious nearly five; the age was thirty-six. Complained of a slight depression of the spirits, and want of appetite all day afterwards, but the next morning had no bad symptoms.

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### CASE XIV.

Mrs. Walter had a molar tooth extracted by Mr. Tibbs, without any pain. The Ether was some time in producing its effect; the tin apparatus was tried, but not going under its influence rapidly, Robinson's was used, with Dr. Smith's mouth-piece; after its inhalation, five minutes or so, she went into a state of unconsciousness, and remained so about four or five minutes: hardly credited the tooth was out, until she felt it with her hand.



## CASES XV. &amp; XVI.

Dr. Logan, Surgeon Dentist, extracted two stumps from a lady in my presence, without any kind of suffering, or even expression of pain. In another case of a young lady, who was in a very excitable state; after inhaling the Ether a short time, the pupils became much dilated; the stump was elevated, when she gave an involuntary cry of "Oh!" and put her hand up: still, afterwards, she said she felt nothing of any kind, nor do I believe she had the slightest suffering; the pulse was, before the Etherization, 100, while under its effect, it fell down to 70, and was very soft. Neither of these ladies suffered any after consequences; the first was liable to a nervous palpitation of the heart, and the Ether entirely relieved it at the time. I have given these cases because they were performed in my presence. I understand both gentlemen have since performed many very successful operations in this department of surgery.

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## CASE XVII.

S. Charlotte, a young woman of 25 years of age, of a nervous hysterical temperament, had the first molar tooth extracted by Mr. Cullis, Surgeon Dentist, at my house, on Monday evening, Feb. 22nd, by *candle light*. She inhaled the Ether through a sponge, and was put under its influence in less than two minutes. She remained so for about four, and the extraction took place without her having the slightest knowledge of it until she saw the blood coming from her mouth.

Several cases in Dental Surgery have also been operated on by Mr. Robinson, Gower-street, London, to whom the first credit of introducing the remedy into this country for the extraction of teeth belongs. He was also the inventor of a very ingenious apparatus for Etherization.

## CASE XVIII.

A servant of a lady in this town had the Ether administered, and went under its influence in one minute and half; the last molar tooth of the lower jaw was extracted without giving her any pain. She had had several out before, and said they gave her intense agony; she was highly delighted at the manner of taking this one out.

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## CASE XIX.

## FISTULA AND TUMOUR.

Elizabeth Jones, aged thirty-nine, residing at No. 4, Grove-street, Cheltenham, had been subject for some time to ulceration around the verge of the anus, and following this a fistulous sore, extending four inches in length, with the walls of considerable thickness; she had also a syphilitic condylomatous tumour as large as a walnut in the perineum. She states she has been for the last ten years an inveterate gin drinker. The evening before the day I intended operating, I had her to my house and administered the Ether, with the effect of only producing intoxication, and great numbness of feeling when pinched. Finding I should have some difficulty in putting her under the Ether, I determined to give her on the morning of the operation (Tuesday February 23rd,) one grain of acetate of morphia. On my visiting her she was not at all affected by the morphia, but very excited from the dread of the operation. The Ether was kindly administered for me by Dr. Smith with merely a sponge, covering the nose and mouth, containing half an ounce of Ether prepared with the Ethereal oil; in less than three minutes she became affected. I introduced my finger and director, and divided the fistula in its whole length without even a movement from the patient.

I then asked my assistant for the knife to remove the tumour, at this she cried out before I touched her, and

continued doing so. I took away the disease, and in a few minutes she was asked if she had suffered any pain, and she said "No, not any; you have not done it;" and would not believe it was all over till I showed her the blood and tumour. This was a most satisfactory case, and the ease of applying the Etherization with the sponge was very evident to all the observers. She stated she could clearly see and hear all that was passing around her, but felt very much intoxicated, or, in her own words, "Was very drunk."

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## CASE XX.

### REMOVAL OF THE ENTIRE SCAPULA.

This bold operation was performed by Mr. Fergusson, for the first time in England, on the 6th ult., at the King's College Hospital. Although, as Mr. Fergusson remarked, a posterior, or even the entire scapula, has been occasionally removed after severe gun-shot wounds, by which that bone was fractured, both on the continent and elsewhere, this was the first operation undertaken for the extirpation of the entire bone in consequence of disease.

The subject of this operation was a man of about 25 years of age, who some three years since had submitted to amputation at the shoulder-joint for disease of the head of the humerus. The glenoid cavity was found to be diseased, and some adjacent portions of the scapula were removed, in the belief that the whole of the diseased bone had been extirpated.

