plan. The Hamburg Hospital at Eppendorf, which was completed nineteen years ago, has stood as a model of this system of hospital construction ever since its completion. It was planned under the supervision of Professor Kurschmann, who followed very largely the ideas laid down in the report of the Johns Hopkins commission. Dr. Ochsner regarded the point brought out regarding the position of windows an important one. There are several modern contrivances in use in a number of hospitals which will permit the bed to be near a window without being in a draft. Every hospital, he said, should have a large area of balcony space, not balconies for ornamentation, but balconies for use. His plans provide for these at the end of all halls. The flat roofs of these institutions should be utilized for the same purpose. This can be done by arranging the elevators so that the patients can be carried to the roof. The most pernicious form of heating, in Dr. Ochsner's opinion, is that employed in the so-called closed systems of combined heating and ventilation, because in these hospitals all the air supplied to the patients is forced over steam coils during the cold seasons of the year. The lowest temperature possible in steam-heated coils is 212 F., and many times the steam is superheated so that it reaches 400 F. Consequently the air is spoiled by being scorched. This fault can readily be overcome by passing air over coils heated with hot water regulated with a very simple device at a temperature not to exceed 160 F., which is not sufficiently high to spoil the air. It requires, however, a very large number of coils, if this low temperature is maintained, to elevate the temperature of the outdoor air to the proper degree, which should be approximately six degrees F. above the normal temperature of the room. This is a very important matter which, in time, must be generally adopted. In the larger cities of this country the physician and surgeon is not usually concerned with obtaining the funds for construction and maintenance of hospitals. These funds are supplied by societies, by church organizations or by philanthropic individuals. It is quite different in the smaller towns. There the medical profession must virtually secure the financial support both for the construction and for the maintenance of hospitals. It is consequently imperative to secure efficiency in these institutions with the means at the command of the profession. Moreover, the hospital must be so planned that its maintenance is possible under existing conditions. In the large cities it is reasonable to expect important changes during the next few decades. With the introduction of ambulance systems similar to the system in vogue in Berlin, with the addition of automobile ambulances, the necessity for locating hospitals in the center of great cities virtually ceases to exist. Dr. Ochsner showed that with a careful distribution of automobile ambulance stations, properly supplied with ambulance surgeons, it will be possible to carry all emergency cases to hospitals located near parks in the city, or in good-sized parks in the outskirts of the city. By telephoning to the hospital the moment the patient is placed in the ambulance everything can be in readiness when the patient arrives at the hospital, so that there is virtually no loss of time. Dr. Ochsner contended that it is a serious error to build many storied hospitals because of lack of space. The same area of land should be utilized as for hospitals built on the low pavilion plan. We should build many storied hospitals because they provide better air, more sunlight, less street dust, less noise and because their construction and maintenance is more essential.

Habitual Users of Peruna.—In the *Lancet-Clinic*, Aug. 3, 1907, W. H. DeWitt reports having, within the past year, two patients suffering from chronic alcoholism due to the habitual use of peruna. The second patient suffered from extreme nervousness and insomnia, and denied using stimulants to excess, but admitted taking five or six drinks of peruna daily for two years. DeWitt comments on the explanations given by the manufacturers of peruna as to the incorporation, in this "hypothetical cocktail," of a laxative. "At the solicitation of friends" would more correctly read, "at the behest of Uncle Sam." The fact that the press of the country aids and abets the traffic in this nostrum is cause for caustic criticism on the part of Dr. DeWitt.

AN INHALER FOR THE ORDINARY SEQUENCES AND MIXTURES OF ANESTHETICS.

ON THE PRINCIPLE OF UNOBSTRUCTED RESPIRATION.*

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Undesirable respiratory symptoms during anesthesia may be said to belong to two classes: those due to the patient's condition and those dependent on the means of administering the anesthetic. The former are often not remediable, the latter may fully be. Time does not permit discussion of the manifold causes which underlie stertor and other unfavorable respiratory signs during etherization, but does require mention of two which may be entirely dependent on the apparatus used, namely, first, added work being done by the lungs and by their auxiliaries, and, second, obstruction to the inflow and outflow of the tidal air.

Both, by virtue of the mass of gauze, of cotton or of sponge through which the patient must force his respiration, are actively inherent in the ether chamber of the average bag-inhaler of which Bennett's, Gwanthmey's, Clover's and Allison's inhalers are familiar types. Both are also caused by the space left below the packing in the old-fashioned newspaper-and-towel cone—a space insufficient, as a rule, for the 500 c.c. of tidal air of the average adult.

