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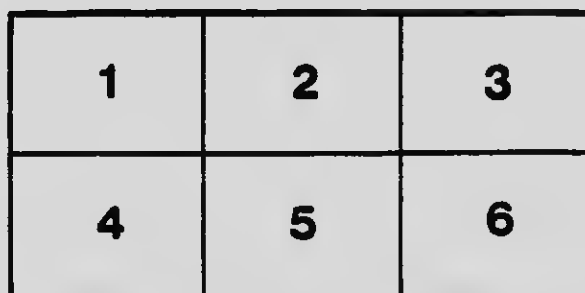
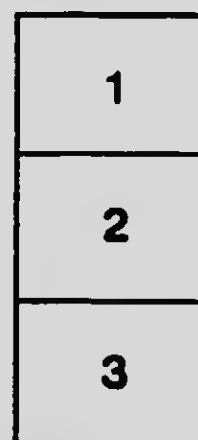
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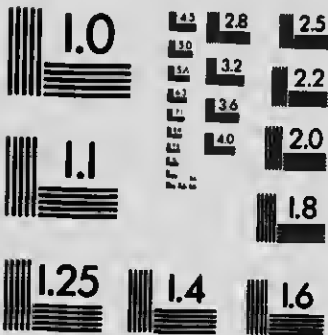
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On the Use of Nitrous Oxide and  
Ether as an Anesthetic.

1641

... BY ...

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Gynecologist to St. Luke's Hospital, Ottawa.

615.781

Reprinted from  
THE CANADIAN JOURNAL OF MEDICINE AND SURGERY, TORONTO,  
July, 1901.

## ON THE USE OF NITROUS OXIDE AND ETHER AS AN ANESTHETIC.

BY L. COYTEUX PRÉVOST, M.D.  
Gynecologist to St. Luke's Hospital, Ottawa.

I CONSIDER had all anesthetization which kills the patient and, in the meantime, destroys at a stroke the reputation of a surgeon. Am I conciliating enough? Is this proposition satisfactory to all? I am sure it is.

Now that I possess the intimate conviction of having, at last, my opinion shared by everybody, I shall humbly venture to add that we are justified in calling anesthetization defective also, when the poor patient finally loses consciousness only after fifteen or twenty minutes of anguish and struggle against the threat of imminent smothering, or when sensibility suddenly returns, accompanied with disorderly movements at the first contact of the knife. Detestable again the anesthesia, when the surgeon operates, a prey to the most uncomfortable anxiety, with his eyes riveted as often upon the undecided manoeuvres of the anesthetist as upon the field of operation; that he is, at every moment, compelled to discontinue his work, waiting with folded arms until the patient, half awake, is again put to sleep.

At last, unsatisfactory again is anesthesia, when the after-effects of the operation have acquired an exceptional character of gravity by the fact of an objectionable anesthetic, or owing to the imperfect manner in which it has been administered.

Therefore, I could not help being overpowered by the greatest stupefaction when lately, at a meeting of a medical association, I heard an honorable confrere making without a frown the following declaration:

"The practice of anesthesia is the easiest and the simplest thing in the world.

"Anybody whoever can properly administer an anesthetic, and it is not necessary to possess so much intelligence and experience to do it.

"I have yet, personally, never seen anybody die from anesthesia.

"It is ridiculous to pretend that special education is required to be a good anesthetist. One should, then, as well exact similar qualifications to treat a case of pneumonia, a meningitis or typhoid fever."

Tell me, gentlemen, do you not think life a little too short to stop and answer those pseudo-arguments?

After all, everybody is the master of his own opinion, and has the right to suit his taste.

As far as I am concerned, I contend that the practice of anesthesia is an extremely important operation, and anybody who undertakes it is laboring under an immense responsibility. It is in the hands of the anesthetist that the patient confides his life, and on his ability as much as the surgeon's rests the immediate or ultimate success of the surgical operation.

