recurrence. This removal, however, must be a thorough one. It must include all the musculature of the tongue as far down as the hyoid bone. I had the misfortune of seeing a recurrence in one of my cases, where I had failed to remove all the muscles of the affected side of the tongue, owing to my wish to avoid undue mutilation. The patient suffered with a cancer of the lateral aspect of the tongue, about the middle. It was comparatively localized and I decided to remove it by Whitehead's operation. I completed the whole operation at one sitting. I performed a very extensive operation on both sides of the neck and removed all the lymphatic glands. I did not open the buccal cavity from below. After the wounds of the neck had been closed I removed one-half the tongue, as completely as possible, by the intra-buccal operation. The patient did fairly well, but about ten months after the primary operation presented himself to me with a recurrence of the growth in the sub-maxillary region on the affected side. Examination showed that this growth was in the stumps of the muscles left behind. It was adherent to the side of the jaw and was comparatively localized. The patient refused further operation. I am convinced that, in this particular case, if I had opened the buccal cavity and removed the whole of the muscles of the affected side of the tongue that the recurrence would not have happened.

Dr. George T. Tyler, Greenville, S. C.—I think Dr. Horsley has shown the importance of a very radical operation. One thing that has impressed me: The almost impossibility of getting it all at one time.

I recall with a good deal of satisfaction a case of cancer of the cheek which I operated upon and reported in the *Southern Medical Journal* of December, 1913. I did a block dissection, removed all the glands possible, including the sub-maxillary gland on that side. The patient had a satisfactory recovery.

I think that these cases should be watched carefully and seen at short intervals after the operation. I removed in this case, three times, recurrences near the site of the operation, and each one of the sections removed showed involvement of the malignant process. One of these specimens (and I am very glad Dr. Thompson brought that out), was from the other side of the neck.

In spite of all I could do to keep after this man, he developed a recurrence near the site of the original operation which he would not allow me to remove. Later the wound broke down at the line of the incision and he had a sloughing mass there.

Why do these growths recur soon after at the site of operation? In doing this kind of work, are we thinking about recurrences? In spite of that they do come back near the site of the original growth. Can it be that in spite of our efforts we have not removed enough tissue? I do not know.

I wish to stress the absolute importance of observing these patients at short intervals and removing the recurrences whenever they appear. In this case I gave the patient one year of life, but I believe I could have cured him had he al-

lowed me to remove those recurrences as they were noticed.

Dr. J. L. Jelks, Memphis, Tenn. I wish to ask a question, because I know the essayist and one or two others who have discussed this subject are very thorough men.

A question has arisen in my mind and been fixed there for several years that seems to have been answered rather contrary to the opinion that I have had drilled into me by teacher and experience: That secondary or metastatic cancer, following operations in the buccal cavity, is extremely unsatisfactory. Now, gentlemen, it appears here that some satisfactory reports have been made, but I have never seen a secondary operation for cancer originating in the buccal cavity in the mouth avall anything; and here are men that can answer these questions, after thorough work. Have they gotten permanent results at any time following secondary operation?

Dr. E. C. Samuel, New Orleans, La.—Hearing such prominent men as Dr. Horsley and Dr. Thompson, of Galveston, talk, we ought to say a word about X-ray conditions. Probably neither one of them thought of mentioning that. If you have the conditions mentioned after operation, I think that the patient should be given the chance of combined deep therapy and radium if it is available, especially radium. Dr. Horsley has mentioned one of his cases that had a thorough course of radium treatment with a recurrence, but do not stop at that one case. Every case should be given a chance, if possible, especially with deep therapy.

Dr. Matas makes it a practice that every case of carcinoma operated upon is referred to the Roentgenologist as soon as possible, to refer him to the X-ray department. We are not able to follow up the patients far enough, but it is a means of giving the patients something, anyway, especially if you are going to get a recurrence. Give them the chance of thinking there has been something done. We may accomplish some good and we may not, but if there is a chance let the X-ray man give that result, if possible.