Fig. 1.—FP, metal face piece; IS, inner shell of ether chamber; OS, outer shell of ether chamber; E1 and E2, elbows used only with gas and oxygen mixture; TP, T-piece used in all sequences and mixtures; V1, V2 and V3, removable and reversible valves; BC1 and BC2, bag-cages; C, collar for attaching bag-cage to T-piece.

The specialty of anesthetization in this country is really just beginning to be developed because the importance of careful administration and because the possibilities of the anesthetic itself for determining the issue of a case favorably or fatally are now more fully realized than ever before. Gentleness and control of administration are the watchwords of modern anesthesia.

Many years ago I thought of the possibility of devising an inhaler which would accomplish four things: 1, leave the normal work being done by the lungs virtually unaffected; 2, offer no obstruction to the inflow and outflow of the tidal air, leaving its motions normal; 3, allow fresh air to be admitted with each inspiration and to be controlled by the anesthetist; 4, preserve sufficient expired air and expired ether-fumes to warm the fresh ether-fumes, thus reducing refrigeration.

Such an inhaler would have the following advantages:

First, gentleness of administration, which is particularly important in childhood and old age and, for example, in septic conditions, in respiratory and genitourinary lesions.

* Read in the Section on Laryngology and Otology of the American Medical Association, at the Fifty-eighth Annual Session, held at Atlantic City, June, 1907.

Second, simplicity of construction, so that all parts could be boiled for sterilization.

Third, minimal nausea, vomiting, pulmonary and renal congestion, not only on account of the graduated administration, but also on account of the measured quantity of air given.

Fourth, deliberation, as well as gentleness in producing the anesthesia. The time which this deliberation requires is a gain by securing the safety of the patient from the after-effects, to which the patient in the nature of things is entitled.

The inhaler has proved so valuable in my hands that it is hoped it will be found to be a gain along the lines of safety and precision. Its action is not unlike the vaporization methods of Junker and Braun, so admirably improved by Gwathmey, but the apparatus is in itself simpler and more readily operated and, so far as I have been able to make comparisons, gives quite the same results as to the induction of, the maintenance of and the recovery from the etherization.

The details of the inhaler are these: First, the maintenance of the normal labor of the lungs, and, second, the absence of obstruction to the tidal air are accomplished by taking two tubes larger than the adult trachea, fitted gas-tight over each other, with two match-

other bag-inhalers, which receives and stores the warmed expired ether-fumes, to be rebreathed by the patient, admixed with fresh ether-fumes from the windows.

This apparatus may be employed for the following anesthetics or sequences of anesthetics: 1, for gas alone; 2, for gas and air in definite proportions; 3, for gas and oxygen in definite proportions; 4, for the gas-ether sequence; 5, for the gas-ether sequence with oxygen; 6, for the ethyl-chlorid-ether sequence; 7, for the ethyl-chlorid-ether-oxygen sequence.

In addition to the unobstructed air-way of the ether-chamber, as already detailed, the special features of this inhaler are:

First, the T-form bag-carrier which permits the insertion or removal of valves at each end of the cross-piece of the "T" so that the foregoing sequences of anesthetics may be administered. The cross-piece also has a cut-off at each end for controlling connection with the bag and with the external air.

Second, the removal and reversible valves, which may, by simply turning them over, be made at will either expiratory or inspiratory. Thus, by manipulating the movable valves themselves rather than by providing special inhaler-parts containing fixed valves, as in Ben-

Fig. 2.—Inhaler assembled for administration of gas alone; FP, face piece; TP, T-piece; V1, valve in expiratory position; V2, valve in inspiratory position; BC1, bag-carrier.

ing windows opposite each other (see Fig. 1, OS and IS), so that when the indicator is at the word "air" of the scale the windows are closed and when it is at the word "ether" they are open to their full extent. Outside the windows of the outer tube screened with wire gauze is the packing of the ether-chamber.

Ether is fed through the lateral holes in the outer shell of the ether-chamber when the patient's face is turned to the side and through the end holes when his face is turned toward the front.

Breathing through a tube larger than his own trachea, the patient evaporates his ether from the ether-soaked gauze in the windows in a manner which is provided in no other inhaler so far as I am aware. The patient, furthermore, has no obstruction to his tidal air to overcome, as is quite obvious.

Third, fresh air is admitted with each inspiration by means of the inspiratory valve at one end of the T-form bag-carrier. This fresh air is controlled by the cut-off valve just within the tube (see Fig. 1, TP).

