

Fig. 1.

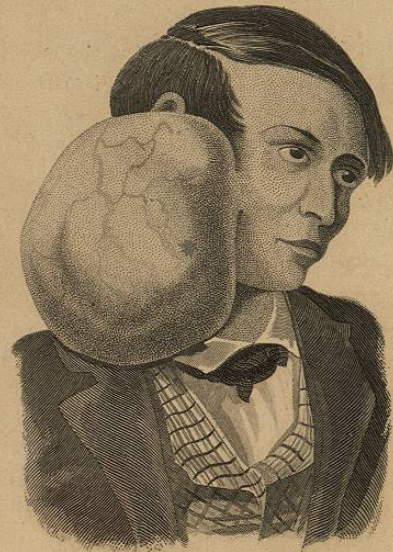


Fig. 2.

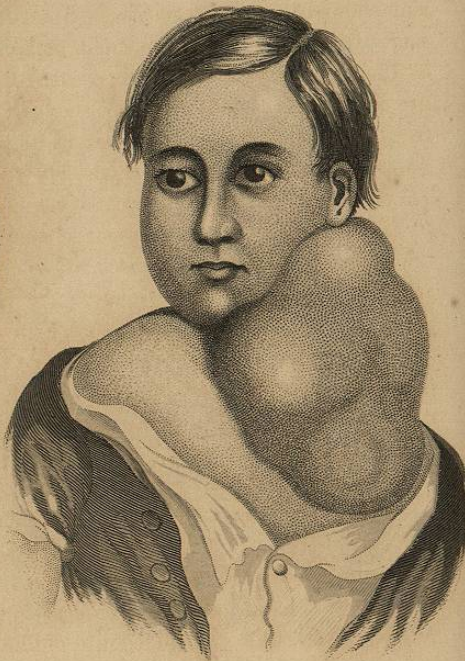


Fig. 3.



Fig. 4.

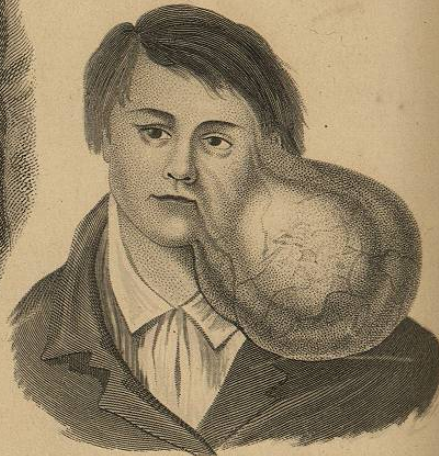


FIG. 1.—A large cystoma of the right parotid region, caused by the development of a sebaceous follicle in consequence of a blow upon the part. Commencing as a lump the size of a nut, this tumor gradually increased to nearly the size of the head; gave exit at one time to sebaceous matter; had a broad base; was nearly immovable; had the veins enlarged upon its surface, and showed a small ulceration in front, from which, fetid, acrid, and bloody sanies had escaped. As the tumor enlarged, the jaw became closed, sensation of the face diminished, and there were all the other symptoms due to pressure on the vessels and nerves of the part. The tumor differs in appearance from scirrhus of the parotid gland in its size and period of development. It was readily removed, and is represented as an example of one of the class of growths of the parotid region not involving the parotid gland.—*After Auvert.*

FIG. 2.—Large adenoid tumor of the neck dependent on degeneration of the lymphatic glands of the neck. Arising as a small swelling caused by an enlarged gland below the angle of the jaw, it gradually increased until it occupied the entire side of the neck, involving many glands, and reaching from above and behind the ear to below the clavicle, so as to turn the head to the opposite side. Its appearance was that of an irregularly lobulated mass; it was unaccompanied by pain, was perfectly firm and hard, and gave no sense of fluctuation at any point. Under the use of chloroform it was successfully removed by Mott.—*After Mott.*