Whether this was the case could not now be ascertained. The amputation was skilfully performed; the flaps were well made, and an excellent stump was formed. Caries of the scapula, either from extension of disease from some necrosed portion of bone allowed to remain after the former operation, or subsequent diseased action occurred; abscesses resulted, and several sinuses discharging pus

were now seen leading down to the diseased bone. The profuse discharge from these sinuses caused so much debility and annoyance to the patient, that he expressed his desire to undergo any operation, however severe or dangerous it might be, to rid himself of the disease. Mr. Fergusson, on first seeing the case, thought that the extirpation of some portion of the scapula would suffice; but a more careful examination of the state of the parts, and further consideration, induced him to prefer a total, to the partial extirpation he had at first contemplated.

The new method of rendering the patient insensible to the pain of so severe an operation was adopted in the present instance. The inhalation of Ether was first attempted with the apparatus invented by Mr. Robinson; but as no effect was produced after a trial of five or six minutes, another instrument was employed. The failure of this apparatus appeared to depend not on the inefficiency of the apparatus, but rather on the mode in which it was employed. Numerous inspirations of air uncharged with the ethereal vapour occurred, which it is well known would suffice for the destruction of its ordinary stupefactive effect.

Mr. Startin's ingenious apparatus was now called into requisition; but even then some minutes elapsed before the patient was thoroughly under the influence of Ether. Mr. Startin himself superintended the inhalation, and gave the signal for commencing the operation.

Mr. Fergusson commenced the operation by an incision extending from the middle third of the clavicle, along that bone, and around the spine of the scapula. A second incision was then made, nearly at right angles to the first, to the extremity of the stump. The flaps were next turned back; the clavicle cut across near its middle; and the entire scapula together with the external half of the clavicle dissected out. Considerable thickening and condensation of the soft parts around the bone, rendered it much less moveable than in the healthy condition of the parts, which rendered its removal more difficult. The entire operation however did not occupy more than five or six minutes. The

axillary artery was necessarily divided in the course of the operation; but little hæmorrhage occurred from it. The coagulum did not extend so far up the artery as might have been expected, and the vessel was much smaller than usual. Eight or nine smaller arterial branches required to be secured, but these were in the same contracted state as the axillary artery, so that very little blood—scarcely six ounces—was lost. The flaps were brought together and retained in apposition by five or six ligatures; after which the whole was covered with wet lint and a roller.

Was the Ether effectual in rendering the patient unconscious? On the whole it may be said to have effected its purpose. But the insensibility was not so profound as in many cases we have seen. During the course of the operation the patient writhed and groaned several times, and the countenance was expressive of suffering; but it may be safely asserted that if the Etherefication did not absolutely destroy the consciousness, it produced a vast diminution of pain. It must be remembered that very extensive incisions were required, that large nerves were necessarily divided; both which circumstances are productive of intense agony under ordinary circumstances. The man certainly did not give signs of greater suffering than is often shewn under very trivial operations. On visiting the patient in the ward some time after the operation, he did not exhibit such signs of collapse as might have been expected after so severe an operation, and his pulse remained good. On questioning him as to the amount of pain he had endured, he stated that he was conscious of a sensation of “dragging,” about his shoulder, during the whole course of the operation; but that he could not call it pain. As he had complained of the introduction of the ligatures at the conclusion of the operation, he was asked whether he remembered the circumstance, and whether the pain felt during the earlier stages of the operation equalled that produced by the insertion of the ligatures. He answered that it was a totally different sensation, repeating his statement of the “dragging” during the operation.

It may therefore be safely asserted that if the etherefication was not so absolutely and perfectly successful in this case as in some, it at least exercised a most beneficial effect, so far as the sensations of the patient were concerned. It has been repeatedly remarked that persons who have at all indulged in spirituous potations are brought under the full influence of Ether with great difficulty. Judging from the usual habits of soldiers it may be rationally inferred that the difficulty which occurred in bringing this man under its influence, arose from the above-mentioned cause.

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## CASE XXI.

### STRANGULATED HERNIA; OPERATION; INHALATION OF ETHER TO FACILITATE THE REDUCTION OF THE BOWEL.

Adam C——, aged 66, a tall, bulky man, with “fair round belly,” came to the Middlesex Hospital about twelve o’clock on the night of February 7th, with an hernial tumour, about the size of an orange, but more cylindrical, descending into the right side of the scrotum; it was tender, not very hard, with no impulse in coughing. The account he gave of himself was, that he had been ruptured for 40 years, had always worn a truss, and never experienced any difficulty in returning the rupture, if it chanced to come down. About five o’clock in the afternoon of the day he went there, he slipped as he was walking along the street, and in endeavouring to preserve his balance he strained himself, the rupture came down much larger than on any former occasion, and he was unable to return it as usual. He called in a surgeon, who, after employing the taxis about an hour without success, advised him to come to the hospital. As there was considerable tenderness of the tumour, the result, probably, of the previous manipulation, he was at once put into a hot bath, before attempting reduction. The taxis was then

