

A

BRIEF TREATISE

ON

THE USE OF CHLOROFORM

IN

DENTAL AND SURGICAL OPERATIONS.

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# CHLOROFORM.

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Of the unaesthetic power of this agent Professor Simpson of Edinburgh claims to be the discoverer, and happily for himself he remains undisputed master of the field, against whom no rival claimant has entered the lists to tilt a lance.

Since the remarkable discovery of this power in ether, various experiments have been made to procure, if possible, another volatile, respirable agent to supersede it. Dr. J. Y. Simpson, Professor of Midwifery in the University of Edinburgh, communicated his discovery to the Medico Chirurgical Society of that city, at their meeting, on the 10th of Dec. 1847.

Immediately after, he forwarded the results of his experiments to the Baltimore College of Dental Surgery, and with commendable promptitude the faculty of that institution prepared the article and tested its power. The next steamer from Great Britain brought letters and pamphlets on the subject from Professor Simpson, which speedily excited an interest throughout the country.\*

In order to show the difference in the constituent properties of ether and chloroform, we have prepared a table, (see page 7).

Dr. Jackson says, that chlorine may be made with advantage from rum or whiskey, while pure sulphuric ether can only be made from the most highly rectified alcohol. It may be made in any rum distillery where a steam or water bath heat is employed, and may be collected in tanks, and separated from all traces of alcohol by washing it with water. It is a heavy sweet liquid, having a sp. gr. of 1.489 at 60 F. It boils at 141 F. It is not combustible when flame is applied to it, nor is its mixture with the air explosive. It is made as follows, according to the directions given in Professor Simpson's papers.

\* Chloric Ether was manufactured in this country by Mr. Samuel Gurthrie, of Sacket's Harbor, in 1832. (See Amer. Jour. Science, vol. xxii. p. 105.)

Chloroform was made about the same time by Leibig and Dumas, in Germany and France.

Mr. Gurthrie appears to have obtained nearly pure Chloroform, for he states that its specific gravity was 1.486 at 60 F., and that it boiled at 166 deg.

Prof. Simpson states that it was discovered by Sonberlan in 1831. Berzelius attributes it to Leibig, who, Prof. S. says, discovered it in 1831. Dumas first determined its true composition.

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Bleaching powder (Hyper Chlorite of Lime) lb. iv.

Water, . . . . . lb. xii.

Alcohol, . . . . . floz. xii.

Mix in a capacious retort or still, and distil so long as a dense liquid, which sinks in the water with which it comes over, is produced."

A much larger proportion of alcohol may be advantageously used, and any excess of it which may come over may be readily separated by the action of water, which dissolves the alcohol and leaves the chloroform in the state of a dense, oily looking fluid at the bottom. The water, after having stood some time, is to be drawn off from the surface of the chloroform, which may then be more completely separated by means of the separating funnel or bottle prepared for that purpose. The chloroform thus obtained free from alcohol is sufficiently pure for inhalation, but if it is required to be absolutely pure, it must be carefully agitated with concentrated sulphuric acid, and redistilled in a glass retort placed in a water bath.

Berzelius recommends the following.

Take one part of slacked lime and mix it with 24 parts of cold water. Pass chlorine gas through the mixture, until nearly the whole lime is dissolved. A little more slacked lime is then added, to restore the alkaline reaction. The clear liquid is then mixed with one part of alcohol or wood spirit, and after standing 24 hours, it is cautiously distilled in a very spacious still. A watery liquid, containing a little spirit and a heavy oil, collects in the receiver. This is the chloroform. Agitate with cold water and allow it to subside to the bottom of the containing vessel, and then the water may be drawn off, and the chloroform may be obtained and separated from any remaining water by means of chloride of calcium and redistillation.

In the usual process of making "chloric ether," proof spirit (common rum) is mixed with hyper chlorite of lime and distilled. Some of the alcohol escapes decomposition, and comes over with the chloroform produced, so that the chloric ether of the shops is the tincture of chloroform.

The proper administration of chloroform differs from that of ether in several particulars, and its use is preferable in a majority of cases.

1st, A smaller portion of chloroform is requisite to produce insensibility to pain.

2d, Its action is more rapid, complete, and generally persistent.

3d, When administering chloroform, the operator should avoid touching the face of the patient with the handkerchief, (which is better and safer than any instrument), as this irritates him, especially in the first stage, when he is more easily diverted and excitable;—therefore,

4th, The quantity used should always be sufficient to produce insensibility at the first inhalation. It should not be too concen-

trated or confined to too small a surface, however, as this tends to produce a choking sensation, which annoys the patient and delays the operation.

5th, In dental operations, to prevent the jaws from becoming clenched, a cork or piece of gutta percha may be placed between the teeth, before the inhalation is commenced.

6th, The patient should be warned against feeling alarmed at any new or strange sensation. The better to insure rapid and complete chloroformization, the patient should be directed to close his eyes.

