

TRANSACTIONS  
OF  
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,  
WEDNESDAY, JANUARY 13th, 1846.

MR. MORSON, VICE-PRESIDENT, IN THE CHAIR.

DISTRIBUTION OF PRIZES IN THE CLASS OF ORGANIC  
CHEMISTRY.

THE CHAIRMAN proceeded, as the first business of the evening, to present the prizes which had been awarded to the successful competitors in the class of Organic Chemistry, by Professor Fownes, as follows:—

LECTURE PUPIL.

Prize . . . . Mr. JOHN C. MAJOR, 88, Snow Hill.

LABORATORY PUPILS.

Prize . . . . Mr. W. H. BELL, Richmond.

Certificate of Merit Mr. R. D. Grindley, Chester.

The prizes consisted of

LINDLEY'S *Vegetable Kingdom*. Second edition, handsomely bound. And

FRESENIUS'S *Qualitative and Quantitative Analysis*; and WILL'S *Outlines of Chemical Analysis*. Bound in one volume.

The following communication was read:—

ON THE ACTION OF A MIXTURE OF NITRIC AND  
SULPHURIC ACIDS ON SUGAR.\*

BY MR. LEWIS THOMPSON.

HAVING an opportunity of sending a small parcel to England, I beg to inclose a sample of a substance which may interest you, —the only use to which I have yet applied it, is in the construction of rockets and fusees. It is prepared as follows:—Having mixed together three parts of strong sulphuric acid and one part of strong nitric acid, place the whole in a freezing mixture for some minutes, then add slowly one part of finely powdered sugar, and mix the whole with a glass rod—in three or four minutes the sugar will become pasty, and is then to be removed and thrown into a large quantity of cold water. After the excess of acid is removed it must be kneaded in warm water (from 90° to 100°); it then assumes the appearance of that in paper B. It must next be boiled for several minutes in a strong solution of carbonate of soda or potash, after which it may be care-

\* See Professor Brande's Lecture, page 388.—Ed.

fully dried and fused at a heat not exceeding 235° F.; or it may be dissolved in alcohol, and the solution evaporated to dryness, when it exists as in paper A.

Although made from sugar, it is, I believe, the bitterest substance in nature. Five grains of that marked B. placed for twelve hours in eighty gallons of water, rendered the whole intensely bitter, yet it had lost no appreciable weight.

When anhydrous, as A., it is very inflammable, and once lighted is difficult to extinguish: it bears some resemblance to the alkaloids, and possesses all the characters of resin, except in not combining with alkalis. It might perhaps be useful in medicine.

17, *Rue des Plantes, près la Place de Cologne, Bruxelles,*  
Dec. 8th, 1846.

To PROFESSOR GRAHAM, F.R.S., &c. &c.

THE CHAIRMAN stated that this communication had been addressed to Professor Graham, who, in consequence of the last sentence in it, thought it might be suitably laid before the Members of the PHARMACEUTICAL SOCIETY. The subject was a very interesting one, and well worthy of further investigation.

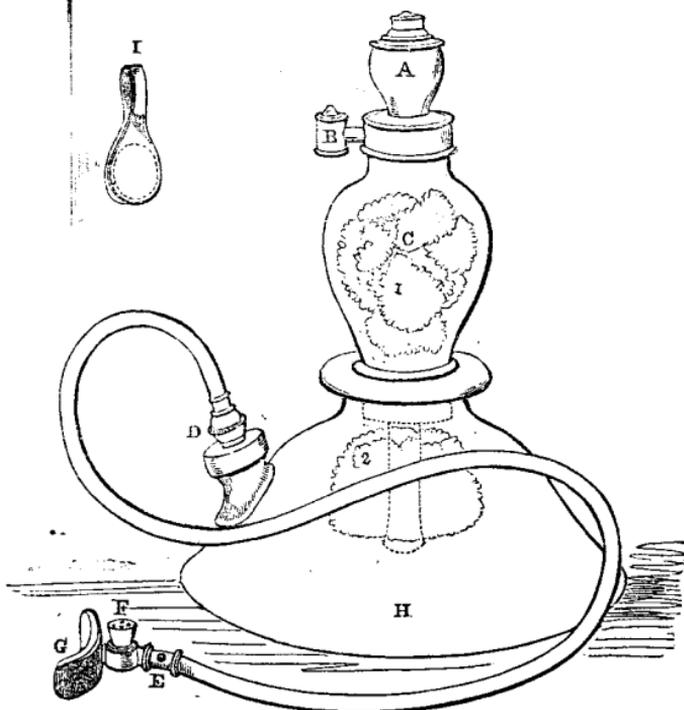
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## ON THE INHALATION OF THE VAPOUR OF ETHER, AND THE APPARATUS USED FOR THE PURPOSE.