used during the time the patient was in the bath, and again after he was removed to bed, but without success. A large injection was thrown up, but it returned almost immediately. During these attempts at reduction, the patient complained, not only of pain in the swelling, but across the belly, but there was no vomiting. Mr. Tuson was sent for, and having examined the patient, determined to operate, the tumour being then extremely tender, any attempt at reduction producing great pain, both within the part and across the belly. The operation was commenced about four A.M., the hernia having been down eleven hours. The skin and the several layers of fascia covering the sac having been divided, the sac itself was opened, when a quantity of dark serum escaped, and a coil of intestine was seen, much congested, of a deep port-wine colour, still retaining its natural polish but with a few flakes on its surface of slightly adherent recent lymph. The stricture having been pretty freely divided, Mr. Tuson proceeded to return the gut, but this he found that he could not accomplish. The incision was then enlarged, still the bowel would not pass up; but during the loud groanings and exclamations which the patient had uttered during the whole of the operation, an additional coil of intestine slipped down. Thinking that the difficulty might be produced by some obstruction high up within the canal, the knife was again used, until an aperture was made sufficient to admit of the introduction of the points of the three middle fingers into the abdominal cavity. This, however, made matters much worse, additional folds of bowel kept escaping, in spite of all attempts to prevent them, until at one time there was a quantity out fully equal in bulk to half the size of the man's head. The attempts to return this mass of intestine were continued for upwards of three quarters of an hour. At times, when he was quiet, nearly the whole was reduced; but on his again beginning to complain and bellow, it rushed out again with great rapidity. At length, when it appeared almost useless to persevere any longer, the muscles of the chest and abdomen, the muscles of expression and respiration, being thrown into violent convulsive action every time

the wound was touched, and forcing out the intestines, it was suggested, that if the patient could be got under the influence of Ether, the sensibility of the wound would be destroyed, and the muscles become passive. The Ether apparatus was accordingly brought, and the patient began to inhale. At first, the Ether produced very considerable coughing, irritation, and excitement; fresh coils of intestine protruded through the wound, and it was feared that in spite of the pressure kept up by the operator and his assistants, the whole of the moveable viscera would have been forced out. By forcibly retaining the mouth-piece, the man was compelled to continue the inhalation, the state of excitement passed away, and he soon sunk into a kind of stupor. The groaning ceased, the muscles of the face and limbs relaxed, and the intestines were returned without the slightest difficulty. The edges of the wound were then rapidly brought together, and secured by several stitches. The introduction of the needles occasioned no symptom of pain. During the time the compress and bandage were being adjusted, the patient gradually roused, and appeared, from his answers, to have been quite unconscious of what had been done to him during the time he was under the influence of the Ether. His manner was that of a man partially intoxicated. Soon after he was placed in bed, he complained of considerable pain across the abdomen. He was ordered twenty minims of liq. opii Indiensis immediately.—One P.M.: considerable tenderness over the whole abdomen; tongue furred, brown, and dry; pulse quick and small; breathing hurried, with loud mucous rattles audible at a considerable distance, (this bronchial secretion is not to be attributed to the Ether, as he had long been subject to cough and spitting.) Ordered, chloride of mercury, four grains; opium powder, half a grain, every four hours. He continued to complain of great pain during the remainder of the day, and passed a very bad night. On the morning of the 9th, the abdomen was very tender, with great pain in breathing and coughing; pulse very quick and feeble; no nausea or vomiting; bowels not acted. Castor oil, one



ounce, immediately ; increase opium to one grain ; a fomentation to the belly of fresh-boiled hops. The castor oil did not return, but the bowels were not acted on. The patient continued throughout the day to become gradually weaker ; towards the evening, the mucus accumulated in the trachea so as to produce loud rattles, heard over the whole ward, and at a few minutes past ten P.M., he expired, 40 hours after the operation.

The body was examined the following day, 15 hours after death. On removing the stitches which united the edges of the wound, and opening the sac, four or five folds of small intestine, with the appendix cæci vermiformis, were found in it, all closely united to each other, and to the sac, by recently effused lymph. These portions of the intestinal canal were not strangulated, there being free communication between the sac and the cavity of the abdomen, through the wound made in the abdominal parietes. The incision made for the purpose of dividing the stricture, and removing any obstruction to the return of the intestines, was full two inches in length, and had divided the tendon of the external oblique, the lower border of the internal oblique and transversalis muscles, and a layer of fat and peritonæum. The epigastric artery passed on the inner side of the incision ; the peritonæum was inflamed throughout its entire extent ; the small intestines, extremely vascular, were covered and glued to each other by recent lymph ; they were also remarkably distended with air. One portion of the intestine appeared to have been the part that had been strangulated, was small in calibre, and rather livid. The omentum was natural in appearance, but rather short ; the cæcum was loose in the iliac fossa, and hung towards the ring ; the appendix vermiformis was somewhat larger than usual ; the kidneys, small and granular, contained much fat around the pelvis ; the spleen was united by old adhesions to the diaphragm ; the heart was healthy ; the lungs the same, with the exception of a little œdema and congestion of their posterior surfaces ; the trachea and bronchi contained some mucus, but there was no unusual vascularity of their lining membrane ; the other viscera appeared healthy.

