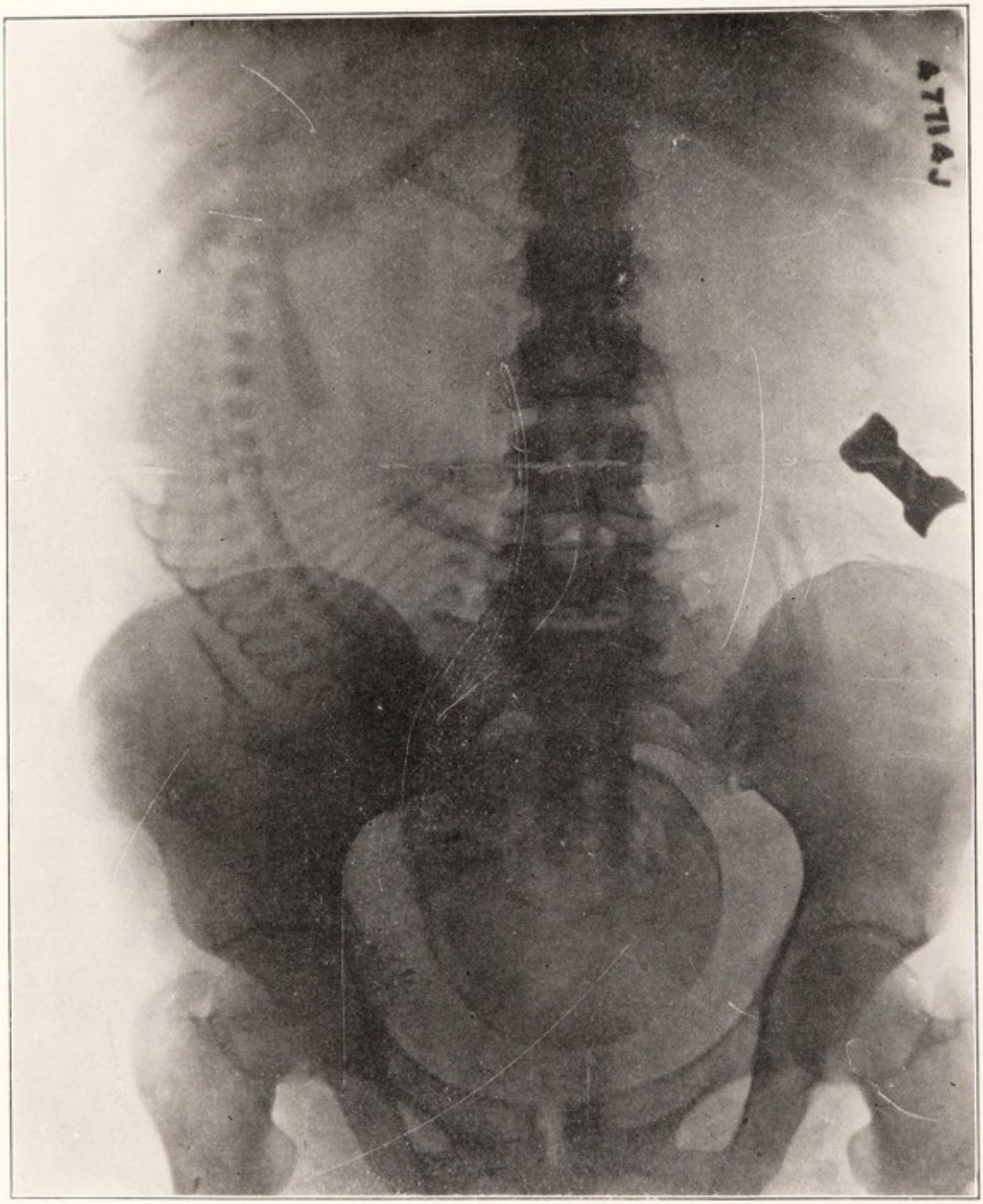
Complications of pregnancy / by Edward P. Davis.

COMPLICATIONS OF PREGNANCY



X-RAY. INTRA-UTERINE PREGNANCY AT SEVEN MONTHS. (Manges.)

Frontispiece

COMPLICATIONS OF PREGNANCY

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PREFACE

THIS book has been written with the intention of presenting to the medical profession knowledge of practical value concerning the complications of pregnancy. Many of the most important problems in the study of pregnancy remain unsolved, and biochemistry may add greatly to our knowledge in this department.

The writer has given what he has found to be clinically reliable knowledge. A bibliography of recent literature would indicate to the reader many papers of value, giving the results of study, which, while interesting, are not yet conclusive. Illustrative cases have been quoted from the writer's observation. Methods of treatment in the most important conditions are described.

While pregnancy is a physiological condition, physiologically perfect individuals are rarely encountered. It has been shown that the study and treatment of the complications of pregnancy is remarkably successful in lessening mortality and morbidity of parturition. No greater advance has been made in modern medicine than in this regard. The complications of pregnancy are many of them obscure in nature and sometimes difficult to recognize and to correct. It is, therefore, essential that such knowledge as has been fairly proved and has borne the test of experience should be brought to the attention of the profession.

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PHILADELPHIA

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COMPLICATIONS OF PREGNANCY

CHAPTER I

INTRODUCTION

Description of normal pregnancy—Circulation of the blood and respiration—The composition of the blood—Digestion—Excretion—Metabolism—The nervous system—Duration of pregnancy.

Normal Pregnancy.—Before one attempts to appreciate the reaction of the pregnant woman to the complications of pregnancy, it may be well to review the essential features of the condition of pregnancy under normal circumstances.

It is a familiar observation that the occurrence of pregnancy affects woman profoundly. Mechanically, physiologically and functionally, the ordinary conditions of life are changed. When, in addition, a complication arises, the reaction of the pregnant woman to such complication often differs from the reaction that would take place were she not pregnant.

We may first consider the mechanical element and how this may affect a complication arising during pregnancy. As the uterus and its contents grow, they must interfere with the circulation of blood and of lymph in the pelvis and the abdomen. Pressure upon the intestine interferes with peristalsis and may bring about a paretic condition favorable to the development of intestinal infection. Pressure upon the ureters may cause an accumulation of urine in the pelves of the kidneys. Pressure upon nerve trunks may not only cause pain but may produce actual changes in the anatomical condition of the nerve. As the pelvic joints are softened and often made mobile during pregnancy, the functions of the pelvis are altered and unusual strain is brought upon various portions of the skeleton. From the standpoint of mechanics, apart from other considerations, pregnancy in itself is a complication—and an important one.

The Organs of Circulation and Respiration.—Essential alterations were formerly supposed to take place in the size and structure of the heart, in the blood-vessels and in the lungs. The organs of circulation and respiration may appropriately be considered together in studying pregnancy. It is not now believed that there is essential change in the size of the heart, nor in the tissues of the lungs, unless mechanical pressure causes congestion. The quantity of blood is increased one twelfth,

which necessitates the performance of greater labor on the part of the heart. This may increase the rate of the pulse and disturb the heart action readily, and may cause disturbance in breathing as well. Pregnancy in the healthy individual does not produce essential disease of the heart or lungs. The average blood-pressure of pregnancy in a healthy woman is systolic 100 to 130, diastolic 60 to 85; pulse pressure 35 to 50.

The Blood.—The condition of the blood in the pregnant woman has been the subject of much study and considerable argument. Before we studied toxemia as we now do, pregnancy was thought invariably to cause anemia in the early months. We now know that, in a perfectly healthy individual, pregnancy not only produces no anemia but enriches the blood by an increased percentage of hemoglobin and cells. Antibodies, capable of destroying bacteria, are also developed. Provided the pregnant woman escapes toxemia, she is better prepared to resist acute infection than is the woman who is not pregnant. The question is often raised whether menstruation entirely ceases during pregnancy. Certainly before the fourth month, when the membranes of the ovum have joined those of the uterus, a discharge of blood is not only possible but not unusual. Well-recorded cases attest the fact that some women lose blood at regular intervals from the uterus throughout pregnancy. In the majority of cases, however, menstruation ceases.

Recent studies on the composition of the blood in pregnancy show that calcium is increased considerably in quantity, diminishing somewhat in the second half of pregnancy. The nonprotein nitrogen is lessened in quantity and, of this nonprotein nitrogen, urea nitrogen should comprise 44 per cent. There is no essential change in the quantity of uric acid, creatin, the chlorids or the sugar concentration. During the last months of pregnancy, there is a slight decrease in the combining carbon dioxid capacity of the blood-plasma.

The Lymphatics.—The lymphatics share with the blood-vessels the engorgement caused by pressure. In the healthy pregnant woman, we do not find enlargement of the lymphatic glands nor evidences of an abnormal state of the lymphatic fluid. The lymphatic metabolism of the body is stimulated by pregnancy in a healthy woman, and she is thus better prepared to resist acute infection.

The Digestive Organs.—In addition to mechanical alteration in the position of the digestive organs, pregnancy favors dilatation of the bowel and stomach and interferes with peristalsis, thus preparing the way for the pathological development of bacteria in the intestine. The congested condition of the liver, and the fact that antibodies produced in the blood have a tendency to attack the liver substance, bring this organ to a condition approaching the pathological. In the sound and healthy woman, pregnancy stimulates appetite and may also increase and improve digestion.

The Organs of Excretion.—Of these the kidneys are usually first considered, and the kidney of pregnancy is essentially a congested kidney, which has long been considered the inevitable result of pregnancy.

The majority of evidence shows that the condition of the kidneys is such as to invite the development of interstitial nephritis where there has been a nephritis before pregnancy. When upon this condition is engrafted toxemia, the result will depend considerably upon the course taken by the toxemic process. If this latter goes on to eclampsia, the kidneys are often spared serious and permanent damage, but, if the toxemia does not reach that culmination, it may be some time before the kidneys return to their normal condition. While formerly it was thought that kidney failure was the great and dangerous complication of pregnancy, it is now known that such is not the case. The problem of toxemia is more complex than the development of nephritis.

Perhaps the most important organ of elimination in pregnancy is the intestine. Constipation is a relative term, but there can be no doubt of the fact that the majority of pregnant women retain fecal matter unnaturally, and that they often suffer as a result. Constipation alone may not produce a serious effect in pregnancy, but it paves the way for complications of a serious nature and may be instrumental in developing anemia of considerable severity. During pregnancy the absorption of toxic material from the waste products of digestion, if not eliminated because of constipation, is a grave danger.

The Nervous System.—The belief that pregnancy must produce a profound disturbance in the nervous system must be abandoned is the view of modern pathology. The development of maternal instinct is a natural accompaniment, and during pregnancy a natural stimulant to the functions of the nervous system; melancholia, forebodings, deranged appetites, unreasonable attitudes and vagaries of temper often accompany pregnancy. Modern knowledge frequently detects the physical cause for these abnormalities. While the sensory nerves under a considerable degree of stimulation are easily disturbed, this does not in itself constitute a complication of pregnancy.

The Metabolism of Pregnancy.—In the healthy parturient, increased metabolism is the rule. There is increased appetite for oxygen, food and water, and such appetites are normal to the condition. The abnormal arises when the limit of the patient's ability to digest and assimilate food is passed.

The Muscular and Nervous System.—The late War proved that during pregnancy women of fairly good fiber can do considerable muscular work, not only without injury, but with benefit. To secure this result, the diet and hygienic conditions must be good. Under favorable conditions, the tendency during pregnancy is to increase the strength and vigor of nerves and muscles.

The Body Temperature.—The temperature of the body in healthy pregnancy is somewhat increased. The degree of gain varies with the temperament and circumstances of the individual. This must be taken into account in estimating the development of fever during pregnancy.

The Minor Factors.—Of minor importance, so far as life and health are concerned, and often so far as comfort is concerned, is the condition

of hair, skin, teeth and nails during pregnancy. In the sound woman the hair should grow more luxuriantly and healthily than before. The skin should have a freer circulation of blood and as a consequence a better action of the sweat glands. Under perfectly normal conditions, the teeth escape injury, and there may be a tendency on the part of wisdom teeth which have not yet made their appearance to erupt during this time. So few women are perfectly normal during pregnancy that caries in the teeth is common, however. The growth of the nails is often stimulated by the condition of the skin, and, where the nails become unduly brittle, the metabolism of the pregnant woman is often at fault.

General Considerations.—In general it may be said that, in spite of great mechanical alterations in the body producing an increased strain upon the functions and capacity of various organs, pregnancy in the healthy woman of the natural age for a first pregnancy is a distinct stimulation. This age is, broadly speaking, before thirty. After that time experience shows that each year adds to the complications of pregnancy.

CHAPTER II

COMPLICATIONS ARISING FROM ABNORMAL CONDITIONS OF GENITAL ORGANS

Abnormal conditions of the genital organs complicating pregnancy—Lack of development—Dislocation of the genital organs—Flexions—Treatment of these conditions.

A lack of development in the genital organs may complicate pregnancy and under some conditions may lead to its premature termination, while failure of development in the pelvic floor and vagina may render vaginal delivery impossible or dangerous. So far as pregnancy is concerned, the most important failure of development is in the uterus. When this is more or less infantile and sharply flexed, its growth is prevented, it does not expand and rise in the pelvis as is normal, and abortion may be the result.

This condition is to be inferred in women evidently poorly developed, in whom a history of great pain during actual menstruation is given, and in whom nervous disturbances accompany the monthly period.

The diagnosis is made by bimanual vaginal examination, at which the impregnated uterus is found to be sharply flexed, and deficient in size and development.

The treatment of this condition is palliative only. Constriction by clothing should be completely removed, the general hygiene of the patient made as good as possible and, at the time when menstruation should have returned if impregnation had not occurred, the patient should be kept reasonably quiet. If the condition be extreme, abortion is very likely to occur. Should this accident happen, the opportunity should be taken to do as much as possible to remedy the condition. At a suitable time after the abortion, the uterus should be thoroughly dilated by solid dilators and the flexion corrected so far as possible. A firm packing of sterile gauze after the dilation and curetting will help in straightening the curve of the uterus. If the flexion has been accompanied by prolapse and backward displacement, it may be necessary to open the abdomen and shorten the round ligaments, thus correcting the position of the uterus.

Abortion in such cases does not mean that sterility is inevitable. If the patient receives proper treatment, subsequent pregnancy may be successful and, under the stimulus of gestation, the uterus may greatly improve in development.

Congenital lack of development in the fallopian tubes, ovaries and

broad ligaments complicating pregnancy is only important in so far as it may interfere with the growth and expansion of the uterus. Nothing can be done for this condition except the general care described.

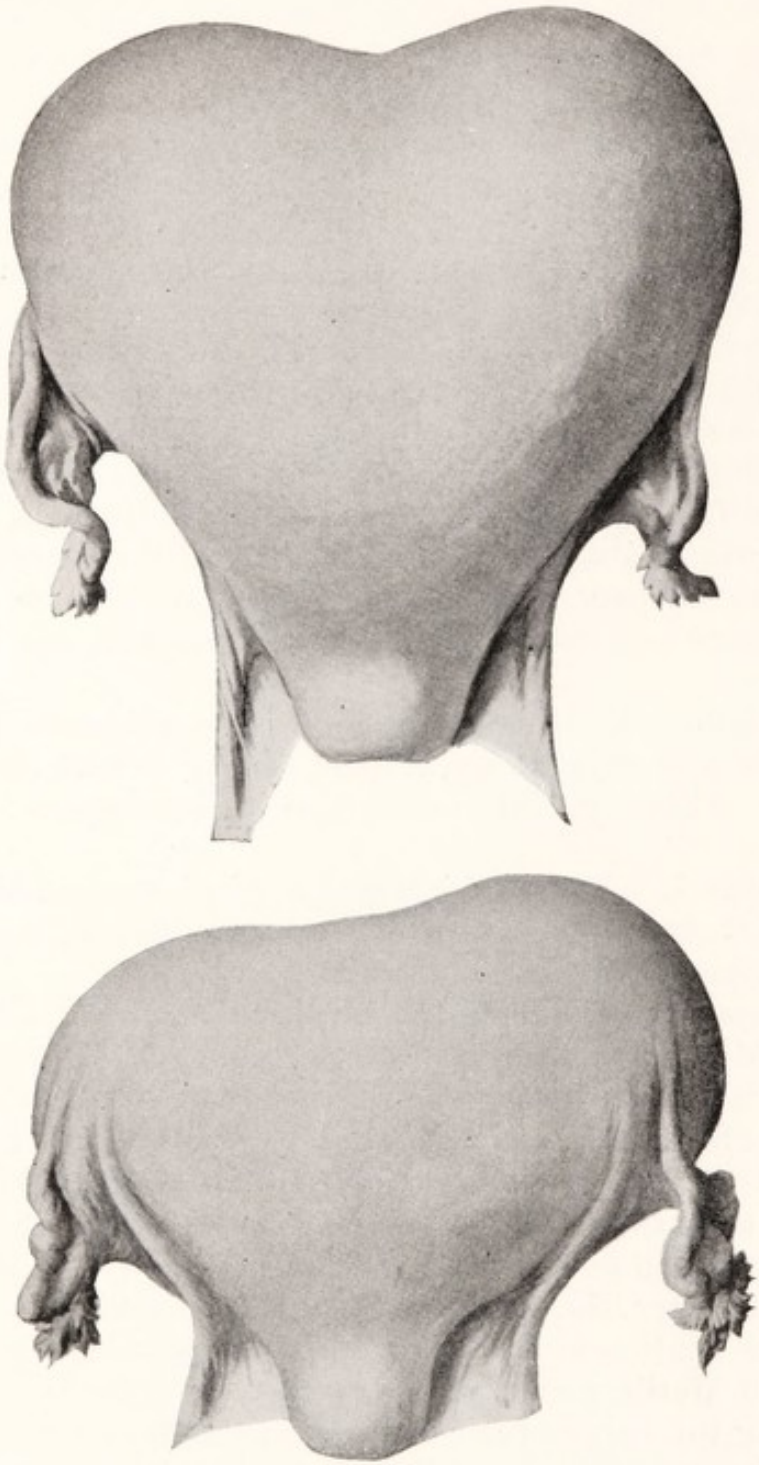

FIG. 1.—A BICORNATE UTERUS. (Bumm.)