BY MR. SQUIRE.

THIS is now the all-engrossing subject, and the public attention is daily called to the several operations which have been performed without the accompaniment of the severe pain heretofore experienced. Some failures are also recorded, without stating the particulars as to their cause. For instance, the temporary apparatus, which I put hastily together for Mr. Liston, when he performed the first capital operation in this country, without a *sign even* of pain, was afterwards much improved and employed in subsequent operations, two of which are reported in one of the medical prints to have entirely failed; but no allusion is made to the cause of failure. Now, I think it would be useful to the profession to have, in each case of success or failure, the circumstances also reported. In the two failures alluded to, the noses of the patients were not held: practice, however, teaches us that this is necessary, and I find, on enquiry, that this precaution was taken with the first capital operation. After the complete success just mentioned, we cannot be surprised at the extraction of teeth, and minor operations of Surgery, being performed without pain. It remains, therefore, to collect the various causes of non-success from parties who have the opportunity of frequently witnessing the inhalation of ether and its

effects, in order to render this boon most useful to suffering humanity, by instructing those who will hereafter have to employ it.



- A. The Urn with its stopper, into which the ether is poured.
- B. Valve which admits the air.
- C. Contains sponge saturated with ether.
- D. Valve which opens at each inspiration, and closes at each expiration.
- E. Ferule for regulating the quantity of atmospheric air admitted.
- F. Valve for the escape of expired air.
- G. Mouth-piece.
- H. Lower vase.
- I. Spring for closing the nose.

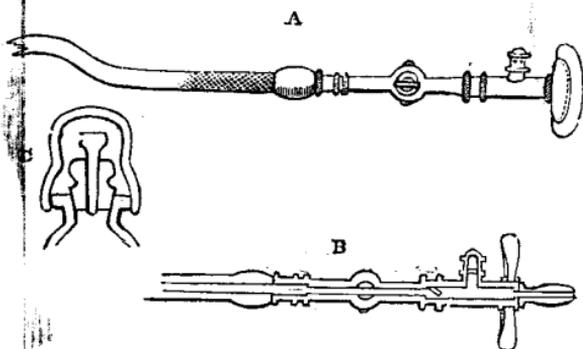
I am informed that the patients differ much in the amount of courage they exhibit, in the anticipation of an operation, and this, of course, will vary with the magnitude and danger of such operations. They, therefore, require encouragement as well as a good deal of tuition in inhaling the vapour of ether from a tube; and it has been remarked that in various stages of the process of inhalation, they have desisted, and even when close upon the point of insensibility, have stopped short, refusing to inhale further. These circumstances will militate against its uniform success, let the apparatus employed be ever so perfect, and until the process becomes more familiar, and the public are satisfied that no unpleasant effects are produced by it on

patients of all ages, the confidence of the public will not be entirely secured, and we shall have occasional failures from the causes I have mentioned. Persons in health desirous of trying its effect for pleasure, are affected in one minute to the full extent, and in the cases I have witnessed, the different dreams induced are very amusing; they, however, all agree in not being able to reckon the time they have lost during the minute or two they were asleep.

I may mention the marked difference in the effects produced by the washed and unwashed ether in the same person on the same evening. On inhaling the washed ether, he felt pleasurable sensations, then taking the ordinary rectified ether, it produced unpleasant sensations, followed by a trembling, but on inhaling the washed ether again shortly afterwards, the pleasurable feelings returned.