To treat this subject inconsiderately, as it is done in some places, is, to my mind, nothing less than criminal. Almost every day, medical reviews contain the relation of fatal accidents occurring during anesthesia, and what if they related the innumerable "starts" after which hazard and good luck, as much as the skillfulness of the attendants permitted to resuscitate individuals who had the narrowest escape with their life. And then, what anxiety, what appalling fright! An inexperienced anesthetist had undertaken the administration of an anesthetic agent upon whose properties he has but the most superficial knowledge. Little conversant with the warnings which the character of the pulse, the respiration, the condition of the pupil, generally give to the educated anesthetist; possessing insufficient experience to constantly remain sheltered against the surprises of an accident, he continues his operation without the least apprehension, automatically as it were, when, all of a sudden, the patient ceases to breathe. The face becomes livid, the tissues flabby, inelastic; the pulse is imperceptible. Quick, hurry, artificial respiration; the patient is going to die, if he has not already breathed his last.

Everybody then hustles about. The surgeon himself—for, after all, he is the general commanding the action, and therefore entrusted with the greatest responsibility—the surgeon, washed, scrubbed, purified, antisepticized, rushes to the arms of the moribund, and during three, five, ten minutes, conscientiously pumps the air into the inert lungs of the victim, while the assistants bring into play all the other accessories reputed successful in reanimating life. At last! Oh, what a sigh of relief is emitted from everyone's breast, and accompanies, with a touching unanimity, the feeble groan which for the patient is the forerunner of the resurrection! He is saved! But what a fright, O Lord!

The operator resumes his work, which he shall continue to the

end, but not without being unpleasantly distressed from time to time by a chill of goose-flesh all along his nervous system.

These cases, gentlemen, remain unpublished, and do you think they are very uncommon? As far as I am concerned, it has been my misfortune to witness them, outside of my operating room, though, I hasten and am proud to say. I have seen them out of the city where, at times, I have occasion to be called to perform operations at the house of the patient. In those conditions, you are as well aware of it as I am, we are not, as in the hospital, surrounded by our usual assistants. It is generally the family physician who obligingly offers his services to act as anesthetist. Certainly, some of them are very clever, although it is always easy to notice quite an explicable lack of experience; but, how many others there are who, feeling the paramount importance of the functions which they are going to discharge, bring with a visible emotion and almost trembling near the mouth of the patient the cone containing the mysterious agent which will plunge the unfortunate being in a condition so similar to death, even when anesthesia is perfectly regular. It is easy for the operator, if he gives a stealthy glance upon the features of his confrere, entangled in the fulfilment of functions to which he is not accustomed, to detect on the latter the anxiety which tortures his mind, and the knowledge of this fact is far from being of such a nature as to promote the calmness so necessary to the surgeon at the beginning and in the course of a serious operation.

And, anesthesia at the dentist's. Let us say a word about it. It is, if I am not mistaken, comparatively the most frequent source of the accidents we generally hear of. I do not wonder at it, and the only thing which surprises me is that they are not of more frequent occurrence.

Every physician has, at least once or twice a year, occasion to send a patient to the dentist to have teeth removed under anesthetics. Naturally it is he, the family physician, who, at the client's earnest request, is asked to administer the chloroform. These rare opportunities to handle an anesthetic constitute, in the majority of cases, the entire amount of experience which the physician possesses upon the subject.

At times, we happen to read in some of the periodicals the following terrific news: "Mr. ——— died yesterday in the dentist's chair while being under the influence of chloroform."

But what we do not read is the more frequent fact of a patient anesthetized by the family physician, and upon whom the dentist, forceps in hand, is awaiting the propitious moment to begin his surgical functions. With the extraction of the first tooth the patient emits a scream, wakes up, and struggles with the feeble strength left to him, against the pain and the actions of the dentist, who thinks best never to stop once his work is commenced.



The improvised anesthetist witnesses immovably the scene which is taking place, and penetrated, I am sure, by the intimate conviction that, although there is no death to record, his anesthetization has been all the same an utter failure on the whole line. This, however, will not deter his beginning again a few months later, and perhaps with the same result. Neither he, his client, nor the dentist have realized the dangers they have escaped, because really, if no one could detect the signs of complete anesthesia, how could they have been made aware of the precursory symptoms of fatal accidents? All these are well-known facts, and I do not think that I may be accused of exaggerating.

