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THE TREATMENT OF EXTRA-UTERINE PREGNANCY.

BY

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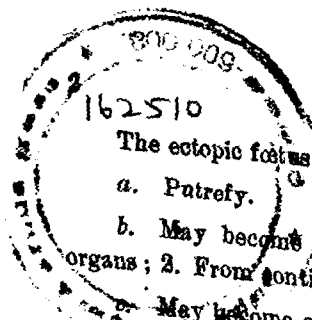


EXTRA-UTERINE gestation is of far more frequent occurrence than we believe. The operative treatment of this distinctly surgical condition can be discussed more intelligently after we have become familiar with the possible terminations of an ectopic pregnancy abandoned to the unassisted resources of nature.

An extra-uterine (tubal, ovarian or tubo-ovarian) pregnancy may go to term, and a living child be delivered, through channels created by the surgeon. In connection with this termination, one must keep in mind that extra-uterine children frequently die in the first few days of life; many of them have lived only a few hours. They are frequently the subjects of deformity. The operation necessitating their removal from the maternal organism may prove fatal to them. It may prove fatal to the mother, either immediately, from surgical shock or excessive hemorrhage, or remotely, from toxemia, septicemia, or pyemia.

The child may go to term, remain undelivered, and die, persisting in the maternal organism.

The foetus may die previous to term. Small embryos when expelled into the peritoneal cavity are promptly absorbed unless the placenta retains a firm attachment to the tube. Foetuses that die at an advanced state of development cannot be absorbed.



The ectopic foetus may:

- a. Putrefy.
- b. May become septic: 1. From communication with neighboring organs; 2. From contiguity with neighboring organs.
- c. May become converted into a friable fatty substance, then constituting what is known as an adipocere.
- d. May be transformed into a lithopædion, of which three chief types are distinguished.
- e. May become encysted by a connective tissue membrane, and remain quiescent for a time or permanently.
- f. The foetal cyst: 1. May be merely a mechanical inconvenience to the maternal organism. 2. May mechanically interfere with a subsequent intra-uterine pregnancy, and may have to be removed to allow an intra-uterine pregnancy to go to term. 3. It may irritate contiguous organs, excite rectal tenesmus, vesical tenesmus, painful micturition, etc., or determine pressure symptoms; intestinal obstruction by compressing the intestines; urinary retention by compressing the bladder or ureters, or cause various displacements of the uterus. It may cause errors in diagnosis.
- g. After the death of the foetus, the gestation-sac may be considered as a cyst—a foetal cyst. After death, the liquor amnii is absorbed. No more is secreted. The cyst shrinks. The walls may, and frequently do, become adherent to surrounding organs or to surrounding tissues, viz., bladder, vagina, intestinal canal or abdominal wall, by either or by several of which channels the cyst may eventually, completely or incompletely, eliminate its decomposed contents. Hence the cyst may rupture: 1. Into the bowel, by one or several openings. 2. Into the vagina. 3. Into the urinary bladder, and the foetal bones and other cyst contents be expelled per urethram. 4. Into the rectum, and the foetal bones and other cyst contents be expelled through the anus. 5. Into the uterus. 6. Into a cyst of other nature contained in the abdominal cavity. 7. Through the abdominal wall. 8. The foetal cyst may open and be eliminated through more than one channel in the same patient.

Rupture of the gestation-sac may take place before or after the death of the foetus. J. B. Sutton says that primary rupture takes place in the majority of cases between the third and the tenth week. Rupture is one of the terminations of tubal pregnancy, be the pregnancy tubo-uterine, intra-mural, isthmic, or ampullary, etc. Ovarian pregnancies are subject to the same accident. Primary or secondary gestation-sacs may rupture. The gestation may be arrested by this accident, or it may continue uninterrupted, though changed in type. The rupture is associated with hemorrhage, slight or profuse, circumscribed or diffused, belonging to one of the three following

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types, or to a combination of two or of all these types: a. Extra-tubal; b. Intra-tubal; c. Intra-mural. If the amniotic sac be ruptured and there be an outflow of the amniotic fluid, gestation will come to an end.

Extra-tubal rupture may occur: a. Into the peritoneal cavity; if the ovum does not perish, the pregnancy will be continued as a tubo-peritoneal or peritoneal pregnancy. b. Between the folds of the broad ligament. Pregnancy may here continue as an intraligamentary pregnancy, called by some authors a tubo-abdominal pregnancy. Intra-ligamentary pregnancy is far more infrequent than peritoneal pregnancy. c. An intra-mural rupture may lead secondarily to an intra-tubal or extra-tubal rupture. In intra-mural rupture, a thin layer of muscle tissue and peritoneum separates the blood-sac from the peritoneal cavity. It may be compared to the condition that obtains when a saccular aneurysm ruptures and the blood escapes interstitially. Intra-tubal rupture may, if the abdominal opening of the tube be occluded, lead to an accumulation of blood in the cavity of the tube, viz., hæmatosalpinx. If the abdominal end of the tube be not occluded, the blood passes out of the tube into the peritoneal cavity, giving us a pelvic hæmatocele or a hæmoperitonæum. The ovum, continuing to develop in the tube, may secondarily rupture, either into the peritoneal cavity or between the folds of the broad ligament, and gestation therein continue. If one variety of rupture fail to relieve the tension, the gestation-sac will probably rupture in another direction. The ovum may be carried out of the tube by the intra-tubal hemorrhage, giving us the condition of tubal abortion. The hemorrhage that attends and follows rupture usually requires immediate surgical interference.

We then have a most alarming complication of tubal or ovarian ruptures, hemorrhages, small or large. The amount of blood discharged bears no relation to the extent of the rupture. Severe hemorrhages can occur from very small orifices. The rupture may be punctiform in size; may be a large tear; may be almost a complete rending of the tube. Rupture into the peritoneal cavity may lead to the formation of hæmatocele, or to a flooding of the peritoneal cavity; the latter will cause the patient's death if the hemorrhage be not operatively arrested. There may be one severe and perhaps fatal intra-peritoneal hemorrhage, or there may be recurring hemorrhages, causing maternal death. Intra-peritoneal hemorrhage due to a ruptured ectopic gestation-sac has the same gravity as intra-abdominal hemorrhages due to other causes. The signs and symptoms of acute anemia are quickly produced.

If the extra-tubal rupture be between the folds of the broad ligament, the extravasation and accumulation of blood therein will separate these folds and a pelvic hæmatoma will be produced. This hæmatoma is almost invariably one-sided, and, needless to say, is on the side of the rupture. In some cases, however, it may dissect forward between the uterus and bladder,

or backward around the uterine horns beneath the peritoneum and extend to the opposite side. In those cases where the tension within the hæmatoma is sufficiently great, rupture may take place into the peritoneal cavity, giving us the combined condition of both intra-peritoneal and extra-peritoneal hemorrhages. The same may occur in a hæmatosalpinx. The excessive tension may lead to extra-tubal rupture into the peritoneal cavity, or between the folds of the broad ligament, or in both directions. The hemorrhage associated with the rupture of a tubal or an ovarian gestation-sac may, in itself, prove fatal, may lead to formation of a pelvic hæmatoma, or to the formation of a pelvic hæmatocele. These encysted blood collections—hæmatomata or hæmatoceles—may be and frequently are partially or completely absorbed, may persist as fibrous bands or masses, may become infected and thus be the seat of a suppurative inflammation. If the inflammation remain circumscribed, an abscess is formed. If the inflammation spreads to, or if the abscess bursts into the peritoneal cavity, a circumscribed or diffused suppurative peritonitis results. If the inflammation extends to the retro-peritoneal connective tissues, a cellulitis results, with all its accompanying dangers.

The migration of the ovum into the abdominal cavity, through the ostium abdominale, is known as tubal abortion (Bland Sutton). We may have tubal abortion. Tubal abortion may also lead to hæmatosalpinx. Usually, however, the blood escapes freely through the ostium abdominale into the cul-de-sac of Douglas, and either becomes encysted there, or escapes into the general peritoneal cavity.

In the early stages, abortion and rupture are due directly to the destructive action of the trophoblasts on the peritoneal and mucous surfaces. They can be indirectly due to increase of tension caused by hemorrhages from vessels, the walls of which have been destroyed by the ectoblastic cells. Tubal abortion may be complete or may be incomplete. In the former, there is usually one attack of pain and weakness. In the incomplete form, we have repeated attacks of weakness. The abortion, if the amniotic sac remains intact, and if the ovum resists absorption, leads to a tubo-peritoneal or peritoneal pregnancy. If the villi or placental attachments are destroyed, the ovum, being unable to form secondary attachments to other structures, dies. The expulsion of the uterine decidua does not imply the death of the extra-uterine foetus.

TREATMENT.

We assert without the least hesitancy that this is as truly a surgical disease as appendicitis, and though, as in this disease, a clinical cure may at times be obtained by non-operative measures, it is not common for that clinical cure to be an anatomical cure. We maintain with emphasis that the most conservative treatment is that which saves the most human lives. In

ectopic pregnancy, the viability of the child should not be considered, except as it endangers the life of the mother. The extra-uterine foetus is a parasite, a malignant new growth. We must destroy the foetus to save the mother. From the standpoint of treatment, we must consider: 1. Will the patient live—*a.* If she be abandoned to nature. *b.* If she be operated on; and 2. Are the dangers incident to opening the peritoneal cavity less than those of rupture of the gestation-sac. Without surgical aid, extra-uterine pregnancy always terminates fatally to the child, and frequently causes the mother's death.

Nature's tedious methods of relief, and the many dangers to which the woman is obviously exposed during its occurrence, justify surgical interference. Even the absorption of large uninfected collections of blood is far more prolonged than post-operative convalescence.