TREATMENT OF SUPPURATIVE APPENDICITIS.*

By SOUTHGATE LEIGH, M.D., F.A.C.S.
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During the past few years appendicitis has not received its proper share of attention at our meetings. This is unwise. While it is true that the disease is well understood by the general profession, and well handled by the surgeon, yet there is still room for improvement in our knowledge and technique. The death rate has

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been greatly reduced, and yet it should be lower still.

We shall attempt briefly to mention a few points that it might be to our mutual advantage to discuss, and some of which offer room for improvement.

The general practitioner has made great strides in prompter diagnosis and advice for early operation.

Improvement can be made, however, in the early handling of appendicitis cases.

DRAINAGE MATERIALS.

The tubes are made of blue rubber, quite soft and yet firm enough not to kink. They are perforated as required. The cross section shows exact size and thickness. These tubes are made for us by Powers & Anderson, of Richmond, Va. The rubber dam is in tubes of 3-8 and 5-8 inches in diameter. The large size is used for carrying strips of gauze.

Cross Section of Tubes Showing Exact Size and Thickness.

Just as soon as appendicitis is suspected, the patient's bed should be immediately elevated at the head and the patient kept on the right side. In such position, if rupture takes place the septic fluids will either remain at the site of the appendix and become walled off or gravitate into the pelvis, where they may be more safely taken care of by the serous membrane, be more conveniently reached at the time of operation, and the dangerous region of the upper abdomen will be thus safeguarded.

Either nothing at all should be given by mouth, or else only ice, water, and the simplest forms of liquid nourishment, such as egg albumin and broth, the rectum being used if need be for water and nourishment.

The question of transportation is most important, the patient's shoulders being well propped up and inclined to the right side. This must be strictly done in all carriages, wagons, trains and ambulances used for the sick. The last named should always be equipped with an elevating stretcher. Some years ago, being impressed with the importance of this subject, we devised such a stretcher which, together with a bed elevator, are shown in the accompanying cuts.

Cathartics should never be given in acute appendicitis. Low enemas may be safely used with the patient in the elevated posture.

It is our custom when a case of suspected suppurative appendicitis reaches the hospital immediately to place him on an elevated bed, on the right side, with ice bag applied. The first question for us to decide is whether the case demands immediate operation or a delay of a few hours will make any difference. After a tiresome trip a delay is often best for the patient, the local condition permitting. In deciding this point, the white blood count is most helpful. If above 15,000, we usually operate at once. The degree of tenderness, rigidity of the rectus, distention and condition of pulse, however, all must be considered.

Except in desperate cases, we nearly always give a low turpentine enema. If there is delay, the skin is prepared; if not, the shaving is done while the anesthetic is

ELEVATING STRETCHER.

The Stretcher is made of iron tubing and covered with canvas. There is a simple ratchet attachment which holds the elevation at any desired angle.

being given and the skin painted with tincture of iodine.

The anesthetic is of major importance. In our own clinic we are much attached to nitrous oxid-oxygen, which we have now used in 2,900 cases, not only without mortality, but without any bad effects, either direct or indirect. It is especially helpful in severe appendicitis, adding practically nothing to the shock, producing no irritation of the lungs or kidneys, and accompanied either by no nausea or a minimum amount. In skilful hands it seems to be absolutely safe. In the many desperate cases where we have employed it, it apparently has added nothing to the risk. We have frequently resorted to it where we would not have dared to give chloroform or ether.

The location of the incision in cases of suspected suppurative appendicitis is important. Drainage through the old longitudinal incision leaves a very weak spot which nearly always requires operation to close. Many surgeons advocate a counter opening for drainage. This is often unsafe, not affording a sufficiently free outlet for the pus. For several years we have employed the "transverse incision" in these cases. We make the skin and

fascia cut more or less transversely, then

BED ELEVATOR AND FOOT REST.