7th, Always place the patient in as comfortable and convenient a position as the operation will admit previous to inhalation.

8th, Watch the patient and see that he inspires properly,—that he takes long and deep inspirations; if he is intractible and endeavors to move his head from his handkerchief, follow his motions and keep it as near the face as possible without touching the skin.

9th, Always be in perfect readiness to seize the tooth the moment insensibility is produced. Where several teeth are to be removed, it may be necessary to repeat the inhalations.

10th, Do not allow the patient to remove the handkerchief, as many patients attempt to do, for the purpose of inhaling fresh air.

11th, Avoid using more chloroform than is necessary. The muscles of the mouth and tongue may become too much relaxed, and the latter organ rolls up or falls on one side, often obstructing the operation.

12th, Chloroform should never be allowed to touch the mouth, lips, or face of the patient, as it will cause excoriation.

The odor of chloroform is not unpleasant either in inhalation to the patient, or in exhalation to others. A small quantity being sufficient, it is more portable than sulphuric ether; neither is it inflammable or explosive.

A mixture of ether and chloroform we have found both safe and pleasant, in the proportion of three parts chloroform to two parts ether.

Pure chloroform will never produce nausea, unless the stomach be overloaded or in an unhealthy state; but great care should be taken, in dental operations, that the patient swallows no portion of blood, as the effect is very unpleasant, though not serious. We have found that with chloroform tactility retires earlier, with consequent loss of consciousness.

In regard to its safety, we have used it ever since the announcement of its discovery, probably were the first to test it in New England. We have administered it to young children and aged persons, to delicate women and strong men; to persons of every variety of temperament, constitution, and health, and in no one instance with any injurious or unhappy results.

It has been used in dentistry, general surgery and midwifery, with the happiest results. In one, among many other cases of

protracted, and ordinarily extremely painful parturition, pain appeared to be converted into joy, and the patient sang in a happy state during the whole of the process. This case, as have all others of a similar kind with which we have been acquainted, terminated favorably.

Says Professor Simpson,—I have employed it, with few and rare exceptions, in every case of labor that I have attended; and with the most delightful results. And I have no doubt whatever, that some years hence the practice will be general. Obstetricians may oppose it, but I believe our patients themselves will force the use of it upon the profession. I have never had the pleasure of watching over a series of better and more rapid recoveries; nor once witnessed any disagreeable result follow to either mother or child; whilst I have now seen an immense amount of maternal pain and agony saved by its employment.

Chloroform was administered in one instance to a young lady, wasting away under an incurable consumption, when suffering the pangs of final dissolution. By the request of her mother, a small quantity was put upon a sponge and laid upon her pillow, which greatly alleviated her distress. She retained her consciousness, however, to the last moment of her existence, and when death placed his signet on her brow, her countenance, instead of being distorted by pain, presented the calm tranquillity of peaceful sleep.

Another remarkable use to which chloroform has been applied with success, is in that horrible disease—Hydrophobia. Not only has the violence of the spasm been overcome and the pain allayed, but authentic cases of perfect cures by this means are upon record. On the brain it exercises a singular and sometimes a most happy effect. We recollect administering it in one case to a patient but one degree removed from idiocy. The effect upon her countenance was most remarkable; the eyes assumed a brilliancy they had never shown before, and the face seemed lit up with an intelligence to which it was totally unaccustomed. We had not the opportunity of following up any series of experiments in this case, but there is some evidence for believing that the frequent application of chloroform might have been attended with the most cheering results.

Our experiments with both ether and chloroform were not commenced, nor have they been confined to human subjects. Upon various animals, bees, birds, fish, frogs, leeches, &c., we have tested the effects. Upon a large, full-grown American eagle (which we kept nearly a year for the purpose), we performed a series of beautiful and successful experiments.

From a very extensive practice with dental patients and in other departments of surgery we have had the most ample opportunity of observing its effects, and the results have convinced us not only of its perfect safety and general utility, but that immense advantage accrues to the operator in the perfect control which it gives him over his patient. Even in Dentistry the an-

ticipation of pain by the patient often causes the operator much delay and trouble, which is avoided by the use of chloroform, and to the patient it is invaluable, as the most timid may now sit down composedly for the most serious operations. And instead of the affrighted looks and solemn countenances which the dentist was wont to see in his office, he now beholds smiles, and hears jokes and laughter instead of screams during the operation of extraction.

With care and the exercise of ordinary judgment in its administration, we think chloroform may be used with advantage and safety to the operator and safety to the patient, in almost every branch of surgery.

	Propor. of Nitrogen.	Propor. of Oxygen.	Propor. of Carbon.	Propor. of Hydrogen.	Propor. of Chlorine.
Nitrous Oxide, }	1 Atom	1 Atom	----	----	----
Sulphuric Ether, }	----	1 Atom	4 Atoms	5 Atoms	----
Chloroform,	----	----	2 Atoms	1 Atom	3 Atoms