the production of this form of inflammation, but the action of these is as a rule secondary to that of other injurious agents. Thus, different mineral poisons, as corrosive sublimate, arsenic, etc., may be the primary cause, and the toxic substances supposed to be formed in certain chronic conditions, as Bright's disease, the cachexia of malignant tumors, etc., and excreted through the intestinal tract, are apparently factors in its production. It occurs occasionally in infectious diseases, as pneumonia, scarlet fever, septic processes, etc. It may develop from a catarrhal inflammation of the mucous membrane, but is not constantly preceded by this. Macroscopically the fibrinous exudate appears as a gray or a grayish-yellow layer of greater or less extent on the surface of the mucosa. It may be limited to the tips of the villi or to the crests of the valvulæ conniventes, or the patches may be of considerable size. There may be merely a very thin film of this on the surface of the membrane, or the infiltration and necrosis may extend deeply into the mucous membrane. The solitary follicles may not be involved, or they may be enlarged and take part in the diphtheritic process. In the latter case follicular ulcers are common.

Diphtheritic enteritis, when occurring in the course of severe infections, may not give rise to any symptoms not referable to the primary disease. The condition is at times met with post mortem when not suspected during life. Diarrhœa and abdominal pain may exist but are not distinctive. The character of the stools shows nothing to differentiate this from dysentery. The treatment must be symptomatic, with proper attention to the accompanying disease.

Phlegmonous Enteritis is to be mentioned as a rare form of intestinal inflammation. Here there is a more or less diffuse suppurative infiltration, particularly of the submucous coat. It is caused by bacterial invasion and is nearly always secondary to other forms of intestinal disease, such as the various kinds of ulcers, intussusception, strangulated hernia, etc. The symptoms belong rather to the primary disease than to the phlegmonous inflammation. There is no clinical picture by which it can be recognized before death.

Ulcers in great variety occur in the intestinal tract, many of them, however, being found much more commonly in the large than in the small intestine. The majority of these ulcers are not the expression of an ordinary inflammatory process. Certain of them occur in specific infectious diseases, either acute or chronic (typhoid, anthrax, tuberculosis), while others result from the direct destruction of tissue by toxic agents (mercurial ulcers, etc.). Interference with the local blood supply is the probable primary cause in a certain proportion (*e.g.*, duodenal ulcers), or ulcers may accompany tumor growths. None of them should be considered here. There remain as occasionally occurring in the small intestine in inflammatory processes the catarrhal and follicular ulcers, already briefly mentioned, and, rarely in the lower end of the ileum, the so-called stercoral ulcer. None of these is as common or as important here as in the large bowel. The catarrhal and follicular ulcers are expressions of the severer forms of catarrhal enteritis, either acute or chronic; hence their etiology is the same as that of this disease. A few words only as to the manner of their formation and their results are here necessary.

The catarrhal ulcer commences by a localized collection of round cells in the mucous membrane. These cells lie between and surround Lieberkühn's glands. The superficial epithelial cells over this spot are desquamated and the tubular glands destroyed, or, if the ulcer is very shallow, the lower portions of these may remain. This gives rise to small isolated, usually rounded, erosions which at first reach hardly to the submucous coat. These may heal, or may increase in size, and become confluent, forming irregular ulcerated areas of considerable size which may extend downward to the muscle coat, or even give rise to perforation or peritoneal adhesions. In these larger ulcers the walls are somewhat undermined and thickened.

The follicular ulcer, which begins by an increase in round cells in the lymphoid structures, with a subsequent superficial necrosis, at first appears as a minute round opening into the enlarged follicle. In the earlier stages the process is limited to the follicular tissue, the isolated ulcer being round with thickened overhanging edges. The surrounding tissue is next involved, the submucous coat being infiltrated and softened and the overlying mucous membrane becoming necrotic. By confluence considerable ulcerated areas, similar to the large catarrhal ulcers, result. Healing may occur even in catarrhal or follicular ulcers of considerable size by the formation of connective tissue, and, by contraction of this, more or less stenosis of the bowel is occasioned.

Stercoral ulcers, which are comparatively frequent in the large intestine, may at times be found in the lower end of the ileum. They are due to the presence of hardened fæces, such as may occur above stenosed portions of the intestine, or in habitual constipation. This produces a superficial necrosis of the mucous membrane, together with an inflammatory infiltration of the surrounding tissue and subsequent ulceration.