Fourth, warming of the ether-fumes and thus limitation of refrigeration are afforded by the bag as in all

Fig. 3.—Inhaler assembled for administration of gas with measured quantities of air; FP, face piece; TP, T-piece; V1, valve in inspiratory position; V2, valve in the inspiratory position; V3, valve in expiratory position; BC1, bag-carrier.

nett's inhaler, the foregoing variations in use of the inhaler are provided for.

The removable and reversible valves are shown in Figure 1 (V1, V2 and V3). each consists of: 1, the valve-seat, which bears an upper and a lower neck; 2, a thin brass, aluminum or mica disc; 3, two cross-wires, which hold the disc in place and limit its action.

Figure 1 shows the inhaler-parts for the seven sequences of anesthetics stated, for which the inhaler may be used. The parts are all separated to show how thoroughly they may be cleansed surgically. FP is the metal face-piece without the rubber face-cushion. The dotted line rests in the hole for the valve used in the administration of gas with measured quantities of air (Fig. 3) and of gas and oxygen (Fig. 4). IS is the inner shell of the ether-chamber, also called the gauze-carrier. The dotted line rests in one of the windows from which the ether is evaporated. The manner of packing the carrier with the gauze is fully shown. OS is the outer shell of the ether-chamber. The funnels of the side holes through which ether is fed into the gauze, are in plain view, together with the screw-head for operating the shutter of one of the holes. The dotted line rests in one of the windows of the inner tube.

When the inner and outer shells are assembled, the windows match each other when the ether is turned on, thus exposing the gauze, and when the ether is turned off the solid part of one tube covers the window of the other tube. E1 and E2 are the elbows used only with the gas-oxygen mixture (Fig. 4). TP is the T-piece used in all the sequences and mixtures, as shown in each of the subsequent figures. The oxygen- or air-end is toward the reader. The dotted line rests in the lumen of its cut-off, which is partly open. The bead of the screw operating the cut-off is seen in the slot, under which is placed the scale for indicating the percentage of air or oxygen supplied through the cut-off. The gas-end is away from the reader. Its cut-off is so arranged that one looks through the air-window at a small chink in the shutter; in other words, if a patient were breathing through the apparatus (as in the figure) he would be getting a large percentage of air mixed with a small percentage of gas from the bag. V1, V2 and V3 are the three removable and reversible valves. One valve only is necessary in the gas-ether sequence, two for gas alone and three for gas with definite proportions of air, or for gas and oxygen. V1 is side view. V2 shows the seat and lumen of the valve. V3 the disc and cross-wires. BC1 and BC2 are the bag-carriers; both of which are necessary only in gas-oxygen anesthesia. C is the collar for attaching bag-cage to the T-piece in all sequences excepting gas and oxygen. It is the duplicate of the valves, omitting only the seat, disc and cross-wires.

Figure 2 shows the inhaler assembled for the administration

Fig. 4.—Inhaler assembled for administration of gas-oxygen mixture; FP, face piece; TP, T-piece; E1 and E2, elbows; V1 and V2, valves in the inspiratory position; V3, valve in the expiratory position; BC1 and BC2, bag-carriers.

of gas alone. As in Figure 1, FP is the face piece, TP the T-piece, V1, the valve in the expiratory position, V2, the valve in the inspiratory position, BC1, the bag-carrier. The rubber face-piece and bag are omitted. The air cut-off is also partly open as shown by the screw-head and scale just behind V1. The air-window is open wide, closing the gas shut-off fully, therefore a patient breathing through the apparatus would get only air during inspiration and, during expiration, some escape would take place through V1, while most of it would occur through the air-window. When the latter is closed the patient receives gas from the bag through V2 during inspiration, and, during expiration, closes V2 and opens V1, through which his expiration occurs.

The steps of inducing gas anesthesia are these:

1. The gas cut-off is closed and the bag filled with gas. The air-window is thus opened and permits air to enter freely during the early inspirations.
2. The air cut-off is opened wide, permitting the expiration valve to act.
3. The valve-hole of the face-piece is capped (Fig. 1).
4. The rubber face-cushion is now adjusted to the face and the patient told to breathe deeply through the nose and mouth.
5. Gas is thrown into his inspiration by opening the gas

cut-off and closing the air-window. Expiration occurs through the valve at the other end of the T-piece, for which the cut-off has been left open.

