private practice, using some times a new model Hewitt apparatus, but generally a Teter apparatus. What I want to know about it and what I am asking you gentlemen is this, "Is it safe? and if so, how safe?"

You all have read what Hewitt says regarding this question. Let me read it to you again.

"There is no form of anesthesia at present known which is so devoid of danger as that which results from N_2O when administered with a sufficient percentage of oxygen to prevent all asphyxial complications. I have employed this system up to the present time [January, 1901] in about 14,000 cases, as near as I am able to estimate, and with the exception of two or three cases in which, owing to the percentage of oxygen having been insufficient, transient respiratory embarrassment arose, I have had no anxiety. Owing to the fact that little or no strain is thrown upon the circulation, persons with feeble and dilated hearts are anesthetized by nitrous oxide and oxygen without that slight risk which obtains when the former gas is administered alone. Moreover, those patients who, by reason of senile or other changes in the thoracic parietes, pleuræ or lungs might evince symptoms of embarrassed breathing at the acme of ordinary nitrous oxide anesthesia are certainly less likely to do so in the presence of oxygen. So far as I am aware, no fatality had yet been recorded under nitrous oxide and oxygen."

Last year I wrote to Dr. Hewitt and asked if he had seen any reason to doubt the safety of gas and oxygen when used for major operations. He replied that he had not, but that he did not use it much in surgery on account of reflex movement and muscular rigidity that so commonly accompanied it.

Dr. Bennett, in the "Reference Handbook of Medical Sciences" of 1901, writes as follows:

"The writer has administered gas with air or with oxygen for operations lasting from a few minutes to more than two hours in several hundred cases, and while he has had no deaths, *alarming states have several times appeared with such rapidity and so little warning that it seems probable that the general adoption of this form of anesthesia would lead to a mortality more nearly approximating, if not exceeding, that of chloroform and ether.*

"This opinion is strengthened by the occurrence of four such deaths in New York City which have come to the writer's notice within one year."

"It is, therefore, probable that nitrous oxide and oxygen is the safest general anesthetic if restricted to momentary administrations, as for dentistry. The prolonged administration of this anesthetic is quite a different matter, however, and at the present time there are not sufficient data of its use to warrant conclusions as to its safety."

Last year I asked Dr. Bennett if he had seen any reason to change his views as to the safety of gas and oxygen in surgery. He replied that he had not seen any reason to change his views.

In my work I often see the alarming asphyxial states mentioned by Dr. Bennett, and last

autumn I had a death under gas and oxygen. The patient was, to be sure, practically moribund when he came to operation, being profoundly uremic and almost pulseless. Still, the death was without question due to the anesthetic, as it occurred about three minutes after starting the administration, before the incision was made, and with the oxygen indicator pointing to "5." I know of two other deaths and one alarming accident that have occurred in Boston in the practice of young doctors attempting gas and oxygen.

I want to know the cause of these deaths and accidents and am asking you gentlemen to tell me about them and to discuss the general question of the safety of gas and oxygen anesthesia with me.

Of course one answer is that this anesthetic should never be given except by a skilled anesthetist.

I have another idea, also. I think the cause of alarming asphyxial states lies in the uneven flow of nitrous oxide that results when the gas is used direct from the cylinders. There must be an even flow of gas, and the pressure in the ordinary cylinders is too high to secure this even flow. If used from a low-pressure tank or piped direct to the machine from a nitrous oxide plant, I believe the safety of the method is much increased. Under these circumstances the anesthetist can give his undivided attention to the all-important point of proper adjustment of the face piece so as to exclude air and can closely observe his patient's condition. I do not believe that the numbered index for showing percentages of oxygen on the Hewitt and Teter apparatus is of much practical value. The patient's color and breathing are the guides for more or less oxygen, and if sudden oxygenation is required, the index must be entirely disregarded.

DISCUSSION.

The paper was discussed by Dr. Teter, of Cleveland; Professor Henderson, of Yale, and Dr. Davis, of Baltimore.

A PRELIMINARY NOTE ON INTRAVENOUS GENERAL ANESTHESIA.

BY ARTHUR M. DODGE, M.D., BOSTON.

AFTER a series of experiments in conjunction with Faust, professor of pharmacology at the University of Würzburg, Burkhardt, chief surgeon at the City Hospital of Nuremberg, began to use intravenous general anesthesia in his clinic, and last spring published a paper founded on its use in about two hundred and fifty cases.

The writer went to Germany this summer to investigate the method and spent some time with Professor Burkhardt, seeing patients anesthetized every day in the ordinary routine of the clinic, and being given the opportunity to "make the narcosis" himself.