In constructing the apparatus, I have taken into account the weight of the vapour of ether, and have placed the inhaling tube near to the bottom part; considering also its stimulating effects on the air passages, causing coughing, I have a means of regulating the supply of air, to dilute it at the commencement of inhalation, and of increasing the strength as the patient is able to bear it to the full force. This is done by means of a ferule near the mouth-piece, which, when open, allows free access of air, and may be either partially or entirely closed with perfect facility, according to the condition of the patient. To secure an ample supply, I have the upper vessel filled with sponge, also a collar of sponge around the descending tube at the bottom of the lower vessel, which imbibes any liquid ether in excess, and also serves further to impregnate the air in its passage to the inhaling tube. The apparatus is supplied with ether at the top by a metal funnel, forming part of the cap; the ether falls through a rose, and is distributed in a shower upon the sponge: there is a patent valve in this part, which admits air at each inspiration, and closes instantly afterwards, effectually preventing the waste of the ether by evaporation. The inhaling tube is furnished with Read's valves (for the improvement of which he has lately taken out a patent), and which, by permission, are used in this apparatus. These are so arranged as to prevent the air expired from returning into the apparatus. The mouth-piece is made to fit and entirely to enclose the mouth, it having been found impossible to regulate the access of air by the tube mouth-piece. This then is a description of the apparatus in its present state, and I trust it will serve efficiently the very useful purpose its original was so successful in.

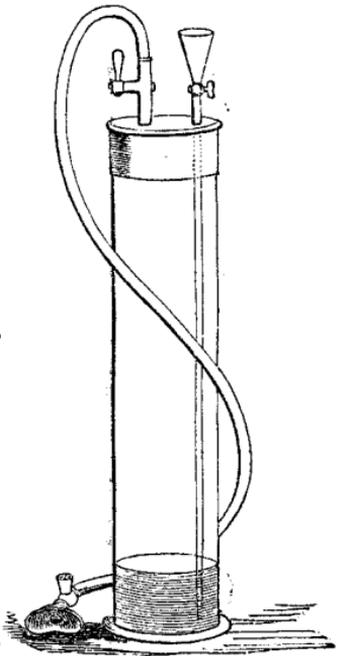
Mr. Hooper proceeded to explain the apparatus which he fitted up for the administration of the vapour of ether. This form of apparatus had been first suggested to him by Dr. Boot and Mr. Robinson, by whose permission he had undertaken its construction. It had since been modified and improved, and he could now submit it to the meeting as an instrument capable of insuring the full effects of the inhalation of the vapour of ether. He might state that the instrument had been used in a great many cases, and had never yet failed to produce the desired effect.



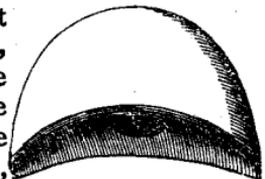
The general form of the apparatus resembles that contrived by Mr. Squire. Instead of the brass fittings at the top, Mr. Hooper has a double stopper, (*C*) over which a glass cap is applied when the instrument is not in use. By removing the inner stopper, a small supply of air is admitted, which may be increased by elevating or removing the larger stopper. This should be done when the patient has become accustomed to the stimulus, and when the full effect is desired; afterwards the access of air may be regulated according to the condition of the patient. Mr. Hooper stated that he had introduced an improved kind of valve in the tube, and also a more effectual mouth-piece, which being elastic and covered with a pad, would adjust itself closely to the mouth. (*A*, the tube, with valves and mouth-piece. *B*, section). He enumerated a number of cases in which he had used this instrument at the hospitals with success, and had much confidence in the efficacy of his mouth-piece.\* Mr. Hooper considered it important not to admit free atmospheric air under any circumstances, but to introduce all the air which might be found requisite mixed with the vapour of ether.

\* Some discussion arose about priority of invention, caveats, patents, registration, &c. which the Chairman very properly cut short, as being foreign to the objects of the meeting.

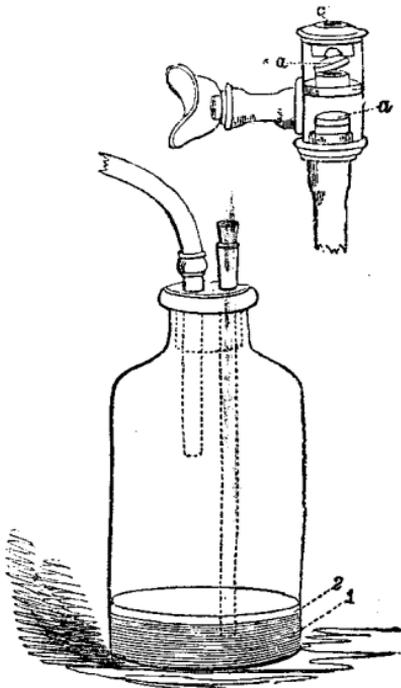
Mr. J. C. CLENDON exhibited an apparatus which had been fitted up for him by Mr. Clarke, of the Strand. This apparatus consists of a tall cylindrical jar with brass fittings at the top, through which a glass tube passes to nearly the bottom, and dips into a few ounces of ether; another tube passes out from the top, having the usual valves and mouthpiece. Mr. Clendon differed from Mr. Squire in thinking that the flexible tube should communicate with the lower part of the vessel. Notwithstanding the density of the vapour of ether, he found that it very readily diffused itself with the atmosphere, and that by means of his apparatus, the full effect could be produced. It was not to be expected that any apparatus would answer in all cases, some persons being much more easily affected than others, and a variety of circumstances might interfere with the result. He thought it desirable to use due precautions in the administration of the vapour of ether, and considered that a medical man should always be present. If any misfortune should occur producing a fatal result, much injury would be done to the public at large, as the process, which, if cautiously applied, might be essentially useful, would be brought into disrepute, and patients would be afraid to try it. By proper precautions, this might be avoided, and experience would lead to improvements in the administration of this valuable remedy.