Ulcers of both the large and the small intestine may exist without giving clinical evidence of their presence. Particularly when they are limited to the small intestine and cæcum there may not even be diarrhœal movements. In general the presence in the stools of small amounts of pus, mixed with a few red blood corpuscles and with mucus, may be regarded as suspicious of an ulcerative process of inflammatory origin, particularly when this is accompanied by other evidences of intestinal inflammation. But there is no way by which it can be definitely determined that these ulcers are located in the small bowel. The pain which may be present in ulceration, either spontaneous or elicited by pressure, is not sufficiently characteristic to warrant a diagnosis of this condition, still less to indicate its definite location.

The treatment of ulcers, when thought to be present in the small intestine, is the same as that of the severer forms of catarrhal enteritis—viz., as complete avoidance of all forms of irritation of the bowel as possible. Large doses of bismuth may prove valuable.

Charles J. Bartlett.

ENTEROCLYSIS.—Enteroclysis, lavage of the intestines, is the title of the subject that we shall discuss, though, to speak correctly, it is but a subdivision of the larger topic, which we shall designate "Intestinal Hydrotherapy."

We would define intestinal hydrotherapy as the employment of water in the intestinal tract for therapeutic purposes, the fluid being administered through the anal orifice. This would include:

1. The enema.
2. Irrigation with a single tube—true enteroclysis.
3. Irrigation with a double-current tube, or with two tubes—also true enteroclysis.

Experiments with Enteroclysis.

We will give a résumé of the experiments which were conducted in the physiological laboratory of the College of Physicians and Surgeons (Columbia University), and which had for their object to determine the relations of this procedure to pulse tension, renal activity, and intestinal absorption; and to ascertain the effects produced by water of different temperatures. The animals employed for these experiments were dogs, and generally those of large size.

They who are interested in the technical details of the procedures will find them recorded in the New York *Medical Journal*, January 29th, 1898, and also in the author's manual, entitled "Enteroclysis, Hypodermoclysis, and Infusion."

I. *The Effect on Pulse Tension Produced by Enteroclysis with Water at Different Temperatures.*—Normal saline solution (a drachm of salt to a pint of water) was employed in all cases. With a temperature not lower than 100° F., nor higher than 105° F., the tension of the pulse was slightly increased; with a temperature higher than 105° F., the increase in tension was more noticeable, becoming progressively greater as the temperature of the solution was increased. At 110° F. there were: marked increase in the tension of the pulse, increased rapidity of respiration, and changes in the respiratory curve. And from 110° to 120° F., there were: progressively increasing tension of the pulse, and strong heart action.

With a temperature from 90° F. down to a point as low as 36° or 37° F. (iced water), the tension of the pulse continued to increase as the temperature of the water decreased. After irrigation for about twenty minutes with water at the lower temperatures the heart action became weaker and the pressure fell.

Practical Deductions.—(1) Irrigate at a temperature of 100° to 102° F., or even as high as 104° F., if increase in pulse tension is to be avoided.

Though physiologically a slight increase in the tension of the pulse occurs at these lower temperatures, clinically none can be detected.*

(2) If a moderate increase of pulse tension is not objectionable, a temperature of 105° to 108° F. can be employed.

(3) To increase rapidly the pulse tension and stimulate the heart, employ the fluid at a temperature of 110° F., and increase the heat gradually to 120° F.

This is excellent in shock; before, or during severe operations, to prevent shock; and, from the commencement of chloroform anæsthesia, to prevent the sudden dilatation of the vessels.

(4) Cold is a temporary stimulant; later, it acts as a depressant. It should therefore be employed with caution. More patients have an idiosyncrasy as regards cold than as regards heat.

II. *Effect of Enteroclysis on Shock from Hemorrhage.*—The degree of the tension of the pulse was first noted in an animal, and then, after blood had been withdrawn from the femoral, the effects on the pulse tension and the heart were observed. The report of a single experiment will suffice:

Weight of dog, 20 lbs.; blood pressure, 155 mm.; 50 c.c. of blood removed at a time, until 509 c.c. in all had been withdrawn. Under the influence of these successive removals, the pressure fell rapidly to 112 mm. Enteroclysis was at once begun with normal saline solution at 110° F., and the heat was rapidly increased to 120° F. Immediate rise of blood pressure followed, and in ten minutes it reached 140 mm., and remained steady at this point; the heart was by this time acting with fair force (see Fig. 1913).

