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AN

INAUGURAL DISSERTATION

ON

Chloroform.

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Chloroform.

Its Origin

Chloroform was first discovered by Mr Samuel Guthrie of Sackets Harbour. N.Y. in 1831, and about the same time by Soubeiran of France, and Liebig of Germany. some writers say, that Guthrie made the discovery as early as the year 1830.

In a subsequent letter to Prof. Silliman, dated July 15th 1832. Mr Guthrie states that the substance which he had obtained, distilled of Sulphuric Acid, had the specific gravity of 1.480 or a little greater - and might therefore be considered as free from Alcohol; and if a small quantity of Sulphuric Acid which sometimes contaminates it be removed, by washing it with a strong solution of Carbonate Potassa, it may then be regarded as absolutely pure. It is thus evident that Mr Guthrie obtained

in a pure state, the substance now called Chloroform, but he erroneously supposed his production to be the well known, Oily Liquid, of the Chemists, which it greatly resembled, and for the preparation of which, he believed he had fallen on a cheap and easy process. Under this impression, he called the substance Chloric Ether, one of the names by which the Dutch Liquid or Chloride of Olifiant Gas is designated. Mr Guthrie was first induced to make the preparation from noticing a passage in Prof. Silliman's Chemistry, which refered the Dutch Liquid as a great diffusible stimulant, when properly diluted with Alcohol and water.

2nd Modes of Preparation.

Soberian recomends the following process; Distill with a brisk fire, 10 parts of Pulv. Chloride of Lime, well mixed with

60 parts of hot Water, with 2 parts Rectified Spts, & Specific Gravity 0,85; from a copper Still, only two thirds filled, into a refrigerated receiver. When the preparation approaches to 176°, the fire must be quickly withdrawn; in order to prevent Reaction and the consequent boiling over of the mixture; Soon the distillation commences, proceeds rapidly of itself, untill nearly completed; when action slackens the fire must be renewed untill the distillation is known to be finished; which is known by the liquid that comes over, no longer possessing the sweet taste of Chloroform. The distillation is composed of two layers; The lower one, dense and Yellowish, consisting of Chloroform, contaminated with Alcohol and a little Chlorine; Upper one, of Water, alcohol & Chloroform, the Chloroform layer is seperated by decantation; & after being washed with water to seperate the

Alcohol & agitated with a weak solution of Carb. of Soda to remove the Chlorine, it is then rectified by distillation from Chloride of Calcium in a water bath. The upper layer together with the washings, is diluted with more water, and distilled by means of a water bath. The new distillation consisting of Chloroform, containing a little water and Alcohol; & is purified as before described.

The Chloroform thus obtained is not perfectly pure, but enough as for Medical purposes.

Dumas, recomends 20 parts Chloride of Lime & 3 3/4 parts Rec. Spt. to 60 parts of water and proceeds with the same, pretty much as did Soubeiran.

Comparing the two formulæ, or proportions, it will be seen that Dumas uses twice as much Chloride of Lime & nearly twice as much Rec. Spt. to the water employed. Messrs Duncan & Flockhead, Druggists of Edinburgh, manufacture Chloroform on a large scale, in a peculiar apparatus, using the propor-

tions as recomended by Dumas. They employ two large wooden Vessels as a still, and a third as a receiver. & into the former throw Steam which furnishes both sufficient heat & water for the process. Sixty pounds of the Chloride of Lime is used by them, at each distillation, and they are enabled to manufacture, on an average, three hundred Ounces per day. They find that the Chloride of Lime used, yields half of its weight of Chloroform. The heavy layer of the distillation, constituting the impure Chloroform, is purified by mixing it, with half its measure, of strong Sulphuric Acid, gradually added, & distilling the mixture, when cold, in a leaden retort, from as much Carb: Baryta, by weight, as of Acid previously used by measure. The product is finally distilled from quick Lime. After having stood over the earth and been repeatedly shaken with it, for a day or two.

3rd Properties & Composition.

Chloroform is a colourless, volatile Neutral liquid, having a bland Etherial odour, and hot, Aromatic, Saccharine taste. It is but slightly soluble in water. Its specific gravity is 1.48. and boiling point 142.°. It is not inflammable but renders the flame of an alcoholic lamp. Yellow & Fuliginous. It burns with a smoky flame when mixed with an equal volume of Alcohol. When pure it has no action on potassium. It is scarcely acted on by Sulphuric Acid in the cold, but dissolves readily in Alcohol or Ether. The Alcoholic solution, when moderately diluted with water, forms an Aromatic, Saccharine liquid of a very grateful taste; A strong alcoholic solution is decomposed by an abundance of water, the Chloroform seperating and subsiding, and the Alcohol uniting with the water. Chloroform

has extensive solvent powers, being capable of dissolving Caoutchouc, Gutta Percha, Lac & Copal substances, which resist most other solvents. It also dissolves Iodine, Bromine, the Organic Alkalies, Volatile oils, Resins, Wax & Fats. It does not dissolve Sulphur or Phosphorous. Its power of dissolving large quantities of Camphor and the means which it furnishes of administering that medicine in an elegant form is of great advantage. As a general solvent it has the advantage over Ether of not being inflammable; the inflammability of the latter being a frequent cause of accidents.