I have quoted Case XX., the entire removal of the scapula, on account of the singular nature of the operation in a surgical point of view, and being the first of the kind ever performed.

Case XXI. I have also given from its very interesting nature to the operative surgeon, who often finds great difficulty to conquer the symptoms which are there described. I have frequently, in my own Hospital experience, seen great trouble in returning the intestines after operations for hernia from the spasm of the abdominal muscles, which Etherization seems here to have entirely overcome.

From what I have now seen of the influence of the Ether, I am convinced no injurious consequences as to the after treatment of operations will take place; and we can safely use it in most cases in operative surgery. I have now tried it in upwards of thirty instances on healthy people, and I have rarely had a failure. They have some of them shown symptoms at first, before they have been perfectly put under its influence, of great excitement; but this generally ends in a very tranquil pleasant state. It will also, appear to a careful observer of these cases, that the patients can frequently see and hear all that takes place around them, and they will act from their sight and reply to questions proposed to them, and give very sensible answers, and yet not be aware of any pain.

I shall now finish these few pages by giving one instance that came under my own observation, together with others that have occurred, of the effects of Etherization on animals; and I have also copied a very interesting report by Magendie, from a French paper, which gives the influence of Ether on the spinal marrow in the lower animals in a very remarkable degree.

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## VETERINARY OPERATIONS.

February 6th, 1847, Mr. Shaw, Veterinary Surgeon, of this town, Etherized a horse, for the performance of

neurotomy (or more commonly called nerving). The Ether, half a pint, was given in a bag, very ingeniously made by himself, inclosing the whole of the mouth and nostrils. The horse was held by a man, not hobbled, but it was considered he would fall from the effects of the Ether. After inhaling it about five or six minutes, the animal became under its influence, but not sufficiently to fall down, and got in a very excited way, broke from the groom, and knocked himself from one side of the yard to the other in a state of intoxication. At last the hobbles were put on, and the horse pulled down. The Ether was again placed to the nose, and Mr. Shaw commenced the operation. He evidently did not give any pain from the incision, or the division of the nerve; but when operating on the other side of the leg, and the horse not being under the influence of the Ether, he felt pain on the first incision, and also on dividing the nerve.

For the following singular applications of etherization I am indebted to the "London Times":—

"Maidstone, 14th Jan., 1847.

"DEAR SIR,—From the extraordinary reports of the effects of sulphuric Ether on the human subject, I was induced to try it on animals. I selected a fine bitch, on Wednesday last, 13th, for the operation of spaying, which from the defective apparatus used was only partially successful; to-day, Friday, 15th, having prepared a more complete apparatus, I performed two operations for spaying with complete success, the animals being perfectly letheonised and insensible to the knife, requiring no assistance in holding their legs. The apparatus used was similar to a common glue pot containing hot water; in the inner receptacle was placed a sponge saturated with Ether, and to the edge of which was tied the leg of a stocking, the other end being drawn over the head of the animal. The time required in producing insensibility was from six to eight minutes. In the usual mode of operating, the struggles and cries have always been so distressing as often to make me dread it; with the Ether it comparatively becomes a

pleasure, there is crying even now, but of a different character. My brother, Dr. Plomley, Mr. Woolcot, surgeon-occulist, Mr. Slaughter, and others were present, and expressed themselves astonished at the result.

"Do what you please with this communication. Have you yet made any trials? if so, please give me your opinion.

"Yours very truly,

"N. PLOMLEY.

"To Professor Spooner,  
"Royal Veterinary College, London."

#### "OPERATION EXTRAORDINARY.

"Mr. Lucas, a veterinary surgeon, of Liverpool, has removed a large tumour from a Newfoundland dog, while the animal was under the influence of Ether vapour. The head of the dog was introduced into a jar containing sulphuric Ether, and the operation was performed without any sign of pain."

"The vapour of Sulphuric Ether has, we hear, been employed at the Royal Veterinary College, Camden-town, on a sheep and a horse, with the most decided success. The first-named animal was affected, and had been for many months, with an incurable disease of the hock-joint. The pain was so severe that the poor sheep was quite unable to put her foot to the ground without experiencing much suffering. On being brought into the theatre she was caused to inhale the vapour of Ether through a tube, and in about five minutes after it was evident that she was under its influence. The leg was then amputated by Mr. Simonds at the thigh without the slightest indication of any pain whatever. The operation occupied about six minutes, and within twenty minutes from the commencement the animal was removed from the theatre restored to sensation and consciousness. The horse was labouring under a chronic affection of the near fore foot, commonly known by the name of the "naricular disease," for which the operation of "unnerving" is generally resorted to as a remedy. This is necessarily a very painful operation, and oftentimes the operator has to contend against the violent struggles of the animal, partic-