Bed Elevator is made of two boards 41 inches high and 11 inches wide at base, fastened together 28 inches apart and notched at intervals of 5½ inches. The notches are to hold the lower cross bar of the head of the bed. The foot rest is placed at the foot of the bed to prevent the patient's slipping down.

separate the muscle fibres and stretch the wound as wide as may be needed, giving

abundance of room for all necessary manipulations.

The drainage materials are brought out at the extreme outer end of the wound. To bring this drainage opening as far as possible to the right requires at times the cutting of a few fibres of the muscle. The main part of the incision is cleansed thoroughly with bichlorid and sutured layer by layer with chromicized catgut, reinforced by a few sutures of silkworm gut. This method, even when large tubes are used, affords the best of drainage and leaves the weak spot so far out that it rarely leads to hernia.

The toilet of the intestines and peritoneum should have the most careful attention. In that large class of cases where there is a small abscess, completely walled, with the general peritoneal cavity free from infection, the operator should be careful to prevent escape of pus. To do this, salt pads must be neatly packed around in every direction, making a complete wall protecting the free peritoneal cavity. Then only should the adhesions be loosened. This loosening must be done so gradually that the pus will come out slowly and be absorbed by small sponges as rapidly as it emerges. When the pus is all out the pus cavity is carefully dried, and not until then should the appendix be sought for, unless, of course, it is free in the abscess cavity. The appendix is tied off with chromicized catgut, the stump cauterized with pure carbolic and turned in (if the tissues will allow) with a purse string suture of chromicized catgut. The use of non-absorbable material such as silk or linen for either ligatures or sutures in these drainage cases will often lead to troublesome sinuses.

After the removal of the appendix the pus cavity is again dried out and packed with tails of gauze passed through rubber dam tubes. The dam prevents much of the pain of dressings. (See cut.)

The packing should cover all infected surfaces. The salt pads are now removed, the drainage materials brought out at the outer end of the incision and the wound closed as before.

In large abscesses adherent to the abdominal wall, where the pus is reached extra-peritoneally, while careful examination should be made with the fingers in the abscess cavity for the appendix, it is

manifestly unwise to open the peritoneal cavity in further search. Such a procedure would convert a simple harmless condition into a severe and dangerous one.

We have always contended for this method, though many authorities, especially Deaver of Philadelphia, formerly insisted that the appendix should be removed in every case. The most progressive surgeons now advocate the conservative course. Statistics show that but few of these cases have a recurrence. It is rarely necessary to perform a secondary operation, though the situation should, of course, be explained to the patient.

The same course should be pursued in those cases of large abscesses which are non-adherent to the outer abdominal wall. They are treated exactly like the small abscesses, except that if the appendix is not readily found it should not be searched for further.

And now we come to consider that very important class of cases of suppurative appendicitis in which the abscess has not been walled off by adhesions, and in consequence the general peritoneal cavity has become infected. The degree of severity and the extent of the peritonitis depends on the length of time since the rupture, the resisting power of the patient and the position in which the patient has been kept. We could mention a number of cases where the "position treatment" was followed from the beginning of the attack with most helpful results; at operation the upper abdomen being found free of pus, which had collected only in the pelvis and around the appendix.

In the operative management of these cases, the transverse incision must be stretched to allow free access to the peritoneal cavity. Incisions are preceded by injecting novocaine solution to produce "nerve blocking." The greatest possible gentleness is exercised in the handling of the tissues.

No irrigation should be used, but the pus wiped out carefully with sponges. After all the pus which is accessible is thus cleaned out, pads are cautiously inserted and the appendix searched for and removed, a pad being packed into the site of the appendix, which is usually quite dirty. The pelvis is often found full of pus, which should be removed by suction. A large soft rubber tube is

passed well down into the pelvis and another slightly smaller up toward the liver. Frequently we pack the old appendix site with strips of gauze, though in some cases we use a third tube instead. The ends of the drains are brought out at the outer end of the incision, which is sutured as described before. Gauze wicks are passed down into the tubes to facilitate drainage. The dressings are securely fastened in place to prevent slipping. The patient is put to bed, elevated at an angle of from 15 to 40 degrees, and kept constantly on the right side. This position is so arranged that the outer openings of the tubes become practically the lowest point of the pelvic and abdominal cavities. We have for some years contended for this position as against the simple dorsal elevated position, and our experience bears us out as to its usefulness and superiority. We realize that many good surgeons advocate the other position, and yet we believe that we have demonstrated that the combined elevated and right side position is superior.