Figure 3 shows the inhaler assembled for the administration of gas with measured quantities of air. The rubber face-piece and rubber bag are omitted. As in Figure 2, the air cut-off is partly open and the air window fully open, so that during inspiration the patient would receive no gas and only air through V1 and the air-window, while expiration will occur through V3 and the air-window. As the latter is closed the patient gets his supply of gas from the bag, his air through V1, the quantity of which is determined by the position of the shutter just behind it, as shown by the percentage scale, and he expires through V3.

The steps of inducing gas anesthesia with an admixture of air in definite proportions are these:

1. The gas cut-off and air-window are adjusted and the bag filled, all precisely as in anesthesia with gas alone.
2. The air cut-off is closed behind the inspiratory valve.
3. The valve-hole of the face-piece is uncapped and the expiratory valve is fitted into it.

Fig. 5.—Inhaler assembled for the administration of the gas-ether, gas-ether-oxygen, ethyl-chlorid-ether or ether-chlorid-ether-oxygen sequences; FP, face piece; OS, outer shell; IS, inner shell; HC, hole-cover; TP, T-piece; V1, valve in expiratory position; C, collar; BC1, bag-cage.

4. The rubber face-piece is adjusted to the features of the patient and he is taught the proper vigor of breathing, then—
5. Gas is thrown into his inspiration by opening the gas cut-off and closing the air-window. Expiration escapes through the expiration valve in the face-piece.
6. When the gas anesthesia is nearly complete air is admitted into each inspiration by opening the air cut-off slightly (from 10 per cent. to 30 per cent. being the extremes for most subjects), thus throwing the inspiratory valve into action.

Figure 4 shows the inhaler assembled for the administration of the gas-oxygen mixture. The rubber face-piece and rubber bag are omitted. The air-window is again wide open, cutting off the gas bag. The oxygen cut-off is partly open. Thus during inspiration, the patient would get much air through the open air-window, a little oxygen through the cut-off, and would expire through V3 and the air-window. In

instituting the gas-oxygen mixture, the oxygen cut-off is closed, then as the air-window is closed the patient receives gas from the bag through V2 and expires through V3. As he passes under the gas, oxygen is delivered to him through V1 by opening the cut-off, the quantity of oxygen being indicated on the scale, part of which may be seen to the left of the screw-head which operates this shutter.

The steps of inducing anesthesia with gas-oxygen mixture are as follows:

1. The gas cut-off is closed and the bag filled with gas. The air-window is thus opened and permits air to enter freely during the early inspirations.

2. The air cut-off, i. e., in this case the oxygen cut-off, is closed and the bag filled with oxygen.

3. The valve-hole in the face-piece is uncapped and the valve inserted therein in the expiration position.

4. As soon as the rubber face-piece is adjusted and the patient breathes in the proper manner, gas is thrown into his inspiration by opening the gas cut-off and closing the air-window. Expiration escapes through the valve in the face-piece.

5. As the patient passes under the gas, oxygen is admixed with it, by opening the oxygen cut-off (from 2 per cent. to 20 per cent. are the extremes for most patients), until the patient's color is good.

Figure 5 shows the inhaler assembled for the administration of the gas-ether, gas-ether-oxygen, ethyl-chlorid-ether, or the ethyl-chlorid-ether-oxygen sequences. As in Figure 1, FP, face-piece; the dotted line rests in the valve-hole used in Figures 3 and 4, but in this case closed by a cover screwed on from within the face-piece. OS is the outer shell of the ether-chamber. The funnels of the feed-holes face the reader, the upper being closed, the lower open, through which the gauze is seen. The scale is shown above the words "ether" and "air" by which the anesthetizer turns from "air" slowly to "ether." IS is the inner shell or gauze carrier of the ether-chamber. Only the base-piece of this shows. HC is a hole-cover at the end of the ether-chamber, pushed away from the hole to indicate how ether may be fed through the end of the apparatus if the patient hold his face to the front. TP is T-piece, V1 is the valve in the expiratory position, C is collar and BCl is the bag-cage.

The air window is shown as before, fully open, while the air cut-off is partly open. With the inhaler in this position, the patient would get free air through the window, and expire partly through it and V1. When the gas is turned on he expires entirely through V1 so that the shutter must then be wide open. For rebreathing the shutter is closed. After he is fully under, and while the ether is being turned on, V1 is taken out and reversed to the inspiratory position. When the patient is fully under the ether and ready for the operation, air is admitted through V1 in the inspiratory position by opening the cut-off according to requirements.