FIG. 3.—Appearance of an immense adipose or lipomatous tumor of the neck. This tumor was not painful; had no pulsation; was formed of numerous large lobes, with the superficial veins distended over them, and was attached to the neck by a large pedicle which extended from the angle of the lower jaw on the right side down to the sterno-clavicular articulation, its weight being so great that the patient could hardly retain the erect position. The tumor was found to be covered by a strong capsule formed of the surrounding cellular tissue, and to have originated in a hypertrophy of the surrounding adipose tissue.—*After Auvert.*

FIG. 4.—A large cystoma of the left parotid and submaxillary regions, which was to the touch semi-elastic, unequally lobulated, and due to a chronic irritation of one of the sebaceous follicles, the duct of which had become closed, and thus caused a retention and degeneration of its secretion.—*After Auvert.*

CHAPTER LXV.

ANÆSTHESIA, AND ANÆSTHETICS.

ANÆSTHESIA means the obtunding of sensibility. Obtunding agents used ordinarily in the sense implied by the heading of the chapter are sulphuric ether, chloroform, nitrous oxide, and bromide of ethyl.

Ethylic, Absolute Ether, Sulphuric Ether.—When equal weights of rectified spirits and oil of vitriol are mixed in a retort, the latter being connected with a good condensing arrangement, and the liquid heated to ebullition, a colorless and highly volatile fluid, long known under the name of ether, or sulphuric ether, distils over. The process must be stopped as soon as the contents of the retort blacken and froth, otherwise the product will be contaminated with other substances which then make their appearance. The ether obtained may be mixed with a little caustic potash, and redistilled by a very gentle heat.

Pure ether is a colorless, transparent, fragrant liquid, very thin and mobile. Its specific gravity at 60° is about 720; it boils at 96° under the pressure of the atmosphere and bears, without freezing, the severest cold. When dropped on the hand, it occasions a sharp sensation, from its rapid volatilization. Ether is very combustible; it burns with a white flame, generating water and carbonic acid. Although the substance is among the lightest of fluids, its vapor is very heavy, having a density of 2.586. Mixed with oxygen gas and fired by the electric spark, or otherwise, it explodes with the utmost violence. Preserved in an imperfectly-stopped vessel, ether absorbs oxygen and becomes sour, from the production of acetic acid. This attraction for oxygen is increased by elevation of temperature. (*Fownes.*)

Dr. Jackson's formula for the preparation of ether for anæsthetic purposes is, we believe, as follows: Procuring the strongest and purest rectified sulphuric ether,—that just described,—wash it well, to get clear of any acids; then decant from the water, drying it with chloride of calcium, to free it of any water that might otherwise remain from the washing.

This, however, is but a single formula for the anæsthetic ether. Different chemists arrive at the same end through different processes. The surgeon should buy of a reliable druggist rather than attempt the preparation for himself.

To exhibit ether successfully, four essentials seem necessary:

- 1st. That the ether be very pure.
- 2d. That the vehicle upon which, or with which, the agent is exhibited,

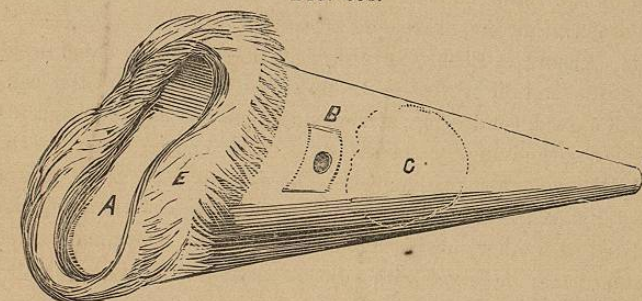
be of such character that full volume of atmospheric air is allowed to pass with the ether into the lungs.

3d. That the vapor of the ether be properly diluted, given for the first few inspirations comparatively weak, and increased in strength as the glottis, air-passages, and lungs are found able to receive it.

4th. That insensibility be produced as quickly as the system will bear, as evinced by obvious signs.

A cone-shaped, close sponge is a good means for administering ether. This possesses every advantage, except that of economy in the exhibition.* From

FIG. 603.



two to five minutes is found the average period necessary to produce the full effect of perfect sleep; though cases present themselves where double this time is required, and where, indeed, it may be necessary to combine with the ether the more powerful agent, chloroform, or even, indeed, to employ pure chloroform.