Mr. WAUGH thought that the effect produced by inhaling the vapour of ether depended much on the adoption of an efficient mouth-piece, by which the vapour may be freely inhaled and unmixed atmospheric air excluded. He had adapted an inhaling tube, furnished with what he considered to be the most efficient kind of mouth-piece, to a common inhaler, and thought this would answer as well as the most complicated form of apparatus. The mouth-piece which he used, and which he observed had been adopted by some others, was originally invented by Dr. Harwood, of St. Leonard's, to whom he was anxious to do justice, by giving him credit for the invention.



Mr. JACOB BELL observed, that most of the instruments hitherto recommended had been constructed with the view of making the most perfect apparatus without reference to expense. He thought it was also desirable to contrive a means of attaining the result as economically as possible. He had therefore constructed an apparatus with a common green quart bottle, having a bung with two orifices, through one of which a glass tube passed nearly to the bottom of the bottle, while in the other, one of Reid's flexible inhaler tubes was fitted. As a substitute for the latter, Mr. Gilbertson had contrived a tube having a new kind of valve made of glass. To this Mr. Bell proposed to add a glass mouth-piece, similar in form to an eye-glass, but rather larger. Some persons might object to apply to their mouths a pad or wooden tube saturated with moisture from the patient who used it last. The glass mouth-piece could be removed and washed as easily as a cup or wine-glass. Instead of a sponge, a little water (1) was introduced into the bottle with the ether, (2) through which the bubbles of air passed from the lower end of the glass tube, thus becoming saturated with the vapour. This apparatus could easily be put together by a surgeon in the country who could not command the facilities of a London hospital: the only part not likely to be had at hand was the tube with the valves, which could be obtained at a moderate cost. The valves *a* and *a\** are two disks of glass, each resting on a short piece of tube, and the whole is contained in a larger tube, the opening to the mouth-piece being mid-way between the two valves. On inspiring, the lower valve opens, and the upper one closes; on expiring, *vice versa*; the expired air passes out through an orifice *c*. The tubes being glass, the action of the valves may be seen, and the trifling resistance occasioned by their weight, may, if requisite, be diminished, by inclining the tube. Mr. Bell thought the failure of the process in some cases should not always be attributed to the apparatus. A fiddle ought not to be condemned because

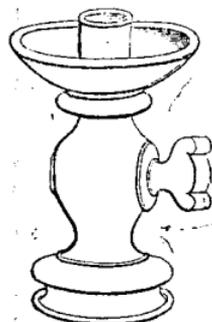


some persons are unable to play it. Skill and practice are equally requisite in inhaling ether. Persons sometimes inhale it as if they were smoking a segar, filling their mouths, but allowing little, if any, to pass into the lungs. In order to produce the full effect the vapour should be allowed freely to pass into the lungs, and each inspiration and expiration should be complete. Any inhaler would answer if provided with a tube of sufficient dimensions, with the proper valves and a means of admitting a due proportion of air. Dr. Boot had observed, that when the vapour of ether is too much diluted, it produces excitement instead of a sedative effect.\*

Mr. PEDLER had fitted up a common bladder with a mouth-piece and stop-cock, conceiving that simplicity was a great desideratum in the construction of an apparatus for the purpose in question. The bladder is used by partly inflating it with air, then introducing a small quantity of ether, and allowing this to diffuse itself through the air until the bladder becomes fully distended. The etherized air is then inhaled and again expired into the bladder, continuing the process until the desired effect is produced.