On Oct. 25, at the invitation of Dr. F. J. Cotton,

and through the courtesy of the Boston City Hospital authorities and of Dr. Paul Thorndike, on whose service the patient was, the method was demonstrated by the writer. As this was the first use of intravenous anesthesia in this vicinity, and, so far as is known, in this country, a short description may be of interest to the profession.

Burkhardt usually employs three solutions:

- (a) Physiological salt solution.
- (b) Physiological salt solution containing 5% ether.
- (c) Physiological salt solution containing 1½% isopral.

Although in some cases the isopral solution was not used, the routine was to start the anesthesia with it and continue with the ether solution. These solutions are contained in large burettes, all connected by rubber tubing to a glass cannula, which is introduced into the vein in much the same manner as for the intravenous use of salvarsan. Any superficial vein may be used, but as a rule the median basilic of the left arm will be found the most convenient.

Anesthesia is induced somewhat more rapidly than by inhalation, and after it is complete the plain salt solution is alternated with that containing the ether according to the depth of anesthesia required. As a rule, less than half the amount of ether used by inhalation is necessary, and the patients recover with the customary unpleasant after effects of ether absent or much mitigated. The patient on whom it was demonstrated at the Boston City Hospital was a man fifty-one years of age, operated on for fistula in ano. He had a moderate degree of arteriosclerosis and was, therefore, not an ideal case for its use. No isopral was employed, the anesthesia being induced and maintained with the 5% ether solution, an occasional change being made to the plain salt solution. Sixteen hundred cubic centimeters of fluid in all were used in one-half hour, and of this 70 ccm. were ether. This is somewhat more than usual, but the excitement of the patient caused by the disturbances attending such a demonstration easily accounts for the excess. The anesthesia was satisfactory to the operator, Dr. Cotton, and the house-officer, Dr. Mahoney, reported a recovery with the usual after effects of ether much lessened in severity.

Intravenous anesthesia is indicated in operations about the head and neck, in hemorrhage, in weak cachectic patients, in diseases of the respiratory tract where inhalation anesthesia is objectionable, etc. It is contra-indicated in nephritis, extreme arteriosclerosis, severe heart lesions, plethoric patients, etc.

In the writer's opinion, its chief field of usefulness will be found in operations about the head and neck, where it is desirable to have the anesthetic and anesthetist removed from the surgical field, and here it would seem to be the method indicated in a majority of cases.

With reasonable care and skill in its administration the dangers from its use are only those inherent in ether itself. Any possible danger from air embolism is obviated if care is taken that the

solution is running out of the cannula while it is being introduced into the vein, and that the flow is not interrupted during the anesthesia.

The writer has since used it at St. Elizabeth's Hospital, at the Massachusetts General Hospital, and hopes to make a more complete report of the method some time in the near future.

NOTE BY F. J. COTTON, M.D.

From the surgical point of view, the anesthesia was perfectly adequate in this case. It was rather curious to note the exact similarity of the anesthesia to that produced by the inhalation of ether. There was the same modification of respiration, the snoring as the patient went under, the dropping back of the tongue, and, when he was being brought into position for operation, there was the same stiffness of the legs, and the violent tremor on attempting to flex them, that are familiar accompaniments of ether anesthesia in these rectal cases. When the operation was finished, the recovery was somewhat more prompt than usual, and there was an entire freedom from nausea as well as vomiting. In this case, it is worthy of note, perhaps, that the stretching of the sphincter produced almost no reaction as shown in the breathing, less reaction than one usually sees in these cases. I suspect, however, that this was a variation in the individual reaction, and not characteristic of this method of administration.

I am inclined not only to agree with Dr. Dodge as to the rôle that this method is likely to play in the future, but should extend the field of its probable application to those cases also in which we particularly want to avoid the irritation of the lungs and throat from ether vapor, as in cases, for example, of bronchial pneumonia, phthisis or latent phthisis. There are certain of these cases that I think could probably be handled better in this way than even with the nitrous oxide-oxygen anesthesia. In throat cases, and cases of mouth surgery where we expect bleeding into the pharynx, the insufflation method (with a tracheal tube inserted through the mouth) will do better work, but in cases of surgery of the mouth and face, and even of the head, in which there is not going to be any bleeding in the mouth and throat, and in which the presence of the operator with his mask is a menace to asepsis and a great nuisance to the operator, this intravenous administration seems to me far the best method up to date.

Clinical Department.

A PARASITIC MULTIOCLULAR OVARIAN CYST WEIGHING NINETY POUNDS.

BY P. E. TRUESDALE, M.D.,

Surgeon to St. Anne's Hospital and the Highland Hospital, Fall River, Mass.

E. M., aged sixty-three. Nativity, Canada. Family history, negative. Past history, no pathological antecedents of importance. Had nine children; no puerperal accidents or difficulties. Menopause twelve