Deduction.—In shock from hemorrhage irrigate with normal saline solution at a temperature of 110° to 120° F., preferably at 120° F.

III. *Effect of Enteroclysis upon Body Temperature.*—Dogs were employed for the experiments, which were conducted in a room of a temperature of about 72° F. Irrigation was continued for about twenty minutes, the temperature of the water being gradually raised from 110° to 120° F. The results were: a gradual rise of the body temperature; in the axilla the increase amounted to 1° F.; the temperature of the aortic blood increased 0.5° to 0.8° F.; the tension of the pulse increasedmarkedly.

Hot irrigation was then suddenly changed to cold, the water having a temperature of 36° to 37° F., and this was continued for twenty minutes, with the following results: Axillary temperature fell 2° F.; blood temperature fell 1° F.; pulse tension at first continued high, but later it fell, and the heart action became rapid and feeble. With a temperature of from 100° to 105° F., the irrigating fluid exerted no appreciable influence upon the body temperature. Water temperatures of 105° to 110° F. caused slight increase of body temperature in the course of twenty minutes; while at from 90° to 60° F. they caused slight fall in the body temperature in the same period of time.

With enteroclysis at a temperature of less than 60° F., there was a loss of body temperature in the course of twenty minutes; but it was not very marked until the extreme degrees of cold were reached. There were idiosyncrasies in the animals. Cold at first stimulated, but, when prolonged, it depressed the circulation.

Deductions.—1. Hot irrigation at 110° to 120° F., when prolonged, increases the temperature of the body and blood, and hence its value as a means of stimulating the heart. In shock and in allied conditions its great value, especially when water at a high temperature is employed, has been demonstrated clinically.

2. In severe fevers it might not be advisable to employ enteroclysis at a high temperature, and yet it is possible that the etiological conditions may radically modify this rule.

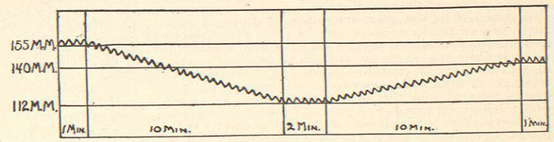

Fig. 1913.—Diagram Illustrating the Effects of Shock from Hemorrhage and its Treatment by Enteroclysis.

3. Cold irrigation reduces temperature and at first stimulates the circulation; but later it is a depressant. It has been employed to reduce temperature in dysentery, etc. I believe that it should be cautiously used and at a temperature not below 70° to 80° F. at first, and only in sthenic cases. It should be employed for a brief period, and friction during its application might be advisable.

Cold rectal irrigation is safer, and iced water has been so employed for rectal congestion for a period of over thirty minutes continuously and with a successful issue.

IV. *Effect of Enteroclysis with Water at Different Temperatures, on Renal Activity and Intestinal Absorption.*—The experiment was made in the following manner: The manometer was in each case attached to the carotid artery, to enable the observer to note the effect on pulse tension; one ureter was catheterized and the catheter was so adjusted that the drops of urine impinged on a lever supported by a tambour, each movement of which was transmitted to a second tambour, which supported a registering pen; every drop of urine was thus registered on a revolving kymograph, in the form of an inverted V. The urine was collected and measured. The opposite ureter was also catheterized and the urine measured.

Enteroclysis with normal saline solution at temperatures of from 110° to 120° F. increases renal secretion in the course of ten minutes, and very markedly so in twenty minutes. There is a marked increase of pulse tension. Note the *two cycles* of the increase of the secretion. Thus, for example, at the end of ten minutes the increase in secretion corresponds to the maximum height of the blood pressure obtained by enteroclysis at 120° F., and to the commencement of temperature increase (see experiments just described). With enteroclysis at temperatures of from 105° to 110° F., there is, at the higher temperatures, a slight increase of secretion in ten minutes and a considerable increase in twenty minutes; but at the lower temperatures there is no increase until after the lapse of twenty minutes.

With enteroclysis at temperatures of from 100° to 103° F., no increase in renal secretion is noted until the opera-

* This statement is in regard to the pure reflex effect of the temperature upon pulse tension,—not in relation to effects produced by absorption of the fluid.

tion has been kept up for twenty minutes, and then the increase is considerable. There is a slight increase in pulse tension. Noteworthy is the single cycle of increased secretion.