In the hands of the average operator, the only possible dangers to which the mother is exposed by the operative removal of the dead or live ectopic foetus are sepsis, hemorrhage, and shock. The first can be avoided, the second can be completely controlled, and the third can be minimized and almost always overcome.

Some operators make use of the terms "primary laparotomy" and "secondary laparotomy." In the former, the operation is performed during the life of the foetus. It is in accord with the theory and practice of modern surgery. It attacks tissues while they are healthy, in preference to awaiting nature's blind efforts to improve conditions. Secondary laparotomy is the operation performed after the death of the foetus. Grandin and Jarman, in discussing operative treatment, say: "The almost absolute mortality-rate of the past has been converted into the almost certain recovery-rate of the present."

The diagnosis of ectopic gestation is in itself an imperative indication for operation. Lives can be saved by accurate diagnosis, prompt decision, and skilful operation. The profession in general has not exhibited that keenness and alertness toward extra-uterine pregnancy which has characterized its study of appendicitis in the past few years.

The first indication is to stop the hemorrhage. This indication is urgent. Hypodermic medication will not accomplish it. To stop this hemorrhage, you cannot depend upon the coagulability of the blood, upon the lessened force of cardiac action; upon such agents as heat, cold, styptics, and the like. You must open the abdomen; you must stop the hemorrhage at its source by ligating bleeding-points with aseptic absorbable ligature material, if you have it at hand, with antiseptic or aseptic non-absorbable ligature material if the former be not at hand.

Even in the absence of urgent symptoms, do not delay operation. As long as the embryo or foetus lives, the placenta increases daily in size, in

vascularity, and in difficulty of removal. Furthermore, every day, the increasing size of the child and of the placenta adds to the danger of secondary rupture.

Having decided to operate, two pathways are open: 1. Through the vaginal wall. 2. Through the abdominal wall. In some difficult cases you may have to use both, the abdominal and the vaginal route. We recommend the vaginal route in only one condition, viz, pelvic abscess—when the gestation-sac has been converted into a pelvic abscess, where suppuration has occurred in an intra-ligamentary foetal cyst, or in all intra-ligamentary hæmatoma. The opening of the pelvic abscess by way of the vagina is a safe and wise surgical procedure. The results are almost always very satisfactory. 2. In those cases where the foetal parts closely press against the vaginal wall. Even here it may be necessary to make use of the abdominal route, in addition to the vaginal route.

Under all other conditions, in the absence of a contra-indication, we recommend that the abdominal route be employed, because the operator is enabled: 1. To remedy at the same time coexisting pathological conditions, as hydrosalpinx, obliteration of the abdominal ostium of the unaffected tube, etc. 2. To arrest the hemorrhage with greater rapidity. 3. To secure a more complete and a more careful hæmostasis. 4. To make a more direct examination. To judge better the extent of damage, and thereby make a more accurate diagnosis. 5. To make a more conservative ablation of organs, and to have the operative field under better control. 6. To more quickly come in contact with the condition, and to remove better and more completely the foetal sac and its contents. The separated ovum may ascend in the abdominal cavity, and it may be very difficult to find and remove it by the vaginal route. An abdominal incision enables the operator in case of an incorrect diagnosis to treat those conditions that simulate ectopic gestation. In operating, sight, as well as touch, is a very useful aid.

The greatest difficulty that we encounter near term, at term, or after term, in operating for ectopic gestation, is connected with the removal of the placenta. A slight detachment of the placenta often results in alarming hemorrhage.

We make use of an incision about one-half inch to one side of the median line; the edges of the resulting wound are better adapted to our method of suturing the abdominal wall. Avoid cutting the epigastric vessels. Avoid cutting the urachus. Cutting into a patulous urachus is as significant as cutting into a urinary bladder. The cut must be repaired. Make use of the Trendelenburg position. The patient must be placed in this position gradually, not suddenly. The return to the horizontal posture must also be gradual. The Trendelenburg position facilitates the gravitation of the intestines towards the diaphragm. It permits a better view of the pelvic tissues or organs.

In all operations for extra-uterine gestation the opposite tube and ovary should be carefully examined. In a few instances, the condition is bilateral. Extra-uterine pregnancy in some individuals has recurred.

Never make a needless sacrifice of tissues or organs. In the absence of a positive indication, such as a highly contracted pelvis, preventing the birth of a living child, etc., never remove the unaffected tube or ovary. As most extra-uterine pregnancies are tubal, early operation will permit the preservation of the ovary. The preservation of the ovaries is of benefit to the patient. Their removal causes the distressing symptoms of premature menopause.

The main difficulty in early and late operation is hemorrhage. The ideal treatment for hemorrhage incident to operations undertaken for the removal of ectopic gestation-sac is prophylaxis. Therefore, do not provoke uncontrollable hemorrhage. Proceed only after having well sized up the situation. Hemorrhage must be controlled by ligation or by compression of the bleeding points. A normal salt solution must not be given before the bleeding-points have been controlled or secured, either intravenously, subcutaneously, or per rectum. Once the bleeding-points have been controlled, its use is of signal benefit. It increases the volume of the circulating fluid. Do not close up the abdomen until you are satisfied concerning the hæmostasis. These hemorrhages are most profuse if the foetus is alive at time of operation.

If possible, avoid denuded peritoneal surfaces. They are possible avenues of infection. After a unilateral ablation of the adnexæ, suture to each other the folds of the broad ligament, from the superior pelvic strait to the angle of the uterus. Peritonization—that is, the covering with peritoneum of all denuded surfaces—lessens adhesion formation. These adhesions may be attended with colicky and other pains; may cause intestinal obstruction. Peritonization lessens hemorrhage; creates barriers capable of limiting the extension of inflammatory processes.

In attempting to remove the foetal sac and its contents, be careful, lest these efforts inflict much damage upon contiguous organs. Repair such damage before closing up the abdominal cavity.

The first condition, the treatment of which we will consider, is that of early unruptured ectopic pregnancy. In this case, there are usually no adhesions. If adhesions be present, they are separated, as in all other intra-abdominal surgical interventions, with great care and by the same methods. The incision (about three inches in length) is carried through the different layers of the abdominal wall into the peritoneal cavity. The incision is slightly to one side of the median line. It is an infra-umbilical incision. After the patient has been gradually placed in the Trendelenburg position, the intestines and the general peritoneal cavity are walled off from the pelvic cavity by compresses of gauze. The first step is to locate the uterus.

Using the fundus of the uterus as a guide, and proceeding to the right and to the left, examine both tubes and both ovaries. Ectopic pregnancy is located with about as equal frequency on one side as on the other. Separate the gestation-sac from any adhesions, if such exist. Then remove the gestation-sac (which is usually tubal), as a whole, if possible, by a typical resection of the Fallopian tube involved. Suture the folds of the broad ligament together; leave no denuded peritoneal surfaces. Close up the peritoneal cavity. Post-operative treatment is that of uncomplicated laparotomy. If the pregnancy be ovarian in type, and be early and unruptured, do a typical ovariectomy. Accuracy and rapidity in operating is as essential in these cases as in any other intra-abdominal work.

If the gestation-sac is ruptured and hemorrhage has occurred or is occurring, after opening the abdominal cavity, wall off the general peritoneal cavity by gauze compresses. Again, immediately locate the fundus of the uterus. Determine on which side is the ruptured gestation-sac. Seize the uterus with the hand preferably or with a double tenaculum, thereby locating and keeping in view the most important landmark. When you have determined on which side the rupture is (it is usually tubal), apply a clamp at the uterine end of the tube. This will stop all further hemorrhage from the ovarian artery of that side. Apply another clamp immediately below the tube, compressing the folds of the broad ligament, but not injuring the ovary. Then remove the affected tube and the gestation-sac. Ligate all bleeding points, suture the folds of the broad ligament and the tubal surface of the uterine stump. Remove as expeditiously as you can the easily removable blood and blood-clots contained in the peritoneal and pelvic cavities. Remove the embryo if it can be found without prolonged search. Let there be no needless exposure, no needless traumatizing of the intestines. Under exposure, undue handling of the intestines intensifies operative shock, and may be followed by the aperistaltic form of ileus. Post-operative treatment is that of acute internal hemorrhage for which a laparotomy has been performed. Use normal saline solution *secundum artem*.

The most dangerous conditions, from the maternal stand-point, are those in which the foetus is alive; the hemorrhage then may prove fatal. In these alarming cases of hemorrhage, some authors have suggested that the abdominal aorta be compressed. If the placenta be attached to the line of incision, the hemorrhage will be profuse, but can be stopped by firm compression. In those cases in which the foetus is alive, we have two things to accomplish, and they must be accomplished with the preservation of the mother's life. The first thing to accomplish is the removal of a living child. The last and most important is the removal of the ovular debris; that is, the placenta, membranes, etc. We shall not often be called upon to operate in cases in which a living child is present. For a physician knowingly to abstain from operating in a case of extra-uterine pregnancy before it reaches

term is, to say the least, injudicious. The best practice is to terminate these pregnancies early, or before the development of the ovum is much advanced.

Remove the foetus without disturbing the placenta. If the foetus is alive, the first thing to do after having opened the abdominal cavity and protected the peritoneal cavity by compresses from the outflow of amniotic fluid, is to remove the foetus, the umbilical cord having been ligated as in a normal pregnancy. Have the amniotic fluid escape externally as much as possible. Upon the maternal end of the umbilical cord a clamp is placed, the umbilical cord being cut either between the ligature and the clamp or between two clamps.