Mr. STOKES had employed a bladder to which an ivory mouth-piece and stop-cock were fitted; he found this method of administering the vapour, to answer perfectly well. The mouth-piece was made with a very large bore, so as to admit of an easy and full inspiration being made.

Mr. WAITE had also used a bladder and ivory mouth-piece. He thought this the best adapted for the use of the Dentist,

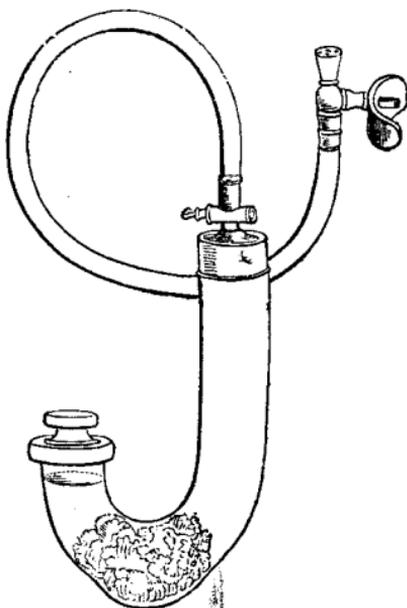


\* In some recent experiments in inhaling ether, it was found to affect some persons much more powerfully than others, and in three cases it produced great excitement. One of the parties having been quiescent for about a minute, suddenly sprung forward, jumped over three chairs, and seized one of the bystanders with great violence. Six men could scarcely hold him, and it was with great difficulty that he was secured. This condition lasted nearly forty minutes, and occasioned no little alarm. After it had subsided, he had no recollection of what had occurred, but discovered several severe bruises which he had inflicted on himself during the struggle, by collision against the furniture. Another of the party, when under the influence of ether, was seized with a convulsive fit of laughter, which continued without any consciousness for several minutes. A third was in a state of boisterous and unconscious excitement for above half an hour. Others became insensible and perfectly quiescent: in these cases the effect subsided more speedily than it did in the former.

From these experiments as well as others which we witnessed some years ago, it appears that the effect of the vapour of ether is precisely analogous to intoxication, affecting persons differently according to their temperament, constitution, or the quantity taken. It is also liable to the same abuse as

on account of its simplicity. He must say, however, that he considered the indiscriminate administration of the vapour of ether by Dentists, many of whom possessed no medical knowledge, as being quite unjustifiable in the present state of our experience as to its effects on different persons. He had been glad to hear the remark made to this effect by Mr. Clendon, as he fully coincided with it.

Mr. TRACY of St. Bartholomew's Hospital, said he had administered the vapour of ether in seventy or eighty cases, for producing insensibility during the extraction of teeth, and had used nearly all the different kinds of apparatus which had been hitherto made for the purpose, and which were kindly supplied to him by Mr. Ferguson, of Smithfield, instrument-maker to the hospital. He could bear testimony to the general efficacy of all these instruments when properly used, and to the almost uniform effect of the vapour in producing insensibility. He believed that where failures occurred, it was from the vapour having been imperfectly inhaled. He considered that the size of most of the instruments was an objection; it was desirable in using the instrument, especially in the extraction of teeth, that the operator should be able to administer the vapour without the aid of assistants; and that when the desired effect was produced, he could easily dispose of the apparatus, while at the same time he gave his attention to the patient. In this respect, there was an advantage in the bladder, which might be thrown on to the ground without being injured. It was also, he thought, desirable to study simplicity in the construction, and economy in the price of the apparatus used. He had himself contrived an apparatus, which he thought would be found to comprise the requisite conditions. Hookahs appearing to be the fashionable shape, Mr. Tracy had adopted the