How is it, therefore, that we have not already recognized the necessity of possessing, in every city, at least one or two medical men thoroughly educated on that subject, and to whom would be confided the duty of administering anesthetics in surgical operations? Everybody would derive benefit from it; the client, the operator, and the anesthetist himself, who would find in the patronage extended to him by every practitioner a remunerative compensation for the hours which he would take away from the practice of his profession, and also a precious competence which experience alone can acquire.

If some take umbrage at this specialization—and why? may I ask you—if it is deemed useless, unreasonable, in the name of humanity and the profession, let us take some means at least to protect our patients against these dreadful surprises, of which the operating room is too often the scene. Let us put an end to our confiding, in our hospitals, the administration of anesthetics to the youngest and most inexperienced. Let us make a rule never to allow the medical student to act as anesthetist until he has acquired a special and prolonged experience, after having passed, if it is necessary, an examination upon this subject, compelling him, at least, to observe during a determinate period the anesthetist in charge, whom he would see at work, and who would be entrusted with the education of the younger ones.

And to guard ourselves against the uncasiness and the misfortunes to which we are exposed in our private practice, would it not be proper to follow the wise advice given by Dr. Boldt, of New York? This eminent surgeon, whose friend I am proud to be, after a series of unfortunate accidents which had befallen him during anesthesia, said in the course of a communication made in 1887 to the Society of Medical Jurisprudence of New York:

“On careful consideration of the subject, it has seemed to me that it would be advisable to have a medical college rule, making it a necessary requirement for every candidate for the degree of Doctor of Medicine, to receive a certain amount of practical training in the administration of anesthetics before such degree

is conferred, so as not to trust to good luck for the obtaining of first experience at such great risk as is the case in the vast majority of instances at the present time; and secondly, to prevent hospitals from entrusting this most responsible position, next to the operator himself, to the most inexperienced gentleman of the house staff, until he shall have received sufficient experience."

There are a great many hospitals which employ a physician whose exclusive or special duty is the administration of anesthetics. All hospitals, in my humble opinion, should follow that example. We owe this moral obligation to those who place their existence in our hands, and such a procedure would be, for the surgeon himself, an invaluable source of security and satisfaction.

The argument which we sometimes receive from those who refuse to accept the righteousness of this proposition, makes me smile. They never have, they say, followed this practice, and still never have they met with any accidents. Do they want to wait until they have a fatal case to record before they put a term to their imprudence? What is to them, then, the bitter experience of others on this subject?

All that I have just said must lead you to believe—and you are right—that I do not accept without reserve the well-spread opinion that complications arising during anesthesia are generally due to idiosyncrasy of the patient rather than to a defective administration of the anesthetics. It is a well-known fact that when anesthetics are trusted in the hands of an educated and careful surgeon, the mortality from their use is reduced to the minimum, and there is no doubt that many deaths have been caused through the want of proper knowledge and experience.

I have more than one reason to believe that the accidents would have been avoided in a great number of cases, had a more competent anesthetist been placed at the head of the patient. I am far from pretending that anesthetization in skilled hands is always deprived of risk and dangers. Certainly not, but we must all the more surround ourselves with every precaution, and endeavor to put on our side as many chances as possible.

A good and satisfactory anesthesia must, to my mind, possess the following qualities: (1) Offer the least risk possible for the patient; (2) be rapid; (3) complete; (4) permanent; (5) followed by as few disagreeable post-operative effects as possible.

In order to obtain the realization of these conditions, we must pay attention to the qualifications of the anesthetist and to the nature and mode of administration of the anesthetic employed. The person who administers the anesthetic should be prudent, educated, and experienced. He must take into consideration the age, temperament, condition of health of the patient; the nature and approximate duration of the operation to be performed. Ho

should be thoroughly conversant with the chemical, physiological, and toxicological properties of the anesthetic agent which he is going to use. He should, before all, exclusively mind his business, without for a single moment allowing his attention to be diverted by the manœuvres of the operator, however interesting the latter may be. His hands, eyes, and mind should be on his duty alone, exercising constant watch upon the pulse, respiration, the condition of the pupil, continually keeping in mind the significance of phenomena which might happen into the field of his observation.