If the foetus has reached term or near term and is dead, there is some difference of opinion as to which operation is the preferable method—the immediate operation or the delayed operation—until the foetus has been dead for a month or longer. Our experience leads us to believe that the dangers attending delay are more than counterbalanced by the numerous dangers incident to the policy of expectancy, so that if the foetus is dead, be that death recent or of some standing, we will, after thorough preparation, incise the abdominal wall. Exceptionally, our incision carries us into the foetal sac. In such cases the peritoneal cavity will not be opened. This is liable to occur in some extra-peritoneal or broad ligament pregnancies. In this variety, the sac and placenta are entirely beneath the peritoneum. The latter may have been pushed up, even stripped for a considerable distance from the anterior abdominal wall. We will hastily remove the foetus without disturbing the placenta, ligating the umbilical cord near the placenta. Evacuate the contents of the sac, and then attempt to remove the sac and the placenta together, after having separated them from the surrounding structures to which they may be adherent. Usually, our incision carries us into the peritoneal cavity. In this instance, the patient is gradually placed in the Trendelenburg posture. The adherent intestines, omentum, and other viscera are separated, if feasible, from the sac, by tearing the adhesions apart, or cutting them between ligatures. Hemorrhage must be controlled as you proceed. The general peritoneal cavity is protected by gauze compresses, which are numbered and counted, and then the incision is carried into the ovum. Occasionally, you may be able to remove the ovum as a whole. If the placenta is not safely removable, if the nature of the adhesions of the surrounding organs to the ovum is such that their separation would prove disastrous, content yourself with evacuating the foetal cyst and then suturing its walls to the abdominal wound. The sac must be packed daily until the placenta has been expelled and the sac-cavity obliterated. If the placenta is to be left behind, it is better that it be not disturbed and made to bleed.

The following methods have been employed:

1. The foetus, the umbilical cord, and the amniotic fluid have been

removed. Everything else has been left *in situ* and the abdominal wall closed. This is an extremely risky experiment.

2. The foetus is removed, and more or less of the sac is resected. Drainage of the cavity of the sac is employed, and the placenta and sac are left for spontaneous expulsion. This is the most frequently employed procedure.

3. After the removal of the foetus, umbilical cord, and amniotic fluid, the placenta is removed in part—so much of it as is easily separated—and the remainder is left to spontaneous absorption.

4. The placenta is left *in situ* after removing the foetus. Then, after the expiration of a certain time, the placenta is shelled out, when it is hoped that the blood-supply is spontaneously cut off.

5. The placenta and entire ovum are removed immediately. Ideal measure, if feasible.

6. The placenta and gestation-sac are removed at once, likewise the neighboring organs, the uterus and ovaries, providing the hæmorrhage cannot otherwise be arrested.

7. Preliminary ligature of the uterine and ovarian arteries of the side from which the placenta receives its blood-supply, following by removal of the placenta.

There is no disputing the fact that the foetal sac and placenta should be removed completely if the procedure be consistent with the safety of the mother. The complete ablation of the ovum is theoretically the only perfect operation.

The method that we have had occasion to follow in those cases in which we feared to disturb the placenta is the following: After having incised the sac, we remove the foetus and other intra-ovular contents, and ligate the umbilical cord close to its implantation, resect a portion of the sac-wall and sew what is left to the abdominal wound. This closes off the general peritoneal cavity. It leaves us a large pouch, which we pack tightly with strips of aseptic gauze. Many authors employ iodoform gauze instead. We endeavour to keep the cavity of this sac aseptic until all the placenta sloughs out of the wound. The elimination of the placenta by this method takes from twenty to fifty days.

In some cases, a vaginal drain has to be used, in addition to the abdominal drains. The first strips of gauze that are inserted in the foetal sac are made to serve the offices of a compress and of a tampon. They are used to check the bleeding. After the first dressings, the gauze strips are used more with drainage in view. After the foetal cyst has been sewed to the abdominal wall, or immediately previous, according to the exigencies of the case, the compresses that have been used to protect the general peritoneal cavity

are removed. Sewing of the sac-wall to the abdominal wound shuts off all communication between the cyst and the peritoneal cavity. We use No. 3 catgut to suture the sac-wall to the abdominal wall. In some cases it will be found necessary to irrigate this pouch during the subsequent dressings, with some astringent aseptic or antiseptic solution. The abdominal wound is closed as in those cases in which a Mikulicz drain is employed. Post-operative treatment, symptomatic.—*The Cleveland Medical Journal*.

* ACUTE INFANTILE DIARRHŒA.

BY

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As the name implies, it is looseness of bowels of an acute type to which infants are liable.

It has been said that diarrhœa in infants, or in general, is a symptom and not a disease and that the disease of which it is a symptom is inflammation of the intestinal mucous membrane, or intestinal catarrh. In some cases it is considered as a functional disease in which the symptom is of almost sole importance without any morbid changes of the intestinal mucous membrane: as such, it is the symptom of disordered or excessive function on the part of the neuro-muscular apparatus of the intestine.

CLASSIFICATION OF DIARRHŒA—

Diarrhœa in children may be broadly divided into Acute and Chronic, of course based on clinical course and symptoms rather than on ætiology.

Under Acute Diarrhœa—

1. Simple irritative diarrhœa. (a) Gastro-intestinal catarrh.
(b) Catarrhal enteritis.
2. Reflex diarrhœa. (a) Diarrhœa during dentition. (Teething diarrhœa).
(b) Lienteric diarrhœa.
3. Febrile diarrhœa. I. Inflammatory diarrhœa including—
(a) Gastro-enteritis.
(b) Ileo-colitis.
(c) Colitis.
II. Infective diarrhœa.
4. Cholera infantum. Septic diarrhœa.

The time-honoured term "Summer diarrhœa" has been ignored since it has no value in classification, for any one of the abovesaid varieties may occur in summer and most of them are rather more frequent then than at any other season.

CAUSES OF DIARRHŒA—

A. Predisposing causes:

- (a) The period of "dentition."
- (b) Heredity or acquired weakness of the digestive organs.

* Specially contributed to *The Antiseptic*.

B. Exciting causes :

I. Defective hygiene or living under insanitary surroundings.

Diarrhoea has been thought to be an index of the sanitary condition of large towns due in large measure to filth and putrefactive processes. Hence dwelling in damp, cold, dark and unventilated houses with overcrowding, etc., adds to the risk. In other words, living under good sanitary surroundings will lessen the risk of decomposition to which milk and other foods are liable.

II. Local irritants.

(a) Undigested casein or the offending ingesta acts as a local irritant.

(b) Acid or alkaline fermentations.

Milk in a state of commencing decomposition capable of acting as chemical irritant, or milk too copious in quantity or badly prepared, excites diarrhoea.

(c) Bile—excessive, acid or absence of.

The pouring out of an excess of bile or bile of an abnormal quality, may act in the same way ; on the other hand, an absence of bile, from inflammatory closure of the common duct, may also lead to diarrhoea, for in the absence of the alkaline bile which usually neutralises the acidity of the chyme as it passes out of the stomach, the contents of the small intestine remain acid and therefore act as an irritant and set up an intestinal catarrh from the lack of bile.

The loose motions are in such cases found to be white or clay coloured and often very offensive as a due admixture with bile also prevents the formation of irritating products of putrefaction by its known antiseptic action.

(d) Long retained indurated faeces—may set up catarrhal inflammation of the intestine, not only by mechanical irritation but also by the toxic substances developed by the putrefactive changes they undergo.

(e) Poisonous ptomaines of microbes.

The interesting researches of Escherich, Vignal, Hayem, Brieger, A. Gautier and others have thrown much light on the action of numerous forms of micro-organisms found in the alimentary canal. There are no microbes found in the intestinal canal of the new-born infant, but they begin to appear there soon after birth, entering no doubt by the mouth from the surrounding air. If the child is hand-fed, microbes may also enter the alimentary canal. At any rate an immense number of micro-organisms are found in the alimentary canal of an infant of a few days old. Some of these microbes may actually take part in the physiological processes of assimilation ; others may, under normal conditions, be quite inoffensive and indifferent ; the substances they contribute to form, although toxic in large quantity, are in

the minute quantities produced readily eliminated and prove harmless. Amongst these are various organic acids, sulphuretted and carburetted hydrogen, ammonia, leucine, tyrosine, indol, scatol and above all certain poisonous alkaloids known as "ptomaines". But if from the prevalence of certain conditions such as the occurrence of great heat and moisture, or the production of some abnormal change in the chemical reactions of digestion, the contents of the stomach and intestines become transformed into a medium particularly favourable to the culture and multiplication of these microbes, if they encounter putrescent substances in abundance, the toxic substances already mentioned are developed in such increased quantities that they cannot be eliminated with sufficient rapidity by the excretory organs, and toxic symptoms make their appearance, diarrhoea being the most frequent of these. This symptom seems to be excited especially by the organic acids and the alkaloids formed by microbic action. The simplest and commonest forms of diarrhoea are probably provoked by the irritant action of these acids on the intestinal mucous membrane, the graver forms, notable for the suddenness, violence and seriousness of the attack are probably due to the poisonous effects of animal alkaloids.

(f) Microbic origin.

Many instances of endemic or epidemic diarrhoea, such as are especially prone to occur in hot weather, are infective and of microbic origin, and the elevation of temperature which has been regarded as a cause of diarrhoea may only act by calling the infective organisms into activity, or by promoting the activity of putrefactive processes in foods, especially milk. Such epidemics are promoted among the children of the poor by the use of infected milk and the passage from child to child of dirty teats and comforters.