Lack of development of the vagina and pelvic floor cannot be corrected during pregnancy. The test of labor is required to indicate the treatment necessary to deliver the child safely.

Dislocation of the Genital Organs.—Genital organs normal in development may become dislocated during pregnancy from several causes. Laceration and relaxation following a previous pregnancy are the most

usual causes. Atrophy and relaxation in patients in especially bad condition may also produce this complication.

The most frequent dislocation of the uterus complicating pregnancy is retroversion. The predisposing causes of this accident are laceration

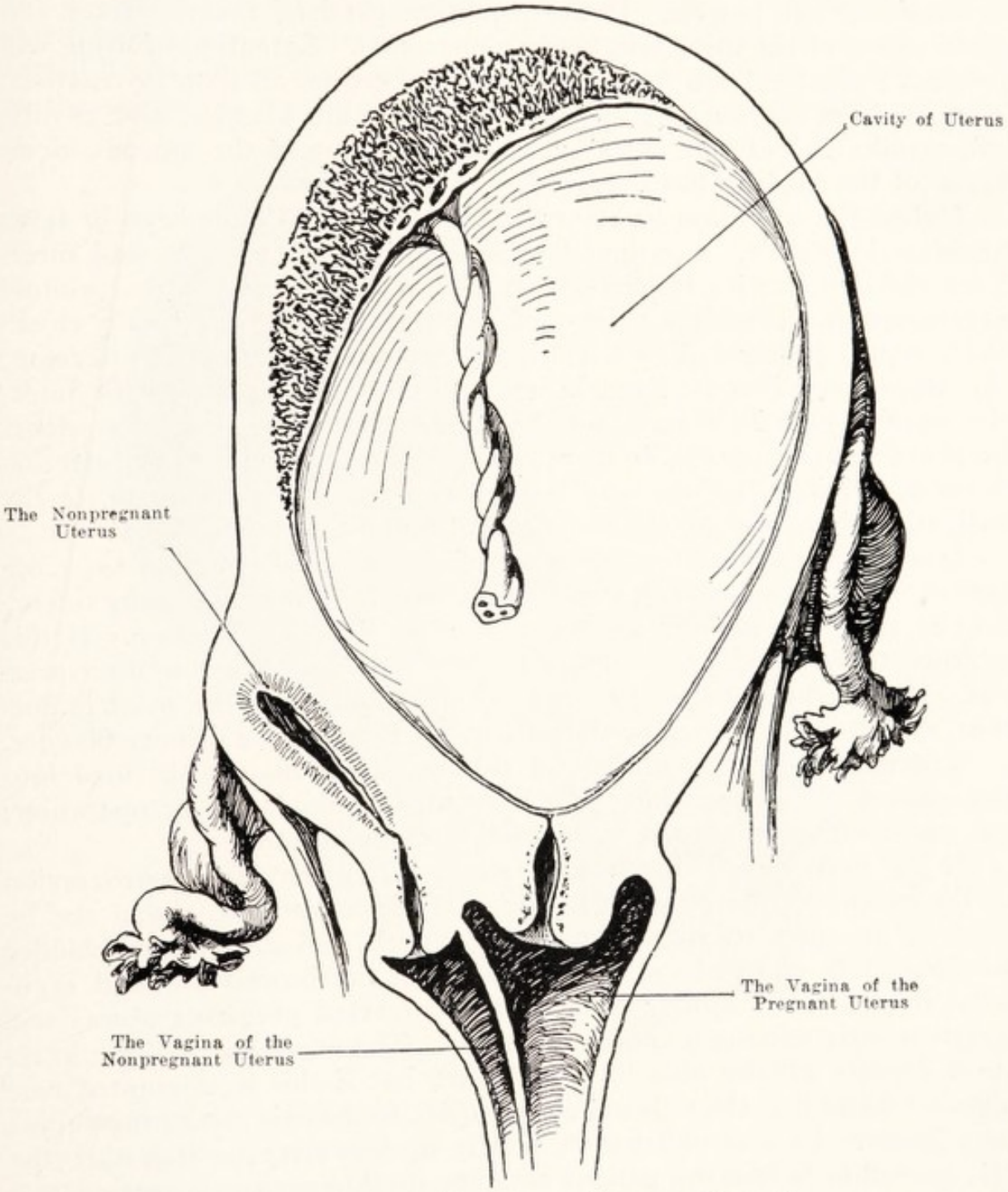

FIG. 2.—DOUELE UTERUS AND VAGINA. (Bumm.)

and relaxation of the tissues, the pressure of clothing, lack of attention to the emptying of the urinary bladder, straining and lifting and a sudden strain or fall. These abnormalities can develop only in the early months before the uterus has become so large that it is at or above the pelvic brim.

The most important signs and symptoms of retroversion are disturbances in the functions of the urinary bladder. The patient has a desire to empty the bladder more frequently than usual, and there is a sensation of irritation and sometimes of pain. There may also be a dull ache or pain at the bottom of the spinal column, across the back, and difficulty in emptying the bowels. If the condition persists, the character and composition of the urine will become abnormal. Retention of urine will produce vesical catarrh and the urine will become alkaline in reaction; bacteria from surrounding tissues may enter the bladder, and cystitis will result. In extreme cases extensive sloughing of the mucous membrane of the bladder has occurred.

Unless the condition be remedied, the death of the embryo or fetus becomes inevitable. Continued pressure upon the uterine wall interferes sufficiently with its circulation to cause the death of the product of conception. The alkaline plug of sterile mucus which normally closes the cervix is penetrated by bacteria; infection and perimetritis develop; the uterus may become fixed in its abnormal position and septic infection may result. In other cases the uterus empties itself of its contents by abortion and may regain its normal position. Should septic infection develop, pelvic adhesions may form which will greatly complicate the patient's subsequent health and prevent her complete recovery.

It should be the custom of obstetricians to make a vaginal examination of all pregnant women who consult them. This is especially important in the early months to recognize a possible retroversion. If this is done, there will be little difficulty in recognizing the condition present. It must be remembered that the first, and often the most important, symptoms described by the patient are those of the urinary bladder.

Treatment.—The treatment of this condition may be divided into two classes: (1) cases which do not require manipulation or operation; (2) cases which do require manipulation or operation.

It has been shown that, if a pregnant patient having a retroversion of the uterus be placed in bed, preferably in a hospital, and if she be made to lie upon her side instead of her back, and the urinary bladder be completely emptied every six hours and the bowels emptied regularly, in the vast majority of cases a retroverted pregnant uterus will spontaneously assume its normal position. The assumption of the knee-chest posture greatly aids this treatment, but if this is attempted care must be taken that the vulva is drawn apart so that air enters the vagina very freely. To accomplish this, it may be necessary to insert a cylindric speculum before the patient assumes the knee-chest posture. This treatment, however, is difficult to carry out because its duration is uncertain. The patient is often not impressed with the fact that she is receiving appropriate treatment, and it is very difficult to control a patient for an uncertain length of time. Drugs are rarely of use in this treatment, unless simple laxatives are needed; occasionally sedatives may be employed if the patient is restless and sleepless. The complaint of pain may call for the use of opium.

The replacing of the pregnant uterus may be hastened and sometimes accomplished by manipulation.

If the urinary bladder and rectum of the patient are emptied and she is put in the knee-chest posture, the obstetrician, having suitably prepared his hands, may introduce two fingers into the vagina and carry the posterior vaginal wall upward and backward. This allows air to enter freely; gentle pressure should then be made against the retroverted fundus to see if it can easily be dislodged. If it be pressed to one or the other side of the promontory of the sacrum, it will sometimes

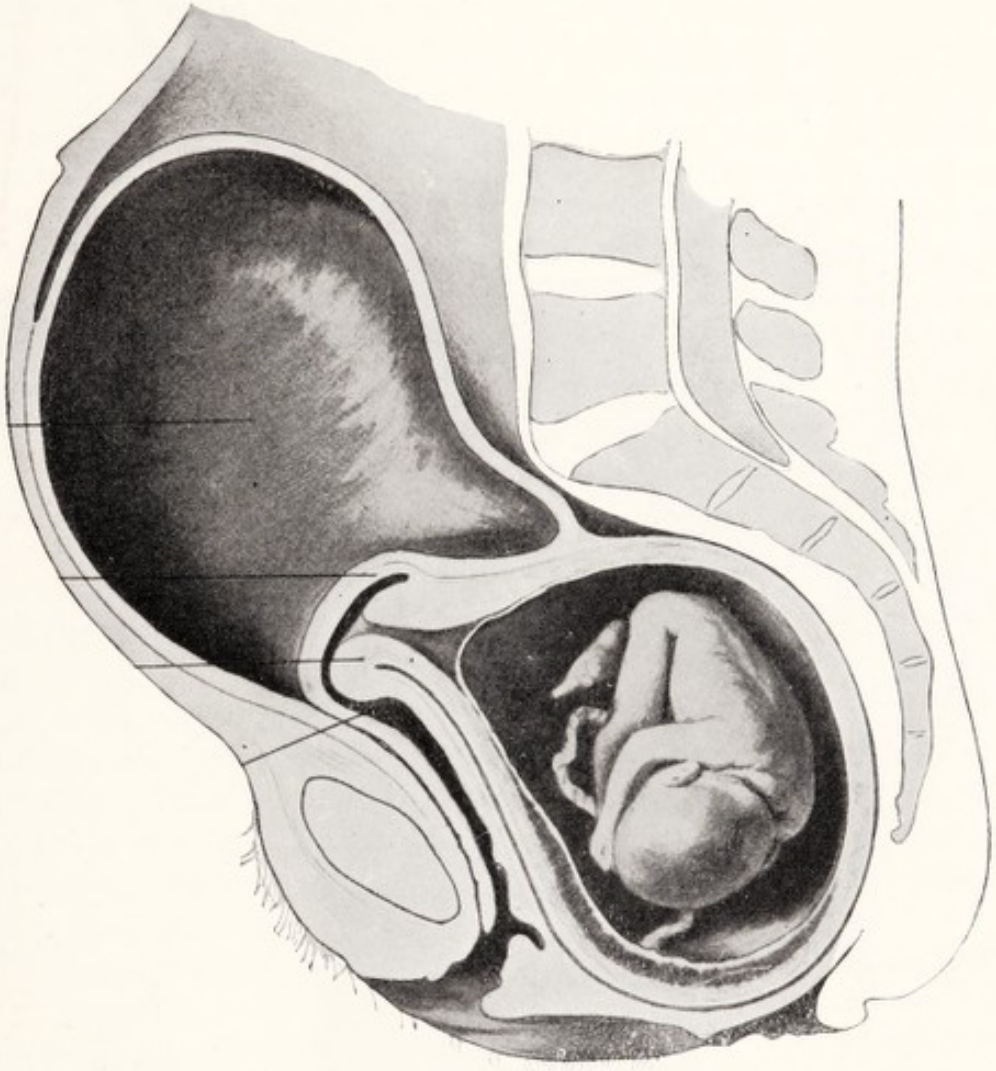

FIG. 3.—RETROVERSION AND INCARCERATION OF UTERUS COMPLICATING PREGNANCY. (Bumm.)

slip up above the pelvic brim and the replacing be accomplished. Gentleness and patience and skill are necessary for this manipulation to avoid the danger of bringing on abortion.

If this effort fails to replace the uterus, Sims' speculum may then be inserted and the posterior vaginal wall drawn upward and backward by an assistant. A pessary made of carded lamb's wool, soaked in ½ per cent solution of lysol and smeared with a borated ointment, may then be introduced and placed behind the cervix, extending across the posterior vaginal wall. The size and shape of this pessary should be varied to fit the individual. Very often a roll the size of two fingers and as

long as the longest finger is found useful. To the middle of this is attached a piece of sterile silk by which the pessary can be withdrawn. It should be fitted in place by the gloved fingers of the obstetrician and may be worn by the patient from thirty-six to forty-eight hours. It should then be removed, a vaginal douche (½ per cent lysol) be given and another pessary inserted.

If there is evidence that perimetritis is present with fixation of the uterus, a different treatment has been found useful.

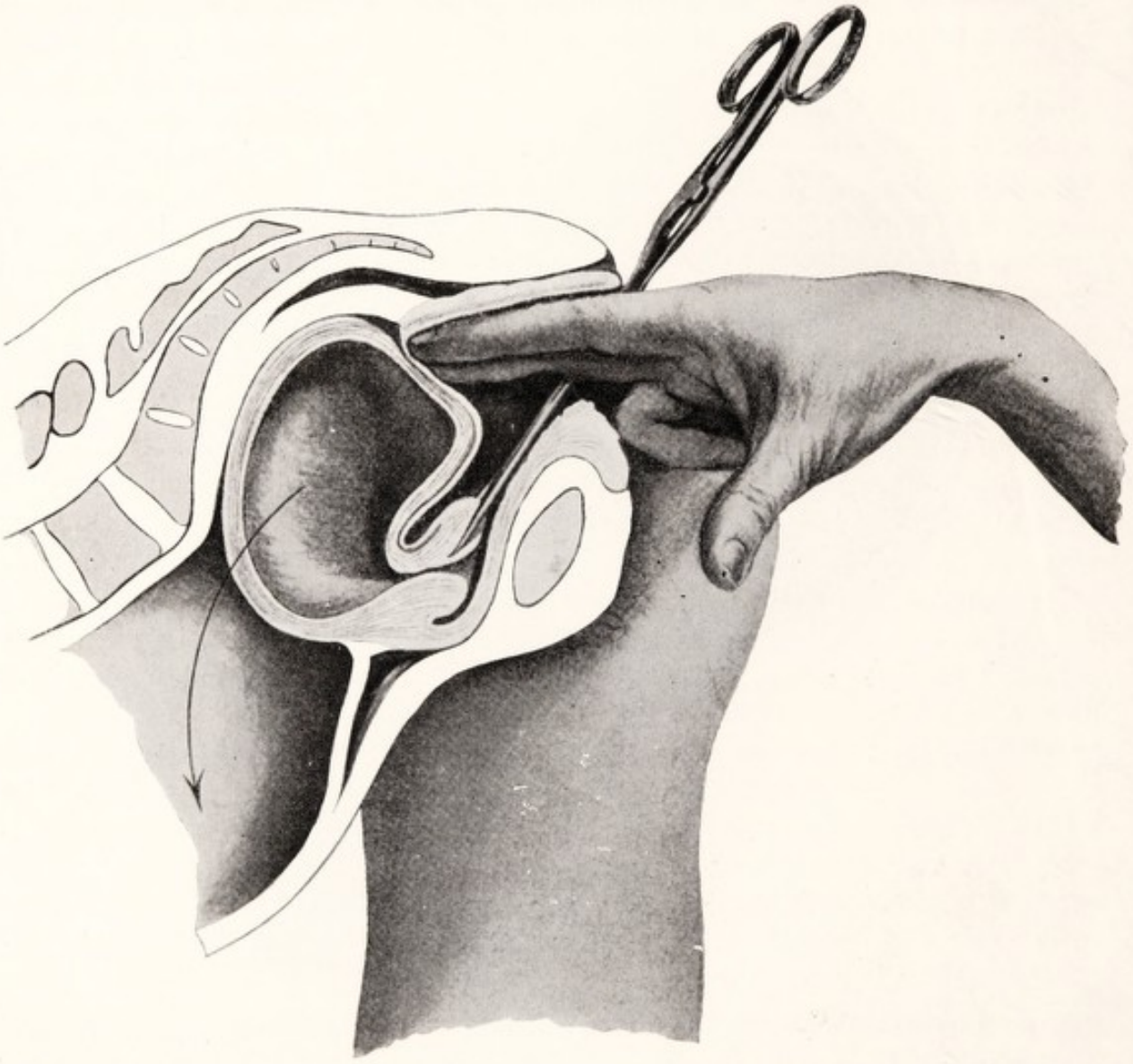

FIG. 4.—REPLACING RETROVERTED PREGNANT UTERUS BY MANIPULATION WITH PATIENT IN KNEE-CHEST POSITION. (Bumm.)