Of course in the most desperate cases of diffuse suppurative peritonitis the operation must be performed with extreme rapidity, and consists often of simply making an opening and putting in large tubes, the appendix not even being sought for unless it be close at hand.

In the after-treatment of suppurative appendicitis we must divide the cases into three classes: the non-adherent abscesses, the large adherent abscesses, and those in which there is more or less general infection of the peritoneal cavity.

In every case elevation and the right side position are a safeguard and help.

In the first class we give salt solution by rectum by the continuous method in a small proportion of cases. The packing is gradually removed and replaced by rubber dam, the wound being dried daily and made to heal from the bottom. The general treatment is simple. The patients requires but little medication. The bowels move without difficulty and liquid nourishment is begun early. There are necessarily some adhesions which must be borne in mind in dieting and in avoiding constipation, both during the stay in the hospital and for several months afterward.

In the second class, adherent abscesses, the treatment is still simpler, the abscess cavity being treated by careful irrigation and sponging, and kept well open until healing is thorough from the bottom.

In the third class, the skill of the surgeon and his assistants is well tested in

RECTAL INFUSION APPARATUS

This consists of an ordinary infusion bottle, regulating screw, visible dropper, double tubing (one branch to allow a gas outlet for the bowel), and medium size catheter for the rectum. The solution is kept warm by hot water bags around the bottle, or better, a hot water bag on the tube near the rectum, as recently suggested by Dr. Scott, of Texas.

the details of the after-treatment. Good judgment and close and careful watching are required both in the local and the general handling. While now-a-days the greater part of surgical work is done in the operating room, here we have a condi-

tion in which the post-operative treatment is of equal importance with the operation.

Success in this treatment depends more than anything else upon the complete and willing co-operation on the part of the patients. We find it best to present the matter clearly before them, stating the exact condition, and making it very plain that their life rests practically in their own hands. After such a conference between patient and surgeon there is usually no difficulty from that direction.

The most tiresome part to the patient is the position, but this may be varied a little from time to time, and is greatly helped by frequent rubbing with alcohol.

The administration of fluid by the bowel has the following good effects:

1. It so fills up the blood vessels and lymphatics of the abdomen and pelvis that they do not so readily absorb the septic fluids.

2. It stimulates and nourishes the system and increases the power of resistance.

3. It is a convenient vehicle for the introduction of medicine and nutriment.

4. Its use prevents any difficulty in moving the bowels.

Many appliances have been devised for this purpose—some more or less complicated. The one which I shall show you is most simple both in get up as well as in use. (See cut.)

For the first six or eight hours we use normal salt solution, and then change to tap water. If diacetic acid shows in the urine at any time we add sodium bicarbonate, one or two ounces, to each pint of water. The urine must be frequently tested.

When the patient is badly nourished, or when the condition of the stomach prevents the necessary administration of food, glucose $\frac{1}{2}$ ounce to the pint is added to the liquid, and furnishes the best rectal nutriment available.

The usual rate of flow of the liquid is from thirty to sixty drops a minute. Ordinarily this may be kept up continuously for forty-eight hours, when it frequently becomes necessary to allow a short interval of rest from time to time. In most cases the infusion is continued off and on for from three to six days, longer being rarely necessary. The patient is kept in

the elevated right position for about the same length of time.

The degree of elevation varies with the case. We try to place the patient in such a position that the outer openings of the tubes become as nearly as possible the lowest point of the pelvic and abdominal cavities. We have never yet had a single case in which the drainage from this position was not good.