larly at the instant when the division of the nerve is effected. In this case the Ether vapour was inhaled for about thirteen minutes, when the horse fell forwards, and the nerve on each side of the leg was divided by Mr. Spooner without the least manifestation of pain; a slight convulsive action of the limb, similar to that which takes place when a nerve of a recently killed animal is cut through, alone giving indication of any sensation. Within twenty-three minutes this animal also had perfectly recovered from the effect of the Ether. No restraint whatever was resorted to to keep the animals in the required position for these operations, and the inhaler employed was not one invented for the purpose, but an apparatus temporarily adjusted by Mr. Morton until a more perfect one was obtained."

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At the meeting of the Academy of Science in Paris, M. Flourens stated that he had made experiments to ascertain the effect of the Ether upon the spinal marrow. In the first place he caused the Ether to be inhaled by a dog which, in a few minutes, became perfectly insensible. He then laid bare the spinal marrow at a point of the dorsal region, and during the whole of this cruel operation the animal gave no sign of pain, He then divided the nerves of sensation, and still no pain was manifested. Lastly, he picked, cut, and tore the spinal marrow itself, and the dog did not give the slightest symptom of suffering, and experienced no convulsion. His next experiment was on a fowl, and with the same results. When the effects of the Ether were dissipated, the spinal marrow resumed all its vitality. M. Serres announced that he had made several experiments upon animals, but with liquid Ether, as he was desirous of ascertaining its effects upon the nervous system. He had laid bare the nerves of the thighs of several rabbits, and placed them in contact with a sponge dipped in Ether; the results were as follows:—Sensibility was abolished in the nerve subjected to the action of Ether, at the points

immediately in contact with it, and in all the radiations emerging from the nerve under that point; but the entire sense of feeling remained in the portion of the nerve above the point immersed in the Ether. In order to take into account the action of the air, the following comparative experiment was made:—Of two nerves which were laid bare one was immersed in the Ether, and the other was exposed simply to the action of the air. Five minutes afterwards, the first was dead to all sensation, even on the application of pincers. The second retained all its sensibility and powers of contraction. Having thus ascertained the sedative power of the Ether, M. Serres resolved to discover whether the sensibility could be restored by the immediate application of strychnine to the nerve, which had been deprived of it. He applied the tincture of nux-vomica, strychnine, and the chlorhydrate of strychnine, and all without effect; they produced neither sensibility to pain nor restored the power of contraction. A paper was read giving an interesting account of some experiments made by M. Gruby, to ascertain the effect of Ether on several animals, *viz.* ten dogs, four rabbits, two mice, and fifty frogs. To intoxicate these animals required different periods of time, which are shown in the following table:—

	Minimum.		Maximum.		Duration.	
Frogs ..	..	8m.	..	..	35m.	.. 20 to 25m.
Dogs ..	..	50	..	..	40	.. 12 to 30
Rabbits ..	..	2	..	..	8	.. 6 to 12
Mice ...	..	2	..	..	4	.. 4 to 8

In general, says M. Gruby, the effect of the intoxication appeared to depend on the intensity of the vapour—the prolongation of the aspiration—the rapidity and force of the inspiration, and the age of the animals. Beyond the term above fixed for respiration, the animals died in a sleep. In young animals the phenomena were more prompt, than in those which were full grown. M. Gruby found that the perspheric circulation, the pulsations of the heart, and the respiration diminish under the influence of the Ethereal vapour, that if after the experiment the animal be exposed to the air, the number of pulsations of the heart and the

inspiratory motion augment considerably, as does also the cutaneous circulation. Frogs, which were wounded immediately before the experiment, resisted the intoxicating effects of the Ether much longer than those which were uninjured. He ascertained also that the stagnation in the capillary vessels, produced by the Ether, disappears before sensibility is again manifested; and that a frog, deprived of its brain and exposed to the vapours of Ether, retains its sensibility and its powers of contraction much longer than one that has not been wounded. The experiments on dogs showed that they first lose their tactile peripheric, then voluntary motion, and, finally, the contractibility of the voluntary muscles. Dogs, twenty days old, lost their sensibility in three minutes, and died in eighteen to twenty minutes under the effects of the Ether. Grown up dogs lost the power of sensation in eight minutes, and died, if the action of the Ether was continued, in forty-five minutes. The dogs recovered their sensibility and motion when exposed to the air, if the experiment with the Ether was not prolonged beyond eighteen minutes for the young, and forty to forty-four for the adults. Young dogs which were apparently dead, having ceased to breathe, were brought to life by copious bleeding from the jugular vein. A young dog which had already been under the effect of the Ether, and had recovered, was again exposed to it, and the same effect produced in fifty seconds; but a dog which had been bled after the experiment, and was exposed to the Ether, resisted much longer than another dog which had not lost blood. Again, in the case where the experiment was carried to such a point as to produce death, M. Gruby found that the immediate cause of death was an accumulation of blood in the veins of the brain, those of the lungs, and the liver.