In the choice of the anesthetic, the surgeon must be guided by his general knowledge and his personal experience, and employ the agent which, in his judgment, offers the least risk to the patient, and the administration of which is accompanied with the least unpleasantness, and followed by the least disagreeable after-effects.

It is not my intention to enter into these interminable discussions concerning the relative value of ether, chloroform, A C E mixture, etc., etc. I simply desire to offer for your consideration the results of my personal experience during the last two years, at the hospital as well as in my private practice. I hasten to declare that, faithful to the principles I have enunciated, it has been my good fortune to have been assisted in all my operations by the same anesthetist, Dr. C. W. Gorrell, of Ottawa, to whom I am happy to pay the largest tribute of congratulations upon his consummate ability and his thorough competence.

The agent we have employed is ether. After using it alone at first, we have lately associated with it the nitrous oxide, given at the beginning of anesthesia, by the means of Clover's inhaler. So far, I consider this mode of anesthetization as absolutely ideal, as much for the rapidity with which the patient becomes anesthetized as for the freedom from all unpleasant sensations during the process of anesthetization, and the diminution of after-symptoms so frequent after operations.

Here is, in a few words, the method of anesthesia which we have recourse to:

The apparatus which we have been using for the administration of nitrous oxide and ether is the Hewitt's inhaler. This consists of a Clover inhaler with the rubber bag replaced by a large bag with valvular attachments. One end of this bag has a stop-cock, through which the nitrous oxide is allowed to enter from the gas cylinder into the bag. At the other end, the bag is connected with the Clover inhaler by a series of valves and conducting tubes. The two main valves we may call the inspiratory and the expiratory valves, the latter being double, that is, covering two openings. The inspiratory valve is next to the gas bag. The

valves being opened, allow the gas to pass directly from the bag to the lungs, the expiration passing through the expiratory valve to the open air. When the expiratory valve is rotated, it partly closes the aperture for the exit of expiration to the open air, and partly opens a valve leading to the gas bag. When the expiratory valve is completely closed, the valve leading to the gas bag is fully opened, making what is to all purposes a Clover inhaler, using the nitrous oxide gas.

The gas bag is filled with nitrous oxide. One ounce of ether is placed in the cylinder of Clover inhaler, the indicator turned to zero.

The patient is warned that some disagreeable sensations may be felt at first, but that unconsciousness will come on after a few breaths.

The mouth-piece is then fitted to the face of the patient, who is instructed to breathe easily a few times, to prove that the valves are working. The valves connecting the nitrous oxide bag with the Clover is now opened, and the patient told to breathe deeply. After four or five respirations, the indicator of the Clover is turned one-eighth from zero to 1, and the expiratory valve is closed about 1-4. If patient bears ether well, the indicator may be turned rapidly to 1-2-3, or full. The expiratory valve is slowly closed. When anesthesia is complete, the gas bag is removed and the ordinary Clover bag substituted.

Within the last two years, we have been using this mixed method almost exclusively, and perhaps it will be of some interest to you to know the results we have obtained with regard to the time required to induce complete anesthesia:

#### NITROUS OXIDE AND ETHER, 307 CASES.

Anesthesia in.....1	minute.....	24	times.....	7.8	per cent.
".....1½	".....	55	".....	17.9	"
".....2	".....	94	".....	30.6	"
".....2½	".....	47	".....	12	"
".....3	".....	44	".....	11	"
".....3½	".....	9	".....	2.9	"
".....4	".....	19	".....	6.1	"
".....4½	".....	1	".....	.3	"
".....5	".....	14	".....	4.5	"
".....less than 2	".....	79	".....	25.5	"
"....." " 3	".....	220	".....	71.6	"
Longest time (5 minutes).....	.....	14	".....	4.5	"

At first sight, it might seem strange that in 14 cases, anesthesia was not complete until after five minutes, and in the face of the fact that we claim an unusual rapidity of action for this mode of anesthesia.