That the increase in renal activity which occurred in the course of twenty minutes, from an enteroclysis with normal saline solution at temperatures varying from 100° to 120° F., was due to absorption of the fluid from the intestine, was demonstrated as follows: A weak solution of potassium ferrocyanide, 1 to 40,000, was added to the normal saline solution in each case, and the urine, as it fell into the receiving vessel, was tested every fifteen to thirty seconds with chloride of iron. On every occasion the Prussian-blue reaction was secured at the end of twenty minutes, and this occurred synchronously with the increase of renal secretion. This experiment further demonstrates the fact that intestinal absorption occurs from the large intestine (colon or rectum) in about twenty minutes.

The following interesting fact was noted: A small enema, or an enteroclysis, of normal saline solution, which had a temperature of 99° to 100° F., and which contained a weak solution of potassium ferrocyanide, produced, at the end of about twenty minutes, increased diuresis, as demonstrated by the greater number of drops of urine registered on the kymograph at this time, synchronously with the appearance of the Prussian-blue reaction in the urine in response to the chloride-of-iron test; yet no discoverable rise of pressure occurred in the manometric tracings. The increased secretion was therefore evidently due to the action of the saline solution on the kidney cells. This corresponds to the results obtained by Foster in his experiments with infusion; for this authority noted that a normal saline solution, administered in so small an amount that no rise in pulse tension could be detected with the manometer, caused a profuse diuresis.

The effects of cold irrigation on renal secretion were found to be as follows: Enteroclysis with normal saline solution at all temperatures from 100° F. to iced water (36° to 37° F.) produces diuresis in about twenty minutes, this effect being due to absorption of the fluid from the intestines. The pulse tension is increased as the temperature is lowered, and hence, by this means, secretion is further increased. With the lower temperature, however, in about twenty minutes the animal frequently goes into shock and renal secretion then ceases. Cold enteroclysis, or enemata, would seem, therefore, to be contraindicated in renal disease.

We believe that general deductions from physiological experiments on healthy animals cannot be universally applied to the human subject, and this is doubtless the true explanation why the pure physiologist quite frequently leads us to erroneous conclusions. In the practice of medicine, the results secured are often markedly modified by the existing clinical conditions. For example, enteroclysis at a temperature of from 110° to 120° F. was recommended when the pulse tension and temperature were not high. Nevertheless, I have secured excellent results in acute uræmic poisoning, with high pulse tension and a temperature of 102° F., from an enteroclysis with normal saline solution at a temperature of from 115° to 120° F., kept up for a period varying from half an hour to one hour. Profuse sweating, diuresis, and bowel action followed, and there was also a marked fall in pulse tension. Other observers have had the same experience.

If the blood-vessels are atheromatous, a great degree of heat might be undesirable. Nitroglycerin, gr. $\frac{1}{100}$, given previously to the enteroclysis, might be of value.

Clinical Applications.

Hot saline enteroclysis is an excellent remedy in acute uræmic poisoning, in oliguria, in renal congestion, or in any dropsical condition due to oliguria, such as pulmonary œdema, pleurisy with effusion, ascites, etc. It aids elimination of the toxins, through the kidneys, in typhoid fever, sepsis, septic endocarditis, diphtheria, etc. Many practitioners have obtained excellent results by the employment of this mode of treatment.

A temperature of from 110° to 120° F. gives the best results, due to the double cycle of increase in the urine, attributable to the several causes heretofore noted in the account of the experiments.

Renal disease with polyuria seems to contraindicate the employment of this method; or, at all events, the existence of the latter symptom necessitates a cautious employment of the method. In a case of enlarged prostate, I found that prolonged irrigation aggravated the polyuria.

The Enema.—There are two forms of enemata—the high and the low. The *high enema* is administered through a colon tube, or long catheter, to which is attached a fountain syringe, or a vessel arranged on a similar principle. The bag should hang at a height of two or three feet above the patient, and the tube should be pinched sufficiently to allow the fluid to enter slowly, so as not to excite intestinal spasm. The colon tube, well lubricated with olive oil or vaseline, is inserted into the rectum and pushed gently into the bowel for a distance of from twelve to fourteen inches. Its progress is facilitated by allowing the solution to flow, as the tube is pushed farther up into the bowel. In infants a small catheter (No. 16 or No. 18 French) can be used. The water employed for the enema should preferably be sterile (boiling it for about fifteen minutes is generally sufficient). If a Davidson syringe is used, the flow is often intermittent and forcible, exciting spasm of the bowel, and hence it is better to use the fountain syringe.