With the patient in the knee-chest posture, a strip of sterilized surgeon's lint, three inches in width, soaked in sterile glycerine, is packed around the cervix, exerting gentle pressure. This may be worn thirty-six hours. It is then removed, followed by a douche, and the treatment repeated.

In addition to these soft pessaries, the treatment without manipulation should be continued; the regular emptying of the bladder and the bowel; the knee-chest position; and the avoidance of lying upon the

back. At intervals the obstetrician should endeavor to replace the uterus with the patient in the knee-chest posture when the tampons or pessaries are changed.

In the experience of the writer, this treatment has been successful in cases where adhesions were not present in a sufficiently large percentage of patients to justify its employment. It is tedious and uncertain in duration, and for this reason patients often lose confidence in the treatment and desire a more prompt and radical method.

Treatment by Manipulation or Operative Interference.—This should be done in the hospital, under anesthesia. The natural inclination of the obstetrician would be to use nitrous oxid and oxygen for this purpose. Unfortunately this anesthetic does not relax some patients and, as complete relaxation is necessary, such anesthesia may fail. Furthermore, if the operator cannot succeed in replacing the uterus by the vaginal method, he may be obliged to open the abdomen. Hence, in undertaking treatment under anesthesia in the hospital, preparations should be made for abdominal section, and ether and oxygen employed as the anesthetic and, in competent hands, should be carried to the point of surgical anesthesia.

Under thorough surgical technic, the patient is placed in the dorsal position or upon her side; the bladder completely emptied by catheterism. The posterior lip of the cervix should then be firmly grasped by a large strong forceps; gentle but persistent traction should be made outward and slightly backward, while two fingers of the other hand should be carried along the posterior vaginal wall and the effort made to press the fundus to one side of the promontory of the sacrum and carry it above the pelvic brim. Experience, judgment and skill are necessary for this manipulation, for violence may be followed by abortion, and in extreme cases the uterus may be seriously damaged. If the uterus is replaced in this manner, it should be retained in normal position by a vaginal packing of sterile gauze, which carries the cervix back and up. Subsequently, a soft rubber ring pessary may be fitted.

If this manipulation fails, the patient should be placed in the Trendelenburg position and, under careful antiseptic precautions and with complete surgical anesthesia, the abdomen opened in the median line. If adhesions are present, they should be dealt with by careful separation and ligation. The uterus should be carefully dislodged and brought into normal position. If the condition of the round ligaments justifies the procedure, they may be shortened and the uterus thus retained in the normal position. If one or both ovaries have been prolapsed, they should also be restored to normal position.

In some cases an inflamed appendix may be found adherent to the uterus or right broad ligament, and if such be present it should be removed.

After manipulation or operation, the patient should be kept quiet by the hypodermatic use of morphin; the bladder should be emptied regularly by catheterism; the patient encouraged to lie upon her sides.

Cases are occasionally met with where it is impossible for the operator to restore the pregnant uterus to its normal position without lessening its size. Under these circumstances the uterus should be opened by a longitudinal incision in its anterior wall. Its contents should be removed by the gloved fingers, and a finger be passed through the cervix to be sure of the escape of lochia. The uterus should then be closed by bringing the muscle together with interrupted silk stitches and the peritoneum with catgut. It will then be possible to restore the uterus to its normal position and retain it there by shortening the round ligaments.

Treatment of Retroversion of the Pregnant Uterus Complicated by Fixation and Infection.—In this dangerous condition the choice of operation may be difficult to make. If the uterus be dilated and emptied, there is danger that it will be perforated during this procedure and, if this is not done, it is a focus of infection. If the condition be serious, it may be necessary to treat the uterus as a malignant growth. If this decision be made, then vaginal hysterectomy must be performed, followed by free drainage of the pelvic cavity. Pus pockets in the pelvis should be emptied and drained at this time. The ovaries, if possible, should be allowed to remain.

The occurrence of retroversion of the pregnant uterus should be kept in mind by the obstetrician when the patient has recovered from her pregnancy and labor. A thorough bimanual examination should be made, and, if there is a confirmed tendency to retroversion, the round ligaments should be shortened or some other appropriate operation should be performed. For women of childbearing age, fixation operations should be declined and the round ligaments utilized if possible.

Prolapse.—Prolapse of the uterus and vaginal wall may complicate pregnancy. This condition is seen in patients who have been injured in previous labors, or who have not had proper care after confinement, or in whom the tissues of the abdomen and pelvis have become atrophied and relaxed. A result of this condition may be a moderate protrusion of the vaginal walls with disturbance of the bladder and sometimes the bowel and, in extreme cases, protrusion of the cervix from the vagina or complete prolapse of the uterus in the early weeks of gestation.

Signs and symptoms of this condition are discomfort and disturbance of the bladder and rectum with indefinite pelvic pain and the appearance of prolapsed tissues and organs. Vaginal catarrh develops and, if the cervix prolapses, it will become inflamed and eroded. In extreme cases, abortion may occur, while in others the condition is tolerated to a surprising degree.

These cases should be studied by thorough bimanual and visual examination with the urinary bladder of the patient and the rectum completely emptied. The choice of treatment lies between palliative measures until the uterus is so large that it cannot prolapse, or the performance of some operation intended permanently to correct the tendency to prolapse. The latter method is rarely indicated, for as a rule

the conditions are all unfavorable for operation. The tissues are unusually vascular; hemorrhage would be more than usual; perfect union might not result and the results would very likely not be satisfactory.

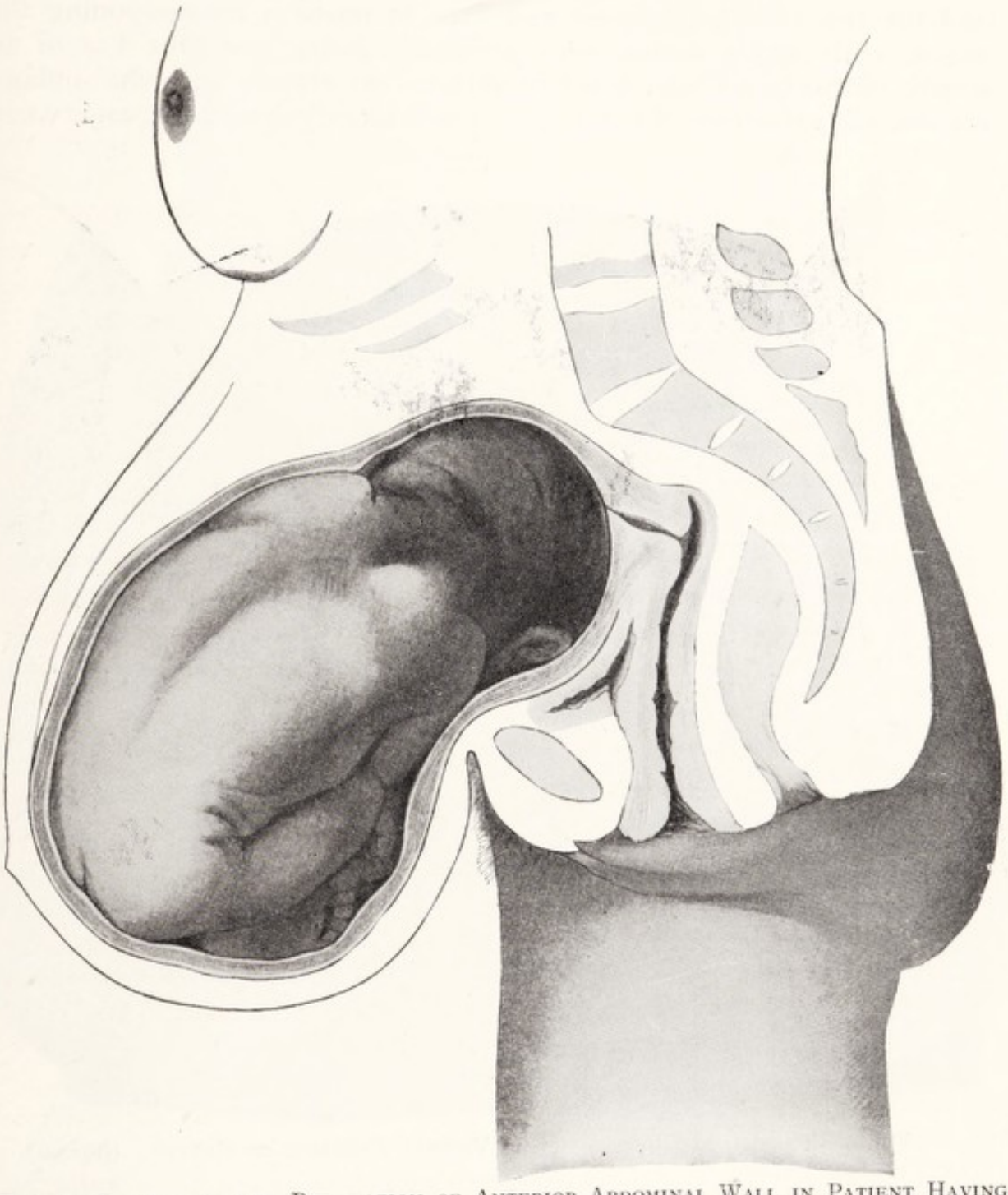

FIG. 5.—DISTENTION AND RELAXATION OF ANTERIOR ABDOMINAL WALL IN PATIENT HAVING SPINAL DEFORMITY, WITH ABDOMINAL PROLAPSE OF PREGNANT UTERUS. (Bumm.)

If, however, the patient is a young, strong woman; if the prolapse depends upon some definite and considerable laceration; and if a chronic catarrhal infection is not present, then the correction of the laceration during pregnancy is permissible. If an operation is undertaken, the patient should be kept under the influence of morphin after the operation to avoid danger of abortion.

The nonoperative treatment of this condition should, if possible, be conducted in the hospital. The patient should be in bed, the parts thoroughly but gently cleansed with ½ per cent lysol solution or saturated solution of boracic acid, the bladder and rectum having been emptied and the tissues then replaced and kept in position by tamponing the vagina with sterile carded wool or sterile gauze, with the use of an aseptic ointment. Under these conditions, the chronic catarrhal inflammation will grow less; the congestion will largely disappear; and, when

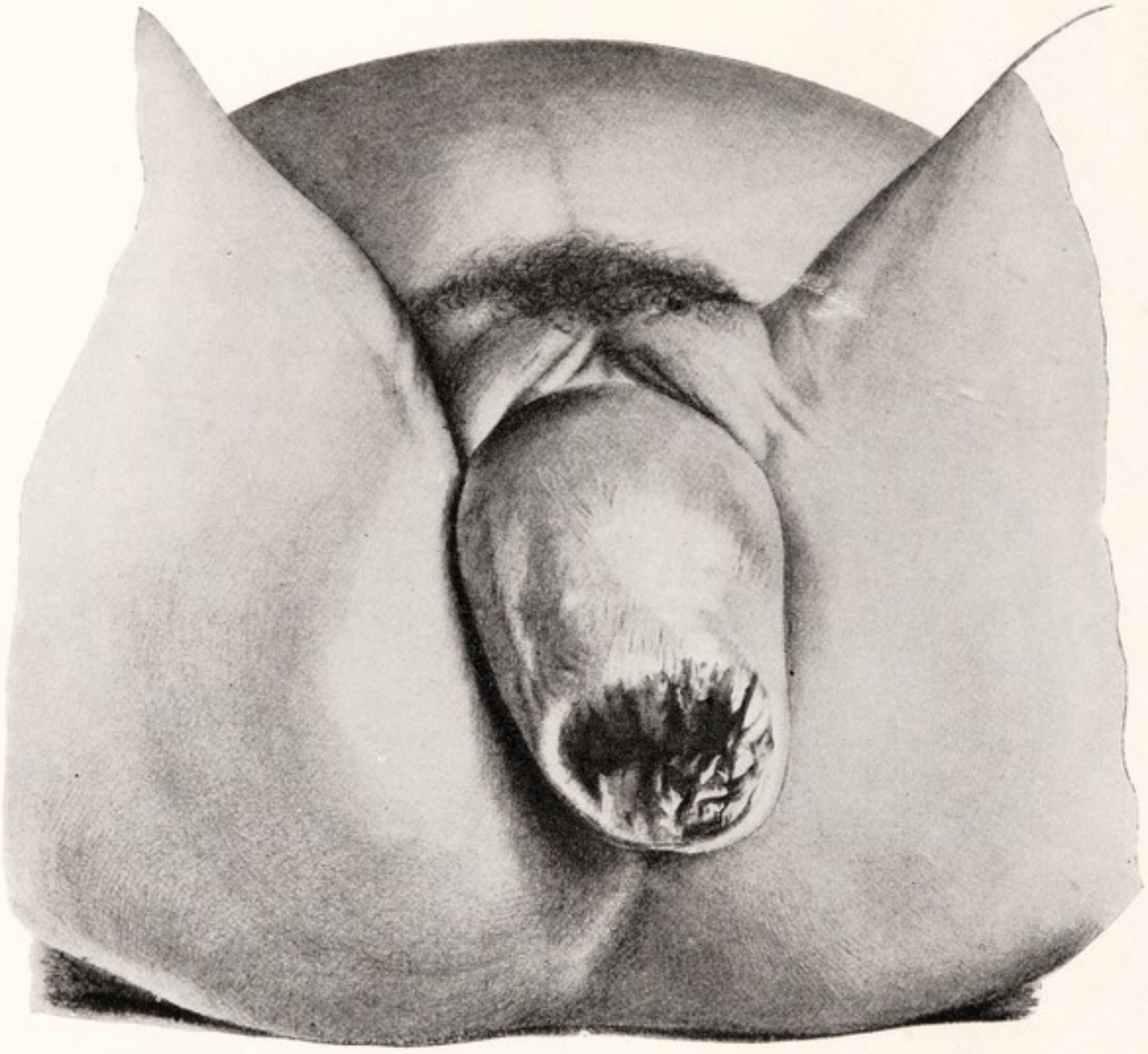

FIG. 6.—PREGNANCY COMPLICATED BY VAGINAL PROLAPSE OF CERVIX. (Bumm.)

the uterus is so large that it cannot prolapse, the treatment may be stopped. Obviously this is a tedious and unsatisfactory procedure for patients who are active and who are accustomed to move about. With such as these, the same treatment may be carried out, provided the patient be kept under observation and a sterile vulval pad be worn, retained in place by a properly fitting T-bandage. As a rule, however, it is better to keep the patient quiet until a spontaneous cure results.

The prevention of abortion in these cases depends largely on pre-

venting the overfilling of the urinary bladder and rectum, the avoidance of exertion and straining and the prompt use of morphin, with rest in bed, should symptoms of uterine contraction appear.

FIG. 7.—RIGHT INGUINAL HERNIA COMPLICATING PREGNANCY. (Bumm.)

After the patient's pregnancy and confinement, the prolapse and its accompanying conditions should receive appropriate treatment by operation.

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CHAPTER III

PREGNANCY COMPLICATED BY INFECTION OF GENITAL ORGANS

Infection of the genital organs complicating pregnancy—General mixed infection—Gonorrhea—Syphilis—Tuberculosis—Pelvic abscess—Diagnosis and treatment.

General Mixed Infection.—It has been repeatedly shown that during pregnancy the vagina contains many bacteria of different varieties. Ordinarily their pathogenic virulence is kept in abeyance by the vaginal secretion of acid mucus. When, however, conditions arise which limit or destroy the formation of this secretion, they may assume a pathogenic virulence and infection may result.