Chloroform is composed of three Eqs. of Chlorine and one of Formile, and is therefore the Perchloride of Formile. Its Formula is a Bicarburet of Hydrogen. The Formula of Chloroform is $C_2 HCl_3$. Its composition was first accurately determined by Dumas in 1835, by

Whom it was called Chloroform from its resemblance to Formic acid

4th

Impurities and Tests

The impurities are usually alcohol and Ether, both of which lower the Specific Gravity. To determine the presence of the impurity which has this effect on its density, Soubeiran recomends that a drop of the suspected Chloroform, be added to a mixture of equal quantities of Concentrated Sulph: acid and water. Such an acid when cool, will have the Specific Gravity of 1:38 & good Chloroform being of a greater density will sink in it. Another very good test and perhaps the best is to drop a small portion of Chloroform into a glass Vessel of distilled water. If pure the Chloroform will be seen at the bottom of the Vessel, in a Transparent Globule, but if the Chloroform, even contains a small portion of Alcohol it will be of a milky appearance.

5th Its Medical Properties

Chloroform when taken internally, acts as a sedative Narcotic, probably operating on the nervous system independent of Vascular Action or Congestion. Chloroform like most Medicines has numerous effects, and like them also, its effects depend greatly on the dose & the condition of the Patient. In a very large dose it acts as a narcotic poison, & sometimes evinces narcotico acrid effects. In small doses it is stimulant or sedative, according to the state of the system, & is Spasmodic, Anodyne & Anaesthetic.

6th Its use

Chloroform was used internally by Prof. Pelletan of Paris as early as 1832. In Asthma Spasmodic, Cough, Scarlet Fever and Neuralgia with favorable results, and by Dr. Henry of Liverpool in 1838 for Hys-

-ried. It has been used for Neuralgic affections. Puerperal Convulsions, in Chorea, Hydrophobia, Tetanus, Delirium Tremens, Asiatic Cholera, Epilepsy as well as many other diseases.

7th The manner of using Chloroform.

First. It is given internally diluted with water, Brandy or a liquid.

Second. Externally; when used as a gargle or to abraded surfaces, it should be diluted with water, but if to the skin it should be in it its natural purity or undiluted and should be covered with Oil Cloth or some suitable substance to prevent evaporation.

Third & Last Mode is by Inhalation, which is most in use, as its anaesthetic action is most generally desired.

8th The Dose.

The dose when administered Internally, for the

adult, from 5 to 10 gtt. in a little brandy and water. When by inhalation, the dose is a fluid ʒi. & Should it fail to have the desired effect, use as before, at the expiration of two or three minutes, until you produce the desired effect. The best mode of administering Chloroform is by pouring it on a handkerchief or Towel; a piece of Sponge may be used to advantage. In administering Chloroform Care should be taken, for fear of destroying your Patient, by a prevention of the proper circulation of Atmosphere, as it is spentially neceepary that the Patient should receive a due proportion of air to sustain life, and at the same time great care should be taken, to avoid carrying the effects of Chloroform too far. There should be an experienced Physician, aspisting, to watch the Pulse. The Inhalation should be immediately removed

at a suspension of the Pulse, and should not be again applied, untill the Pulse has regained its wonted Vigor.

9th Its Effects.

The usual effects produced by a full dose of Chloroform, administered by Inhalation, are, the rapid production of Coma, Relaxation of the muscles, slow and often Stertorous breathing, upturning of the eyes, and total insensibility to agents, that usually produce acute pain. The Effect on the heart action is variable. Occasionally frothing of the mouth takes place and more rarely, Convulsive twitches of the face & limbs. The insensibility is usually produced in one or two minutes, and the effect continues from five to ten minutes; though the effects may be kept up for many hours provided the Inhalation be renewed from time to time. The immediate effects of the

Agent, are followed by a drowsy state and often a deep sleep. As a general rule no recollection is retained of any thing that occurred during the insensible state. It is a good rule not to administer Chloroform, immediately after meals; Nor to persons ~~subject to~~ Epilepsy or affected with Organic diseases of the Heart

10th The Best Means of restoring a patient after the Chloroform has been carried too far, by Inhalation, are, The horizontal position, Cold air fanned in the face, Cold water to the head & face, Frictions, heat to the body & extremities & Ammonia to the Nostrils. A late mode is to force respiration, either by blowing into the Patients mouth or by thrusting two fingers deep into the Throat, even to the entrance of the Larynx & Oesophagus.