Several micro-organisms have been shown to be associated more or less closely with infantile diarrhoea, notably a Motile bacillus found by Mr. Morgan in a considerable proportion of cases of acute diarrhoea during summer epidemics, and the organism known as *Bacillus euteridis* of Gartner. When mucus is present in acute diarrhoea, the bacillus of dysentery known as Shiga's bacillus or its allied bacillus known as Flexner Harris organism can be isolated. Streptococci are also to be found in large numbers in diarrhoeal stools in some cases. There is, however, no evidence on which any specific role can be attributed to any one of these bacteria. It seems clear that there are many different micro-organisms, all capable of exciting acute diarrhoea in infants, but we cannot at present say, either on clinical or pathological grounds, that this or that variety of infantile diarrhoea is due to any particular micro-organism.

The house-fly may play an important part in carrying the bacteria. The infection may also be air-borne or dust-borne.

(g) Entozoa. Many intestinal worms—generally round-worms (*Ascaris Lubricoides*)—acting as local irritant have been seen to have induced diarrhoea even in infants 6 months old, especially hand-fed.

III. Chills and climatic variations.

Exposure to cold and damp, insufficient clothing, and damp bed or clothing, all excite diarrhoea. There are some children who are readily affected by alterations of barometric pressure, electrical atmospheric disturbances as thundery weather, etc. Sudden changes, from one extreme to the other, of heat or cold, affect some children.

IV. Nervous or Reflex cause. Dentition.

V. Defective absorption with augmented peristalsis of the small intestine so that the food is passed unaltered.

VI. Symptomatic: Pyrexia of all sorts as measles, small-pox, malaria and rickets, syphilis, etc. etc.

Signs and Symptoms.

Simple irritative diarrhoea or the gastro-intestinal catarrh varies much in severity. To take a common case: The child would be purging for a day or two with no apparent disturbance of its health. There is certain amount of pallor, a little fretfulness, and possibly slight rise of temperature. Milk is vomited undigested in curds. Mouth somewhat dry and the tongue redder than natural with its papillae prominent. The motions are usually liquid, green (acid in reaction) and offensive. Sometimes the evacuations are bright yellow; in others again pale. The majority of such cases yield to simple treatment, but it also happens sometimes that, the diarrhoea having existed on and off for a week or two, the symptoms of the more severe gastro-enteritis or even of cholera infantum suddenly develop.

REFLEX OR NERVOUS DIARRHOEA—

(1) Teething diarrhoea.

The diarrhoea of disordered dentition is of reflex type, probably caused by increased peristalsis. Infants, during teething, are peculiarly prone to this derangement, for teething sets up pyrexia and a feverish child is more sensitive to changes of temperature. The motions are usually of the type of simple catarrhal diarrhoea.

(2) Lienteric diarrhoea.

Intestinal nervous centres may become so sensitive, as in many delicate children, that every meal, however small, may induce an immediate call to stool, the motions being liquid or pultaceous and pale but otherwise healthy. The peristaltic movements may be even so increased as to hurry the food through the stomach and bowels so that it appears unchanged in the stools. Time is not allowed for digestion or absorption to be even begun. It is

most frequent in children before the period of second dentition. The appetite is vicarious; and the child becomes emaciated.

FEBRILE DIARRHOEA (Inflammatory diarrhoea, Gastro-enteritis and Ileo-colitis).

The symptoms of Febrile diarrhoea differ according to the alimentary tract which is chiefly affected. In some, it is evident, from the prominence of vomiting and the absence of mucus from the stools, that it is the stomach and small intestine which are mainly involved and these may be distinguished as Gastro-enteritis. The majority of the cases of so-called "Summer diarrhoea" are of this type. Vomiting is often a more troublesome and dangerous symptom: the infant is unable to keep down anything except a little water or albumen-water, the eyes sunken and the skin dry and inelastic. Bowels are open 10 to 12 times or even more in twenty-four hours. The stools are thin and watery and after a few evacuations they lose their yellow colour and become dark brown and offensive, or after assuming a greenish tint, gradually lose all colour and are pale and watery like those in cholera infantum; temperature from 101° to 102° for 3 or 4 days and then usually subsides and may be normal or sub-normal during great part of the illness.

ILEO-COLITIS is the name given to a group of cases less common than the foregoing and less restricted to the summer season. In ileo-colitis the lower portion of the intestinal canal is affected; vomiting, though it may occur during the first day or two, is usually not a prominent symptom; the abdomen is usually full and tender and sometimes the distension and tenderness can be definitely referred to the colon region; the stools, which are liquid or partly liquid and partly lumpy and sometimes tinged with green, show excess of mucus or mucus and blood at times. Fever tends to be higher and more prolonged than with gastro-enteritis (fortnight or more in some cases); the tongue is thickly coated with white fur, the edges and tip being red. The mouth is wanting in natural moisture. As the case goes on, the fever may oscillate considerably or intermit; the child wastes, becomes very restless and may ultimately sink into a state of stupor and die. Children remain sometimes for months wizened and flabby and with dainty bowels.

ACUTE COLITIS (Ulcerative colitis, Membranous colitis)—

is a disease which rarely attacks children but more common in infancy than in later childhood. The symptoms are scarcely distinguishable from those of ileo-colitis but they are apt to be even more severe. There is usually diarrhoea with much fullness and sometimes tenderness of the abdomen. Fever with a temperature ranging from 102° to 104° is more or less continuous.

The Stools. In some, they are with mucus and blood, in others green and offensive, and in some others yellow and loose. There is much prostration. The association of a very intense broncho-pneumonia has been

noticed. Membranous inflammation of the œsophagus associated with an intense inflammation of the colon have been noticed in a child of 21 months.

INFECTIVE DIARRHŒA (Green diarrhœa of infants, Alkaline in reaction) may be classed under this head since Prof. Hayem considers that this form of diarrhœa is spread by contagion and that the agents of infection are the germs deposited on the linen soiled by the motions. The presence of a special bacillus in these cases has been demonstrated by the Professor and when isolated and cultivated it has been found to produce the green matter by a sort of process of excretion. He further observed that the vomited matters and the stools were either neutral or alkaline which led him to the discovery that this bacillus could not live in an acid medium.

CHOLERA INFANTUM (Septic diarrhœa)—

is so called from the symptoms closely resembling Asiatic cholera of the adult; that is to say the disease is sudden in its onset, is attended by profuse watery evacuations; the infant speedily becomes collapsed, shrivelled and corpse-like, and dies.

It is most prevalent in the summer months: the onset is sudden but it frequently happens that there has been an irregular diarrhœa for some days. Then the character of the ejecta changes; they become quite watery in consistence and of muddy colour and very offensive, or perhaps rice-water-like and with less objectionable fœtor. The stomach becomes irritable and often rejects everything. The rapidity of the change is startling. One or two of the characteristic motions in a few hours will reduce the child from comparative health to a moribund state, in which the fontanelle is sunken, the orbits scooped out, the edges smeared with a film of mucus, the soft parts shrivelled down upon the bones, the skin hanging in folds or generally wrinkled. The abdomen is detracted, the cry an almost inaudible sibilus, and the voluntary muscular movements so slow and feeble that they come more to resemble those of unstriped muscle. The temperature is below normal in this condition but in the early stages it may rise to 101° to 108° and should reaction become established more or less pyrexia returns. It is difficult to say what chances of recovery remain for the worst case, because so often summer diarrhœa runs up to, yet does not quite touch, the typical condition and yet speedily recovers. Acute diarrhœa may be of grades of severity—from simple catarrhal diarrhœa at the one end up to the worst case of cholera at the other.

Hence, never miss an opportunity of examining an intestinal discharge in any case of infantile diarrhœa because of its valuable suggestion to correct diagnosis and treatment.

Morbid Anatomy.—In many cases there is no morbid appearance of any sort; in others there is some slight swelling of the solitary glands and Peyer's patches; rarely some ulceration of the follicles and glands; a streaky

ecchymosis here and there; or an unnatural pallor of the mucous membrane with an excess of mucus along the canal. But the above are no diagnostic lesions of the disease to which the child has succumbed. More pronounced lesions are sometimes found in cases associated with fever, namely infiltration and fatty degeneration of the liver and almost parenchymatous degeneration of the kidney. The intestinal follicles and the mesenteric glands are sometimes intensely inflamed. The symptoms may not have been very definite during life and yet after death the mucous and sub-mucous coats of the bowels are swollen, ecchymosed, covered with an adherent layer of false membrane and infiltrated with yellow gelatinous lymph or semipurulent fluid.

Diagnosis.—Few mistakes are possible. An ileo-colitis may possibly be overlooked and the case considered one of simple diarrhœa. This is to be avoided by paying attention to the temperature which is more likely to be high in ileo-colitis, and to the tongue which is more red and furred also. Much fullness of the abdomen and abdominal tenderness might also, in certain cases, put one on guard. Intussusception might mislead at its onset. Persistence of vomiting, the probable existence of the sausage-like tumour in the abdomen and the presence of a polypoid mass in the rectum will, in most cases, be quite sufficient to prevent mistakes.

Prognosis.—Simple diarrhœa is amenable to simple remedies and generally subsides quickly but it may give place to one of the more severe forms. Febrile diarrhœa is often troublesome and is likely to lead to chronic looseness of bowels and a seriously enfeebled condition. Cholera infantum, if pronounced, is most fatal. Severe collapse is always most dangerous. The continued presence of fever with a red, dry tongue, is also an unfavourable sign.

Treatment.