The only explanation I can offer is that sometimes it is diffi-

cult to get the mask of the inhaler to fit accurately the faces of certain individuals; especially men with moustache and whiskers. In these cases I believe it advantageous to wet the beard before applying the cone, in order to secure better adaptation and prevent the respiration from taking place through the dry hairs.

Let us now compare the above figures with the results following the administration of ether alone.

ETHER ALONE, 132 CASES.

Anesthesia in.....	1 minute.....	0.....	
"	1½	0	
"	2	7 times	5.3 per cent.
"	2½	7	5.3 "
"	3	27	15.2 "
"	3½	12	9 "
"	4	28	22.7 "
"	4½	6	4.5 "
"	5	14	10.6 "
"	5½	1	.7 "
"	6	12	9 "
"	7	9	6.8 "
"	8	5	3.8 "
"	10	9	6.9 "
"	14	1	.7 "

Thus, never with ether alone, have we succeeded in inducing complete anesthesia in less than two minutes, a result which we have obtained in 25 per cent. of our cases in making use of nitric oxide. On the other hand, with the mixed method, the time required never exceeded five minutes, whereas this time has been reached or exceeded with ether alone in 37 out of 132 cases, that is, in 28 per cent. I need not dwell any longer upon the advantages to the surgeon of this shortening of time in the process of anesthetization. To the patient, these advantages are: The rapidity with which she or he becomes anesthetized, the freedom from all unpleasant feelings, such as smothering sensation, irritation of the throat by the vapor of ether, etc.

As regards the quantity of ether employed by the use of one or the other mode of anesthetization, it was not our experience to perceive any difference at all, the amount of ether being practically the same in both cases, a fact which is obviously evident when we consider that, in the mixed method, the ether is allowed to be inhaled almost at the beginning of anesthetization.

Now, gentlemen, what has been our experience concerning the effect of ether alone, or with nitrous oxide upon the kidneys? Does it confirm the opinion so universally entertained that ether is apt to produce renal irritation, albuminuria, very frequently nephritis, and sometimes total suppression of urine. I said it already, it is not my intention to enter into this everlasting con-

troversy, aiming at the proclamation of the advantages of one anesthetic agent over another. Upon that question, as with regard to all opinions which haunt the human mind. "*tot sensus, tot capita.*" Some profess a religious faith in chloroform; they are not only entirely convinced of its numerous advantages, but they are, besides, so deeply impressed with the idea that ether has been guilty of so many misdeeds that, according to them, this agent should be unmercifully banished from the class of anesthetics. Others swear by ether exclusively; another group is composed of the admirers of the A C E mixture.

Here, as well as in everything, I deem that the wisest are those who conform themselves to the indications offered by the patient, the nature and complications of the disease, and also to the more or less experience they have acquired with the anesthetic of their choice.

Chloroform especially has had, and has still, its detractors. Ether, on the other hand, is not in want of enemies. One of the greatest faults which are found with it is its harmful action upon the renal functions. This subject periodically returns at almost every meeting of our medical associations. I do not want to make any citations, but I have present in my memory the names of eminent surgeons who have in turn related cases of albuminuria, nephritis, and suppression of urine, which they attributed without the least restriction to the irritant influence of ether upon the kidneys.

I have, indeed, the utmost respect for the authority of these great names, and I reluctantly resist the impulsion of bowing to their judgment and their experience. However, may I be allowed to humbly ask one question? A patient is being prepared to undergo a major operation. Urine is analyzed before anesthesia and is found normal. Ether is given, the operation takes place, and 24 hours or more afterwards there is albumen in the urine or the functions of the kidneys are disturbed, even entirely suppressed. Will you, please, tell me to which of the following causes the pathological disorders should be attributed:

1. The irritant action of ether upon the kidneys.
2. The shock caused by the disturbance produced in the renal circulation through manipulations of organs having, with the vascular system of the kidneys, a close relation by the means of the nervous plexuses by which they are connected.
3. The elimination, through the kidneys, of infectious agents which have been brought into greater activity and virulence by the fact of the surgical traumatism, and which the organism is endeavoring to get rid of by all its excretories.
4. The congestion of the kidneys produced by possible exposure to cold on the operating table.