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From these experiments it evidently appears that the ethereal effect will produce its influence, not only over the cerebral system, but also on the true spinal system. In the above experiments, not only were the nerves of sensation

rendered completely insensible to pain, but even the irritation of the spinal cord itself produced nothing like a convulsive action; and again, on the cessation of the ethereal effect, the spinal marrow resumed its peculiar properties of excitability. These facts go directly to prove that the effect of Ether is different to that supposed by Dr. Ranking and others who, in a late number of the "Lancet," state it will be of no service in tetanus, &c., from its only acting on the cerebral portion of the nervous system. If the action of it on the true spinal system is proved by practical observation, we shall have a very valuable addition to our class of remedies in spasmodic diseases.

While these pages have been going through the press, a very ingenious and simple manner of administering Ether has been brought forward by Dr. T. Smith of this town, (and to whom I must now return many thanks for the valuable and judicious assistance I have received from him, both in administering the Ether for me, and also for many acts of kindness connected with this subject)—viz. the mere application of sponge. The manner of its application is thus,—he first takes two drachms of ethereal oil, and puts it into six ounces of sulphuric Ether, he then warms the end of a sponge with hot water, squeezes all the water out, and having poured about half an ounce of Ether in a tumbler, places the sponge in it; it immediately takes up the Ether, the sponge is then simply placed over the nose and mouth, and the patient inhales from it; this has now been tried in several cases with uniform success. I saw a very troublesome tooth drawn by Mr. Tibbs under its influence without even a sign of pain, and I believe upwards of twenty have been extracted with the same success. I also inhaled by this process myself, and became affected in a very short period, being quite unconscious to all that passed around me. I feel fully convinced (although I confess I was at first dubious of its results), that this will be a very valuable addition to the manner of applying the Ether; the ease with which you can remove it if your patient coughs or any other unpleasant symptoms arise, and the cheapness



of its application, will render it generally useful. To the surgeon in country practice it will be invaluable; for all he will now have to do is to get a sponge, which every house contains, and not be carrying a very cumbrous instrument over the country with him.

Dr. Smith tells me that the sponge acts admirably, and the Ethereal effect has now been produced in upwards of fifty cases by its means in Dental Surgery; and from what I saw and felt myself, I must bear my testimony to this superior mode of application over that of any of the instruments I have yet seen. My only doubt on the subject is whether the Ether will not volatilize too rapidly, and so pass away in the room. This you can, in a great measure, avoid by not having your sponge above 90 degrees in temperature.

Before closing these few practical observations, I think I cannot do better than give as complete a list as I have been able to collect of all the important operations in surgery that have as yet taken place in this country under the vapour of Ether, and if any one is dubious of its wonderful influence in allaying pain, I should say he need only review the names of the operators, he will then find arrayed all the first Surgeons in England and Scotland, and gentlemen whose acknowledged talent and shrewdness would not allow them to forfeit their reputation for a novel remedy, unless fully persuaded of its value.

For these cases I am indebted to the pages of the "Lancet," "Medical Gazette," and "Medical Times," with other periodicals.

The first operation performed in this country with perfect success, was by Mr. Liston at University College, for that of amputation of the leg.

#### AT KING'S COLLEGE HOSPITAL.

The following were successful Cases by Mr. Fergusson:—

1. Phymosis.
2. Abscess in the buttock.
3. Fistula. In this case the patient moaned much, yet felt no pain.

4. Stricture in the urethra.
5. Warts, &c.
6. Tumour of the jaw. Moaned and showed signs of suffering, yet afterwards stated he had no pain, and was not conscious the operation was done, and said he was ready and willing to undergo it, although it was all over at the time.
7. Removal of the entire scapula.
8. Removing portion of the shoulder joint, occupying fifteen minutes.

#### AT GUY'S HOSPITAL.

Successful Cases by Mr. Morgan and Mr. Key:—

1. Lithotomy.
2. Strangulated hernia.

#### AT THE WESTMINSTER HOSPITAL.

SUCCESSFUL.

By Mr. Hale Thompson :—

1. A very painful operation on a woman.
2. Phymosis.
3. Tumour, connected with the trunk of the body.
4. Amputation of the leg in a little girl, thirteen years of age.

#### AT THE LONDON HOSPITAL.

SUCCESSFUL.

1. Amputation of the leg. The patient during the time gave sly winks and nods to those around him, and when the Ether was removed, he called out, "hold hard there, and let's have another go at the grog." He stated he had no pain, nor did he manifest symptoms of any.
2. Amputation of the leg. Conscious during the whole time, yet felt nothing of it.
3. Amputation of both legs.

#### ST. GEORGE'S HOSPITAL.

SUCCESSFUL CASES.