Ether acts well in proportion to vigorousness of employment. Rapidity of breathing, not the quantity of the agent respired, is the secret of easy and quick narcotism. It is quite possible to get out of one part of an anæsthetic an effect to secure which ten are commonly used; not only this but every relation is of healthier and more agreeable character.

Over-dilution, and a consequent protracted inhalation, is the cause of excitement which supervenes in the experience of many practitioners while it so rarely shows itself in that of others. In these cases a patient is made drunk; drunk in the first degree, but not, as remarked by Mr. Snow, dead-drunk, the condition required for surgical purposes.

It will be remarked, it is to be noticed in passing, that one of the objections of the opponents of ether lies at this door,—this supervening state of excitement

* Fig. 603 represents an instrument devised by the writer twenty years back; he has been able to find nothing better. As seen, it is simply a common cone, open at both ends. A is the mouth-piece enveloped by a napkin, E; B is a valve for escape of respired air; C implies a sponge placed within the cone with a view of holding ether; D is to furnish air (which necessarily must pass through C) for inspiration. A tinner will make the apparatus in a few minutes.

instead of that of stupor. The fault is not with the agent, but with the operator?

The idea is to be conveyed that the effects of sulphuric ether and of the common alcoholic beverages are the same. The results of the latter are too well known to require description. There is, first, the state of exhilaration, which gradually changes to complete stupefaction, or narcotism: the second condition, the result probably of narcotism of the brain. Just so acts ether, yet passing through its various stages more quickly, the effects of its being poured in a continuous and undiluted stream upon the heart and brain. Ether is no sooner absorbed than the blood charged with it passes to the left side of the heart, and immediately thereafter is circulated through the coronary vessels, the carotid and vertebral arteries, and thus pervades the tissue of all parts of the heart, as well as of every portion of the brain. A writer, in an influential dissertation, presents an example in this wise: Suppose, to take an extreme illustration, that the blood was as capable of absorbing as much ether as water can combine with, or one-tenth its own weight. If, then, we suppose the blood in the lungs was impregnated to this extent, it would be applied in that state to the heart and brain; whereas, if the blood in the stomachic vessels was impregnated to the same extent with ether, before reaching the liver it would have mingled with more than its own mass of pure blood from the splenic and mesenteric veins. The tenth would then become a twentieth, and, on the blood leaving the liver and joining the larger current of the inferior cava, the twentieth would become a fiftieth or sixtieth; a further dilution would take place at the confluence with the superior cava, so that the blood, on reaching the heart and brain, instead of containing one-tenth part of absorbed ether, could not contain as much as one-hundredth. When, therefore, the same quantity of ether, or any absorbable substance, is taken up from the lungs and from the stomach, it must, in the former case, be applied to the tissue of the heart and brain in a state of concentration at least ten times greater than the latter, and will therefore act on these organs with more suddenness and energy.

The evanescence of the influence of ether, as compared with that of alcohol, is explained by a momentary consideration of the different manner of absorption. During the inhalation of ether, as we have just seen, the charged blood is applied to the heart and brain, while that circulating in the lower parts of the body contains a much smaller proportion of it. Now, on stopping the inhalation, the blood in the heart and brain speedily passes off by the veins, and is succeeded by that which is comparatively pure coming from the lower regions of the body, and so the narcotic symptoms disappear.

It is far otherwise when alcohol is absorbed from the stomach, for the whole mass of blood must be impregnated with it before a highly-charged fluid can be applied to the heart and brain; and then the effect continues for many hours, till the alcohol has been thrown out of the system by the lungs and skin. With respect to ether, it must not be supposed that on the subsi-

dence of the narcotism it disappears from the body; for it is merely weakened in its effects by being diffused over the whole mass of blood. This is obvious, from the smell of the breath for many hours, and from its frequently causing copious perspiration.