In uncomplicated cases of simple catarrhal diarrhœa and in all other forms of diarrhœa as well, after attending to defective hygiene and avoiding chills and damp by proper clothing, bedding, etc., regulation of diet is essential. If milk is not digested, it should, immediately, be withheld, substituting albumen water—an excellent food for children—and gradually returning to the natural food in the following order:—

Wine whey, raw meat juice, barley water, a weak peptonised milk with lime water, and milk and lime water or Sod. citrate. When it is clearly traceable to the presence in the alimentary canal of irritating ingesta, we should aid this effort of nature to eliminate them. If indurated fœces are retained in the colon or if obstinate constipation has preceded the attack, a warm enemata of soap and water with or without castor oil is all that is necessary. If, on the other hand, the irritating substances appear to

be still on the small intestine, it is advisable to give a dose of castor oil. A word may be said about the action of castor oil—our grandmothers' remedy. The pure oil, as all know, is a local emollient and sedative. When given internally, it only acts as a purgative by a small percentage of its bulk being changed into recinoleic acid in the duodenum; the unaltered remainder passes down the bowel exercising its bland emollient action on the intestinal tract. The recognition of this fact places in the hands of the physician a remedy of the greatest value in the treatment of every form of diarrhoea—reflex, catarrhal, or irritative.

Gregory's powder (Pulv. Rhei Co.) is also an excellent remedy for the purpose in doses of 5 to 20 grains. Rhubarb, it must be remembered, has the valuable property of acting as an astringent after its purgative effect has passed away, by the presence of Rheo-tannic acid.

As many of the commonest forms of diarrhoea depend on an unduly acid condition of the intestinal contents, evacuations being frothy and acid, possibly owing to the absence of sufficient alkaline bile in the small intestine, they are easily cured by alkaline medicines without the use of any direct astringents. In such cases your aim is not to immediately arrest the flux from the bowels but to prevent its continuance. So, for an infant of a year old, the following is a suitable formula:

Bismuth carbonatis	gr. xxx
Pulv. Cretæ arom.	gr. xvi
Pulv. Tragacanthæ Co.	gr. iv
Aqua cinnamomi ad.	℥ i

ft. mist. A tea spoonful every 6 hours.

There is a distinct advantage in curing a diarrhoea by such simple means rather than by the use of strong astringents and opiates as the latter interfere with the action of the liver and are apt to be followed by loss of appetite, constipation, etc. But many cases of acute diarrhoea cannot be arrested by such simple means and we are obliged to have recourse to remedies which exercise a more direct influence over the catarrhal mucous membrane. There are many such at our disposal to meet the demand, but there is none so immediately and strikingly successful as opium. This drug has a most remarkable influence over the circulation in mucous membranes. It has also the property of relieving pain and spasm, and when these accompany an acute attack of diarrhoea it will rarely be wise to withhold a dose or two of this drug.

Some object to giving opium to young children in any dose for the purpose, but physicians of ripe experience who have seen the wonderfully calming and curative effect of quite minute doses of the drug will not

hesitate to avail themselves of this valuable resource. Prof. Osler, even in the acute choleraic diarrhoea of children, recommends morphine hypodermically. He says: "This drug alone commands the situation." A child of 1 year may be given 1/100 to 1/80 grain, to be repeated in an hour, and again if not better. So, Dover's powder (Pulv. Ipecac. Co.) 1/4 grain for an infant of 3 months, 1/2 grain at 6 months, and 1 grain at 12 months, 2 or 3 times a day, will usually be sufficient with quantity sufficient of Pulv. Cretæ Arom. and Soda bicarb.

A safe and useful plan of giving small doses of opium is by means of small enemata. A tablespoonful of the following should be shaken up with an ounce of thin, warm starch and injected into the bowel:—

Pulv. Ipecac. Co,	gr. iv
Acide Tannic	gr. xii
Mucilaginis Acaciæ	℥ ii

ft. enema.

If, on the other hand, there seems any good reason why opium should not be given internally it may be applied in the form of the 'linimentum opii' externally on hot flannels over the abdomen.

The preparations of Bismuth enjoy a great reputation in the treatment of intestinal catarrh; the Oxy-carbonate, Nitrate and the Chloride are all efficacious. The Salicylate is chosen in the case of infectious or putrid diarrhoea or when the evacuations are very offensive. They act to some extent locally by affording a protective covering to the inflamed mucous membrane. They further absorb sulphuretted hydrogen and are eliminated in the form of black sulphides. The Oxy-nitrate has marked antacid properties besides acting as an inert powder and as an absorbent of gases. It is a very basic salt and is thus enabled to neutralise the excessive acidity of the intestinal contents. It is, however, often advantageous to mix bismuth with "prepared chalk" which also has antacid and absorbent properties. It must be remembered that nothing less than 5 grains of the salt for a dose answers well even in young children. Hence the following mixture of bismuth and chalk is useful for gastro-intestinal catarrh in children:—

Bismuth Sub-Nit.	gr. xxx
Cretæ Preparatæ	gr. xx
Soda Bicarb.	gr. xii
Pulv. Tragacanthæ Co.	gr. xx

ft. pulv. vi. A powder in a dessert-spoonful of thin arrowroot water every 3 or 4 hours. Half this dose to infants 3 months old and twice the dose to older ones.

INFLAMMATORY DIARRHŒA—

As diet plays an important part of the treatment, milk should be withdrawn immediately substituting any one of the easily digestible foods suggested under Catarrhal diarrhœa. If the stomach does not retain any food, as it is the case in gastro-enteritis, vomiting being a troublesome symptom, pieces of ice to suck and iced water alone should be given, suspending all food for a while. Regarding medicinal treatment: After a dose or two of castor oil in the form of emulsion, the best drug is one of Bismuth salts, being a gastric sedative as well; Dover's powder can advantageously be added to it. Mustard plaster to the pit of the stomach may be tried. If the trouble is lower down as in ileo-colitis and colitis, after a preliminary purgation of castor oil, an enema of Tannin and Dover's powder answers well. Fomentation of hot flannel with laudanum may be applied. A warm linseed poultice may be tried.

Internally, Bismuth and Tannin. Of the various preparations derived from Tannin, Tannalbin and Tannigen are the best; of which Tannigen is the most popular of the novelties. It is composed of Acetic acid and Tannin and is a tasteless insoluble powder only dissolved (acid tannin reformed) in the alkaline intestinal secretions. From 2 to 5 grains may be given to children.

In some graver forms of gastro-enteritis, entero-colitis and colitis of microbic origin, the rational treatment would be to promote intestinal antiseptics both by alimentation and medication. One of the simplest medicinal measures for the promotion of intestinal antiseptics is a purge which carries away the undigested and fermenting products of a faulty alimentation as well as the microbes with which they swarm. In calomel we have a medicine which is both purgative and antiseptic and hence its great value and success in the treatment of diarrhœa of the choleric type when administered at the onset of the attack. The dose to be given must depend on the age of the child, but small doses frequently given are the best; $\frac{1}{8}$ to $\frac{1}{4}$ grain every hour for 5 or 6 doses mixed with half a grain of milk sugar and thrown on the child's tongue is a good way of giving it. Some physicians give from 1 to 4 grains at a dose and some prefer grey powder as its action is milder.

Salol has been warmly advocated as an intestinal antiseptic in these cases and especially in the treatment of acute enteritis of children of malarial origin. It is perfectly innocuous even in the youngest infants. Half a grain may be given to a child of 3 months every 2 hours. It may best be given to children suspended in a mixture with a little mucilage and syrup.

Resorcin has had many advocates. Creosote, Carb. Acid, Creoline, Naphthaline, Menthol, Thymol, Sodii Salicylate and Benzoate, Tinct. of Iodine, etc.,

have all had their advocates for this purpose. Copious enemata of warm water mixed with 10 per cent. of alcohol or $\frac{1}{2}$ per cent. of Salicylic Acid or Creolin water $\frac{1}{4}$ to $\frac{1}{2}$ per cent. are of use when we wish to exercise an antiseptic action on the large intestine.

Robert Simons thinks he has demonstrated the remarkable results which may be obtained by the subcutaneous injection of sea-water in all cases of gastro-enteritis in young infants. He says that the dying infant, unable to retain food after a single injection, may be seen to digest a normal amount of milk immediately afterwards. The dose of the isotonic sea-water plasma is 30 c.c. injected into the scapular region.

INFECTIVE DIARRHŒA—

Prof. Hayem, after elaborate investigation of infective green diarrhœa of infants, having failed in his attempt to find a remedy in Hydrochloric Acid, it led him to try Lactic Acid which had the desirable effect. As such, lactic acid given in a tea-spoonful of a 2 p. c. solution to the infant a quarter of an hour after each suckling—from 5 to 8 tea-spoonfuls in 24 hours—vomiting, if present, soon ceases, the motions lose their green colour and become yellowish, and in a short time become normal in appearance and frequency.

If, as already stated, the stools of an infective infantile diarrhœa are mixed with mucus with the presence of bacillus dysenteriae as Shiga's bacillus, etc., a polyvalent serum, i.e., the serum of a horse immunised against various strains of dysentery bacilli has given the best results. Of the polyvalent serum the one brought out by the Lister Institute is the best, which is prepared by injecting a combination of Shiga's, Kruse's and Flexner's original strain bacilli from El. Tor, from asylum dysentery and from infantile diarrhœa. In children under 2 years of age 2 c.c. or less is a sufficient dose. Such treatment should be combined with the general treatment including intestinal antiseptics.

CHOLERA INFANTUM (Septic diarrhœa)—

In cases of persistent vomiting with choleraic diarrhœa and high temperature, it is futile to depend on routine treatment. Subcutaneous injection of normal saline solution, 8 to 10 ounces, will often be given with marked benefit at its outset. If the fever is high, the child may be wrapped in a rough towel wrung out in cold water; where vomiting is persistent and continuous, a liberal supply of pure water may be permitted to wash out the stomach; ice may be given *ad libitum* for the purpose. Stomach may be washed with an alkaline solution of gr. xx to 3 of Bicarb. of Soda followed by a weak solution of Permanganate of Potash.

Mustard poultice to the epigastrium and a few doses of calomel— $\frac{1}{8}$ grain every half an hour—help greatly to allay the irritability of the stomach.