In all the preceding methods of assembling the inhaler, the neck of the rubber bag is slipped over the rings seen at each end of the T-piece. Thus it is impossible for the valves or collar with the bag carriers to slip out. The apparatus does not, therefore, come apart during use at all, whereas, the fact that the parts are removable, makes surgical cleaning of each possible, and, at the same time, allows each part to be used for several different purposes, thereby reducing the cost of the inhaler. There is not one part of this inhaler which does not occur in one or other form in all other inhalers, but is more detachable and cleansible in this instrument.

The steps of inducing gas-ether anesthesia are these:

1. The gas cut-off is closed, and the bag filled with gas. The air-window being opened by the shutting of the gas-shutter permits free air to enter, during the preliminary inspirations.

2. The air cut-off is opened wide, permitting the expiration valve to act easily.

3. The valve-hole of the face-piece is capped as shown in Figure 5.

4. The windows of the ether-chamber are closed by having the indicator at the word "air."

5. The rubber face-cushion is now adjusted to the face and

the patient told to breathe deeply through nose and mouth. When he does this properly, the gas is thrown into his inspiration by opening the cut-off and closing the window. Expiration occurs through the valve at the other end of the T-piece, for which the cut-off has been left open.

6. Rebreathing, otherwise called to-and-from breathing, is secured by closing the cut-off, thus checking the exit through the expiration valve.

7. By this time the patient is sufficiently under the gas to permit turning in a small amount of ether. The quantity of the ether is gradually increased until the full volume is being given. When the patient is fully under the ether the valve is reversed to the inspiration position and then as needed definite proportions of air are admitted to keep the blood well oxygenated. Thus it will be seen, the patient receives in series, gas alone, then gas with ether in increasing amounts, next ether alone and last ether with an admixture of air, as his color may indicate.

8. To deepen the narcosis, at any stage of the operation, the air is simply stopped by closing the cut-off again, while more ether is poured into the gauze.

For the administration of the gas-ether-oxygen sequence, the only detail additional to the foregoing is to attach the bag to the oxygen tank and thus deliver that gas into the bag, to be mixed with the warm ether-fumes in the bag. In this case, of course, the valve must be kept in the expiration position.

For the administration of the ethyl-chlorid-ether sequence or the ethyl-chlorid-ether-oxygen sequence, the ethyl-chlorid is sprayed through the air-window of the T-piece until the patient goes under its anesthesia. All the subsequent steps are the same as those already described when gas instead of ethyl-chlorid is being used.

This apparatus has been found easy to operate, certain in results, safe and gentle in administration and surgical in its separability of parts for boiling, in the designer's hands.

It is assured that it will be found such in the hands of all who, after a little study of it, employ it in their work.

For their valuable suggestions and kindly aid I beg to express at this opportunity my best and sincerest thanks to Mr. Seward W. Hartley in preparing the mechanical drawings, to Mr. John T. Hoyt, of the Department of Physiology, Columbia University, in making the earliest models, now almost four years ago, and to Messrs. George Tiemann & Co. in consenting to manufacture and market the final model as set forth in this article.

DISCUSSION.

DR. JAMES TAYLOR GWATHMEY, New York, said that anything that will decrease the dangers of anesthesia and make it pleasanter deserves a great deal of credit. The objection to all closed methods of giving anesthesia is that in the majority of cases, especially in hospitals, the internes do not pay the attention they should; they clap a closed inhaler with a deflated bag over the patient's face, thus forcing the patient to attempt to breathe from a vacuum. This throws a tremendous strain on the heart and lungs. It may not kill the patient, but he may suffer from the after-effects for several days, perhaps weeks and months. Probably half the fatalities with closed inhalers occur in this way, by having a patient attempt to breathe from a vacuum. With the safety valve of Dr. Pedersen that is absolutely impossible. It does not make any difference how ignorant the person who gives the anesthetic is of the theoretical part, or how carelessly he may give it, he can not make the mistake of smothering the patient in that way.

In regard to the value of gas-oxygen anesthesia, Dr. Gwathmey quoted Hewitt's latest edition of "Anesthetics" that gas-oxygen is the greatest improvement in anesthetics that has been made in the last ten or fifteen years. The anesthetist can keep a deeper anesthesia, using oxygen instead of air, and remove the useless nitrogen in the air and replace it by an equal amount of nitrous oxid gas, and in that way do away

with cyanosis and stertor in the majority of cases. Dr. Gwathmey thinks Dr. Pedersen is to be congratulated on the apparatus, which is easy to operate. Dr. Dawbarn, he said, has stated that in the last eighteen years, since using different closed methods with not very much attention paid to the anesthetic, he does not know of a single case of pneumonia, and attributes it to the closed method of heating ether. Any apparatus that does not heat ether is based on wrong principles.