In the desperate cases we frequently give salt solution under the skin or into the vein, on the operating table, and repeat the process by the former method every few hours on account of depression or if the patient fails to retain sufficient fluid by rectum.

In suppurative peritonitis cases we are never in a hurry to start nourishment by the mouth. Ice and water in small quantities are given in a few hours after the operation, but liquid nourishment by mouth, even such simple food as albumin water, is delayed for twenty-four hours or longer. Of late we have been adding glucose to the saline after the first twenty-four hours. The glucose especially is a good food; it is readily absorbed and does not interfere with the dropping of the solution.

The stomach tube is resorted to promptly and repeatedly on the least sign of acute dilatation. One must be slow in the adding of soft and especially solid food. There are necessarily many adhesions, and great care should be exercised to prevent intestinal obstruction. If such symptoms should appear, the patient is put at once on the elevation and rectal treatment and all nourishment by mouth cut off. It is remarkable how quickly severe obstruction symptoms will disappear under this simple treatment.

Cathartics should be used cautiously in suppurative peritonitis cases and in a simple form. We employ lapactic pills, aloin, podophyllin and cascarn tablets and Robins' pills. A low cleansing enema is given daily, and if the bowels do not move sufficiently turpentine is added. If this is not sufficient, notwithstanding the previous cathartics, we give cautiously a small high irritating enema containing turpentine, salts, glycerin, etc. Where the continuous rectal treatment is being used there is very rarely any difficulty in moving the bowels.

In the way of drugs, besides the cathartics already mentioned, we use, when indicated, moderate stimulation, hypodermically, with strychnine, spartein, caffein, atropin, digitalin and adrenalin. Physostigmine salicylate is certainly helpful for gas distention, as is also asafetida by rectum.

The wound dressing is important. For the first few days this is done morning and night. Suction is used to clear the tubes of fluid and fresh wicks are inserted. Free absorption of fluid from the bowel sufficiently delays the formation of adhesions and the discharge from the tubes continues quite free. Later the tubes are gradually shortened and finally replaced by rubber dam, which is used as long as it is necessary to keep the sinuses open.

It would hardly be interesting, and would take up too much time, to give a detailed account of our cases, which have been many and varied.

Outside of the moribund cases, we have had but few fatalities.

Since the introduction of the Fowler-Murphy treatment and our modifications, our results have been most gratifying. While we look upon all cases of general peritoneal infection as being entirely uncertain as to outcome, yet we know that, with the present methods of treatment, with thorough co-operation on the part of the patient, and with a resisting power not previously too much depleted, practically all will recover.

DISCUSSION.

Dr. A. L. Blesh, Oklahoma City, Oklahoma.—I congratulate the essayist upon this paper, for the reason that in the mad scramble to do gastrojejunostomy and bone grafts and all that sort of thing, we have forgotten that old subject of appendicitis. It is an indictment that today we yet have to deal with suppurative conditions in appendicitis. It is an indictment either of the profession or of the laity. It is of the profession, in the last analysis, because we have failed in our duty as educators. It is a crime that we yet have suppurative conditions to deal with and the manifold conditions following therefrom.

The essayist calls your attention to the blood count as an indication in operation. Several years ago I made a prolonged study of the blood count as an indication, dwelling largely upon the differential. I cried "Eureka! I believe I have it!" I believed then that a low differential was a safe indication, and the contrary, a danger indication.

I have now with a larger experience come to this conclusion: The time to operate a case of appendicitis is just as soon as you can get to it and

make your diagnosis;—and when you are in doubt about your diagnosis, operate anyway. Why not? We know that appendicitis is a disease which is very common indeed; that it takes a great toll of life, even today; and what man is there among the laity that would hesitate to pay \$150.00 or \$250.00 as a guarantee that he would not have appendicitis in the future? He will pay that sum to insure his house against fire, yet he does not expect his house to burn down. It is the safest assurance we have against appendicitis, and when the appendiceal region is sore, I believe it is the safe course to operate. The blood count has ceased to be a guide to me as an indicator for operation in appendicitis. I believe with Dr. Murphy that the thing to do is to operate as soon as you see the case.