Milk must be withdrawn at once and replaced by light wine whey or a predigested food like "Palatable Peptone." A word about Palatable Peptone; out of the many preparations of predigested food available in the market the one which is brought out by Parke Davis & Co., under the name of Palatable Peptone, suits well of its pleasant taste where rest to the digestive organs and slight stimulant to the system are required. Given mixed with ice, I have seen infants craving for it. Collapse must be met by subcutaneous doses of $\frac{1}{2}$ a drop of Liqr. Strychninæ and hot compresses to the abdomen; a mustard poultice over the region of the heart; hot water bottles to the extremities. Hot bath or wet pack to suit individual cases may be resorted to.

Out of the intestinal antiseptics in cholera infantum, I have great faith in two drugs which I commend:

1. Tribromophenol-Bismuth.
2. Acetozone.

Tribromophenol-Bismuth. It is a combination of bismuth oxide and tribromophenol. Given in 3 to 5 grain doses repeated every half an hour up to 6 doses remarkably stops the vomiting, reduces the frequency and changes the consistency of the motions. It is an intestinal antiseptic if not a germicide. It is being used in cholera at any stage with good results.

Acetozone. It is the peroxide of Benzoyl-Acetyl—a powerful yet non-poisonous, non-toxic and non-irritating germicide. A solution of 1 in 2000 given in tea-spoonful doses every quarter of an hour has a marked effect in cholera infantum by checking diarrhoea and neutralising foetid stools. Gastric and intestinal lavage with warm acetozone solution, 1 in 3000, is a very desirable measure.

It sometimes happens that an attack of septic diarrhoea leaves behind it a general œdema without albuminuria, œdema being general, affecting the face as well as the limbs. Adrenaline chloride, 5 drops of 1 in 1000 solution, 3 times a day, acts well.

The "diarrhoea of disordered dentition" being of reflex or nervous type is best met with by mild sedatives as "Bromides." Other symptoms of pyrexia, watery motions, etc., may be treated on general principles.

LIENTERIC DIARRHOEA—

The best treatment for this is Arsenic which is administered in liquid form as Fowler's solution with minute doses of Strychnine. In very young infants, bromides may be tried with $\frac{1}{4}$ to $\frac{1}{2}$ a minim of Fowler's solution.

* TREATMENT OF INSOMNIA.

BY

O. RATNAVELU CHETTY, L.M.P.

In these days of apparent restless activity, the doctor is often called upon to treat this common and inveterate ailment which taxes the patience of the patient and the energies of the physician.

Is this disease to be treated by drugs, or no drugs? With very few exceptions drugless method is the rational treatment to be adopted if the cause or origin is diagnosed.

1. Heavy late suppers are often the cause and the reverse condition (empty stomach) should be equally avoided.

2. Cold feet with some patients bring on sleeplessness. Hot baths with brisk rubbing or a little addition of mustard powder relieves the malady, before bed time.

3. Prevention of a nap in the evening often produces sleep, provided the room is airy, quiet and dark.

4. Patients of excitable temperaments or with affection of heart or lungs, find high mountain altitudes aggravating their symptoms so as to suffer from insomnia.

5. Massage with some patients relieves the congestion of the brain by bringing blood to the extremities and abdomen.

6. If mental worry or business distraction, the treatment is a change of scene and air—preferably sea-voyage. If exhaustion, a week's rest in bed with proper treatment for neurasthenia.

7. With some, tea, coffee, tobacco or long sexual abstinence, according to idiosyncrasy, may bring on insomnia.

Regular-habits, out-door exercises, mental freedom, and life easy as circumstances would admit, bring about sleep.

If these functional methods fail, then suspect organic lesions: and treat accordingly by giving Bromides and Hydrates: for Migraine Morphia to bring on sleep after operations or child-birth: bearing always in mind to avoid the fashionable drugs which produce drug-habits.

OUR CONTEMPORARIES. MEDICINE.

Epidemic Ulcero-Membranous Stomatitis
(Vincent's Angina).

BY

CAPTS. A. R. CAMPBELL AND A. D. DYAS.

During the four months, Oct. 1916 to Feb. 1917, 129 cases of this hitherto rare condition have passed through the writers' hands. At the

* Specially contributed to *The Antiseptic*.

Canadian Military Hospital, Bramshott, Surrey, until the beginning of the war, it was one of the rarest diseases. It seems to have first become prevalent in France, where it was known as trench mouth, and believed to be caused by over-indulgence in cigarettes, etc. It became one of the commonest of disabilities among the troops. As usually seen, the condition is not such as to confine the patient to bed, but the accompanying depression and the inability to masticate cause a serious lowering in efficiency.

Vincent's angina is an infectious disease of the mucous membrane of the mouth, throat, bronchi and prepuce. By far the most frequent site of infection is the mouth and throat. Next in frequency are the bronchi. The preputial cases are rare.

VINCENT'S ANGINA OF THE MOUTH AND THROAT.

Type 1.—The largest percentage of cases are of tonsillar type. A yellowish-grey membrane covers one or both tonsils. The breath is extremely foetid, the odour differing markedly from that of diphtheria. The patient complains of some difficulty in swallowing and of enlarged and tender cervical glands. But absence of headache, myalgia and marked prostration is characteristic and contrasts with diphtheria or acute tonsillitis. The temperature is slightly elevated; it may be as high as 103.5° .

In the early cases there are only small whitish patches in the crypts. If not treated, these may spread until membrane covers the whole tonsil; they may extend over the soft palate, uvula, and even the posterior wall of the pharynx. In a well-developed case the membrane is yellowish grey, resembling a diphtheria membrane so closely that a differential diagnosis can be made only by the microscope. On removal it leaves a freely bleeding surface, as in diphtheria. In more advanced stages there is ulceration of the deeper structures so that the tonsil may almost be entirely eaten away.

Type 2.—The next most frequent type is a deep ulcer on the ramus of the lower jaw, immediately behind the last molar tooth. In many cases the posterior edge of the ulcer is swollen so that it projects over the crown of the tooth, making mastication practically impossible. In untreated cases, infection spreads along the margin of the gums, causing pyorrhœa about the molar teeth.

Type 3.—Pyorrhœa caused by Vincent's organisms is also frequent. Usually, in an otherwise healthy mouth, it is at first limited to the region of the upper and lower incisors. The gums are swollen, spongy and tender, and bleed easily. On pressure there is usually a copious flow of pus mixed with blood, the alveolar surface of the gum being eroded and covered with a yellowish membrane. In advanced cases the teeth become loose and may even drop out. Any condition, such as mercurial treatment, tending to lower the vitality of the gums predisposes to infection with Vincent's organisms. A number of advanced cases were found in men undergoing antisyphilitic

treatment with mercury, the lesions being taken for mercurial gingivitis or syphilitic lesions. These cases cleared up quickly under arsenic. Decayed teeth or any mechanical injuries to the gums frequently form a nidus for infection.

Type 4.—General infection of the mouth is the severest type of all, and the patient is acutely ill. The membrane extends over the cheeks, tongue, fauces, pharynx and palate, and even to the lips. Ulcers occur on the cheeks where they are in contact with the teeth. The tongue is greatly swollen, making speaking and swallowing difficult, and the margin is deeply indented with ulcers corresponding to each tooth. The infection may extend along the ducts into the parotid and submaxillary glands, sometimes causing chronic enlargement.

BRONCHIAL INFECTION.

In 7 cases the clinical picture was moderately severe bronchitis, with copious expectoration, general depression, and slight pyrexia. These cases ran a course of about 3 weeks. The sputum in all was loaded with Vincent's organisms. There were no visible lesions in the mouth or throat. The infection was self-limiting with a course of about 3 weeks.

BALANITIS.

Four cases were seen in men with long prepuces. There was considerable œdema of the foreskin, the inner surface of which was covered with the typical membranous ulcers, some of which had spread to the glans. Infection was due to the lack of cleanliness and to chafing. All cleared up in four or five days under treatment.

BACTERIOLOGY.

In about 50 per cent. of all swabs taken from the throats of soldiers admitted, a few Vincent's organisms were found. The large number of cases of Vincent's angina can be understood when the effect of injury or lowering of vitality of the tissues is taken into account. In the lesions the two organisms, namely, the fusiform bacillus and the spirochæte, are present. In early cases the bacilli are practically always much more numerous than the spirochætes, but in more advanced cases the spirochætes are usually predominant. Various forms of staphylococci and diplococci are always present. Carbol-gentian violet is the most satisfactory stain in looking for these organisms, the bacilli taking the stain readily and the spirochætes fairly well. Both organisms are usually gram-negative.

Under active treatment, the organisms disappear in a few days. But several bronchial cases gave opportunity for more lengthy observation. When first examined the sputum contained about equal numbers of the organisms. After about a week the spirochætes were much more numerous and had become granular. After another week or ten days the organisms were

greatly diminished in number, being practically all spirochaetes. Many were swollen and straightened, looking like a sausage with the tip at one end cut off. Some were empty; others showed the granules dropping from the open end. Soon after this the patients were discharged cured.

DIFFERENTIAL DIAGNOSIS.

From diphtheria the tonsillar type of Vincent's angina can be distinguished with certainty only by a microscopic examination of a smear, as the membranes have the same characteristics, namely, location, colour, toughness and bleeding, on removal. However, the patient with Vincent's angina is never so acutely ill as a diphtheritic with the same amount of membrane. He has, as a rule, no headache, backache or great depression, his complaints being a sore throat which has come on one or two days previously, difficulty in swallowing, and enlarged and tender cervical glands. In a few cases the two infections were found together, these patients being very ill. Patients with a Vincent's angina, when in contact with a carrier, readily become infected.