During a healthful pregnancy, the cervix is practically closed by a plug of mucus of alkaline reaction, and such is the condition of the cervix that ordinarily bacteria from the vagina do not, during pregnancy, make their way into the uterine cavity.

A mixed infection may develop when the genital tract is subjected to frequent manipulation or disturbance during pregnancy, especially when the external parts are not properly cleansed. Retained secretions are decomposed and bacteria from the intestine and skin become active. Under these conditions it is not unusual for Bartholin's glands in the vulva to become infected and for the infection to go on to the formation of pus and abscess. Should the condition not be corrected before labor, the risk of puerperal septic infection is thereby increased. The prevention of this condition calls for the hygiene of pregnancy and the thorough practice of external cleanliness during this period. A diagnosis may be made of this condition by the presence of an offensive mucopurulent secretion of alkaline reaction and, if the glands of the vulva become infected, by swelling at one or both sides at the situation of the infected gland.

The treatment of this condition consists in thorough external cleanliness and antisepsis; in the use of vaginal douches of 1 per cent lysol; one teaspoonful tincture iodin to the quart of warm water or saturated solution of boracic acid; and, in the event of glandular infection, opening the gland under light anesthesia, curetting its interior, disinfecting it and packing it with 10 per cent iodoform gauze. This packing should be removed in twenty-four hours and the gland cavity irrigated with iodin until it is obliterated and completely closed.

Should there be much smarting, burning and irritation, a rectal suppository of one-half grain aqueous extract of opium may be used to

advantage. Where incision must be done for abscess, the patient should remain in bed for a short time after the abscess is emptied.

Patients suffering with mixed infection of the genital tract should be warned that infective secretion may be conveyed from this portion of the body to other parts by the fingers. Hence, care should be taken to cleanse thoroughly and properly the hands before bathing or touching the nipples or other parts of the body if the patient has recently touched the external genital organs. If there is abundant secretion, a sterile or antiseptic vulval dressing should be worn and, when removed and soiled, should be burned.

Gonorrhea.—Infection of the genital tract by the gonococcus is a not infrequent complication of pregnancy, the recognition of which may be difficult, but the treatment of which is important. It must be remembered that in dealing with pregnant patients nothing should be taken for granted and that the reputation or the social status of a patient should in no degree influence the judgment of the physician. Many women are innocent victims of gonorrheal infection, while others may have the best of reasons for concealing it.

Etiology.—This infection is the result of a specific germ, the gonococcus of Neisser. It is conveyed by contact of germs developing in folds of the mucous membrane of the vagina, and then attacking the muciparous glands, making its way into the cervix and uterus and in some cases attacking the fetus. Through the medium of the lymphatics it may develop in the pelvic tissues about the uterus or make its way to the fallopian tubes and to the tissues about the ovaries.

The course and history of such an infection will depend upon the virulence of the infecting germ, the resisting power of the patient, and the presence or absence of manipulation and interference. The last is especially true in regard to the use of the catheter to empty the bladder. If the necessity for this should arise, it is very difficult to avoid infecting the bladder. Where all the conditions are favorable for resisting the infection, the patient may escape with vaginitis and endocervicitis not severe in grade. If the conditions are unfavorable, perimetritis and pelvic abscess may develop. In extreme cases a general peritonitis and mixed infection may prove fatal.

Diagnosis.—The diagnosis of the condition is made by the complaint of the patient of an irritating, burning, painful sensation which is made worse when the urinary bladder is emptied; a purulent or mucopurulent vaginal secretion soon makes its appearance and, if the infection be severe and develops rapidly, the patient may walk with difficulty and suffer considerable pain. A moderate elevation of pulse and temperature usually accompanies the infection. If the patient is ignorant of her condition, she may convey the infection, if she has children, to her children by touch, or she may infect other portions of her own body.

A positive diagnosis is made by examining bacteriologically the secretion and identifying, without doubt, the characteristic organism. Some idea may be obtained of the virulence of the infection if the

gonococcus is found in pure culture or if it is associated with or outnumbered by other forms of bacteria.

The recognition of gonorrheal infection complicating pregnancy often places the patient and the physician in an embarrassing position. If the patient is an innocent victim of infection, the physician must carefully avoid exciting suspicion in answering the patient's questions concerning her condition and in advising and conducting her treatment. Similar precautions are necessary under other conditions. In the case of married women, when a positive diagnosis is made, it is often of interest and value to ascertain whether the husband has ever been infected. If this can be done without exciting unfortunate suspicion, this should be accomplished. Under such trying conditions, the physician must remember that his first duty is to the patient and above all to keep strictly her confidence, no matter what may be the other elements in the case.

Treatment.—It may be difficult in these cases to secure for the patient sufficiently thorough and vigorous treatment without exciting suspicion. Such are usually hospital cases unless it may be better, for various reasons, that the patient should retain the privacy of her home. Certainly trained nursing is necessary. Strict antiseptic precautions must be taken, not only by the patient, but also by the nurse or attendant that she too may not become infected. An experienced nurse is essential; one who will keep her own counsel concerning developments she may observe. She should be warned that the case is infectious and, by the use of rubber gloves and other measures, avoid contaminating herself.

Rest in bed and the regular and free evacuation of the bowels are essential. A light nutritious diet, preferably composed of milk, fruit and bread with the addition of vegetables in season, is desirable. Strong tea and coffee and alcoholic beverages are to be avoided; so also is the excessive use of tobacco.

The local treatment is obviously of especial importance. The external parts should be as thoroughly prepared as for a vaginal operation. The use of the catheter should be avoided to prevent contaminating the bladder. Under a good light, the external parts should be thoroughly inspected and, if the infection has gone to the stage of ulceration, the ulcerated surfaces should be cleansed of their secretions and tincture of iodin freely applied. The vaginal walls should then be examined with the aid of a speculum and a gentle but thorough irrigation of warm green-soap suds should be made to remove infective secretion.

Following this the mucous membrane should be as thoroughly disinfected as possible by one of several antiseptics. If the condition is acute and the patient robust, the obstetrician may apply, by gauze dipped in the solution, a solution of bichlorid of mercury, one to two or four thousand. It is not safe to use this in a douche, but it may be applied under direct vision and with a good light. Following this, a copious irrigation of saturated solution of boracic acid should be given.

In patients who are somewhat depleted or anemic, bichlorid of mercury should not be used but thorough and gentle irrigation practiced with lysol 1 per cent; tincture of iodin, a teaspoonful to the pint; or the saturated solution of boracic acid. If there are ulcerated surfaces on the vaginal wall and cervix, these should be thoroughly cleansed, and tincture of iodin should be applied. If there is much irritation and inflammation, it may be well after the irrigation to tampon the vagina with 10 per cent iodoform gauze, packing this about the cervix and taking care not to enter the cervical canal.

The success of this treatment will not depend upon the strength of the antiseptic employed, but upon the thoroughness of its application; the avoidance of force and injury to the parts of the patient; and regular following out of the treatment. If the external parts are sore and inflamed, they should be copiously irrigated and sterile gauze, smeared with an ointment containing ten grains of boracic acid to the ounce, should be applied. If irritation and pain be so great that the patient has pain in the back and symptoms of irritability of the uterus develop, sufficient opium should be used to control this. In keeping the bowels open, laxatives are preferable to enemata, to avoid disturbing the genital organs and also to avoid the conveyance of infection to the rectum.

The duration of such an infection cannot be foretold. The patient cannot be considered cured until repeated smears taken from various portions of the vagina, cervix and pelvic floor have been found to be sterile. It must be remembered that the gonococci are often found at the urethra; in folds of mucous membrane in the vagina; and about the cervix or on the mucous membrane of the vulva; hence, a thorough and painstaking search is necessary to demonstrate their absence.

Nothing can be done to prevent the infection of the fetus except thoroughly and patiently to treat the mother, nor can the infection of the fetus be inferred or demonstrated until birth. Such infection produces no symptoms in the fetus which ordinarily can be detected. Should the patient fail to comply with the physician's directions or become impatient with the treatment, it may be well to explain to her that this form of inflammation sometimes infects the child, and that this is what the physician is endeavoring to prevent. The obstetrician must remember the danger of infecting himself in conducting the treatment, and the use of rubber gloves, sterile gowns and aprons is demanded. It is well, if possible, to set aside the instruments required for the use of the infected patient, only, to avoid a possible danger of infecting others.

Prognosis.—While few patients die during pregnancy as the result of gonorrhea, a gonorrheal mixed infection may produce a fatal puerperal sepsis. While the risk to life may be comparatively small, the risk to health is very considerable from the development of chronic endometritis and infection; from infection of the fallopian tubes closing the lumen of the tube; from fixation of the uterus from perimetritis; from adhesions of

the genital to other organs; and from the possible occurrence of pelvic abscess. Gonorrheal infection of the fetus occurring during pregnancy exposes it to the dangers of ophthalmia and other complications.

Salpingitis and Pelvic Abscess.—Pregnancy complicated by chronic salpingitis calls for a decision between the removal of the infected tube, or tubes, or palliative treatment until after the pregnancy is ended. If the latter is selected or if the patient is suffering considerable annoyance and pain and the mobility of the uterus is somewhat impaired by adhesions, it is best to have the patient remain in bed, preferably in a hospital. The bowels should be made to move thoroughly at least once each day. Pain in the abdomen and pelvis should be combated by mild counterirritation with the use of a dry ice bag, and if necessary by sedative medicines. A thorough study should be made of the patient's blood to determine the presence or absence of anemia and also of leukocytosis. If the patient's excretion is at fault, this should also be stimulated. If improvement follows this treatment, the patient's anemia will gradually disappear and the leukocyte count will become practically what it should be. Excretion will improve; pain and disability will grow less.

There is, however, a definite source of danger in chronic infection in the pelvis complicating pregnancy and this may best be illustrated by narrating a case.

A multiparous woman of uncertain history and antecedents passed through a spontaneous and a comparatively short and easy confinement in the Philadelphia General Hospital. Her convalescence was uninterrupted, without evidence of septic infection. She was allowed to leave her bed to give some assistance in the domestic work of the ward. She shortly afterward complained of pain in the right lower abdomen, radiating to the opposite side. The bimanual examination was negative. Influenza of the intestinal type was present in the community at the time, and it was thought that this was a case of that sort. Within a few hours the patient became severely ill with symptoms of intense septic infection. The abdomen was at once opened and an active streptococcus peritonitis was found which rapidly proved fatal. On searching for the source of the infection, an old focus of infection was discovered in one of the fallopian tubes which had ruptured. There had been a small pocket of very foul and offensive pus confined in an area of the tube which was adherent to the surrounding tissues. The action of lifting on the part of the patient had broken open this pocket, and general infection had resulted.

Pelvic abscess complicating pregnancy requires evacuation with the least possible disturbance of the pelvic tissues. This should be done under surgical anesthesia by a broad, transverse incision across the posterior vaginal wall, followed by the introduction of one or two fingers of the gloved hand and a gentle but thorough examination of the tissues. A large, perforated, soft rubber tube may then be inserted and retained in place by a light packing of 10 per cent iodoform gauze.

The head and trunk of the patient should be raised somewhat in bed to encourage free drainage. Pain should be controlled by hypodermatic injection of morphin. The tube should be removed when the discharge grows less; the gauze packing should be allowed to remain so long as it is draining efficiently. No further manipulation than the removal of the tube and packing should be practiced, and after this has been done it is well, if possible, to avoid douching and sponging of the vagina, maintaining strict external cleanliness and antisepsis.

Tuberculous Infection of the Genital Tract.—Tuberculous infection of the fallopian tubes and uterus and the ovaries, or the tissues surrounding these organs, may complicate pregnancy. At first it would be difficult to distinguish a tuberculous condition from a condition of mixed and general infection. The comparatively slow progress of the disease, the absence of the acute symptoms produced by streptococcus or mixed infection, the evidence of deterioration of the general health and the gradual thickening of the tissues should suggest a diagnosis. The detection of tuberculous infection in the lungs or other portions of the body would be valuable evidence.

In such a case, the obstetrician should remember that the mammary glands may also be the site of infection. If such is the case, the tissues of the breast will be found thickened along the tubules, fluid will usually be present and, if this fluid can be obtained for examination, it will be found to contain tubercle bacilli.

The treatment of the condition will depend upon the age and general condition of the patient and especially upon the circumstances surrounding the case. In a comparatively young patient for whom everything possible can be done, conservative treatment should be given a very thorough trial. A favorable climate, rest, the best of hygiene, the correction of anemia, the relief of pain, the stimulation of excretion, all that can be done to reënforce the patient should be given a thorough trial.

It is true that the removal of tuberculous tubes is often followed by the complete recovery of the patient, but this would expose her to the risk of abortion and would be followed by sterilization. Where conditions are favorable for spontaneous recovery, every effort should be made to secure this.

In patients no longer young, in poor condition and worse circumstances, and especially where a woman has living children who need her care, it may be impossible to give her the benefit of palliative treatment. Here the most efficient conservative treatment will consist of operation, removing tuberculous tubes and draining collections of pus. Should conditions be found which show that the uterus itself is involved —a rare occurrence—it may be necessary to complete the operation by opening and emptying the uterus at the time of the section and performing a supravaginal hysterectomy; or, if the operator prefers, he may remove the uterus unopened. In these cases, operation by abdominal section is preferable.

Syphilitic Infection.—Syphilitic infection complicating pregnancy may develop a characteristic lesion at the point of infection followed by the appearance of constitutional disturbance. Unless controlled by treatment, such infection is usually accompanied by a mixed septic development so that the patient is exposed, not only to the risk of syphilis, but also to the risk of puerperal septic infection.

If the patient is pregnant with a syphilitic ovum, she may herself have escaped a definite local lesion and in this case she may have no symptom except a general reaction to the local infection.

In syphilis acquired outside the genital organs, a characteristic lesion will usually aid in drawing attention to the condition present.

The diagnosis of syphilis complicating pregnancy at once suggests the Wassermann reaction. The literature on this subject is extensive and diversified. The writer believes that it is not too much to say that a definitely positive Wassermann reaction with or without clinical signs points strongly to syphilitic infection, and that the absence of such a reaction is of negative value as evidence, and is no proof that syphilis may not be present. A Wassermann reaction should be taken in all cases where the least suspicion arises, and no harm can be done in clinical practice if a Wassermann reaction is taken in each patient under the care of a clinic.

It was long believed that syphilis complicating pregnancy frequently caused abortion. This is not true at the present time, whether because the disease is early recognized and promptly treated, it is difficult to determine. The history, however, of the birth of stillborn, macerated children is significant and suggestive of syphilitic infection.

When in a pregnant patient acute syphilis with local lesion is discovered, thorough treatment in the hospital is demanded. Local lesions should be disinfected, if necessary under mild anesthesia, with the application of carbolic acid, the electric cautery or by curettage followed by antiseptic applications. The patient's general condition should be accurately studied, the blood examined to determine the presence or absence of anemia and, if the patient be sufficiently advanced, care should be taken to ascertain whether the fetus is living. In such a patient, hospital treatment is demanded and the prompt use of salvarsan or some of its derivatives is indicated.

In using any of these substances, there is a distinct risk to the life of the fetus, but the disease is a greater risk and so the treatment is justifiable. If it is adopted, the usual full dose should be administered and, if pain and reaction develop after the treatment, they should be controlled by the hypodermatic use of morphin.

The repetition of the treatment will depend upon repeated examinations for the Wassermann reaction, the tolerance exhibited by the patient to the treatment and her general condition. Local treatment should be continued until lesions have disappeared. Hospital care is imperative until repeated Wassermann reactions are negative and the patient shows no sign of the disease.

Cases in which the mother escapes acute infection in pregnancy with syphilitic ovum produce what is termed latent syphilis. It is a question in these cases whether it is always the part of wisdom to employ vigorous treatment by salvarsan or its derivatives. Some believe that the use of mercury and the iodids has a better effect than the use of salvarsan. These patients may not require detention in a hospital, but they should report for observation at regular intervals and treatment should be persistent and accurately carried out.

Pregnancy Grafted upon Preëxisting Syphilis.—Cases of secondary syphilis may require the attention of the obstetrician because the condition is complicated by pregnancy. Many of these patients present no lesion but give an accurate history of some former attack and the repeated birth of macerated children. If these patients are thoroughly examined, no local evidence whatever may be found of the disease, but in most of these patients the Wassermann reaction is positive and may be decidedly so. The general health of these patients may be good and they may even have none of the signs or symptoms of secondary syphilis, although upon careful questioning they will usually give the history of a previous acute attack.