I offer for your consideration these various propositions, to which I have neither the intention nor the desire of finding a solution. Dr. Manu, at the meeting of the American Gynecological Society, May, 1898, announced that he had found albumen in 50 per cent. of his cases anesthetized with ether.

These data differ a great deal from the results of my own investigations. I make it a duty to examine, in every case, the urine of my patients before and after anesthesia, and although I am well aware that the absence of albumen is not always a criterion of the integrity of the renal parenchyma, still I will beg the permission to state the results of my observation.

I hasten to say that the quantity of albumen found in my cases has been almost the same after anesthesia by ether alone, or associated with nitrous oxide, the slight difference being in favor of the latter.

Out of 434 observations, albumen was found 26 times, that is, in six per cent. of the cases. In the immense majority of these cases the urine, after operation, contained but insignificant traces of albumen, which generally disappeared within 24 to 48 hours.

## ALBUMINURIA AFTER ANESTHESIA.

OPERATIONS.	AMOUNT OF ETHER.	TIME OF ANESTHESIA.		REMARKS.
		H.	M.	
Removal of Intra-uter. polyp.	2 ounces.		20	Traces. None after 24 hours.
Laparotomy.	4½ "	1	20	Traces. None after 24 hours.
Schroder and nephrorrhaphy.	4 "	1	35	Traces. None after 24 hours.
Curetting.	2 "		20	Traces. None after 24 hours.
Laparotomy (pyosalpinx).	4 "		50	Traces.
Radical cure (hernia).	5 "	1	20	Traces. Disappeared on 4th day.
Schroder; colporrhaphy, laparotomy and oophorectomy.	6 "	1	35	Albumen; disappeared in 12 hours. Returned on the 7th day. None on the 19th day.
Ventro-fixation.	3 "		30	Traces. None after 24 hours.
Laparotomy (pelvic abscess).	5 "	1	15	½ gr. to litre after operation. ½ gr. 24 hours after operation. ½ gr. on the 4th day. None on the 7th day.
Fistula in ano.	3 "		35	Traces. None after 24 hours.
Vng. hysterectomy.	3½ "		40	½ gr. to litre the first 3 days. Diminished gradually. None on the 8th day.
Laparotomy.	3½ "		40	Traces. None after 24 hours.
Ampt. of the breast (cancer).	3 "		45	Traces. None after 24 hours.

## ALBUMINURIA AFTER ANESTHESIA.—(Continued.)

OPERATIONS.	AMOUNT OF ETHER.	TIME OF ANESTHESIA.		REMARKS.
		H	M	
Laparotomy (ectopic gestation).	4½ ounces.	1	15	½ gr. to litre after operation. None after 24 hours. Returned on the 10th day, ½ gr. per litre. On the 11th day: ½ gr. per litre. " " 11th " ½ gr. " " " " 17th " 1-16 gr. per litre. " " 19th " ½ gr. " " " " 25th " none.
Abd. hysterectomy.	7 "	2		½ gr. per litre after operation. 1-16 gr. 24 hours after operation. None after 48 hours. Returned on the 30th day, ½ gr. per litre. Disappeared gradually in 3 days.
Nephrorrhaphy.	3 "		50	½ gr. per litre after operation. ½ gr. " 24 hours after. Traces on the 7th day. None on the 8th day.
Laparotomy (intra-lig. cyst).	3 "	1	10	Albumen, ½ gr. to litre. None on the 3rd day.
Laparotomy (ectopic gest.).	6½ "	1	45	Albumen present. None after 48 hours.
Colpotomy (pelvic abscess).	2½ "		20	Same patient as above. Colpotomy done 10 days after first operation. No albumen before anesthesia; traces after. None after 24 hours.
Laparotomy (removal of pad).	¼ "		30	Abdominal hysterectomy the day before. Gauze pad forgotten in abdomen. Abdomen reopened the next day. No albumen before anesthesia. Traces 24 hours after. None after 48 hours.
Laparotomy (intes. occlusion).	5½ "	1	40	Traces. None after 48 hours.
Appendectomy.	4 "	1		Traces. None after 48 hours.
Curetting.	2 "		30	Traces. None after 24 hours.
Curetting.	2 "		35	Traces. None after 24 hours.
Nephrorrhaphy.	5 "	1	35	Traces. None after 24 hours.
Schroder. Colporrhaphy, laparotomy (ventro-fixation).	8½ "	2	10	Traces. None after 24 hours.