Does not the question here suggest itself, If the effects of ether and of the common alcoholic beverages be so nearly alike, why any dread of the one and entire fearlessness with the other? Would not the answer seem to be something of this kind? Men when etherized are as dead-drunk; our eyes are accustomed to seeing them only partly drunk. In this state they excite amusement: in the state of profound drunkenness they have always aroused our fears for their recovery. Associations have great weight.

The immediate and obvious effect of ether on one to whom it is administered in anæsthetic dose is almost too familiar to justify the use of a paragraph for its description. First, there is commonly exhilaration, this shading gradually into stupor. Second, and finally, there is narcotism, which differs much as to the time which it lasts; one person recovering almost instantly on the cessation of the exhibition of the agent, another continuing drowsy, or, it may be, remaining in the deadness of profound sleep for many hours.

The progressive effects of the medicine as relation is had with the various nerve-centres are markedly shown in the course of an etherization. A first effect is on the intellectual faculties, these being, 1, stimulated; 2, degraded; 3, negated. Second, the influence shows itself in relation with the spinal cord; on the anterior column first, motion being affected, soon temporarily destroyed, successively on the posterior segment; sensation, little by little, being obliterated. The point of danger is intermediate to brain and cord; namely, the medulla oblongata, the respiratory centre. So long as an ether patient breathes undisturbedly there is no necessity for apprehension. Disturbance of respiration is a signal for caution.

Throwing out of immediate consideration the idiosyncrasies, let us for a moment consider the question of the general harmless exhibition of the agent.

The safest means may be made a source of ill. As the intruder on the physical laws of his organism must suffer the consequences of ignorance or of temerity, so may any agent, however good, become an evil by its abuse. As the drinking of alcoholic beverages can be carried to a point beyond which the life-principle will not react, just so, and as the warmest supporters of the anæsthetics would have impressed, may ether be made an instrument of irreparable injury, blasting and destroying where it was designed to refresh and save.

To lay down certain reliable rules, applicable in all cases, for the process of etherization, is an impossibility. The presentment of conditions in various individuals differs so materially, that it would be charlatanism to act on any but rules resulting in a general knowledge of the agent and a comprehension of physiological laws and pathological alternations. One person, as Dr. Snow has remarked, shall become impassable as the subject on the dis-

secting-table; another talks incoherently or mirthfully, replies to questions, or obeys directions; others utter exclamations of pain, which they afterwards retain no reminiscence of having felt; others again declare that they have suffered pain but felt themselves powerless for its expression. Finally, in the exceptional few, ungovernable violent or convulsive action takes place, quite adverse to the performance of any delicate surgical operation. With some an utter oblivion is induced; while others, though undergoing all the apparent torture of a prolonged dissection, are revelling in the realms of memory and in the fields of imagination. M. Jobart and other observers have attempted to lay down three distinct stages in the effects of the agent, according to the prolongation of the etherization. 1. That of incoherence, agitation, or delirium, as the case may be. 2. Acceleration of the pulse, with loss of sensibility and loss of power. 3. Exhaustion and coldness of the surface. The matter cannot thus be methodically stated, for it is quite certain that any of these conditions may be induced, in different individuals, by very various doses of ether; while others, again, are susceptible of only the first degree, to appearances, and yet enjoy an immunity from suffering during operations. Even the quickened condition of the pulse and respiration, and that almost universally employed criterion, the insensibility of the pupil, may deceive in the supposed impression produced.

A number of the French Academicians some years back instituted a series of experiments on animals, for the purpose of determining the mode and order in which the various portions of the cerebro-spinal system were influenced during inhalation. The following are some of the conclusions arrived at as stated by the veteran vivisector, Baron Flourens:

The action of ether on the nervous centres follows in a given course. It acts, first, on the cerebral lobes, disturbing the intellect. It acts, secondly, on the cerebellum, deranging the equilibrium of the movements of the animal. Thirdly, it acts on the medulla spinalis, in which it extinguishes, successively, the sensory and motor principles; and, lastly, it acts on the medulla oblongata, where arrived, life becomes extinct.