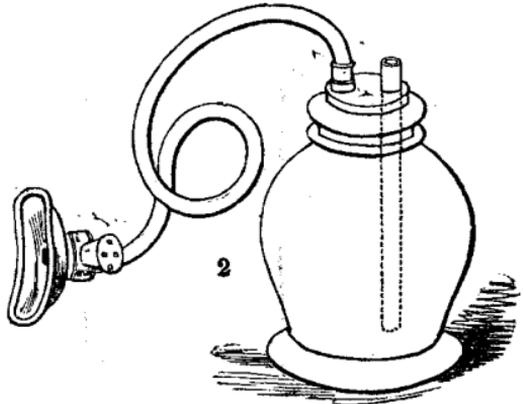
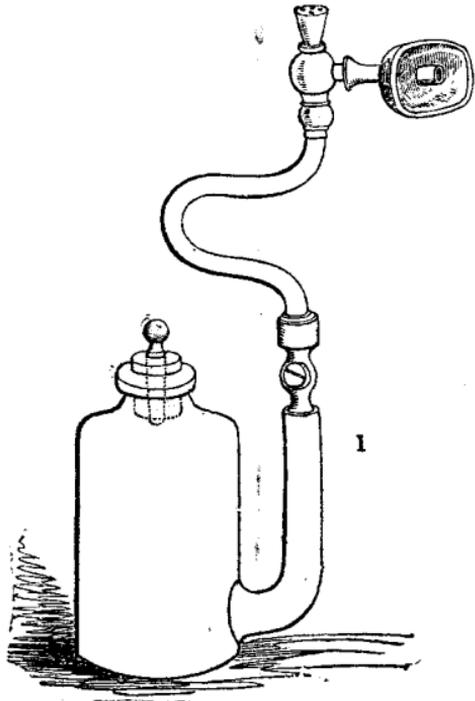


ardent spirits; and the propensity, when once acquired, is equally dangerous.

Chloric ether has been tried in some cases with success, it is more pleasant to the taste, but appears to be rather less powerful in its effects than sulphuric ether.—Ed.

form of the German pipe. The pipe is of glass, and mounted at the top with a brass cap and stop-cock, into which an elastic tube is screwed of sixteen inches in length, which is surmounted by a double valve mouth-piece of the kind in ordinary use. A steel compress padded, is used for securing the nostrils. As much ether is to be poured into the pipe, as will fill the well and saturate the sponges: the mouth-piece is then to be placed between the patient's teeth, the stopper removed, the stop-cock turned on, and the patient directed to inhale in a natural way.

Mr. FERGUSON, of Smithfield, exhibited three forms of apparatus. The first (1) is that suggested by Mr. Alfred Smee, consisting of a bottle with a double stopper, similar to that used by Mr. Hooper (figured page 353). The bottle being filled with sponge wetted with ether, the vapour passes through a tube at the bottom, furnished with the flexible tube and mouth-piece. The second (2) is sufficiently intelligible from the figure annexed without further description. It may either be used with sponge, or sufficient ether may be put into the bottom of the vessel so as to cover the lower end of the tube. The third, in its general form and principle, resembles Mr. Squire's apparatus.



Mr. SAINSBURY adverted to the importance of making the inhaling tube sufficiently large, observing that some of the specimens on the table were defective in this respect. The diameter of the human trachea should be taken as a criterion of the size required.

THE CHAIRMAN observed, in answer to an inquiry, that alcohol is sometimes present in ether, and that in this case it should be separated by washing; but that pure ether does not require it.

Mr. HOOPER remarked, that in case of any acid being present, lime-water would be the best remedy.

A question having arisen respecting the possibility of inhaling the pure vapour of ether,

Dr. ANDREW URE stated that the pure vapour of ether was a non-respirable gas, that like carbonic acid gas, it could not be admitted into the lungs without admixture with atmospheric air, as the spasmodic closure of the glottis would exclude it.\* Dr. Ure suggested instead of a mouth-piece, a hood to enclose the head, and having a glass window in front, as the labour of "wire-drawing" the air and vapour through a small tube was likely to interfere with the result.

THE CHAIRMAN, in dissolving the meeting, observed that each form of apparatus exhibited had appeared to answer the purpose for which it was intended; that the most simple apparatus, if effective, would eventually be found the most useful, and that time and experience only could demonstrate, amongst the many varieties, which form of instrument was likely to be most generally adopted.

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[\* Subsequent experiments appear to show that it is possible to inhale the pure vapour of ether. It is desirable that some further investigation should be made on this subject. In the experiments hitherto reported, no provision has been made for determining the relative proportion of ethereal vapour and atmospheric air inspired, this having been regulated at random, according to the apparent effect on the patient. It is generally admitted that the vapour, when much diluted, is stimulating and exciting, and that its sedative effect is in proportion to its concentration. It remains to be determined, by a series of accurate experiments, to what extent the concentration ought to be carried in order to produce most speedily and effectually the desired result. Some of our readers may probably be interested in Dr. Snow's table of the densities of ethereal vapour at different temperatures, quoted at page 361.—Ed.]