In casting a glance on the above table, you shall easily convince yourselves that the appearance of albumen has very little relation with the quantity of ether inhaled, or the duration of anesthesia, the albumen being detected in urine as well after the use of two ounces of ether and a 20-minute anesthesia as after the administration of six ounces of ether and an anesthesia of two hours' duration. The quantity of albumen has always been very small; never have I observed total suppression of urine. Once only, following abdominal hysterectomy, the quantity fell to five ounces in 24 hours. This considerable diminution of urinary secretion was accompanied with no alarming subjective symptoms



whatever, and under the influence of hot applications and injections of salt solution in the rectum, the physiological functions of the kidney soon became normal. Therefore, although I deem prudent not to indulge in false security, I am compelled to confess that my personal experience renders very slight, to my mind, this exaggerated fear of the injurious effect of ether upon the kidneys.

Furthermore, I shall now cite a few cases in which the examination of urine detected the existence of albumen before anesthesia, and you shall see for yourselves that anesthesia has in no wise aggravated the condition of the patient, notwithstanding the quantity of ether administered and the long duration of anesthesia in certain cases.

CASES IN WHICH URINE CONTAINED ALBUMEN BEFORE ANESTHESIA.

OPERATIONS.	AMOUNT OF ETHER.	TIME OF ANESTHESIA.		REMARKS.
		H.	M.	
Hemorrhoids and appendectomy.	6 ounces.	1	25	Albumen before operation. None on the 4th day after.
Opening and drainage of abscess in abd. walls.	3½ "		30	1 gr. per litre before operation. 1 gr. " " after " " ½ gr. " " 24 hrs after operation. ½ gr. " " on the 15th day. Gradually diminished. None on the 19th day.
Examination (tub. kidney).	1 "		15	Before operation: pus cells, blood cells; albumen: 1½ gr. per litre. 24 hours after: 1½ gr. " " 48 " " 1½ gr. " " 3rd day " 1½ gr. " " 4th " " 1 gr. " " 6th " " ½ gr. " " 7th " " ½ gr. " " 8th " " ½ gr. " " 9th " " ½ gr. " " Still some albumen when discharged.
Removal of hemorrhoids.	3 "		35	Albumen before operation. Not increased after. None on the 4th day.
Appendectomy.	4 "		50	Albumen before operation. Not increased after.
Amput. of thlgb.	4 "		50	Albumen before operation. None 24 hours after.
Schroder.	3½ "		55	Albumen: ½ gr. per litre before. " ½ gr. " " after. Quantity of albumen oscillated between one-eighth and one-fourth during her stay in the hospital. Still one-eighth when discharged on the 18th day.
Curetting and cauterization (cancer of cervix).	4 "		50	Before operation, albumen: ½ gr. After " " ½ gr. Same quantity when discharged on the 5th day.
Vag. hysterec. (cancer).	5 "		45	Albumen before operation. None 48 hours after.
Cauterization (cancer).	2½ "		25	Albumen before. None 24 hours after operation.
Bassini (strangul. hernia).	6 "	1	35	Albumen before. Traces 24 hour after. None 36 hours after.

CASES IN WHICH URINE CONTAINED ALBUMEN BEFORE ANESTHESIA.  
(Continued.)

OPERATIONS.	AMOUNT OF ETHER.	TIME OF ANESTHESIA.		REMARKS
		H.	M.	
Abdom. hysterec.	7 ounces.	1	40	Albumen, blood cells and casts before. Diminution of urinary secretion for the first 24 hours after operation. Albumen not increased. Still albumen and casts when discharged on the 28th day.
Explor. laparot. (cancer of uterus and bowels).	3½ "	1		Blood and albumen before operation. Urinary secretion normal after operation. Same quantity of blood and albumen.
Appendic. abscess (operation).	1 "		25	4½ gr. per litre before operation. ½ gr. " " 12 hours after. ½ gr. " " 24 " None 48 hours after operation. ½ gr. on the 4th day. None on the 5th and following days.