1. Amputation of the leg below the knee. By Mr. Cutler.
2. Amputation of the leg below the joint. By Mr. Johnson.
3. Removal of dead bone from the tibia. By Mr. Hawkins.
4. Fistula in ano. By Mr. Tatum.
5. Cancer of the breast. By Mr. Cutler.
6. Lithotomy, and two amputations. He stated the muscular twitching was less in the stump than usual.

#### AT THE WESTMINSTER OPHTHALMIC HOSPITAL.

SUCCESSFUL.

1. Lithotomy. In this case, the man appeared to suffer pain, and cried out, and on the operation being completed, he said he suffered nothing.
2. Cancer of the breast.
3. Puncture of a large tumour in the neck.

#### ST. THOMAS'S HOSPITAL.

1. A child, aged six, had the index finger amputated by Mr. Mackmurdo.

#### ST. BARTHOLOMEW'S HOSPITAL.

SUCCESSFUL.

1. Mr. Lawrence removed a diseased eye (melanosis).

2. Middle finger amputated. By Mr. Stanley.
3. Operation on the urethra. By Mr. Skey.

## MIDDLESEX HOSPITAL.

1. Lithotomy, by Mr. Arnott; and in this case the effect of the Ether was kept up during the evening to allay irritability.
2. Venereal warts.
3. Cancer of the breast.
4. Ectropium.
5. Crops of warts.
6. Amputation above the knee. By Mr. Shaw.

## OPERATIONS ON THE EYE, BY MR. F. BRETT—SUCCESSFUL.

1. Extraction of cataract,
2. Strabismus.
3. Amaurosis and ptosis.

## QUEEN'S HOSPITAL, BIRMINGHAM.

Amputation of the leg: she moaned and screamed, although, after the leg was removed, she was told so, and doubted it, stating she had had no pain.

## LIVERPOOL HOSPITAL.

## SUCCESSFUL.

Four cases of cataract and one of strabismus. By H. Neil, Esq.

## AT THE NORTHERN HOSPITAL.

Amputation of the left leg.

## SUFFOLK GENERAL HOSPITAL.

Tumour from the breast. By Mr. Image—successful.

## NOTTINGHAM HOSPITAL.

1. Amputation of the leg. By Mr. Coleman—successful.
2. Amputation of the thigh. By Mr. Crowfort—successful.
3. Lithotomy.

## KIRKDALE, LIVERPOOL.

Two cases of strabismus, one only partially so, the other complete. By Mr. Parker.

## NEWCASTLE INFIRMARY.

## SUCCESSFUL.

1. Fistula. By Mr. Potter.
2. Removal of diseased bone of the leg. By Mr. Potter.

## DERBY INFIRMARY.

## SUCCESSFUL.

1. Removal of diseased bone of the fibula.
2. Tumour of the back: suffered little pain. By Mr. Johnson.
3. Amputation of the arm.

## BRISTOL GENERAL HOSPITAL.

## SUCCESSFUL.

Removal of a fistula; two amputations of thighs; two legs amputated; stricture of urethra; cancer of lip; extraction of the toe nail. By Mr. Lansdown.

## STROUD.

Amputation of the leg. By Mr. Wiblin—Successful.

## CHARTER HOUSE INFIRMARY.

Fistula. By Mr. Selnor—Successful.

## EDINBURGH MIDWIFERY.

A case in midwifery, in which Dr. Simpson tried it with apparently great success for turning the child.

Dr. Murphy also used it in a case of turning. The woman quickly lost her consciousness, and went to sleep; on passing the hand into the vagina, the woman had a momentary slight tetanic spasm, and this was succeeded by a half drunken stupid state. He believed the uterus was not under the influence of the Ether. Delivery was effected in five minutes; the child was asphyxiated, but soon recovered, and altogether, he thought, the patient felt less pain than if the Ether had not been administered.

These are as yet the only two cases reported in this department of the profession; but at a meeting of the Academy of Medicine, held at Paris, Feb. 22nd, 1847, Baron Paul Dubois, Clinical Professor of Midwifery, brought forward the subject of Etherization in midwifery cases. He instances several cases, and draws the following conclusions:—1st. That the inhalation of Ether has the power of preventing pain during obstetric operations. 2nd. That it may also momentarily suspend the natural pains of labour. 3rd. That the state of ebriety, produced by inhalation of Ether, does not suspend uterine contraction when the latter is decidedly set in, and takes place at short intervals: and that it does not impede synergetic action of the abdominal muscles. 4th. That the state of ebriety appears to lessen the natural resistance which the perineal muscles oppose to the expulsion of the head. 5th. That the inhalation of Ether had not appeared to exert any bad influence over the life or health of the child.

For these valuable cases and report, I must refer my readers to the pages of the "Lancet," March 6th, 1847.

## LYNN HOSPITAL.

SUCCESSFUL.