Microscopic examination is of still greater importance when the patient gives a syphilitic history, especially when he is undergoing mercurial treatment, for this favours the development of Vincent's angina. A positive Wassermann reaction does not exclude Vincent's angina, nor does the fact that a mouth lesion clears up quickly under arsenic exclude syphilis. In cases of Vincent's angina with no syphilitic history, however, the Wassermann reaction is always negative. A healing ulcer about the mouth or throat will almost invariably be mistaken for a syphilitic mucous patch by any one unacquainted with the case.

In pyorrhoea the onset is often given as from two to three days before admission, and in such cases the disease is usually limited to the upper and lower incisors. When the condition is general, the history is usually given of a long-standing pyorrhoea, and the *Endamæba buccalis* is frequently found with Vincent's organisms. In bronchitis and balanitis, the diagnosis can be made only by microscopic examination of a smear.

TREATMENT.

Many forms of treatment have been recommended, including the use of arsenic, iodine, silver nitrate, trichloroacetic acid, hydrogen peroxide, tincture of ferric chloride, and potassium permanganate. In slight lesions any of these will bring about a cure. Arsenic, however, is the most useful remedy. For ulcers about the mouth and tonsils, the writers' routine treatment is liquor arsenicalis swabbed on 3 or 4 times a day. Where the ulcer is deep and spreading rapidly it is first well swabbed with 10 per cent. silver nitrate solution, and the treatment continued with liquor arsenicalis.

In pyorrhoea they use the mixture recommended by Bowman: Vinum ipecacuanhæ, $\frac{1}{2}$ ounce; glycerine, 1 dram; liquor arsenicalis, sufficient to make 1 ounce. A few drops are poured on the patient's tooth-brush and the gums are well brushed two or three times a day. It is surprising how quickly the lesions will disappear under this treatment, a severe acute pyorrhoea being completely cured in five or six days. In general stomatitis and gingivitis the patient should be given large doses of liquor arsenicalis internally, sodium cacodylate hypodermically, or salvarsan. He also should frequently use a soothing antiseptic mouth wash until the condition is sufficiently under control to permit of local treatment. The great majority of cases are cured in from 4 to 7 days.—*American Medical Association Journal.*

The Assistance of the X-Ray in the Diagnosis of Pulmonary Tuberculosis.

BY

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In the diagnosis of tuberculosis by means of the X-ray there are certain essentials which must not be overlooked, for without them diagnosis is most unsatisfactory and very apt to be wrong. The first essential is that of technique. There must be available for the diagnosis a pair of well-taken stereoscopic views, for the shadows seen in the single plate are very often misleading and cannot be properly interpreted. The two stereoscopic plates must show proper perspective of the organs within the chest. The next essential for the diagnosis is a knowledge of the macroscopic pathology and the clinical course of pulmonary tuberculosis.

All of you at this time and day are perhaps familiar with the markings or shadows seen in the picture of a normal adult chest. There is no difficulty in recognizing the heart, diaphragm and ribs, for these cast dense shadows and are so situated as to be easily identified. Extending from approximately the second to fourth rib in front and to the right or left of the mediastinal border for approximately one-half to one inch are the two roots of the lungs more commonly called hiluses or hili. These are identified as shadows of medium density, somewhat oblong in shape and running more or less parallel to the sternal border. Extending from the roots into the lung fields, much as a fan, are the pulmonary ramifications of blood-vessels and bronchi. These ramifications are seen to branch at various intervals and occasionally there is seen a blood-vessel or bronchus in cross-section view. Normally, with the exception of the larger blood-vessels and around the roots of the lungs, the pulmonary ramifications are not dense shadows, though they are readily recognizable.

In pulmonary tuberculosis of the adult we have a disease whose characteristic is the formation of tubercles or nodules. Essentially there are two types, the indurative and the exudative. When the disease is in progress, tubercles are formed which later conglomerate to form larger tubercles, and these in turn conglomerate to form still larger areas of tubercles. The tubercle, at first microscopic, grows by conglomeration or union to macroscopic size, and as such it is seen on the X-ray plate. The tendency of all tubercle formation is to go on to caseation, ulceration and cavity formation, or to fibrosis or calcification. Perhaps some tubercles are disintegrated and carried off or absorbed.

It must be borne in mind that tuberculin tests have shown that the greater proportion of people have at some time in their life been infected with the tubercle bacillus. When this has taken place, small or large foci of infection—tubercles—were formed, but the system has overcome the infection and the focus, or foci, been healed, walled off, fibrosed or calcified. It is not improbable that the earlier foci were in a fair percentage of cases situated in the lung, perhaps in all of the cases. Consequently, upon section of the lungs at autopsy of persons dying from causes other than tuberculosis, obsolete or old foci of tuberculosis can be, and very frequently are, found. X-ray pictures of people in good health and suffering from no disease whatever will show evidences of an infection which has long since been recovered from. In other words, in these instances the X-ray will show evidences of tuberculous infection but not of disease.

There are several ways by which tubercle bacilli taken into the respiratory or digestive tracts could gain entrance into the lung. These are: by way of direct inhalation, by way of the blood stream, and by way of the lymphatics. Which of these three paths of entrance is the most common and most important has by no means been determined as yet, though the respiratory method is perhaps the most believed in at the present time.

At the roots of the lungs are the larger bronchi, blood-vessels, and connective tissue. Surrounding and accompanying the larger bronchi and blood-vessels are lymphatic glands which are in communication with the lymph tissue of the lungs and also with the mediastinal and paratracheal lymph glands. One or more of these glands are fairly often seen to be enlarged and denser than usual in X-ray pictures of the chests of some people who are not ill. They are also seen in the X-ray pictures of some people who are suffering from clinical pulmonary tuberculosis. Commonly in the adult, enlarged glands at the root of the lungs are due to deposits of foreign material carried to the glands by the lymphatics—coal dust, soot, marble dust, brick dust, etc. So that with no other evidence seen in the plates but enlarged glands at the roots, tuberculosis cannot be diagnosed in the adult with any degree of certainty. There are, however, at times,

shadows seen at and around the root which make one feel there must be some tuberculous involvement, although this latter cannot be determined except by close correlation of history and symptomatology. I speak of the root shadow which is enlarged, more dense than usual, and in which the usual clear spaces between the larger bronchi and blood-vessels have been obliterated. The larger bronchi and blood-vessels leaving the root at the same time seem to be accentuated in density. This is not, however, a common occurrence without other evidence of tuberculosis within the lung fields. It could be explained probably by the belief of some that tuberculosis affects first the larger lymph glands at the roots and by a retrograde flow of lymph due to blockage of the flow, finally invades the lungs by means of the lymphatics.

Within the lung fields proper there are changes to be seen which readily tell the experienced observer that some form of pathology exists. These changes are essentially of two distinct physical characters, distinct as to distribution and shape. The first of these changes is characterized by the linear arrangement along the course of the bronchi and blood-vessels of small nodules or somewhat circular shadows. In size they may vary from one millimeter upwards. They appear separate and distinct and give rise to the impression of beading along the ramifications. At times they appear with rather clean-cut margins, but at other times their margins as well as the margins of the pulmonary ramifications appear hazy and fuzzy. They may occur anywhere along the course of the blood-vessels and bronchi, which appear to be accentuated in density. To be of use in diagnosis they should not be considered when in the immediate vicinity of the roots. Often these changes are the only noteworthy ones seen in the plates of those suffering, or having suffered, with the symptoms of pulmonary tuberculosis. Usually in this type of case the symptoms have not been very marked, nor does the symptom contain tubercle bacilli.

Another change, commonly associated with more advanced disease, a greater severity of symptoms and tubercle bacilli present in the sputum, is the condition termed "mottling." In this type of change the tubercles are not arranged linearly, and follow no definite outline. Their outlines appear to be less distinct, and between the individual tubercles there appears to be a haze of lesser density. The whole appearance approaches one of patchiness rather than of linear beading. Of this second type of change there are many modifications seen. Sometimes the patchiness is more or less even in density without individual tubercle formation. The density itself in these areas varies considerably, as well as the characteristics of the margins bordering on the patches. In other cases of more advanced diseases we see the annular high-light of cavity formation, surrounded by increased density, and in addition we may encounter evidences of nearly all of the pathologic changes

such as pleurisy, misplacements, fibroses, etc., which are concomitant with an acute or chronic pulmonary tuberculosis but which need no mention here.

In addition to the linear, beaded type and the patchy or mottled type there is yet another characteristic mentioned by Doctor Dunham and which is based upon microscopic pathology, namely the fan-shaped density in the periphery of the lung, with its angle toward the root.

We have stated before that adults have very largely been infected in early life with the tubercle bacillus and that probably a large proportion of them had infections within the lungs. Recovery from these latter infections may have left behind evidences of the former disease, which may be disclosed by X-ray examination. Thus we see in the X-ray pictures of many healthy adults isolated, dense, clean-cut tubercles here and there in the lung fields. We may also see isolated, clean-cut tubercles along the ramifications, and we may see these ramifications much more accentuated in density than usual. Such evidences as these cannot be taken as indications of disease, but must be looked upon merely as evidences of tuberculous infection.

How then are we to judge, if possible, the presence of disease? For this we must of necessity correlate our physical signs and symptomatology, because with the X-ray plates alone one cannot positively diagnose pulmonary tuberculosis with any degree of assurance. There are, however, certain manifestations seen in the plates which would lead one to suspect that the pulmonary focus has been recently active or has ceased to be active for some time past. Again we must return to pathology and consider what takes place in active and in healing foci. According to Tendeloo and others, there is, surrounding the tubercle in the active focus, an area of inflammation which he terms collateral inflammation. This area of inflammation is shown on the plates by areas of faint density surrounding the tubercles and causing their margin to appear fuzzy or hazy. When the tubercles have become more confluent, and caseous broncho-pneumonia is present, an exudative type of active lesion, this is seen as a more or less dense shadow with irregular fuzzy outline and in which there are no individual tubercles visible.