As to drainage, I use a simple rubber-tube drainage. I open the abdomen as quickly as possible, and I wish to dwell thoroughly upon that word, "quickly"—and stick in a tube. Do not spend much time mopping out. Just simply get a tube in there. If the appendix bobs up invitingly, take it out; otherwise, let it alone. The toilet of the peritoneum, in a suppurative case, may be ignored. You should have no dealings with the general peritoneum. Stick a hole in there, put in a tube and get out. That is the proposition.

No antiseptic should be applied inside the cavity. That is a universal rule. Nature will take care of the contents if you give her half a chance,—and do not believe for a half minute that you can supplant Nature. If you will give her any little help, she will pull you through. These patients will be brought to you from the four corners of your states, with the septic material welling up in the danger region of the diaphragm, and the patient in profound toxemia.

Rapidity of operation; it should be done with the utmost celerity. I believe that the operator who spends ten minutes is going to lose twice as many cases as the operator who spends five minutes.

Adhesions: These are nature's means of protecting the general abdominal cavity against infection, and for that reason should command the utmost respect of the surgeon. He should not unthinkingly or carelessly, in suppurative cases, break up these adhesions. Whatever they may determine—in obstruction of the bowels or what not—he has not that question now to deal with; but the question he has now to deal with is, "How am I going to carry this patient through this particular critical time?" Sufficient unto the today is the evil thereof; hence the adhesions while commanding the attention of the surgeon in their proper time and place, must not now be thought of, and instead he must give his undivided attention to the imminent danger present in the overwhelming toxemia.

Dr. W. W. Grant, Denver, Colo.—This subject is old, and yet ever new, and will remain so as long as the mortality remains as high as it is. The mortality is high because of late diagnoses. In all cases the late diagnoses give the poorest results.

There is no condition in which a man should be clearer as to what is best to do than in appendicitis. There should be no doubt about what he is

dealing with, and absolutely none in the perforated gangrenous cases.

I believe that the surgeons who have most experience in the treatment of these cases do not believe in quitting until they have removed the focus of infection—a gangrenous appendix. The Oschner treatment has, as Dr. Oschner treats the subject, probably done some good in his hands, but as understood and practiced by the profession it has probably killed more people than it has saved. The Oschner treatment affords an escape for timid surgeons who have not the courage and skill to meet the radical indications.

Remove the appendix when the patient has life enough to stand, a little while, the operative procedure.

The appendix is better or gangrenous soon after thirty-six hours. There should be no doubt what the future will determine after this length of time. No case is primarily acute, but all are subsequent to, long standing appendicitis of a mild character and demand radical treatment at all times. Early and complete operation is the only solution to prevent the present high mortality rate.

Dr. J. A. Crisler, Memphis, Tenn.—I am very much interested in the subject matter which Dr. Leigh has so beautifully given us. I think he has read the best paper that I ever heard on this subject. I believe that he will surely save more lives by his technique than without it, because he carries gentleness and good horse sense throughout every line. A man who is as painstaking and careful and respectful of tissues and of gravity and every other sensible condition that must tend to benefit the patient, deserves and gets a low mortality.

As to the walled off cases, I agree with Dr. Grant; it is just as well to get in and get out quickly and drain these cases for most of them get well. However, in our cases we wash out these abscess pockets with a 2½% solution of iodine and render them still more simple. The cases of general peritonitis and suppurative peritonitis so called, are no longer a nightmare to me. If these patients come into our hands before all of their fighting forces are gone, we use the iodine treatment with which you are all familiar, after which we feel safe about the outcome. To those of you who have not tried it, I do not expect you to believe it. I surely would be slow to believe it and exceedingly doubtful as to the outcome, if I knew no more about it than many of you do. In the first place you are staggered at the thought of pouring a 2½% solution of iodine (in alcohol) into the abdomen for fear of producing immediate death from the toxic effects of the drug. Then you imagine that if the patient survived this, that the subsequent adhesions would be another factor to be considered most seriously. Our records show that within the last seven years we have operated upon something over forty cases for ventral hernia and for other purposes, following previous operations for suppurative conditions within the abdomen. Some of these hernias were of several years standing, during which time adhesions could have formed if they were going to, following the use of our iodine treatment. I tell you truthfully and candidly that we found less adhesions in these cases following the use of the iodine method, than we have found

