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NITROUS OXIDE GAS FOR SURGICAL PURPOSES, IN 1848.

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A RECENT number of this JOURNAL contained an account of the removal of a cancerous breast by Dr. Sims, in Paris. I take the liberty of referring to the following extract from the records of the Massachusetts General Hospital, in April, 1848. In the operation here described, which precedes that of Dr. Sims by twenty years, the inhalation of nitrous oxide was conclusively shown to be capable of producing a complete insensibility for surgical purposes. The experiment alluded to was tried only eighteen months after the original discovery of practical anæsthesia by ether, in November, 1846, and at that time possessed the interest, which it no longer has, of a novel experiment connected with the development of a recent and great discovery. Anæsthesia by nitrous oxide was then abandoned, in view of the livid surface and muscular rigidity, both doubtless due to asphyxia, but also on account of the inconvenience of the preparation of the gas on a large scale, and especially from the bulk of the apparatus required for its administration. This will continue to prevent the extensive employment of the nitrous oxide in surgical operations, while agents so much more portable are at command. For the extraction of teeth, dental practitioners may prefer to keep upon their premises a reservoir of nitrous oxide rather than a permanent odor of ether; but the amount consumed in surgical operations alters the question. Again, pure nitrous oxide gas will not support animal life, the discoloration of the surface, alluded to in the following operation, illustrating this fact. And, lastly, while a patient may be so narcotized with ether vapor that fresh air can be let into the lungs without restoring him to consciousness during a long surgical operation, it is not so with

the administration of nitrous oxide, where the admission of a little air is apt to arouse the patient, so that it is comparatively difficult to maintain a protracted and equable anæsthesia. The following is the case alluded to, reported by Dr. John C. Dalton, the present distinguished Professor of Physiology, then house-surgeon at the hospital.

April 25th, 1848.—M. H., æt. 45, married. Reports that, eleven months ago, she felt a peculiar sensation in the left breast. Since then, the breast has gradually become indurated and painful; the latter symptom has been much aggravated during the last three weeks, and an opening which took place near the nipple about a month ago, has continued to discharge moderately since. Her general health has suffered somewhat. Now, the left breast is very hard and knobbed, with a brawny appearance of the skin, excepting over the most prominent protuberance, where it is smooth, red and shining. A fissure, about an inch and a half in length, runs by the side of the nipple, from which a thin yellowish discharge constantly exudes. Breast perfectly movable. No enlargement or induration in axilla.

27th.—*Operation* by Dr. Bigelow. Patient, having been placed on operating table, was made to respire nitrous oxide gas through a valved mouth-piece and a flexible tube leading through a bladder to two large copper reservoirs filled with the gas. After several inspirations, the patient's lips and the most vascular part of the tumor began to assume a purple color. She remained quiet, however, and in a short time was evidently insensible, though the muscles were not perfectly relaxed. The tumor was then encircled by a double incision through healthy skin, down to the fibres of the great pectoral muscle. The dissection was then continued in the usual manner, until the whole mass was separated. Three vessels were tied, and the wound covered with a wet compress.

The patient made no outcry or other sign of suffering until some time during the ligation of the arteries, when she expressed a little uneasiness. She recovered perfect

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consciousness soon after, without unpleasant symptoms.

During the above operation, the patient inhaled about sixty quarts of the gas, which was delivered under a moderate pressure from two large gasometers. By means of the double valvular mouth-piece, the inspired gas was exhaled into the apartment, and a constant supply of fresh gas ensured; a provision which it is believed is not sufficiently attended to by some of the dental practitioners of the present day.

The following extract from the last edition of the *Chemistry of Brande and Taylor*,* a high authority, corroborates the observations made upon the patient operated on in this instance:—

"This gas is a narcotic poison, and, when breathed, rapidly destroys the life of an animal. It may, however, be taken by a human being in limited quantity. When breathed, it is rapidly absorbed into the blood, and produces a great change in that fluid, manifested by a dark-purple color of the lips, and by a livid or pallid appearance of the face. It is not to be regarded as an anæsthetic, like chloroform or ether-vapor. It is a powerful excitant and stimulant to the nervous system."

If it be asked why a double proportion of oxygen should, in protracted doses, produce lividity of the surface, the answer doubtless lies in the fact that while atmospheric air is only a mixture, the nitrous oxide is a chemical combination which yields its oxygen to the blood reluctantly. This objectionable fact seems to be established, and the insensibility from nitrous oxide does not appear to be so profound that it can be advantageously diluted, when inhaled, with atmospheric air like ether; circumstances which, apart from its prohibitory bulk, would tend to restrict its use to short operations.

A perfect anæsthetic should be—

1. Always effectual.
2. Wholly safe.
3. So far under control that a greater or less degree of anæsthesia can be produced at will, and continued indefinitely.
4. It should of itself support animal life, or be capable, like ether, of ensuring a safe insensibility while the patient is breathing atmospheric air.
5. It should produce its effect neither by asphyxia, intoxication, nor narcotism; the

former of which is obviously objectionable, while the two last are followed by vomiting and other inconvenient symptoms.

6. It should be of small bulk.

7. It should possess little or no odor.

Of the numerous agents now known to science in this connection, none have proved so unobjectionable as ether and chloroform; the anæsthetic application of the former in Boston constituting the great discovery of a sure and safe immunity to pain, even of surgical operations; the subsequent employment of chloroform for the same purpose showing it to be, on the whole, a convenient and in many places quite a popular substitute for ether, though it is less safe.

The great objection to ether is its odor; to chloroform, its danger; although few people hesitate to encounter as great danger to life in a long journey by sea or land. To such the danger of chloroform might not be an objection to its use, were it not that ether is perfectly safe, and offers a ready alternative. When chloroform kills, the only warning it gives is the death of the patient, who dies suddenly by shock, and in spite of precautions. With ether, no such accident is possible; its effect may be readily and perfectly graduated, its danger foreseen and easily averted. When the question of bulk is important, as in the field, it is obviously better to ensure to every soldier a painless operation by a sufficient supply of chloroform, even with its attendant danger, than to attempt the impossibility of transporting ether in bulk. But there is no difference whatever in the nausea or vomiting produced by the one or the other, nor in the subsequent aversion to either anæsthetic, of patients once thus made sick, nor in the character nor degree of other unpleasant symptoms, danger excepted; and the sooner these facts are wholly recognized the better for the absolute safety of the patient, as preference will then be given to ether, in spite of its odor. Had ether a pleasant odor it would be, as an anæsthetic, far superior to chloroform.

At present, dead-drunkenness by inhalation seems to be the most available means of anæsthesia. It remains to discover some efficient agent as manageable and safe as ether, without its odor; or as portable and agreeable as chloroform, which shall not kill by shock; or, lastly, to devise some new principle of annulling consciousness, dependent neither upon the absence of oxygen nor the presence of a merely inebriating agent.

* *Chemistry*. By William Thomas Brande, D.C.L., F.R.S.L. & E. of Her Majesty's Mint, &c. &c., and Alfred Swaine Taylor, M.D., F.R.S., Fellow of the Royal College of Physicians of London, &c. &c. Second American Edition, thoroughly revised. Philadelphia: Henry C. Lea. 1867.