To produce the best effects of sulphuric ether, it is of the first consequence that an entirely reliable article be employed. Not only this, but that it be employed heroically, yet persuasively. In the Hospital of Oral Surgery, where ether is used almost exclusively, and under circumstances the most trying to such agents, it will be testified that trouble of any kind has yet to be experienced. A patient is assured, not forced. The agent is administered in full doses, not in dribbles. Instruction is given to make full respiration, persons are not allowed simply to sniff and smell.

The effect of a bad article of ether is not only to deny anæsthesia but to provoke sick stomach, headache, and derangement generally.

Concerning the dose required, this is a matter special to each patient. Persons are met with—trusting and confiding people of lax fibre—upon whom a single inhalation will produce the anæsthetic impression. A differ-

ent class—the vigorous and lusty, of untrusting nature—will consume it as some men do spirituous liquors. The writer has given a whole pound before getting the primary impression.

The criterion in ether exhibition relates, as the state of narcotism is concerned, to the effect of touch upon the eyelashes or eye; these insensible, an operation is to be proceeded with. The point of danger, as has been suggested, relates with respiration. Easy breathing is assurance of safety.

Respiration is not, however, to be misjudged. In some persons a peculiar repugnance to the agent exists. Others find much momentary irritability of the air-passages induced. Cure of both is found in a few minims of chloroform dropped upon the sponge.

Sick stomach, another not infrequent associate, finds treatment, alike with cough, in a drop of chloroform, the agent being mingled with a spoonful of water and drunk.

Another specific is coffee. Dr. Stiles, of Conshohocken, a practitioner of experience, assumes failure of this latter remedy to be uncommon; he prescribes it in small, but strong, doses. Carbonic acid is a grateful means of relief. A spice plaster placed over the stomach will seldom disappoint. Creasote is another cure; the dose and manner of administering is the same as that of chloroform.

As to the question of the continuance of a patient in the anæsthetic condition, it is the practice of the author, and that of the Oral Hospital, to make the time just as short as possible; that is to say, as the continuance of the agent is concerned. If an operation to be performed may be completed in five, ten, or fifteen minutes, it is not good policy to prolong it, and with it the continued administration of the ether, to a half or a full hour. That there is, however, any imperative or absolute necessity to hurry through an ether case is not at all implied. The author has kept a patient profoundly under ether for two and a half hours; and in obstetrical practice half a day of intermitting anæsthesia is not at all infrequent. It is contended only that it is neither desirable nor prudent to unnecessarily prolong the condition. Where, however, such lengthened action is demanded, it is to be secured, not by keeping the saturated sponge constantly applied over the air-passages, but by using the agent at such intervening periods as may be necessary to preserve its effect.

The condition of the temperature, as might be inferred, has much to do with prolonging or shortening the time commonly considered necessary to place a patient in a state of sleep. Dr. Snow obtained, from experiments, the following results:

One hundred cubic inches of air, saturated with the vapor of ether, at a temperature of

44°	would contain	27.0	cubic inches of vapor.
54°	"	24.3	" "
64°	"	43.3	" "
74°	"	53.6	" "
84°	"	66.6	" "

Being doubled by a rise of only thirty degrees; or, in other words, if at a temperature of 84° Fahrenheit we employ two or two and a half minutes in affecting a person to the state desired, at a temperature thirty degrees lower we would require from four and a half to six minutes to obtain the same result.

Concerning the idiosyncrasies, the author would speak his own experience by saying that he has never yet met with a person who might not take ether, or ether in combination with chloroform. The London *Medical Gazette* considers its use inadmissible where there is a tendency to apoplexy or epilepsy, and also in plethoric individuals. Another intelligent source says that persons presenting the slightest signs of being cataleptic should be viewed as idiotical. Persons under the influence of liquor, it is generally thought, are to be esteemed for the time as not fit subjects.