in cases similar, upon whom the iodine method had not been used. The matter of adhesions like the matter of toxicity becomes a very secondary consideration. In fact we claim that in cases of extensive peritonitis, the iodine treatment prevents, rather than encourages adhesions. The treatment is life saving and that is what an operation is intended to do. Dr. Leigh's technique will always be worthy and should be employed in every case of appendicitis that is terminating toward peritonitis. When we open the abdominal cavity and find fibrin plaques and free pus everywhere, we pour the abdomen full of a 2½% solution of iodine and if the patient's resistance and fighting forces have not entirely disappeared, they will get well. These are facts and personally I care but little whether or not you adopt the treatment. However, if you will use it liberally and freely as Dr. Crook and others have used it and have seen us use it, you will no longer condemn it, for your high per cent of recoveries in these desperate cases will make you an iodine convert.

Dr. Grant.—Are those general septic cases?

Dr. Crisler.—Yes sir, general suppurative peritonitis and all grades of peritonitis from diffuse to local, walled off abscesses. Drs. Blackburn and Hancock saw me use this treatment a few days ago in two large, walled off abscesses. However, this form of abscess will quite frequently recover without any other treatment beyond simple drainage. We believe that the iodine treatment hastens the process of recovery.

Dr. Grant.—The investigations of Yates and the Johns Hopkins School have demonstrated conclusively that you cannot drain the peritoneal cavity, and that you would have protective or adhesive inflammation very soon afterward. Would you not have protective peritonitis?

Dr. Crisler.—I started to answer your first question by telling you that the classification of peritonitis is immaterial. In cases of so-called general peritonitis, from whatever bacterial origin, a large per cent die without the use of the iodine treatment. With its use we have better and more abundant drainage, because the adhesion process that would tend to shut off the drainage into separate pockets, does not readily form.

Dr. Leigh.—The chair has given me permission to ask a question. Suppose you have a case in which the pus is not only in the pelvis, but extends to the upper abdomen and under the liver, how, exactly, would you apply iodine and in what amounts would you feel justified in applying it?

Dr. Crisler.—I would certainly use the iodine treatment in such a condition most liberally. Very likely I would use as much as a quart and the only fear I would have, would be that the solution might not, per chance, get into every fossa and every pocket in the whole abdomen. You understand that we use 2½% solution, whereas the official tincture is a 7% solution.

Dr. Grant.—What is the solution in?

Dr. Crisler.—In so-called "pure grain alcohol." The same from which the tincture is made. After its use, it begins to appear in the urine about the 18th or 20th hour, during which interval, we believe there is no absorption either of the iodine or the toxins from the peritoneal cavity.

Its elimination through the kidneys is at its height about the 3rd and 4th days following its use.

Dr. Grant.—What per cent alcohol?

Dr. Crisler.—Ninety-five per cent. What is called commercially "pure grain alcohol."

Dr. Thos. H. Hancock, Atlanta, Ga.—I appreciate very much this excellent paper. Dr. Leigh and I had the same kind of training and I agree with him in every particular, but last Saturday in Memphis I had the pleasure of seeing Dr. Crisler do two appendectomies; they were both suppurating cases but the abscesses were walled off. He remarked that he was sorry that they were not cases with general peritonitis because all of this kind got well anyway. From one of them he removed a slough about five inches long, evidently from the omentum, made a counter opening in the side, poured in about a pint of a 2½% solution of iodine crystal in grain alcohol (95%), inserted drainage in both openings and closed the wound. The other case was simply opened, the same solution poured in, drainage tubes inserted and the wound closed. He exhibited two cases that he and Dr. Johnson had operated upon two or three days previously for general peritonitis; one of them a puerperal case with pus pockets generally in the peritoneal cavity. They had both been flushed out thoroughly with this solution and they were both doing nicely. One of them had evidently been in a desperate condition. With the doctor's permission I want to see these cases when I pass through Memphis going home, and if they are all alive, I will be an iodine convert.