These patients are often very desirous of prolonging pregnancy and of obtaining a living child. Under these circumstances it is well to avoid the use of salvarsan or its derivatives; to use mercury very moderately and to depend for success in prolonging the pregnancy upon the administration of iodin and the iodids, with attention to the general nutrition of the patient. The writer has found the following mixture exceedingly useful in these conditions: Iodin, grains, 8; potassium iodid, drams, 8; compound syrup of sarsaparilla, ounces, 8; from one to two teaspoonfuls of this preparation (well diluted) should be taken three times daily, either before or after meals. This treatment may be continued for months during pregnancy, provided the patient is under observation; repeated Wassermann and other examinations of the blood are made and the urine is regularly examined. If it seems advisable to add mercury to this treatment, the use of mercurial ointment by inunction is especially valuable.

Under these conditions the patient should be given a very liberal diet and, if she can assimilate it, a considerable quantity of fat should be included in her food. Water should be taken freely and the bowels should be made to move regularly. For this purpose refined petroleum and preparations of cascara sagrada are especially useful.

It must be remembered that syphilis and often those remedies used to combat the disease are very apt to produce anemia. This can be detected accurately only by examination of the blood. When this is present, an effort should be made, if possible, to remedy the condition by a carefully selected and very liberal diet. But if this is not successful, the administration of iron and arsenic, cod-liver oil or other oils or fats should be added to the treatment. The specific treatment should be continued if possible. In selecting the remedies to combat anemia, care

must be taken to avoid disturbing the patient's digestion. This may require the hypodermatic use of iron.

If the patient's general health continues good and the uterus continues to enlarge naturally, it may fairly be inferred that the ovum is living and that the treatment is successful so far as preservation of its life is concerned. If, however, the abdomen does not continue to enlarge and on careful measurement is found to grow less in circumference, it may be assumed that the ovum or embryo is dead.

In advanced pregnancy, fetal movements and fetal heart sounds are valuable evidence. From the fifth to the seventh month patients may often complain that they cease to feel the movements of the fetus. This is not positive proof that the fetus has died and patients should be encouraged to disregard this symptom and to allay, if possible, their fears. The successful and accurate detection of fetal heart sounds is rarely possible before the seventh month.

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CHAPTER IV

COMPLICATIONS CAUSED BY FOREIGN GROWTHS IN GENITAL ORGANS

Foreign growths in the genital organs and in the abdominal organs complicating pregnancy—Fibromyomata of the uterus—Cancer of the uterus—Ovarian cancer—Cancer of the breasts—Ovarian tumors complicating pregnancy—Diagnosis and treatment.

Ovarian Tumors.—Ovarian tumors may complicate pregnancy and labor. Advanced pregnancy and an ovarian tumor of large size cannot exist in the same individual at the same time; therefore, when an ovarian tumor can be diagnosticated, it is usually in early pregnancy or else the tumor is a small one. It has never been shown that pregnancy stimulates the growth of such tumors, but it is a matter of not infrequent occurrence that, when pregnancy suggests a thorough examination of a patient, an ovarian tumor is found already existing. Pregnancy complicates the existence and development of a small ovarian tumor, for the tendency during pregnancy is for the ovarian tumor to become twisted on its pedicle. This is a serious accident, for the circulation of the tumor may be interfered with and gangrene of the tumor and resulting toxemia for the patient may develop. It is of importance then to recognize the presence of an ovarian tumor complicating pregnancy and to apply appropriate treatment.

If the tumor complicates an advanced pregnancy and labor develops, the pressure of the presenting part may cause a rupture of the tumor, with the escape of its contents into the pelvic and abdominal cavities. The irritation of such contents will cause peritonitis and, if the tumor is malignant, may result later in the development of malignant disease of the abdominal organs.

The diagnosis of an ovarian tumor complicating pregnancy is made by thorough bimanual vaginal examination, with the urinary bladder of the patient completely emptied and complete relaxation of the muscular tissues secured. In many patients these conditions cannot be obtained without anesthesia and so important is an accurate diagnosis that, if there is suspicion of the condition, anesthesia should be employed.

On such examination, a tumor may be outlined at the side of the uterus, displacing the uterus in proportion to its size and point of development. Occasionally a small ovarian cyst may be found on the floor of the pelvis behind the uterus. Such cysts have usually been retained for some time; they have been of slow growth and are very

often dermoid in character. Unfortunately the X-ray will not always give a clear picture of an ovarian tumor, unless it contains solid material, such as malignant growth or the bones and teeth found in a dermoid tumor.

There can be no question concerning the importance of removing an ovarian tumor complicating pregnancy. It may be difficult to decide when the tumor should be removed. A small tumor should be removed as soon as the diagnosis of its presence is made. This exposes the patient to the risk of the interruption of pregnancy, but such risk is less than that entailed by twisted pedicle of the tumor and the complications which its growth may produce.

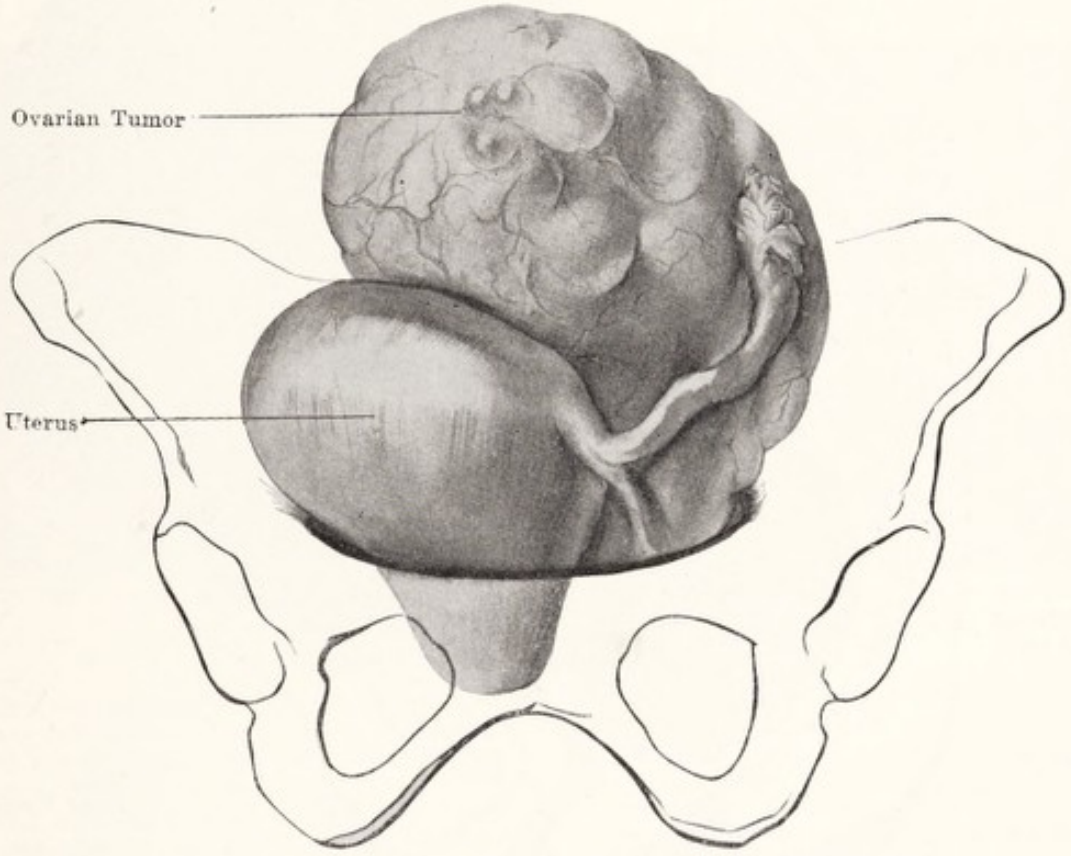


FIG. 8.—PREGNANCY AT FOUR MONTHS COMPLICATED BY PRESENCE OF OVARIAN CYST. (Bumm.)

If a large tumor is discovered late in pregnancy, or the discovery is not made until shortly before the end of pregnancy, opinion is divided regarding the choice of the time at which the tumor should be removed. It has been suggested that a small tumor in the pelvis interfering with the descent of the child may, under anesthesia, be pushed up above the pelvic brim, labor may be allowed to develop and, during the puerperal period, the tumor may be removed. If the tumor is large, the suggestion has been made that it be tapped, its size reduced and the uterus then emptied spontaneously through the vagina or by vaginal operation, followed by the removal of the tumor.

The writer is of the opinion that an ovarian tumor, whether cystic or solid, or containing both cystic and solid material, should be removed

as soon as possible after its presence is discovered. If, at the time of removal, adhesions are absent and the pedicle of the tumor is so situated as not to interfere with the action of the uterus, spontaneous labor may be awaited. If, however, adhesions are such as to interfere with the action of the uterus, or the intra-abdominal conditions are so complicated that uterine action may be dangerous for the patient, then the obstetrician may prefer to empty and close the uterus first and then

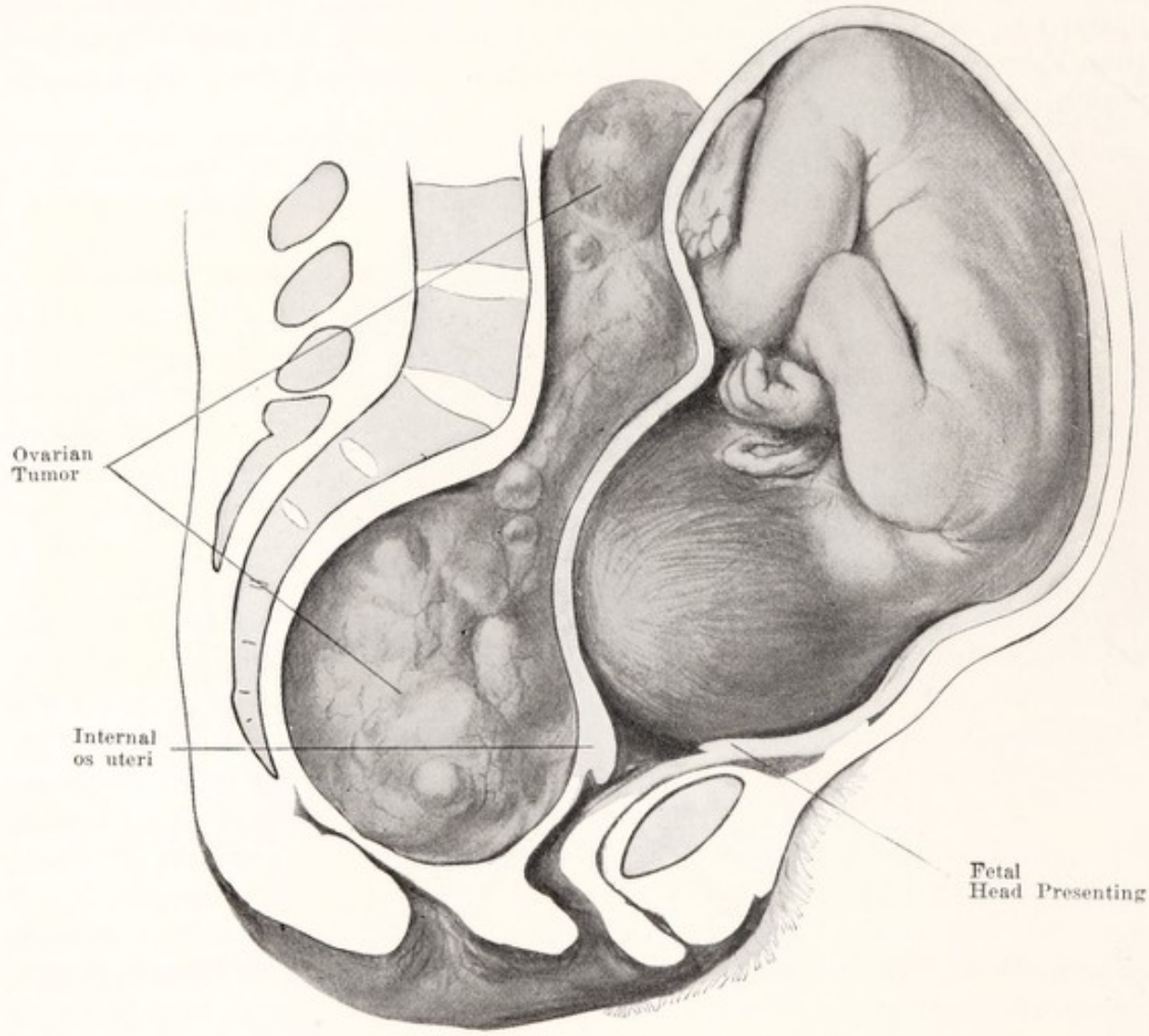


FIG. 9.—ADVANCED PREGNANCY COMPLICATED BY OVARIAN CYST IMPACTED IN PELVIS AND MAKING SPONTANEOUS LABOR IMPOSSIBLE. (Bumm.)

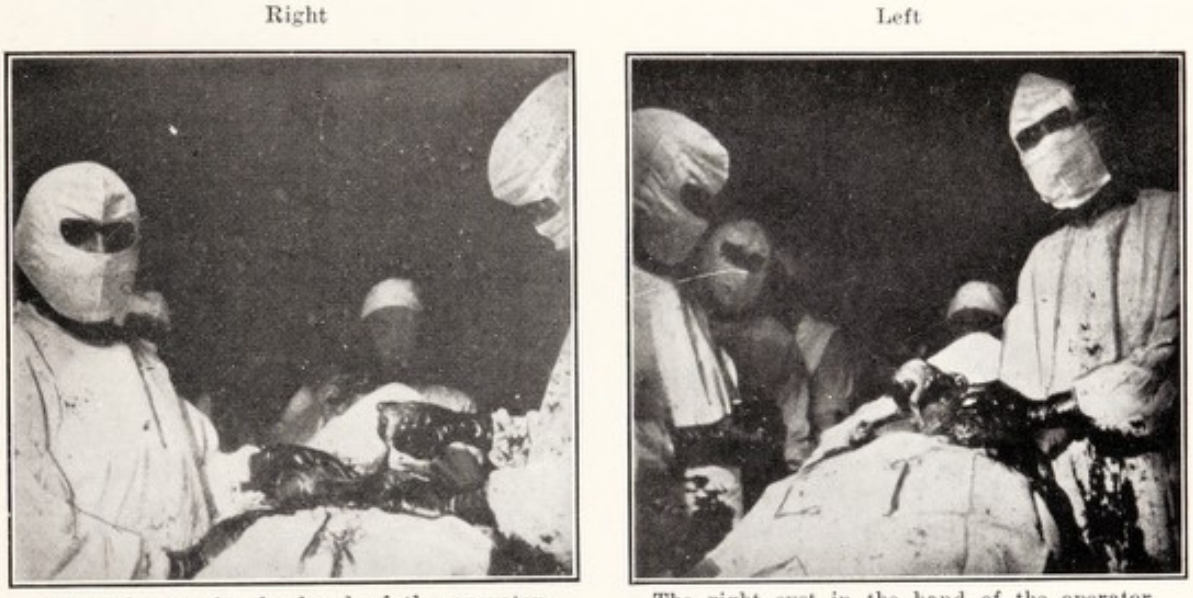
remove the tumor at the same operation. Surgical experience and judgment must decide these questions.

Pregnancy need not complicate the recovery of the patient with an ovarian tumor, nor is there evidence that the tumor endangers the fetus, unless the tumor is malignant. All varieties of malignant disease complicating pregnancy have been found to disturb the mother's nutrition and that of the child as well, and malignant disease of the ovaries is no exception to this clinical rule.

In removing an ovarian tumor during pregnancy, there are obvious advantages in terminating the pregnancy before the removal of the

tumor. The operator can better secure the pedicle, cover exposed surfaces with peritoneum and arrange the position of the pelvic organs, if the uterus is emptied of its contents before the removal of an ovarian tumor. There is also danger that, if labor develops soon after the removal of the tumor, traction upon the pedicle produced by uterine action might possibly loosen the ligatures and result in hemorrhage.

It must also be remembered that tumors which complicate pregnancy may be found in the pelvis but not connected with the genital organs. A prolapsed kidney, a greatly distended and enlarged appendix, a prolapsed spleen and an ectopic pregnancy may complicate gesta-



Right — The left cyst in the hand of the operator

Left — The right cyst in the hand of the operator

FIG. 10.—DOUBLE DERMOID CYSTS.