In conversation with the elder Dr. Flagg, had several years back, that experienced man implied that he believed in no idiosyncrasies, except it might be a very high, nervous temperament; that he had administered ether to the infant of thirty-six hours and to persons in extreme old age; had given it to the robust and the weak, the plethoric and the consumptive; had used it in all stages of pregnancy, except that known as quickening; might also exhibit it here, but would feel called on to exercise more than ordinary care. Seeming idiosyncrasies could generally, he thought, be explained by an examination of the operator's ignorance of the agent. The faith of that gentleman in the perfect safety of the use of ether was so great that he remarked he would not hesitate to use it where there had been, or was, aneurism of the aorta. The opinion of Dr. Flagg concerning the non-existence of idiosyncrasies is to be taken before that of most persons, either of this country or Europe. His opportunities for observation were not surpassed by those of any other physician, and perhaps equalled by few. A work published by him in 1854, long before his retirement from practice, has not, up to the present day, been advanced on, and is an heirloom to be valued by those to whom his industry has left it. The experiences of the author coincide with those of the gentleman quoted. He has administered ether under every possible variety of circumstances as to age, condition, time, and apparent idiosyncrasies, and has never met with any cause for anxiety. In the labor of childbirth ether is absolutely temporary euthanasia. The author, speaking out of an experience arising from a connection of several years with a large obstetrical clinic, bears witness to the entire absence of any objection to the free employment of the agent in the direction. The indication is to have the ether in full strength at the mouth in the commencement of a pain. Two or three inhalations suffice for each contraction.

Chloroform.—From the consideration of sulphuric ether we pass to an investigation of the character and merits of the perchloride of formyle, or chloroform. This agent is, without doubt, the most powerful and reliable of the anæsthetics; but, unfortunately, it possesses qualities which render it not

infrequently fatal to life, and therefore make it of less value than the one just considered. No person is to employ chloroform who is not prepared to meet formidable emergencies.

To procure chloroform, the chemist takes of chlorinated lime say (to take a common formula), lb. iv; rectified spirits, Oss; water, Ox; chloride of calcium, broken in pieces, ʒj. Put the lime, first mixed with water, into a retort, and add the spirits, so that the mixture may fill only the third part of the vessel. Then heat them in a sand-bath, and as soon as ebullition begins withdraw the heat as quickly as possible, lest the glass be broken by the sudden increase. Let the liquor distil into the receiver so long as there is nothing which subsides, the heat being reapplied if necessary. To the distilled liquid add a quarter of the water, and shake them all well together. Carefully separate the heavier portion, which falls, and add the chloride to it; for an hour frequently shake them. Lastly, let the liquid distil again from a glass retort into a glass receiver.

In appearance chloroform resembles the freshest water of the mountain-spring. To the taste it is hot and very sweet; to the nostril it has much the odor of the common strawberry. When dropped upon linen it evaporates very quickly, leaving, if pure, no stain or sign behind. In weight it is quite one-half heavier than water, and, as its vapor is concerned, it is four times as dense as atmospheric air.

The smell of chloroform is esteemed by Dr. Snow, a practitioner widely experienced with the agent, one of the best tests of purity and identity. If a disagreeable scent remain on the hand after the evaporation, the chloroform has probably been made from impure spirits, or even from wood or acetone, and is therefore unfit for medicinal purposes. When dropped on the skin it should quickly evaporate, leaving not the least odor or moisture behind. When chloroform becomes decomposed from any cause, it acquires a greenish-yellow color, and gives off chlorine and hydrochloric acid, so that the alteration is at once apparent. When it is pure, it has no reaction on test-paper, but is quite neutral. The best way, according to the writer quoted, to detect a small quantity of hydrochloric acid in it, is to moisten a slip of blue litmus paper with distilled water, and hold it just within the neck of the bottle, exposed to the vapor. If sulphuric acid be present, it may be discovered by agitating the chloroform with distilled water and adding nitrate of baryta.

Chloroform is degraded by admixture with alcohol, and this can be done without making any perceptible change in its appearance: its specific gravity, however, is thereby lowered. According to M. Mialhe, the foreign presence is most easily detected by adding to the suspected fluid a small quantity of water, when a milky opacity results.

Chloroform, as the heart's action is concerned, is a powerful sedative. In nearly if not quite all the fatal cases resulting from its administration, cardiac syncope has been the cause of death; and in a very small minority of the cases indeed has there been any evident interference with the process of respiration.