Dr. Jere L. Crook, Jackson, Tenn.—It has been my privilege, Mr. President, to hear the Doctor (Dr. Crisler) present this subject on many occasions, and he has been assaulted by many distinguished surgeons. He said he and his associate began his studies on the brutes, then on up in the scale to the Negroes and finally on the white race; and it was remarked at that time that it was a fortunate thing that he could work up gradually, because he had to encounter the most serious prejudice from the civilized world, that you could pour iodine and alcohol into the abdominal cavity, but he does not use iodine except in extreme sepsis, and never without following it with drainage. He was criticised severely in Lexington, and the gentleman from Louisville who stated he had injected iodine into the cavity of eight or ten dogs, did not see the point. He did not put in drainage. He also injected into the cavity which did not have the defense which every infected case has. Nor do I believe the fact that it has not been done by others is a reason for doubting its value. I think that when a man of reputation and ability has had the experience and can present it to us and to intelligent audiences everywhere, and can prove it by many intelligent men who have seen him operate, we should believe him. Then, if we can further bring the treatment before the bar of mortuary statistics and find that it is sustained here, then I believe indictment against this method of treatment cannot be sustained. I have used it myself in general septic, purulent peritonitis, in which the patient would certainly have died, I believe; you may theorize all you want to, I simply know it does not kill the patient, and I believe it

is a large factor toward recovery, in many instances.

Dr. Grant.—Do you deny that encapsulation occurs in six to twenty-four hours, and therefore, if you pour iodine into the belly, you pour it into a pocket?

Dr. Crook.—I do not say that there is not some encapsulation. I do not say that every single portion of that peritoneum is infected with virulent inflammation, but when I open an abdomen and the pus comes right out and I find there is no effort on the part of Nature to provide any adhesions—where Nature has not had time to wall off the pus, and I pour in a pint of iodine and alcohol in 2½% solution and the patient's belly goes down and he gets well, then I take pleasure in substantiating the statements made by Dr. Crisler.

Dr. Leigh (closing).—I appreciate very much the full discussion, and especially that of Dr. Grant. I do not think it is an indictment against the general practitioner that many of these cases are suppurative. We must not lose sight of the old so-called "fulminating" appendicitis—the cases formerly considered fatal in which rupture took place at once. In these cases, even if operated upon as soon as gotten to the hospital, the whole abdomen is found filled with pus.

In regard to diagnosis, while we ought to try to make positive diagnoses, we should always be on the safe side. Undoubtedly there are some cases operated upon for suppurative appendicitis which turn out to be acute infection of the tubes. If we could be sure of that we should not operate, and still, if we are in doubt, it is best to operate. I am an advocate of free drainage. We should have too much, rather than too little. I have seen in a number of large clinics in the last year or two very small tubes, and even wicks used in draining these cases. This is unwise. In the bad cases we get in and out as quickly as possible.

I appreciate Dr. Crisler's complimentary remarks, and I am very much impressed with what he says about iodine.

Dr. Grant is certainly wrong about adhesions, because we have not had the means of finding out how much delayed the adhesions are by the use of salt solution by rectum. Liquid, by rectum, undoubtedly delays these adhesions. I know that from my own practical experience. How long, I do not know.

DIFFERENTIAL DIAGNOSIS OF DISEASES IN THE RIGHT UPPER QUADRANT OF THE ABDOMEN.*

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Much has been written and a great deal of discussion has occurred with reference to the diagnosis of diseases effecting the

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