In the healing lesion collateral inflammation disappears. The margins become more definite and the tubercle more dense, since it becomes fibrotic or calcareous. The area of patchiness of the caseous broncho-pneumonia loses in density, individual tubercles appear, hazy outlines are lost, and the individual tubercles undergo fibrosis or calcification, while the pulmonary ramifications in the vicinity become definite and distinct as they become more fibrous. However, these do not represent all the changes taking place in active or in healing disease, and we must also remember that there are almost invariably present in advanced disease foci in all stages of development. The constitutional disease also very often remains in a state of mere

quiescence, with the likelihood of a fresh awakening or relapse occurring at any time.

So then, although there are certain indications in the X-ray plate which would lead us to believe that a focus is active or healed, it would be quite unwarranted and unsafe as a general thing to make a corresponding diagnosis from the plates alone. However, when serial plates are taken at various intervals much knowledge can be gained as to the progress of the disease in the individual.

The locations of shadows seen in the plates may lead us to suspect the etiology of pathology underlying them. Thus in pulmonary tuberculosis of the adult we know from long experience that that portion of the lung above the root is most often the first involved, unless miliary tuberculosis is present. So, too, the disease is apt to be unilateral. And, when the characteristics of tuberculosis are borne in mind, namely tubercle formation, ulceration, caseation, cavitation, fibrosis and calcification, much knowledge as regards etiology can be gained from the nature of the densities. However, from all that has been said before it can readily be seen that a diagnosis of pulmonary tuberculosis from the plates alone cannot always be made with positive assurance. There should be co-operation between the clinician and the radiologist and the clinician should be prepared to understand the densities he sees in the plate. Furthermore, the clinician must have accurate knowledge of the disease, pulmonary tuberculosis, and its pathology, for without it errors in diagnosis are very apt to be made and mistakes in treatment and prognosis most sure to follow.

The X-ray does afford most valuable assistance in the diagnosis of tuberculosis, for it not only tells us of the location and extent of the lesion, but to the experienced observer it also shows the character or type of the lesion much more accurately than can be told by physical signs or symptoms alone. It affords the most exact information as to the actual pathology that can today be gotten short of autopsy. But it must nevertheless not be looked upon as infallible; nor must it be taken as the final word in diagnosis. Its use should rather be for aid and corroboration in diagnosis and for better knowledge of extent and pathology. In pulmonary tuberculosis, as in all diseases, the use of the X-ray for diagnosis must be based upon a good knowledge of the pathology and course of the disease, an orientation in it, so to speak.—*New York Journal of Medicine.*

The Pathology of Cardiac Dropsy.

The increased output of lymph giving rise to cardiac dropsy is one of a very definite series of events following the occurrence of failure of the heart in its capacity as a pump.

Stage I. Accumulation of blood in the veins, with a moderate rise of venous and capillary pressure in all parts. Abstraction of blood from the arterial system with a fall of arterial blood-pressure.

Stage II. Dilatation of the veins and capillaries of the central parts of the body with a fall of venous and capillary pressure to normal. This leads to increased congestion of the central parts and anemia of the peripheral parts of the body, in which the venous and capillary pressures fall below normal. Increased output of lymph in the congested area giving rise to dropsy.

Stage III. Vasomotor constriction resulting from anemia of the medulla.

Stage IV. Hydraemic plethora is established and raises the venous and capillary pressures in the central portions of the body to a great height.

Stage V. The ascites and hydrothorax increase in degree and edema spreads in the areolar tissues peripherally, as the congested area encroaches upon the anemic regions.

The abnormal output of lymph leading to dropsy is primarily conditioned by the nutrition state of the capillary wall. In uncompensated heart disease in man the control portions of the trunk are relieved by gravity at the expense of the legs, which become included in the congested area.—*Cleveland Medical Journal*.

The Senile Heart.

HARLOW BROOKS, in the *Medical Review of Reviews* for May, treats of the conservation of the heart in the aged. The aged heart is not a term or a condition measured in years, since we find an old heart by do means infrequently in a relatively young person; it is really not the age of the patient as measured by his span of years, but rather the condition of the heart that constitutes the problem. We may summarize the functional result of the natural senile changes in the heart by the simple statement that the heart of the aged is less able to do its work. It must, therefore, seem axiomatic that the keynote of the conservation of the senile heart is that it should be called upon to do less work. The man of fifty who calls upon his heart to do the work of which it was entirely capable at sixteen or twenty is, to say the least very indiscreet. The direct therapeutic application of this primitive and altogether axiomatic conclusion is that the work of the heart in old age must be minimised, and strain above that established by long habit in the individual must not now be exceeded. He is certain that the senile heart muscle is definitely less reactive to our muscle stimulants, digitalis, atropin, adrenalin, etc., than is the youthful or adult heart. It seems, then, that we have a constantly decreasing capability of response to the most reliable drugs which we must from time to time employ as heart muscle stimulants. It would

seem obvious, then, that we are not to expect the results from heart medication in senility which we are justified in expecting in youth or adult life. He believes, however, that these drugs should be used earlier and with less therapeutic indication in old age as compared to youth. Rest is even more valuable in the senile heart than in the more youthful, only rest must, when indicated, be more absolute and more prolonged. The importance of the pulmonary circulation is to be remembered here. Slight bronchitis may be a very inconsequential matter in youth, but in the senile is a matter of weighty moment at all times, and all pulmonary congestions should be promptly treated. The renal state must be also considered, and the kidney be relieved so far as possible from tendency to fibrotic changes, and hence to hypertension. He believes salt in most cases should be cut down to the amount actually demanded, because of its very direct bearing on the retention of fluid in the tissues, which is in itself one of the most serious circulatory tendencies in the defective circulation of senility. He is rather doubtful as to the value of the milk diet in the senile heart. He rather favors the judicious use of alcohol unless a definite contra-indication exists. As to travel, as a general rule, the high altitudes are to be avoided, because of circulatory and respiratory reasons, and the warmer climates are more advisable than the colder.—*Cleveland Medical Journal*.

SURGERY.

Potassium Permanganate in the Disinfection of Wounds.

A perfect antiseptic for use in living tissues has been sought ever since Lister first taught the world the reason why wounds became septic and why wounded people died of hospital gangrene and other forms of bacterial invasion. The surgeon demands a substance which will kill the bacteria but leave the living tissues unharmed. Many have laid claim that they have found this ideal. Experience has always disclosed that the antiseptics discovered were not indifferent substances in the tissues, even in dilutions less concentrated than were required to kill the bacteria. Moreover, very energetic and prolonged action is necessary for the production of a protective effect against spore-bearing bacteria. The disinfectants introduced during the war have not been exceptions to the rule. Shortly after the hypochlorites had been introduced with great confidence, it was regarded as necessary to continue the search. Flavine was one of the results, and a heated controversy has been carried on concerning the powers of this substance. It appears that, notwithstanding the advantages attaching to these new antiseptics, none fulfill the requirements of surgeons. Recently Captain Fraser B. Gurd has called attention to the advantages of an old friend over all the new comers in dealing a knock-out blow to the anaerobes which infest wounds sustained

in the trenches. This well-known substance is permanganate of potash. For it he claims that it is inexpensive, that it is a powerful oxydizing agent, that it is an effective germicide, even in dilutions much greater than may be profitably employed, that it is astringent, and consequently acts as a hæmostatic, that it does not macerate epithelium, that in the dilutions employed it is a mild irritant and stimulates the circulation through the adjacent tissues, that it causes little pain, that it induces the prompt appearance of firm, healthy granulations and, finally, that it does not stain or otherwise alter the appearance of tissues other than those which are necrotic. He uses a two or three per cent. solution for patients asleep on the operation table, and a half to one per cent. solution for patients when conscious. His experience has taught him that it acts efficiently against *Bacillus aerogenes capsulatus*, if the wounds are properly dealt with prior to the dressing. When the solution is applied early, gas gangrene can be prevented, and, save when the infection has progressed far, it has been found to act curatively in established infections. It will be noted that no claim is made that the substance does not affect the tissues. On the contrary, the author lays some importance on the stimulating action, which he uses for the purpose of increasing the circulation. It is certain that potassium permanganate damages the tissue cells to some extent, and may even produce destructive lesions, if applied in a concentrated solution. It remains for surgeons working in casualty clearing stations and advanced ambulances to determine whether the practical advantages of this substance are equal or superior to those of Eusol, Flavine and the other newer war antiseptics.—*Medical Journal of Australia.*^c

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* A LECTURE ON TUBERCULOSIS.

BY

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TUBERCULOSIS is a very common disease and is distributed over the whole world. It is known to occur in all regions, whether dry or moist, high or low, warm or cold. It is a disease of all times and of all countries. It has existed from very remote times. References to this disease are to be found in the Bible, the Vedas and the ancient Sanskrit books on medicines.

Professor Koch, the discoverer of the *Bacillus tuberculosis*, estimated that 1/7th of all the deaths in the civilised countries was due to Tuberculosis.

The rate of mortality from Tuberculosis in India is about 9 %, or 1/11th of all deaths.

A very modest estimate of the number of people affected with tuberculosis in this city will be about 10,000. In this presidency, the disease seems to prevail most in Malabar and Madras.

The frequency of the disease is determined more by overcrowding, poverty, and neglect of the laws of health than by geographic situation.

Tuberculosis has not yet drawn the attention it deserves in this country. The universal distribution and the great prevalence of the disease in various parts of India, the high rate of mortality from it, the curability of the disease in the earlier stages, if recognised early, the easy preventability of the spread

^c Specially contributed to *The Antiseptic*.