11th General Remarks.

Chloroform as before stated has been used in various diseases. It comes in to the relief of all those acute, painful, nervous diseases of Man, it matters little from what cause or in what manner the disease may develop itself, Chloroform at least give relief for a time. Pain a terror to the World, and has been from the creation of the least since Eve induced Adam to partake of the forbidden fruit); But! What; a pleasure it must be to all thinking minds, & kind and sympathizing hearts, to reflect, that the development of Science has done so much to rob her of her once unbounded power or at least a considerable portion of it. She had had once, the power to make the most Iron Nerve to quail at the thought of an operation, that may now be performed by the Scientific Professor of the Medical University of Nashville

without the Patients even being aware of the touch of the Surgeons sharp instrument, and at the same time, he may have lost one or both of his inferior or Superior extremities, and are often so unconscious of the fact, that they will feel for the amputated limb, that I have seen; and it is with difficulty that you can convince them, that they have undergone an Operation, without an exhibition of the limb or some Similar demonstration of the fact, All this too, by the assistance of a small portion of Chloroform, and again it is said become in to the relief of Woman, in one of the processes of Nature, to which we are indebted for our existence. A process that causes the Female the utmost anxiety and that not without just reasons, for there are but few who have not passed through this

trying time of nature and still less, who have not been present with an Obstetrical eye & ear on the distorted and anxious countenance of the Mother, and heard her in her wailing and suitable lamentations, without feeling some cause of alarm., Who. must ever forget those impressions; When I reflect on the condition of woman, now under consideration (I as did the old man feel, thanks God, for the Vaination, & that I am of the opposite sex)

I am aware of the controversy on this point, as to the applicability of Chloroform in Labour, though I think that there is abundant testimony setting forth the beneficial results of its use in such cases, as to leave hardly room for a doubt.

I am also aware of the fact, that there are many deaths reported as among

the evil effects resulting from the use of Chloroform, which is perhaps owing to the improper use of it, but even admitting it to have been properly administered, how many persons do we hear of sinking under operations of various kinds, where no Chloroform had been administered. I see some writer has collected some 10 or 12 cases of death from Chloroform in one year; Who is it that could not collect 50 or 100 cases, fatal ones, where Chloroform had been withheld in the same length of time; and on the other hand, if it is to be proscribed because it has been improperly used, & thereby caused death, would it not look as reasonable that we should discard from the Materia Medica all those medicines, when improperly administered, will cause death, which are nearly all, particul-

-arly those mostly relied on; We would also take from the Surgeon his Cutting Instrument; In fact we would deprive the Profession of all that is worth preserving, as a remedy.

I contend that Chloroform never has produced death in its pure state, but it was the impurities and not the Chloroform.

Chloroform is also recomended in those diseases, and that in the highest terms, by men of eminence in the Profession; of a Spasmodic Character, in which at every Paroxysm or Spasm, the patient will suffer death, more than twenty times, and often terminates his days a raving maniac.

Indeed there are few there and few, if any diseases, into which Chloroform will at some stage of the disease, be beneficial

in some of its modes of operation, either as a stimulant, Respirific, Anodyne, Sedative or some other of its modes of action; We have good testimony that Chloroform has been used with beneficial results in Hydrophobia, Tetanus, Delirium Tremens & Epilepsy & Asiatic Cholera, & several other Diseases that seem to resist most of the Medicines, those diseases being such as seem to run their course with apparent indifference to all the course of treatment, That this alone is sufficient to place it far above any other remedial agent now in use. The time is not far distant, when it is to take the place of a great number of medicines that now hold an elevated position in the history of Medicine.

The discovery of Chloroform what shall

be said of him; as well as the first to appropriate the remedy or bring it into use as an Anaesthetic agent, Columbus the discoverer of this vast Continent of ours, where stands he; Shall we not say that his name is inscribed on the hearts of the entire American People, which none will deny; Then it does seem to me that the discoverer of Chloroform should at least be associated with the above named, & Why should they not be; The former has all the honor man can bestow for the extension of Territory for the relief of suffering humanity; while the latter or products of the latter, relieves the most intense suffering and also prevents the same in a manner peculiar to itself. Then are we ~~not~~ to place him below the discoverer

of this free and independent country of ours, if so, at what height on memory's page shall it be inscribed? This time the unfolder of all things will develop, and finally we shall see that the name of Samuel Guthrie, the discoverer of Chloroform, the great Antidote for pain, the terror of mankind, will be linked together with, on the Page of history, such names as Columbus the Discoverer of America & Washington the Father of his country, who, was first in Peace, first in war and first in the heart of his countrymen.