This last case is, I believe, extremely interesting. I performed the opening and the drainage of the appendicular abscess in presence of several medical gentlemen, who had done me the honor of witnessing the operation. I drew their attention to the fact that the urine of the patient contained 4-1-2 grains of albumen per litre before anesthesia, and they could ascertain for themselves the next day the almost complete disappearance of albumen, in spite of the inhalation of ether used to anesthetize the patient.

A few words concerning the vomiting which follows the mixed anesthesia by nitrous oxide and ether, and I am done with that part of my subject. Vomiting has been obviously as frequent after anesthetization with nitrous oxide and ether as with ether alone, and I will unite in the same statistic the results of my observations.

Out of 439 cases of ether, administered alone or associated with nitrous oxide, 279 patients vomited after anesthesia, that is, 63.3 per cent.

I grant you that, at first view, there is nothing in these figures that we should boast of. But let me tell you that the vomiting recorded in the observations occurred, in the majority of cases, with the awakening of the patient, and before entire consciousness had returned. It has been extremely rare that patients continued to vomit when completely out of the anesthesia, or within the 24 hours following the operation.

This vomiting occurred with the immediate return of consciousness. Far from being objectionable, I deem it eminently salutary. It permits the bronchial tubes to get rid of the mucus they contained and, immediately afterwards, the patient usually falls back in a quiet sleep, out of which he awakes without the least nausea. If, by exception, the vomiting shows a tendency to

return, it is almost instantly relieved by a sinapiam to the epigastrium. I showed you above that the appearance of albumen in urine has not always offered a direct relation between the duration of anesthesia and the quantity of ether administered. It is, I believe, interesting to draw your attention to the fact that we have observed the same thing with regard to post-operative vomiting, and I can point out from amongst the long operations which were accompanied by no vomiting whatever, the following cases:

OPERATIONS.	ETHER.	DURATION OF ANESTHESIA.		VOMITING.
		H.	M.	
Abdominal hysterectomy.	6 ounces.	1	45	None.
Laparotomy.	5½ "	1	30	"
Laparotomy.	4½ "	1	25	"
Laparotomy.	5 "	1	35	"
Abdominal hysterectomy.	5 "	1	40	"
Laparotomy.	5 "	1	20	"
Bassini (rad. curet).	6 "	1	25	"
Appendectomy.	5½ "	1	5	"
Laparotomy.	5 "	1	45	"

With regard to medullary cocainization, spinal anesthesia, cocain analgesia, intro-spinal cocainization, subarachnoidean injections of cocain, cocainization of the spinal cord, medullary narcosis—the simple enumeration of the various denominations given to this new mode of anesthesia would constitute a whole article in itself—I have very little to say. Besides having had my name connected with the fact that I was the first to use it in Canada, my personal experience upon the subject would bring out nothing that you have not already read a little everywhere in medical literature. The technique of this small operation, the quantity of cocain to be injected, the results of cocainization of the spinal cord, are now facts universally known. My own experience is the same as what has been written by different observers within the last two years.

I certainly do not deny the fact that the surgeon may sometimes be placed in circumstances such that the fact of being familiar with this new method of anesthetization would become very handy, and besides, the surgical arsenal cannot be too complete and one would be wrong not to keep in some corner of his memory the knowledge of a special means of action, which might be of valuable assistance to him in unforeseen emergencies.

I have nothing to say against this mode of anesthesia, the unpleasant after-symptoms, and even the fatal results attributed

to it; all I want to declare is, that as long as the old and well-tried anesthetization by the means of anesthetic agents handled by competent men continue to give the same satisfaction as we have been gratified with in the past, I do not, in the least, feel inclined to abandon it for any other, until the superiority of the latter has been clearly demonstrated, which is certainly not the case, so far, with medullary narcosis.