Cesarean section and removal of tumors. Primipara, no disability during pregnancy. Spontaneous labor. Descent of the head prevented by mass in pelvic cavity. So firmly wedged in the pelvis was the tumor that it was not thought wise to attempt to dislodge it by placing patient in the knee-chest posture and practicing manipulation. Accordingly the abdomen opened, uterus incised and emptied. Tumor, two dermoids. Tumor from left ovary transposed to right side. Both pedicles twisted. Tumors removed. Eight months after operation, patient reported had recently menstruated. Minute portions of ovarian tissue may remain in pelvis and peritoneal cavity. Menstruation may occur and even conception be possible.

tion. While in some of these cases diagnosis may be difficult, treatment, fortunately, is the same; abdominal incision, accurate diagnosis concerning the nature of the tumor and such treatment as is appropriate to the condition present.

Fibromyomata of the Uterus.—The growth of these tumors is apparently in many cases stimulated by pregnancy. While many of the patients having these tumors do not conceive, their presence is not a positive cause of sterility, hence it is not an infrequent occurrence to find pregnancy and a tumor existing at the same time.

So far as the state of pregnancy is concerned, these tumors may be divided into the subperitoneal, interstitial and submucous. These divisions classify them from their anatomical situation.

Subperitoneal fibromyomata complicating pregnancy may often be recognized by palpation; as pregnancy advances, instead of the smooth outline of the normally pregnant uterus, elevations on its surface become apparent. As pregnancy proceeds, it is evident that such elevations are not adherent to the abdominal wall, for the abdominal wall slides readily over the tumor. They may develop on any portion of the uterus, often extending but a short distance beneath its peritoneal covering, and hence encroach slightly if at all upon the uterine muscle. Unless these tumors are of large size and numerous, they will often occasion no symptoms during pregnancy. If but one or two are present on the anterior surface of the uterus, their presence may not be known if palpation is not practiced.

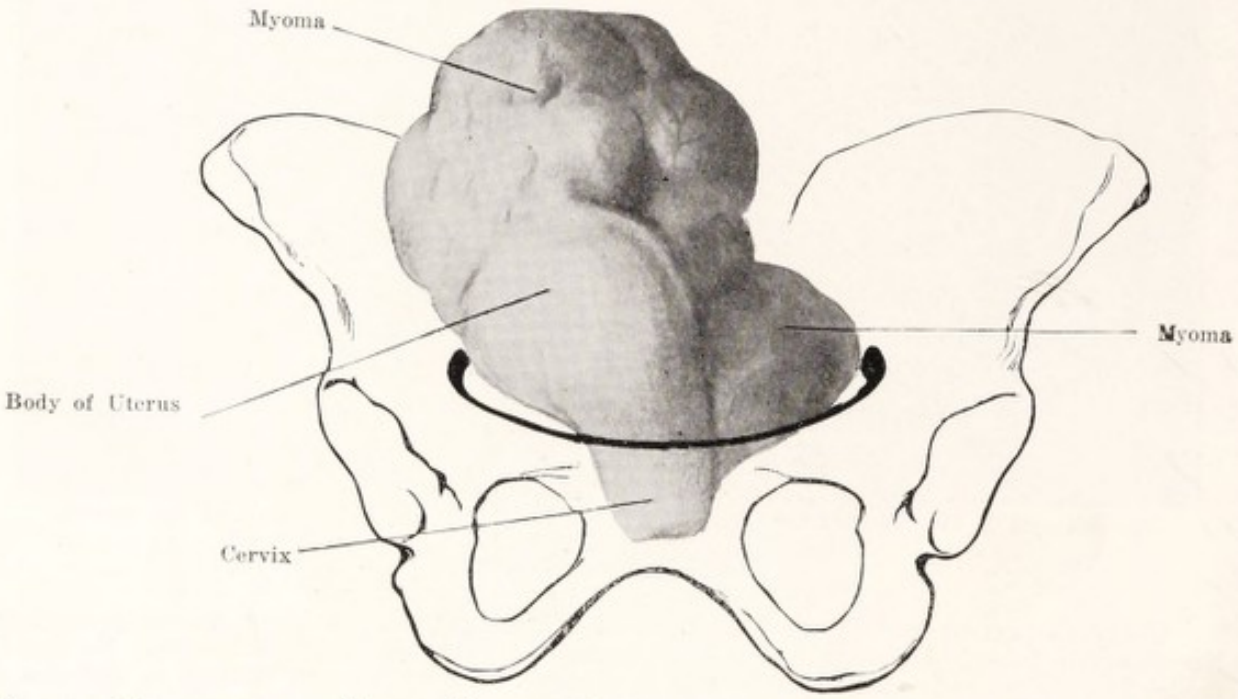


FIG. 11.—PREGNANCY AT THREE MONTHS COMPLICATED BY MYOMA OF UTERUS. (Bumm.)

Their importance in connection with pregnancy depends upon the degree to which they penetrate and involve the uterine muscle. They are rarely situated so low in the uterus as to block the entrance to the pelvis, and hence if the uterine muscle remains competent they do not necessarily interfere with labor.

The treatment of these tumors or the management of pregnancy complicated by their presence depends entirely upon their size, number and depth of penetration. So long as they remain essentially subperitoneal, they usually require no attention. If the obstetrician finds no cause of anxiety for the patient in their presence, it is well not to make their existence known to her. If labor is successfully accomplished, they may largely or entirely disappear during the involution of the uterus.

When, however, they are sufficiently numerous and penetrate to a sufficient depth seriously to impair the integrity of the uterine muscle,

and if they cause pain and distress by pressure as they grow, the question of myomectomy or hysterectomy may demand attention.

The decision to perform myomectomy will depend upon the recognition of one or more tumors so large that their presence interferes seriously with the growth and development of the uterus and so situated as to form an obstacle to the descent of the child.

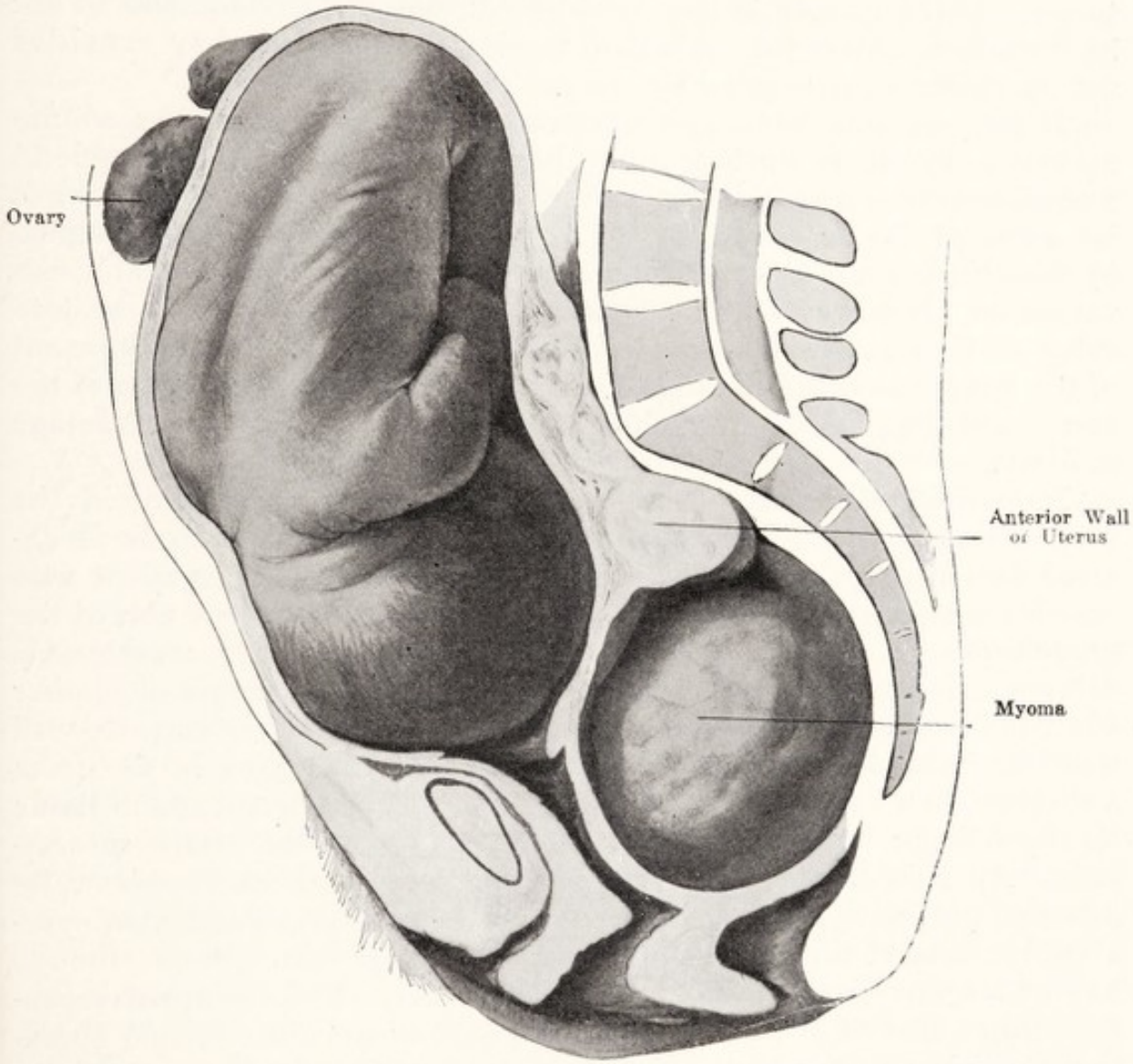


FIG. 12.—UTERINE MYOMA IMPACTED IN DOUGLAS' CULDESAC, COMPLICATING PREGNANCY. (Bumm.)

The question of primiparity or multiparity enters into the decision to attempt the removal of these tumors. In a primiparous uterus, the uterine muscle, if well developed, is stronger, more contractile and firmer than in multiparae; hence, if a fibromyoma is removed from the surface of such a uterus, the operator may expect prompt contraction of the uterine muscle and the avoidance of serious hemorrhage or rupture of the uterine wall. If, on the contrary, the uterus be weakened and relaxed by repeated parturition, the tendency to hemorrhage, relaxation or uterine rupture will be greater.

The principle of myomectomy in these cases consists in incising the

capsule of the tumor and endeavoring to enucleate it from its bed. Uterine sinuses and oozing surfaces must be controlled by sutures of catgut. Some prefer to use silk for this purpose and, if the uterus is healthy and the silk of good quality, it will be readily absorbed. The peritoneal covering of the uterus should be accurately united and care should be taken not to disturb the uterine decidua in removing the tumor. If the growth is largely subperitoneal, the decidua should not be disturbed. After the operation, uterine contractions of an expulsive nature should be prevented by the use of morphin.

If subperitoneal fibromyomata complicating pregnancy are so numerous as to lead to the belief that they penetrate the uterine muscle to a considerable extent, thus preventing its development and rendering it incapable of the expulsion of the fetus, the question of supravaginal hysterectomy must be considered. If the patient is considerably advanced in pregnancy when this opinion is formed, it may be best to delay as long as possible to give additional time for the development of the fetus; but if the circumstances are such that the expansion of the uterus and the growth of the child are impossible, there is no advantage in delay.

Interstitial Myomata.—These tumors are situated largely in the uterine wall and may occupy so little of its surface as not to be recognized during pregnancy. The writer recalls the case of a patient who married comparatively late in life and in whom the phenomenon of the gradual descent of the first child did not develop. After considerable delay under close observation, it was decided, in the interest of mother and child, to perform elective section. On opening the uterus, its wall was found studded with small myomatous tumors varying in size from a chestnut to a small egg. Fortunately there was sufficient sound tissue on the anterior wall to enable the operator to close the uterus successfully. An uninterrupted recovery was followed in about two years by a second pregnancy, and again elective section was requested. On operating the second time, the same condition was present but the tumors had undergone considerable diminution in size. Uninterrupted recovery again followed, the uterus being closed, and since the second operation there has been no other pregnancy. In this case it seems fair to believe that the presence of these numerous growths was the essential factor in preventing the development of the natural phenomena of labor.

It is difficult to suggest any method by which a positive diagnosis can be made during pregnancy of the existence of multiple small interstitial fibromyomata of the uterus. It is doubtful if the X-ray will positively show these growths. The suspicions of the obstetrician may be roused in a primipara if the phenomena of gradual descent and engagement do not develop when full term has been reached, and in some of these cases elective section may be the only resort. The attempt to deliver the patient through an undilated cervix and vagina in such a case would be disastrous for mother and child. If this condition first becomes apparent during labor, the possibility of infection must not be over-

looked. In these cases the decision whether to perform hysterectomy or to close and leave the uterus may be reached with considerable difficulty.

Submucous Fibromyomata.—These tumors, situated beneath the uterine decidua, vary in size and location but are not infrequently found in the lower portion of the uterus in such a position as to interfere with the descent and engagement of the fetus. A diagnosis of the existence of such a growth may not be possible until the last weeks of gestation; then the failure of descent and engagement may attract attention and on bimanual examination the presence of the tumor may be recognized. Should dilatation proceed and the tumor present in advance of the child, the obstetrician has the choice of two procedures: one is to dislodge the tumor, pushing it up into the cavity of the uterus and permitting the child to descend for its delivery through the vagina; the other is to remove the tumor in advance of the child and then allow the pregnancy to go to its natural termination in labor. The circumstances of the individual case must determine the choice of procedure. If the tumor remains in the uterus during the birth of the child, hemorrhage may occur and infection may develop; while if the tumor be expelled as a polypus, inversion of the uterus may result.

The writer was once summoned in consultation by a physician who two weeks previously had delivered a primipara by the use of forceps, no serious complication other than a lingering labor having developed. The patient had apparently become convalescent, but had considerable pain and distress with some mucosanguinolent discharge. She had visited several clinics and a diagnosis of subinvolution had been made. She was taken in the night with severe pain and some vaginal hemorrhage. The attending physician on examination found something presenting in the vagina and during the examination this protruded and the patient went into shock. The writer had her immediately transferred to a hospital, where he first saw her. On examination, a submucous fibroma the size of a man's fist was presenting in the vulva and behind and above it the fundus of the uterus. The effort of the uterus to expel the tumor had resulted in inverting the womb and throwing the patient into shock. The tumor was attached to the uterus by a slender pedicle which was readily severed and the uterus replaced, but the shock proved fatal.

Unless these tumors are of excessive size so that hysterectomy is the only resort, their removal will not sacrifice the uterus and the patient is, therefore, spared sterilization. In removing such tumors, the pedicle should be clamped, ligated and severed, or severed with the electric cautery. The uterus should be thoroughly explored and emptied and firmly tamponed with 10 per cent iodoform gauze. Thorough antiseptic precautions are required and care should be taken to prevent hemorrhage.

Mixed Varieties of Fibromyomata.—In cases where these tumors have been present for some time before pregnancy occurs, they rarely

conform strictly to one type. Thus a large fibroma at the pelvic brim may be to some extent submucous, interstitial and subperitoneal. So large may be the tumor or tumors, that the existence of pregnancy may not be suspected and operators have not infrequently performed supravaginal hysterectomy only to find, on examination of the specimen, a fetus of several months contained in what remained of the cavity of the uterus. In these cases no reproach can be attached to the operator, since the development of the child to term would have been impossible and the operation would have become imperative sooner or later. The clinical fact that the presence of these tumors does not insure sterility is abundantly proved.

Influence of Such Tumors on the Fetus.—If the blood supply of the uterus is largely taken by foreign growths and its lumen considerably encroached upon, it is obviously impossible for a normal child to develop. This fact may in some measure lessen the disappointment of a patient whose uterus is sacrificed, and with it her pregnancy, to save her life and health. The prolongation of pregnancy to viability in these cases may give the mother the chance of the child's life and still preserve her own.

Cancer of the Uterus.—Malignant diseases of the uterus complicating pregnancy may be of three varieties; epithelioma of the cervix, often extending to the vaginal wall; carcinoma of the cervix extending into the uterine body; and chorio-epithelioma originating in fetal tissue involving the uterus, with numerous metastases.

Epithelioma of Cervix and Vaginal Walls.—This growth is of comparatively infrequent occurrence but is more often found in young patients, many of whom live in bad hygienic surroundings. The pregnancy may be proceeding naturally, but there is a bloody discharge from the vagina, sometimes offensive. On examination, a cauliflower mass will be found projecting from the cervix attached to its mucous membrane, while upon the vaginal walls will be areas of similar tissue varying in size. The general health of the patient is unimpaired and, upon examining a portion of the growth microscopically, it is found to be an epithelial papilloma without direct evidence of malignancy. These tumors are susceptible to complete removal, without the interruption of pregnancy, under surgical procedures.