Position of the Patient.—The dorsal position, with the hips or the foot of the bed elevated, is best. The knee-elbow posture is at times employed for a high injection.

Quantity of the Solution; Temperature; Indications.—When it is desired, in a case of fæcal accumulation, tympanites, etc., to secure an action of the bowels, the following mixtures may be employed (in the case of an adult): one quart or a quart and a half of simple water at a temperature of from 101° to 104° F.; or sufficient soap (brown or castile) may be added to this to form suds; or, finally, if there is tympanites, ʒ ss.–i. of spirits of turpentine may be added to the last. Olive oil or glycerin —ʒ ss.–i.—constitutes a valuable adjunct. For the purpose of softening fæcal accumulations I have employed as much as Oss. or Oi. of oil or of glycerin at a single injection. In the case of an infant, from half a pint to a pint and a half of water—with an addition of ʒ i.–ij. of olive oil, if required—is the average quantity employed at an injection.

The enema is also of value in apoplexy and in infantile convulsions. It is important to remember that dilatation of the intestine and loss of muscular tone may result from the too frequent employment of the enema.

Kussmaul's method of oil irrigation for the treatment of chronic constipation appears to be a valuable therapeutic measure. He employs about a pint of olive oil by enema, at bedtime, injecting it slowly through a long tube; the patient lying down during the operation, first on the left side, then changing gradually to the dorsal position, and finally resting upon the right side. Gentle massage is kept up while the oil is being injected. If possible, the enema is to be retained over night.

For stimulation in shock,—to whatever cause it may be due,—in heart failure during anæsthesia, in uræmia, oliguria, suppression of urine, septic conditions, cholera, diphtheria, etc.; and as a means of replacing to some extent the loss of fluid from the body, such as occurs in gastro-enteritis and after certain surgical operations, the enema may be of great value. The fluid should be injected slowly through a long tube, with the hips of the patient, or the foot of the bed, well elevated. The retention of the injected fluid must be carefully provided for. Normal saline solution (one drachm of salt to the pint of water), at a temperature of from 110° to 120° F., should be employed for any of these conditions. In an adult the quantity to be injected at any one time should not be less than one pint nor more than two quarts, and the injection should be repeated every one to three hours,

according to the indications that may be present. In children a proportionately smaller quantity of fluid should be used. In addition to the normal saline solution other solutions may be used to advantage. These are enumerated in the section on Double-Current Enteroclysis.

The method here described is of value in dysentery, typhoid, cholera, gastro-enteritis, etc. It should be more correctly classified under enteroclysis with a single tube, but it is a difficult matter to draw a sharp line of division between the two kinds of enteroclysis.

In cases of jaundice or of hemorrhage (intestinal or in adjacent organs), and in those in which it is desired simply to reduce temperature, the same method is to be employed, but the solution should have a temperature of from 90° to 70° F., or even less. Cold should be employed in sthenic cases only, and even then with caution. In cases of hemorrhage or of jaundice a temperature of from 110° to 120° F. at times gives the best results. Normal saline solution is commonly employed under these circumstances. Some advocate the injection of fresh beef blood to check intestinal hemorrhage.

For relaxing spasm, such as occurs in renal, biliary, or intestinal colic, as much as one or two quarts, at a temperature of from 101° to 104° F., is to be injected, in the case of adults. In the case of children a smaller quantity is to be employed. At times, especially in intestinal colic, a temperature of from 110° to 120° F. gives the best results.

[The nutritive enemata are described in Vol. I., under the head of *Alimentation, Rectal.*]

Intussusception.—In this condition the enema may often prove a useful therapeutic agent through its mechanical effects. When it is administered for this purpose, the patient's hips should be elevated and the shoulders depressed. Some advocate Trendelenburg's position. Emmett Holt, in the case of infants or young children, places them in the dorsal position, with the thighs flexed, and, from time to time during the injection he inverts the patient, gently manipulating the tumor through the abdominal wall. "Hydrostatic pressure should supply the force required. In the case of adults the long colon tube should be employed, while for infants a small catheter, No. 18, will be found better suited to the work. As regards the height at which the fountain syringe should be hung, I may state it to be four or five feet above the patient; this elevation giving a pressure of not over three pounds to the inch. Occasionally it may be necessary to place the bag at an elevation of six or even eight feet, in order to increase the pressure, but this is rarely advisable." (Holt.)