DR. VICTOR C. PEDERSEN, New York, said that in the last six months he has had perhaps half a dozen distinctly dangerous cases in which to administer an anesthetic. One patient was a man 84 years old, who had abscess of one kidney. He went under the ether, with this apparatus, so gently and breathed so quietly that one operator thought something was the matter. The man came out quickly and was able to talk within ten minutes, and the operator said that he had done distinctly better than the average patient younger in years. Another case was an old man, ten years less advanced in life than the first, who underwent a prostatectomy with the same results of the anesthesia. Anything that tends to make the giving of anesthetics genuinely scientific is well worth going into, and Dr. Pedersen hopes, in the hands of others, as well as in his own, that this apparatus will be found serviceable and safe. Of the ether chamber he said that he has drilled a hole in one side of it so that when the ether chamber is unduly filled the danger will be communicated to the anesthetist.

AN EXPERIMENTAL STUDY OF INTESTINAL OBSTRUCTION.*

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The problems in connection with intestinal obstruction,¹ aside from the investigation of the causes and best methods of treatment, are concerned chiefly with the explanation of the fulminant symptoms which follow an acute occlusion and which lead rapidly to death, unless the obstruction be promptly relieved. Such symptoms, in their intensity and sudden onset, seem almost out of proportion to the mere retention of intestinal contents, especially since fecal impaction, with an equally complete retention, may persist for a long time without such a violent reaction. Various hypotheses have been offered, and particularly in recent years a number of investigators have endeavored to find an explanation of these remarkable symptoms.

As is well known to every surgeon, vomiting, collapse, disturbances of blood pressure, sweating, etc., together with distension and more or less pain, follow quickly on an intestinal occlusion, and if this be not relieved a later train of symptoms appear, obviously due to a toxemia. There is a diversity of opinion, however, regarding the cause of these symptoms. Some consider them largely due to reflex disturbances set up by irritation of the nervous structures in the intestine. Others consider the whole syndrome to be the result of absorption of poisons from the obstructed intestine.

Bouchard was the originator of this theory of auto-intoxication; believing that poisonous substances are absorbed from the stagnant intestinal contents, having an especial affinity for the central nervous system. Lepine and Mollière thought that these substances were ptomaines.

Kukula secured at operation the contents of obstructed

intestinal loops, filtered them through Chamberland filters, and injected the filtrate into dogs. The results were negative as a rule, although an alcoholic extract of this material produced symptoms of intoxication when injected into animals. Such animals suffered from repeated attacks of nausea and vomiting, followed by diarrhea with tenesmus, sweating of the paws and depression or collapse. Occasionally there were tonic and clonic convulsions and paralysis of the hind limbs. These symptoms gradually passed off. He states that not only toxic fluids, but toxic gases as well, may accumulate in the obstructed intestine, mentioning hydrogen sulphid and methyl-mercaptan as especially important; that he further believes the vomiting and other results of obstruction can hardly be explained by the reflex theory, although in the early stage the vomiting may be incited by the irritation of the nerve endings, due to the acute stretching of the bowel.

Fig. 1.—Obstruction in lower portion of colon; C, cecum; L, ligature.

Albeck found that the contents of an occluded loop of intestine were much more poisonous than those of the normal intestine, and he was able by injecting the filtrate from this material into rabbits and cats to produce diarrhea, convulsions and collapse, with death in from four to fifteen hours. He found that the poisons are soluble in water, pass through a Chamberland filter and withstand boiling. He thinks that they may be regarded as putrefactive poisons.

Boeszky and Genersich considered the possibility of a general bacterial infection in ileus. In experimental obstruction of the colon in rabbits they found *B. coli* in the peritoneal cavity in 45 per cent. of the cases, in 29 per cent. in the blood and in 17 per cent. in both peritoneal cavity and blood. When the small intestines were ligated *B. coli* were found in the peritoneal cavity in 28 per cent., in the blood in 18 per cent., and in both peritoneal cavity and blood in 9 per cent. They con-

* Read in the Section on Surgery and Anatomy of the American Medical Association, at the Fifty-eighth Annual Session, held at Atlantic City, June, 1907.

* From the Hunterian Laboratory of Experimental Medicine.

1. To Dr. W. J. McCallum I am indebted for the opportunity to do this work. It was carried on under his direction and with his assistance. Some of the experiments were done by him alone.