The patient should be completely anesthetized, the bladder thoroughly emptied by catheterism and the vagina and cervix cleansed as gently but as thoroughly as possible by boric acid solution or 1 per cent lysol. Using wet gauze to protect sound tissue, the operator should then apply the electric cautery, removing each growth as thoroughly as possible. The larger growths should be attacked at the base, but each individual patch of growth, if possible, should be thoroughly removed. Hemorrhage is usually insignificant and, after the removal of the growths, the tissues should be powdered with boracic acid and the vagina moderately tamponed with iodoform gauze. The lower bowel of the patient should have been thoroughly emptied before the opera-

tion, and after the operation a suppository of from ½ to 1 grain of aqueous extract of opium should be left in the rectum. This usually serves to prevent the development of irritation and uterine contraction, but, if it proves inadequate, morphin guarded with atrophin should be added hypodermatically. It is not unusual to see these cases make a complete recovery and go on successfully through pregnancy and labor, nor is there evidence that, where removal has been complete and done under surgical precautions, recurrences develop.

Allied to these growths are so-called venereal warts which may develop during pregnancy upon the external genitals and also within the vagina. These are seen in patients of uncertain habits, usually dirty in their surroundings and personal habits. The presence of these growths does not seem to interfere essentially with pregnancy and very often the patient gives no history of their occurrence or complaint of their presence.

These cases are best treated by admission to a hospital; by thoroughly shaving and cleansing the external parts; and by using from ½ to 1 per cent lysol solution in copious warm vaginal douches and external irrigation. If there is much irritation, a vulval dressing smeared with ointment of boracic acid may be used to advantage. Under these precautions the growths usually disappear. If they do not, under complete anesthesia, they may be treated by the electric cautery in the manner before described. While they cannot be considered malignant, they are foreign growths and on the border line of malignancy.

Carcinoma.—Carcinoma of the cervix complicating pregnancy is unfortunately not infrequent. It is usually seen in multiparous patients who have had lacerations of the cervix, which have sometimes been corrected by operation but more often neglected. The lacerated surface becomes firm, tense and hard in structure and a thin sanguineous discharge develops. It is usually the discharge that brings the patient to consult the physician. Pain is rarely present and, in patients who are careless in hygiene, the discharge may not be noticed until it becomes offensive.

In making a positive diagnosis of carcinoma of the cervix, it must be remembered that in some cases the cervix, previously torn, may become injured, reddened and swollen during pregnancy without the development of malignant disease; hence a positive diagnosis can be made only by the removal of a portion of the tissue and examining it microscopically. This should be done at the earliest possible moment, for the success of the operation may depend upon the removal of the growth before it has penetrated the tissues of the uterus. It is especially important to recognize thickening in the peri-uterine tissues.

The diagnosis having been established, the obstetrician should determine as accurately as possible the extent to which malignant disease has developed. If the cervix and lower portion of the uterus are freely movable and no thickening can be detected in the surrounding tissues, the case is obviously favorable for interference. If, unfortunately, the uterus in its lower portion is fixed in the pelvis and the sur-

rounding tissues are extensively infiltrated, operation will be practically useless.

A problem which must not be neglected is the question of the life of the child. If the diagnosis of cancer is made when the fetus is near viability and the disease is so far advanced that complete hysterectomy is practically impossible, the mother may plead for delay in the interest of the child. If, on the other hand, the discovery is made early, when the chance of operation is favorable, the life of the child should be disregarded.

In cases favorable for operation, a radical total extirpation of the uterus should be performed. Wertheim's method should be followed, preceded by very thorough cauterization of the cervix through the vagina. Some operators prefer to use nitrate of silver in addition to the cautery, believing that it prevents the infection of surrounding healthy tissue. In cases seen early and operated upon skillfully, the presence of pregnancy may add to the gravity of the prognosis, but does not necessarily render it hopeless.

In dealing with cancer of the uterus complicating pregnancy, it must be remembered that the presence of pregnancy will greatly hasten the growth of the cancer, hence the necessity for the earliest possible operation in favorable cases.

When the operation cannot be performed, the question naturally arises as to what can be done to delay the growth of the cancer, spare the patient pain and distress and, if possible, secure a living child. Three methods are at present available: one is the thorough use of the cautery upon the diseased tissues; the second, the application of the X-ray; and the third, the use of radium. All of these methods entail the unfortunate risk of injuring the fetus and hence, if the mother pleads for the life of the child, these methods should not be attempted during pregnancy.

The local use of antiseptics and deodorants, packing with gauze, should hemorrhage occur, and the free use of opium may tide the patient along until viability is well assured. The child may then be delivered by abdominal cesarean section. If this can be accomplished, there need be no further hesitation in attacking the foreign growth by any one or all of the methods described.

If the uterus can be closed after the birth of the child, the question will arise as to introduction of radium within the uterine cavity against the lower segment. It might be well to precede this by the very thorough use of the electric cautery through the vagina, removing as much of the diseased tissue as possible and following this by the application of radium. To control the patient's pain, the X-ray may be used in addition, and by these methods there can be no question but that the life of the patient may be prolonged and suffering prevented.

So extraordinary is the behavior of malignant disease that the obstetrician should never admit to the patient that her case is hopeless, but he should be equally careful in advanced disease not to offer any false hopes to her friends and relatives. While at the persent time

sufficient experience has not accumulated to give us accurate information concerning the effect of radium and the X-ray upon the unborn child, there is reason to believe that in some cases at least the child may be seriously affected by these agents.

It must also be remembered that, in some cases of malignant disease where radium is applied at the site of the original lesion, the rapid development of the malignant process follows in other important organs. Thus, in cases of carcinoma of the cervix, carcinoma of the liver and other abdominal viscera has speedily developed.

The question may arise as to the possibility of delivery through the vagina of a viable child when the malignant disease of the cervix is in its first stage and is susceptible of removal without sacrificing the uterus. While it might seem that the method of delivery through the vagina would be preferable to that of abdominal incision, the latter is much the safer procedure; delivery through tissue which has been the site of malignant disease, however thoroughly it may have been removed, cannot be affected without opening new channels for the growth and spread of the original disorder. If the uterus is not to be removed unopened, then the method of removal should be by abdominal cesarean section.

Cancer of the Breast.—Cancer of the breast, while not a frequent occurrence during pregnancy, is sufficiently common to demand the attention of the obstetrician in all cases where an abnormal condition of the breast coincides with gestation. There is no established relation between cancer of the breast, and pregnancy and previous childbearing, and the development of cancer of the uterus. Hence the disease must be suspected in any patient where the anatomical conditions are abnormal.

Cancer of the breast complicating pregnancy begins in the usual manner with a hard lump near the nipple, but differs from cancer of the breast in the nonpregnant in the rapidity of its development. Hence the necessity for accurate diagnosis and prompt treatment in these cases. It is often difficult to deal with these patients because, like all women, they have the fear of cancer in mind. They dread surgical operations of any sort during the pregnant condition, and the desire for the life of the child may lead them to shrink from any thought of radical treatment. Some of the most unfortunate of these cases are seen in individuals who in the effort to escape operation turn to quackery.

The writer recalls the case of a woman about thirty-five years of age who applied for examination accompanied by a woman, ostensibly her friend. The statement was made that the patient was some months advanced in pregnancy and that she was annoyed by rapid increase in the size of the breasts. On examination there was an intra-uterine pregnancy of between six and seven months, and both breasts were considerably enlarged, containing little or no fluid, but radiating from the nipple masses of tissue of suspicious hardness. As the patient had borne children, it was hoped that this hardened tissue might be due to acini of the breasts which had undergone subinvolution or chronic inflamma-

tion. The patient was kept under observation and very mild applications were made in the endeavor to relieve the irritation. A very brief period sufficed to establish the diagnosis of tumors in the breast with strong probability of malignancy. The patient and her husband were told of the diagnosis and operation was advised; this was immediately declined and during several months following the patient was seen at intervals and the steady progress of the disease was noticed. It then became known that from the first she had been under the care of a Christian Science healer, who had accompanied her at the first examination and had informed her that under no circumstances should such a brutal thing as operation be considered. The patient's condition finally became so unfavorable that she consented to come to the hospital where, under anesthesia, both breasts were incised. Malignant disease with marked cystic degeneration and accumulation of fluid was present. The fetus was living but scarcely viable. The tissues about the breasts were infiltrated, so that complete removal was impossible and, under the circumstances, nothing further than an evacuation of fluid from the breasts was done in the hope of tiding the patient along to the time of viability. As soon as this arrived, the child was delivered. In a few days, death of the mother followed from rapid extension of the carcinoma to both lungs. The child, which was puny, did not long survive the mother. While it is possible that no operation could have influenced the progress of the case, the prompt removal of the breasts as soon as the reasonable suspicion was excited might have been of service. At that time radium was unknown and those who advocate its use will immediately suggest that it might have been of great value, a consummation devoutly to be wished.

It must be remembered that the breasts may contain nonmalignant tumors and that these may become more evident or enlarge during pregnancy. It must also be realized that a positive diagnosis of the malignant character of a tumor of the breast complicating pregnancy may be very difficult without exploratory incision; hence, when the condition is markedly suspicious, the wiser course seems to be to subject the pregnant patient to exploratory operation, the obstetrician being prepared to proceed to complete removal of one or both breasts if conditions present justify the operation. By modern methods the semicircular incision permits the operator to turn the breast away from the chest wall and to examine its structure as thoroughly as possible without the aid of the microscope. The operator may remove a portion of the tissue and have the examination made by a pathologist immediately and decide upon the further course of the operation in accordance with his findings. If a small cystic tumor of the breast is found, it may readily be enucleated and the breast replaced and stitched in position. If an adenoma is present without evidence of malignancy, the same course may be followed. If uniform enlargement of the milk ducts is present without development of actual tumor, the removal of the breasts is not indicated.

Malignant disease of the breasts, while fortunately not common, occurs with sufficient frequency to demand the thorough examination of the breasts during pregnancy of all patients, and frequent examinations in suspected cases. If necessary, both breasts may be removed without necessarily bringing on abortion or premature labor. The development of the fetus may proceed successfully after such an operation, and modern methods of infant feeding will provide for the lack of maternal nourishment.

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CHAPTER V

COMPLICATIONS CAUSED BY PREVIOUS OPERATIONS ON THE GENITAL ORGANS, OR BY ACCIDENT OR INJURY

Pregnancy complicated by the result of injuries or operations—Accidents—Spontaneous rupture of the uterus—Diseases checking the growth of the genital organs—Hernia—Complications arising from previous operations on the genital organs—Shortening of the round ligaments—Interposition operations—Flexion operations—Plastic operations.

Previous accident and physical injury may leave a patient in a condition seriously complicating gestation. Not only is the nature of the injury important but also the period in the patient's development when the injury was received; for example, a mechanical injury to a girl of twelve or thirteen, making it necessary for her to remain in bed or to wear an apparatus limiting her motions for several years, will interfere with the development of the pelvis and when, in later life pregnancy occurs, the termination of the pregnancy in spontaneous labor may become impossible. Disease also may produce a similar result. In the case of a patient examined by the writer, who acquired tubercular infection in one of the knee-joints at the period of puberty, prolonged rest and lack of exercise resulted in the failure of development of a portion of the pelvis and in later life, when pregnancy occurred, spontaneous labor was impossible.

More especially concerned with pregnancy are those injuries which interfere with the development of the pregnant uterus, or those conditions resulting from disease whose results are practically mechanical and dislocating or obstructive. Tuberculous infection of the spinal column will at once occur to the reader as producing—in some cases—malformation of the spine which may interfere with the development of the uterus. If this development is in the upper or mid-dorsal portion of the spinal column and the patient's general health permits exercise, the pelvis may develop naturally. There may be room for the growth of the uterus, at least to viability, and pregnancy in such an individual may result in the birth of a living child. If, however, the spine should be so deformed that the uterus cannot rise out of the pelvis, the interruption of pregnancy will probably result.

It is evident that fracture of a portion of the pelvis may result in a pelvic deformity which may complicate pregnancy; so mechanical injury to the lower extremities interfering with exercise may result in failure of development of the pelvis. Unless, however, the abdominal or pelvic space has been largely lessened, or the development of the

pelvis has been prevented, subsequent pregnancy may develop with surprising success in patients who have had at one time severe injury.

The obstetrician is especially interested in pregnancy complicated by the result of previous operations. Surgical procedures addressed to the permanent reposition of the uterus after retroversion or prolapse may so prevent the development of the pregnant uterus that spontaneous labor may be impossible and rupture of the uterus be threatened. Ventrofixation and vaginofixation are common examples. In both these conditions the development of the anterior uterine wall is greatly impaired; the posterior uterine wall is thinned and distended; the normal axis of the uterus is entirely lost; the direction of uterine force becomes abnormal and spontaneous labor is impossible. In extreme cases, delivery by abdominal section, with or without beginning labor, becomes inevitable. The general surgical principle remains true, that no operation upon the uterus of a woman in the childbearing period is indicated which leaves the uterus in a condition rendering its natural development during pregnancy impossible. Fixation operations upon the uterus should be avoided in women who have not reached or passed the menopause.

Shortening of the round ligaments, if properly performed, does not interfere with subsequent pregnancy and is, therefore, the operation of choice. But if these ligaments be excessively reduced in length or if extensive adhesions develop following the operation, while the retroversion may be cured, subsequent pregnancy may be disastrous. This should always be kept in mind while performing this operation.

The removal of the appendix or gall-bladder, or any operation upon the abdominal viscera, may be followed by adhesions which may complicate a subsequent pregnancy. It is very common to have a pregnant patient, whose appendix has been removed, complain of annoying pain over the right lower abdomen as the uterus grows and rises into the abdominal cavity. Beyond the administration of sedatives, it is difficult to see what can be done for this condition. The reopening of the abdomen might be followed by the development of adhesions worse than those already present.

Hernia of the abdominal wall following previous abdominal section may give opportunity for prolapse of the pregnant uterus with the increase of the hernia. Palliative treatment is usually indicated in this condition, and after the termination of the pregnancy a permanent cure may be considered.

Operations upon the cervix may leave the uterus in such a condition that subsequent successful pregnancy and labor may be difficult or impossible. The high amputation of the cervix may be followed by abortion in subsequent pregnancy, and this operation should be avoided in women of the childbearing age. The complete anatomical restoration of the torn cervix may produce difficult dilatation of the cervix in subsequent labor, and in some cases severe laceration may result; so, too, an improper and ill-chosen operation upon the pelvic floor, vaginal wall

or perineum may cause practically a stenosis of the genital tract which may greatly complicate vaginal delivery.

The diagnosis of these conditions is accomplished by thorough palpation and vaginal examination when the diagnosis of pregnancy is made. All that can be done by the obstetrician is to improve the patient's general hygiene with the hope that gradual development and unfolding of the birth canal may overcome the conditions present. In abnormal cases following fixation operations, should an effort at abortion develop or rupture of the uterus occur, abdominal section must at once be performed followed by hysterectomy.

FIG. 13.—A TYPICAL RUPTURE OF UTERUS.
(Liepmann.)
Transverse across its anterior wall at junction of upper and lower uterine segment.

Hernia and Abdominal Splanchnoptosis. — Femoral or inguinal hernia may develop complicating pregnancy. This accident usually happens only in the early period of gestation, for the uterus of the later months acts as an efficient barrier to the descent of the intestine and omentum. The diagnosis of this condition should not be difficult and the usual surgical treatment is indicated.

Prolapse of one or both kidneys may complicate pregnancy, giving rise to considerable irritation, retention of urine and the possible development of pyelitis. In some patients the right kidney is often prolapsed and maintains its position best during advanced gestation. In these cases the radical cure of the dislocation of the kidney should not be attempted, if avoidance is possible, during pregnancy. The application of an abdominal bandage and pad, treatment by posture or, if necessary, confinement to bed are to be preferred to surgical procedure.

Prolapse of the abdominal contents is not an uncommon complication of pregnancy. This may arise from unusual development of the

fetus, but usually from a relaxed and thinned condition of the abdominal wall. In some patients it is accompanied by overdevelopment and descent of the breasts.

These patients should be treated by the careful fitting of retention bandages and supporting belts. If possible, these should obtain their point of application at the shoulders of the patient, so that there may be a thorough and complete action upon the entire abdominal viscera.