Experiments made upon the cadaver, for the purpose of throwing light upon this question of pressure, furnish results which are apt to be misleading; and it must be remembered that great pressure upon the wall of a viscus like the intestine, especially if it be in a damaged condition, is likely to prove dangerous.

The solution to be employed should consist either of water or of normal salt solution. Holt also advises milk and water or thin gruel as being less irritating than plain water. He advocates at times the injection of air. The injection of oxygen, as employed by Dr. Clement Cleveland, in post-operative intestinal obstruction, or paresis, should be of value (N. Y. *Medical Record*, January 5th, 1901).

"The temperature of the fluid employed should be at some point between 100° and 105° F., and in all cases an anæsthetic should be administered. The quantity of fluid to be injected should vary according to the position of the intussusception. The best guide as to the amount is furnished by *the degree of tension of the abdominal walls.* During the progress of the injection the buttocks should be held tightly together, to prevent escape of the fluid. If at any moment the tension should seem to be too great, the pressure upon the buttocks may be withheld and some of the fluid allowed to escape. As a further guide, in estimating the amount of fluid to be injected, we can remember that the colon of an infant, six months old, will hold about a pint without distention, and that, at the age of two years, it will hold two, or possibly three, pints. The adult colon holds considerably more than a gallon (Weir says nine pints, or a little over) without distention. Pressure should be kept up for from ten to twenty minutes, or even for half an hour. If the injection fails to reduce the intussusception within this time, then stop. A second attempt can be made within two hours, and if failure again results, then resort to laparotomy." This is the advice given by Holt. My own personal view is, that it is better to resort to operative interference after one failure of the injection.

The *low enema* is one in which the fluid injected does not extend beyond the rectum. For this purpose a fountain syringe, provided with the short rectal tip, well lubricated, is to be preferred. A Davidson syringe or even a suitable pattern of a hard-rubber hand syringe may be employed when only a small quantity of fluid is to be injected.

In this form of enema the patient may occupy either the dorsal or the semi-oblique or the sitting posture; and, when solutions of a high temperature are employed, it is well to lubricate the nates and the anus as far as to a point beyond the sphincter. If the enema is to be retained, the patient should assume either the dorsal posture, with the hips elevated or what is known as the Sims position.

The conditions which call for the use of the low enema do not differ materially from those which suggest the desirability of employing the high variety. In fact, the difference often amounts simply to this: in one set of cases it seems desirable to inject a small mass of fluid, while in the other a larger quantity appears to be required. Thus, in shock, uræmia, etc., from two to six ounces of normal saline solution, at a temperature of 110°–120° F., are injected; the intention being that it should be absorbed.* Such an injection should be given very slowly, and, as the tip is withdrawn, a towel should be slipped over the anus, and the buttocks should be held together for some minutes thereafter to prevent escape of the fluid. Then, again, small enemata of starch water containing ɱv.–xij. of laudanum, or of tincture of belladonna, etc., often prove useful in allaying irritability of the rectum or adjacent organs. Finally, in cases of dysentery, etc., after thorough irrigation of the bowel, enemata of this class are generally of value.

When it is desired that the fluid injected should be retained for a short time and then evacuated, the quantity employed should vary from two ounces to a pint, according to the circumstances of the case. The temperature of the fluid should vary in a similar manner; hot solutions (from 110° to 120° F.) being best suited to certain conditions, and cold (from 90° to 60° F.) to others. There are even cases—those of internal hemorrhoids, for example—in which iced water may be used to advantage. On the other hand, there are individuals who show a decided repugnance to cold enemata.

Enteroclysis with a Single Tube.—Enteroclysis with a single tube may belong to either of the two varieties—the high or the low. There are several methods. Thus, for example, a colon tube or large catheter is introduced into the bowel and a fountain syringe or a funnel is attached. A definite quantity of fluid is allowed to flow in, and then the fountain syringe is detached, or the funnel is lowered below the level of the patient and the solution evacuated. This procedure is repeated a second time, or several times, according to the indications, or until the fluid that returns is quite clear. As already stated above, both the temperature and the amount of the fluid employed should vary according to the individual circumstances of each case.

A Y-shaped glass tube may be attached by its stem to the rectal tube, and by its forks to the fountain syringe on the one hand, and to a carry-off tube on the other. By checking the outflow through the latter while allow-

*In these conditions an even larger quantity, if it can be absorbed, is preferable.