Two cataract; cancer of the lower lip. By Mr. Cotton.

## ROYAL FREE HOSPITAL.

SUCCESSFUL.

Amputation of the leg. By Mr. Wakley.

## EAST RETFORD.

EXTIRPATION OF TUMOURS, BY MR. T. C. HALL—SUCCESSFUL.

1. Tumour from the neck.
2. Spasmodic stricture. In this case, the catheter being passed before Etherization, gave great pain; while under its influence, none.
3. Tumour extending from the side of the trachea downwards, and backwards over the sterno cleido mastoideus muscle.

At the General Hospital, Nottingham, Mr. F. Gibson, the resident surgeon, has tried the inhalation of Ether, with very good effect, in three cases of facial neuralgia.

These are extremely interesting cases, from being nearly the only ones as yet reported under Etherization.

At Wortham, by Mr. T. C. K., amputation of the arm—successful.

At the Hospital, Port Pitt, Chatham, amputation of the great toe—successful.

At the Bloomsbury Dispensary, extraction of the toe nail—successful.  
**KENT OPHTHALMIC HOSPITAL, MAIDSTONE.**  
 SUCCESSFUL.

By Mr. Woolcutt :—

1. Removal of a tumour on the back of the skull.
2. Fistula lacrymalis.
3. Strabismus.

**HOSPITAL ST LOUISE.**  
 SUCCESSFUL

By Dr. Malgaigne :—

1. Amputation of a finger.
2. Opening an abscess.
3. Cancerous tumour of the thigh.
4. Opening an abscess.

**CORNWALL INFIRMARY.**

Successful extirpation of the testicle. By Mr. T. Gorringe.

**BIRMINGHAM.**

Successful amputation of the toe. By Mr. Baker.

At the Essex and Colchester Hospital, Mr. R. Nunn operated successfully in a case of lithotomy, on Friday, Feb. 20. The man was put completely under the influence of the Ether, and went on well all day afterwards, but sank from exhaustion on the following Sunday night, at 10 o'clock.

Mr. Braid, of Manchester, extirpated successfully a cancer of the breast.

The Rev. R. Carrow, of Redland, had his leg amputated by Mr. B. Trevers, by this new painless remedy, and in this case it was perfectly successful. The Rev. Gentleman stated he had suffered no pain at the time; but he has since died from exhaustion, three days after the operation.

Mr. Dyke, of Corsham, Wilts, has reported a successful amputation of the left arm.

Mr. Carden, of Worcester Infirmary, successfully amputated a foot.

Mr. J. H. Stellard, of Leicester, and Mr. Barker, of Bedford, have both performed operations under its influence.

At Aston-under-Lynn, successful amputation of the leg.

At Gloucester, Mr. Clutterbuck performed the following operations with success :—

Amputation of the toe.

Tapping for ascites.

Amputation of the finger.

Leamington Hospital, by Mr. Pritchard, lithotomy—successful.

Successful amputation of the leg at Stockport Infirmary.

At the Coventry Hospital, Mr. Laxon kept a person under the effect of the Ether one quarter of an hour, and performed the operation of Lithotomy.

At the Free Hospital, Mr. Wakley successfully extirpated a cancer of the breast, and Mr. Gay amputation of a leg.

Dr. Wright, of Cheltenham, removed a tumour from the eye-lid of a patient; and also performed the operation of femoral hernia, keeping the effect of the Ether up thirty-five minutes.

Dr. Edwards operated on a child nine months old, for a vascular tumour of the temple; also on a patient for the excision of a tumour.

Mr. Shaw removed a tumour from the face of a man with success.

At the Northern Hospital, Mr. Stubbs amputated the thigh in two instances with success. Mr. Bainbridge amputated the arm; and many minor operations have been performed with success also.

At the London Hospital, Mr. Adams amputated with success both legs of a man while under its influence, another surgeon taking up the arteries of the one while he amputated the other.

The Periodical Journals continue weekly to teem with successful operations under the effect of Ether, to which I must refer my readers for more information on these cases.

While these pages have been going through the press, the following case occurred :—

James Smith, aged seventeen, residing in Burton-street, Cheltenham, had been suffering from Phymosis, for some months following on another disease. He was anxious to have it freed without suffering. The Ether was giving him with the sponge, on Tuesday, March 10th, 1847; he was put under its influence in a minute, and the bistoury was introduced, and I divided the skin without any pain; but after it was over he cried out very much, and became greatly excited, but this soon passed away; and when asked if he had felt anything, he said "No." It is worthy of remark that a few hours after the operation he had much secondary hemorrhage and exhaustion, more than I have ever known from a similar operation.

I cannot bring this work to a conclusion without thanking those gentlemen who have kindly given me their presence and sanction, and also to Mr. Eves, for the very valuable assistance he has given me throughout the treatment of the cases recorded.

FINIS.



