

ART. VI.—*Description and Illustration of an Ether Inhaler for the Inhalation of Ether as an Anæsthetic, with a few Observations upon a Mixture of Chloroform and Spirit of Wine for producing Anæsthesia.* By B. WILLS RICHARDSON, Fellow and Examiner, Royal College of Surgeons; and Surgeon to the Adelaide Hospital.

THE relative safety of chloroform and ether as anæsthetics having been recently brought before the profession in Dublin by my friend, Mr. John Morgan, at the first meeting of the Surgical Society of Ireland for the present Session, it appeared to me that it would be advisable to have constructed a simple and moderate-priced inhaler for etherization in hospital practice (Plate XII.). This inhaler has been designed as a substitute for the towel and sponge, in the use of which there is much waste of ether, a matter, in hospital economy, that may be of some importance.

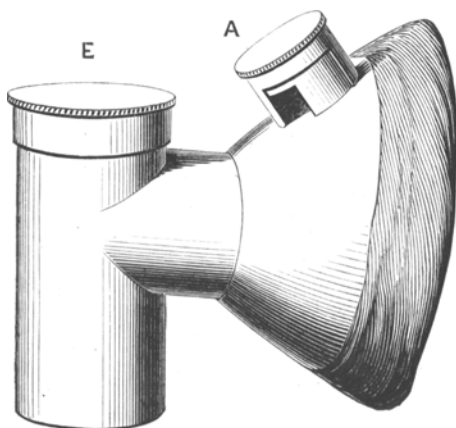
Although I have not myself adopted ether to the exclusion of chloroform, having had most satisfactory anæsthetic results from the use of a mixture of chloroform and spirit of wine, still I think it is our bounden duty, the relative danger of chloroform over ether having been so prominently raised, to test the point, that we may aid in the attempt to solve this deeply important question.

It is almost needless to write, that a question requiring such accurate and unprejudiced observation for its solution as that of the relative anæsthetic safety of chloroform and ether cannot be settled in a day.

To satisfy the logical mind it would be necessary to administer the two agents to an equally large number of persons, and to the same class of persons, having either injuries or diseases similar in their nature. As this, however, would be impossible, we can only arrive at an approximative estimate of the relative safety of these anæsthetics.

Whether or not ether is destined to recover its long-lost prestige in the United Kingdom remains, therefore, to be proved. At all events, Mr. Morgan deserves credit for the talent and energy he has applied to the solution of this important, and if I might venture to call it such, biological question.

According to Snow, about a fluid ounce of ether is usually inhaled by an adult patient in becoming insensible; but in order that the administrator may not, if possible, have to refill the box, it is made of a size sufficient that an ounce and a half of ether when



A.—Air opening. The amount of air to be admitted to the face-piece is regulated by a sliding cap, having an opening of the same size as that in the tube on which it turns. At the beginning of the inhalation the inner opening may be fully exposed and gradually covered, by rotating the cap according as the air passages of the patient become accustomed to the vapour. E.—Ether-box, to hold a little more than an ounce and a half of ether. This box communicates with the face-piece by means of a tube an inch in length and one inch and a half in diameter, the ether-box opening of the tube being two-thirds closed by a fixed diaphragm. This prevents the fluid ether from passing into the tube when the patient is in the horizontal position. The face-piece opening of the tube has a diameter of one inch. The tube itself, in order to increase the evaporating surface, should be nearly filled with soft cotton candlewick, having, when in use, one end submerged in the fluid ether. The inhaler may be made of silvered copper or of block-tin; but the face-piece margin should be formed of flexible metal and covered with morocco leather.

MR. RICHARDSON'S Ether Inhaler.

in the box will fill it to near the upper margin of the diaphragm. It is necessary, according to Snow, that the inhalation should commence, as in the case of chloroform, with the expiratory valve of the face-piece of his inhaler turned to one side, that the vapour should be admitted to the air passages by degrees, to avoid the irritation that would arise from suddenly inspiring any considerable quantity of the vapour. In Plate XII. the admission of air is regulated by the sliding or rotating cap A. When the inhalation has been in progress for one to two minutes, the patient should be made to breathe nearly altogether the pure vapour, which is effected by rotation of the cap A. If there be no peculiar susceptibility against ether narcosis, the latter will be complete in a few minutes.

The quantity of ether my friend Mr. Morgan pours into his ingeniously-constructed inhaler is from one and a half to two ounces. For the description of this excellent apparatus, and for much interesting matter on ether as an anæsthetic, I must refer the reader to his very instructive monograph on the subject.^a

Although deaths, it must be conceded, have resulted from the inhalation of ether, I will, notwithstanding, reproduce here the following observations of Snow regarding the safety of ether, as an inducement for the trial of ether by those who are not disposed to do so in consequence of their having had good luck in the use of chloroform.

"I believe," he has recorded, "that ether is altogether incapable of causing the sudden death, by paralysis of the heart, which has caused the accidents which have happened during the administration of chloroform. I have not been able to kill an animal in that manner with ether, even when I have made it boil, and administered it quite pure." "I hold it, therefore, to be almost impossible that a death from this agent can occur in the hands of a medical man who is applying it with ordinary intelligence and attention."

When we compare these observations with the information collected by Mr. Morgan^b regarding the safe anæsthetic properties of ether, we feel constrained to observe that he would be prejudiced indeed who neglected to test the relative anæsthetic safety of chloroform and this agent.

^aThe Dangers of Chloroform, and the Safety and Efficiency of Ether. By J. Morgan, M.D., F.R.C.S. London: Baillière, Tindall, and Cox. 1872.

^bIbid.

I confess that I am myself in favour of a mixture of equal parts of chloroform and spirit of wine for producing anæsthesia, and, therefore, it is the comparative safety of this fluid I purpose testing against the ether. This mixture is best administered with either a piece of lint, a handkerchief, or with Skinner's apparatus, for the following reasons mentioned by Snow:—"Whenever chloroform is administered from a handkerchief or sponge, it should be diluted with one or two parts, by measure, of spirit of wine or eau-de-Cologne. In this way the convenience of the handkerchief or sponge can be taken advantage of without the danger. Very little of the spirit is inhaled, as the greater part remains behind after the chloroform has evaporated; but it acts by lowering the elastic force of the vapour of chloroform, and diminishing the amount of vapour which is given off from the handkerchief or sponge, just as diluting a strong solution of ammonia with additional water diminishes the amount of the volatile alkali, which escapes as gas. One hundred cubic inches of air are capable of taking up fourteen cubic inches of vapour, at 60°, from pure chloroform. and becoming expanded to 114 cubic inches; but when the chloroform is diluted with an equal volume of alcohol, it will only yield eight cubic inches of vapour to 100 of air. In passing over a sponge or handkerchief the air would take up less than this, usually four or five per cent., which is a quantity sufficient to cause insensibility in four or five minutes, without the risk of sudden accident."

I do not recollect that I have seen this mixture produce insensibility in so short a time as Snow mentions.

In conclusion, may I observe, that in the present medico-legal aspect of the relative safety of ether over chloroform for the production of anæsthesia, it would not, perhaps, be injudicious, upon the part of the administrator, to permit the patient to select the anæsthetic.

ART. VII.—*A New Mode of applying Pressure in Popliteal Aneurism.* By HENRY THOMPSON, M.D., Surgeon to the Tyrone Infirmary.

SOME years ago, having had occasion to treat a case of popliteal aneurism, and neither possessing, nor having any means of procuring within the necessary time, the clamps and other appliances hitherto employed for the purpose, I was obliged to devise some