FIG. 14.—AN UNUSUAL RUPTURE OF UTERUS AT THE FUNDUS OCCURRING DURING LABOR, FROM DEGENERATION OF UTERINE MUSCLE. (Liepmann.)

Small belts which produce constriction only should be avoided and all belts or appliances should not be worn so tightly as to cause the premature descent of the child and bring on an early labor. In some patients the veins of the lower extremities require support during pregnancy and their injured condition may be aggravated by obstinate irritation in the skin and occasionally by rupture of a varicose vein.

Spontaneous Rupture of the Uterus.—At any period of gestation this accident may occur. Its immediate cause may be direct violence, but

its exciting cause will be found in a diseased condition of the uterine muscle. In all highly toxic patients this danger is present.

The signs and symptoms vary with the period of gestation. At varying intervals symptoms of pelvic or abdominal infection develop. If the fetus has been viable and active in its movements, these movements cease; abdominal or pelvic pain is experienced and the characteristic symptoms of pelvic inflammation become pronounced. Operation, as soon as a reasonable suspicion of the condition occurs, is strongly indicated. Even in the absence of an accurate diagnosis, it is better to interfere and to be sure of the condition than to allow a fatal complication to develop and operate too late.

FIG. 15.—TOXEMIA; UTERINE RUPTURE; THINNED AND TORN DEGENERATED MUSCLE FIBERS.

A suspicious occurrence in pregnancy is intermittent or constant but slight vaginal hemorrhage. This may indicate an intra-uterine condition where rupture may readily develop. If in such a patient symptoms pointing to rupture should arise, the necessity for operation would become more urgent.

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CHAPTER VI

COMPLICATIONS CAUSED BY LESIONS FROM DIRECT VIOLENCE

Complications of pregnancy arising from direct violence or from the action of injurious substances—Injuries inflicted by falls—Injuries inflicted by blows—The results of burns—Pregnancy complicated by pistol or gun-shot wounds—By incised wounds—By cuts or lacerated wounds—By action of poisonous drugs.

The pregnant woman may be the subject of direct violence, self-inflicted, accidental, or by assault. Many of the cases of self-inflicted violence are the result of attempts at suicide by shooting, stabbing, hanging, drowning or the taking of drugs or irritant poisons.

So far as bullet wounds are concerned, those which do not penetrate the abdominal cavity will receive appropriate attention by the general surgeon. Bullet wounds of the abdominal cavity occurring in pregnant women, whether self-inflicted or otherwise, will be fatal to life in proportion to the extent of the injury, the organs injured and the time elapsing between the accident and adequate surgical attention. At the earliest possible moment, the abdomen should be opened under antiseptic precautions, wounds of the intestines treated by suture or resection, wounds of important viscera, like the kidney and liver, treated by hemostasis and, if necessary, drainage introduced. Bullet wounds of the pregnant uterus may or may not kill the fetus. If the uterine wall only is injured by the bullet and the membranes are unruptured and the fetus uninjured, an effort should be made to continue the pregnancy by closing the uterine wall by fine silk or catgut. If the bullet pierces the membranes, it will probably destroy the fetus as well. Then the uterus must be emptied of its contents and, if the injury is not severe, it should be closed and allowed to remain. It is necessary to pass the finger through the cervix to permit the escape of lochial discharge after emptying the uterus.

Stab wounds of the abdominal cavity should be treated in the same manner. A stab wound of the pregnant uterus almost invariably results in the death of the fetus and requires the emptying of the uterus and sometimes the performance of hysterectomy. An injury confined to the intestine need not interrupt pregnancy if prompt and adequate surgical attention is given.

In attempts at suicide by drowning and hanging, the principles of resuscitation commonly used are indicated for the pregnant woman. If the attempt is made when the pregnancy is at or near term and it is impossible to resuscitate the mother, if there is the slightest sign of

fetal life, the abdomen should be immediately opened and the fetus extracted in the hope of saving it.

Pregnancy may be complicated by the attempt of the mother to destroy her own life by drugs and irritant poisons. If opium is used and the mother is in a critical condition, no effort should be made to save the child, for the child will unquestionably perish before the mother. If irritant poisons such as arsenic have been taken, the same is true concerning the fetus, so that in treating these cases no attention need be paid to the contents of the uterus.

Very frequently the pregnant woman may combine the attempt upon her own life with an effort to produce abortion, by taking abortive medicines or irritant poisons. This attempt is sometimes premeditated but, so far as the injury to the mother's life is concerned, is frequently unpremeditated. In desperation a woman illegitimately pregnant may take such quantities of irritant drugs, intending to produce abortion, as to threaten or destroy her own life.

There is abundant evidence to show that there is no drug which will specifically produce abortion unless it be of such a character and given in such doses as to produce a violent effect upon the mother and threaten her life and health. Hence drugs sold to women as specifics for abortion are frauds and, as has been ruled by an English court, the person selling such drugs for the purpose of producing abortion is guilty not only of an attempt at criminal abortion, but also of fraud. Within the observation of the writer, a vigorous, well-developed young woman illegitimately pregnant took doses of strychnin and ergot until she was unable to sit or stand from excessive abdominal pain; her pregnancy went to full term with the birth of a healthy child. On the other hand, a woman who had been told that "Rough on Rats," which contains arsenic, would produce abortion, took the preparation and, at the point of death, aborted.

When the obstetrician is called to attend a woman who has taken abortifacient drugs, he must treat her in accordance with the symptoms which have developed. Usually such drugs produce irritation of the kidneys and urinary organs and of the intestines. It may be necessary, therefore, not only to give sedative medicines, but to employ such treatment as will relieve the irritation: lavage of the stomach and intestines, copious drinking of water containing an alkaline, morphin hypodermatically, catheterism at regular intervals and absolute quiet in bed. If a sedative drug has been employed, lavage of the stomach and intestines, and the copious use of water and such stimuli as black coffee or citrate of caffein may be employed. The inhalation of oxygen through a properly constructed mask is also useful.

The interesting question may arise, if the patient does not expel the contents of the uterus, whether the embryo is still living or whether a blighted ovum is retained. This can only be determined by accurately observing the size of the uterus for intervals of several days or several weeks. If the uterus continues to enlarge normally in size and its contour

remains normal, the pregnancy is progressing; but if these uterus grows smaller and motion does not develop, a blighted ovum is retained. When the diagnosis of the presence of a blighted ovum can be made, the patient should be subjected to dilatation and curettage to save her from the dangers of the excess development of the chorion and fetal tissues.

Injuries by Accident.—The pregnant woman may be the victim of violence by accident. She may fall from a considerable distance, striking upon the abdomen or the back and thus injuring the uterus and its contents. If the fall is a severe one, the great danger is that rupture of the intestines, uterus, the urinary bladder, the spleen, liver or kidney may have resulted. If there is reason to fear that this has happened, abdominal section is indicated as soon as possible.

A fall, the force of which does not come directly upon the abdomen or back or by which limbs are fractured or even the cranium, may not interrupt the pregnancy, and the tolerance of healthy women to such accidents is surprising. Here the general surgeon is the proper person to deal with the case, but an obstetrician should be in consultation to detect the signs of threatened abortion or premature labor and to advise such treatment as may if possible prevent it. Circumstances sometimes permit the pregnant woman to escape injury in a remarkable manner.

In the experience of the writer, a primapara at term, returning from a drive on a cold winter day, was heavily clothed in furs. She had in her house an elevator and was accustomed to use it instead of the stairs. The elevator was not where she supposed it to be, but the shaft door had been left open and, in a dark hallway, she walked into the elevator shaft. She fell a short story into the basement striking upon her feet and severely straining her ankles. Fortunately she retained the upright position, and she was so heavily clothed and the elevator shaft was so small that her fur wraps lessened somewhat the violence of the fall. She escaped with a severe strain of the ligaments of the ankles, the pregnancy remaining uninterrupted.

Much of the effect produced by accidental falls and blows depends upon the temperament and good health of the individual patient, and a hopeful view should be taken of all those accidents in which the abdomen and lower portion of the back escape direct violence.

The pregnant woman may be injured by burns, either from flame or caustic substances. The location of the burn is of primary importance in determining its effect upon the pregnancy. Injuries about the region of the anus or perineum almost invariably produce uterine contractions. So a considerable burn on the surface of the abdomen would probably end the pregnancy. On other portions of the body, if the area included in the burn is a small one, the pregnancy need not be interrupted. The prompt use of opium, soothing applications and surgical care may save the pregnancy.

If the pregnant woman should be injured by blows, such as a kick in the abdomen, it must be remembered that the primary danger is rup-

ture of the uterus or intestines or of some other abdominal organ. Uterine rupture will occur in these cases, not only from the direct violence of the kick or blow, but from sudden and spasmodic contraction of the uterus which it produces. Hence such an injury is particularly dangerous to the pregnant patient.

Effect of Mechanical Disturbances.—The extensive use of motor cars has introduced a new element in the management of pregnancy. During the first years when motors were employed, obstetricians not infrequently saw abortion result in women who used these cars during the early months of gestation. Two factors seemed to be influential in producing this result: one, the roughness of the roads over which cars were driven and the rate of speed and skillful or unskillful driving of the car; the other, the place in which the patient sat in the car. As a rule, in a two-seated motor there is less motion in the front than in the rear seat, and if a car strikes an obstacle the jar is less violent in the front than in the rear seat. Hence, pregnant patients should be advised in the early months, if driving in a two-seated car, to sit in the front and thus avoid the peculiar jar which occurs in the rear seat when the car strikes a hole in the road or an obstacle.

In pregnant patients who have suffered from abortion and are susceptible to it, motor cars should not be used until the fifth month of gestation; even then caution is necessary and the car should be driven very carefully to avoid mechanical disturbances.

During the late War, pregnant patients did considerable mechanical and manual work in munition and other factories. In most instances they were considerately treated and especial care was taken to avoid undue exertion, to give them comfortable seats and short hours of work. In other instances, the ravages of war threw upon pregnant women a fearful load of physical exertion. Pregnant women were obliged to flee from home to save their lives amid circumstances of the greatest excitement and peril. As the War progressed, pregnant patients were subjected to lack of food and to disturbances of general hygiene.

The results of these conditions were, from the standpoint of the obstetrician, interesting and instructive. When pregnant women worked in well ventilated factories and where they were shown consideration and allowed to sit in reasonable comfort while at work, they were frequently benefited by the employment. To many of them the stimulus of patriotism acted as a beneficial tonic and the minor ailments of pregnancy were for the time forgotten. Even considerable muscular exertion was well borne by healthy pregnant women, provided the hygienic surroundings were good, the hours of work not excessive, the rations suitable, and the hours of rest sufficient.

On the contrary, the depressing emotions of fear and grief and the horrors of war bore severely upon these patients, and yet the law of evolution asserted itself and in many instances pregnancy proceeded in a most favorable manner.

It has, however, been abundantly demonstrated that regular moderate work during the pregnant state is not only permissible but beneficial, and that its effect upon women and their offspring is far better than that of idleness, anxiety and introspection.

The tendency to the toxemia of pregnancy must be kept in mind in women working in factories while in the pregnant condition. They must have abundant ventilation, sufficient rest and be encouraged to drink water freely and to follow a simple diet. A regular ration of milk should be supplied to these women at frequent intervals during the hours of work.

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CHAPTER VII

TOXEMIA OF PREGNANCY

Pregnancy complicated by toxemia—Causes—Signs and symptoms—Pathology—Diagnosis—Treatment and prevention—The results of prevention and of treatment.

While it is not within the scope of this book to discuss this important subject in detail, a summary of our present knowledge and experience may not be amiss.

FIG. 16.—UTERUS IN TOXEMIA; THICKENING OF BLOOD-VESSELS AND ATROPHY OF UTERINE MUSCLE.

We recognize that the blood of the pregnant patient may become poisoned at any time during the pregnancy and that many phenomena in early gestation which were not included under the term toxemia of pregnancy are now considered part of one pathological process.

At the present time, the formation of substances produced at the site of the attachment of the ovum, and in later pregnancy at the site of the attachment of the placenta, is recognized as the essential cause of the toxemia of pregnancy. These substances alter the composition of the maternal blood. If the extensive literature on the subject is studied, a very large number of abnormal constituents of the blood will be found

to have been isolated as individual causes of the condition. So the literature of urinalyses in these cases has produced a long list of substances which at some time have been given as important factors in the

FIG. 17.—UTERUS IN TOXEMIA; FATTY DEGENERATION OF UTERINE MUSCLE.

FIG. 18.—CHANGES IN UTERUS IN TOXEMIA; MARKED THICKENING AND PARTIAL OCCLUSION OF ITS BLOOD-VESSELS.

production of toxemia. The only reasonable deduction to be made from this fact is that no one substance so far isolated is the essential factor, but that many abnormal substances and abnormal relationships

between the component parts of the fluids and tissues of the body are present in this condition.

While we may not be able to ascribe definitely to one substance the development of the toxemia of pregnancy, there is a striking similarity between the effect produced by this abnormal state and that produced by poisons circulating in the maternal blood. These effects appear in various organs, notably those most normally full of blood, and are essentially the phenomena of embolism and thrombosis; in the liver and spleen and to a considerable extent in the kidneys and, in pronounced cases, in the lungs, bone marrow and brain, the presence of thrombosis and embolism may be demonstrated.

Signs and Symptoms of Toxemia.—The most important clinical sign or symptom of the toxemia of pregnancy is the fact that the pregnant woman becomes a *sick* woman. When we consider the difference between a person in health and the person who is thoroughly sick, we can understand the difference. The old belief that normal pregnancy was unquestionably the cause of more or less misery to the mother cannot be accepted as an accurate statement of the facts. While we may not understand all of the causes which produce the condition, we know that in a healthy individual a normal pregnancy is a stimulus to health and not the cause of illness. If those who deal with parturient women would keep this simple fact in mind, it would be of great service to their patients.

The circulation of poisoned blood through the body of a pregnant woman will become evident through the nervous system. In the early months of gestation a rapid proliferation of fetal cells and chorionic villi may overcome the power of absorption of the mother's blood, causing the mechanical phenomena of embolism and thrombosis, resulting in altered blood-pressure and pulse tension and the development of the sensation of nausea with, or without, vomiting, substernal pain, disturbance in the action of the intestines, of the skin and of the organs of sense, and producing the phenomena formerly known as the pernicious nausea of gestation.

In neurotic patients the symptoms may be confined largely to the nervous system, while the organs of the body may escape serious damage. The psychic portion of the individual is affected and the patient becomes hysterical, excitable, apprehensive and may even pass into a condition of melancholia. Disturbances in metabolism become evident through a study of the basal metabolism of the woman, the estimation of the blood urea, the nitrogen partition of the urine and the microscopic study of the urine. A moderate serum albuminuria cannot be considered an essential sign of the toxemia of pregnancy, an albuminuria in which globulin is the principal constituent being of more importance.

After the formation of the placenta, nature makes an effort to strike a balance between the production of fetal elements and the immunizing substances in the mother's blood. In the majority of cases the latter

triumph, the nausea of early gestation disappears and is often replaced by improvement in the general health. When this does not occur, nature, in apparent desperation, may make a supreme effort to put an end to the process by the development of convulsions, and the patient may have eclampsia.

The significance of this phenomenon has been largely misunderstood. For years the attention of the profession in diagnosis and treatment was directed to the management of eclamptic convulsions. Closer study, however, revealed the fact that the number of convulsions is not an index of the gravity of the patient's condition; and later studies have shown the interesting circumstance that patients who pass through eclampsia and recover and are subsequently thoroughly examined are

FIG. 19.—THE PLACENTA IN TOXEMIA, SHOWING MARKED FIBROUS CHANGES.

found to be in better condition than those who had toxemia to a considerable extent during pregnancy and escaped eclampsia. Chronic interstitial nephritis and irreparable damage to the liver are less common in women who recover from eclampsia than in those who have a considerable toxemia but escape convulsions.

We may reasonably infer from these facts and clinical observations that eclampsia is one of nature's methods of rescuing the woman; sometimes at the expense of the child, in other cases saving both mother and child. The writer has on several occasions seen patients, who have not been under observation until brought to the hospital, in eclamptic convulsions, pass through the convulsions without the interruption of pregnancy and subsequently give birth to a living child.

It may not be amiss to observe the effect of eclamptic convulsions upon the toxemic woman. In all the extreme cases, eclamptic convul-

sions produce relaxation of the sphincters, copious discharges and very often profuse sweating. The patient is unconscious during the convul-

FIG. 20.—CELLULAR INFILTRATION OF UTERUS AND PLACENTA IN TOXEMIA

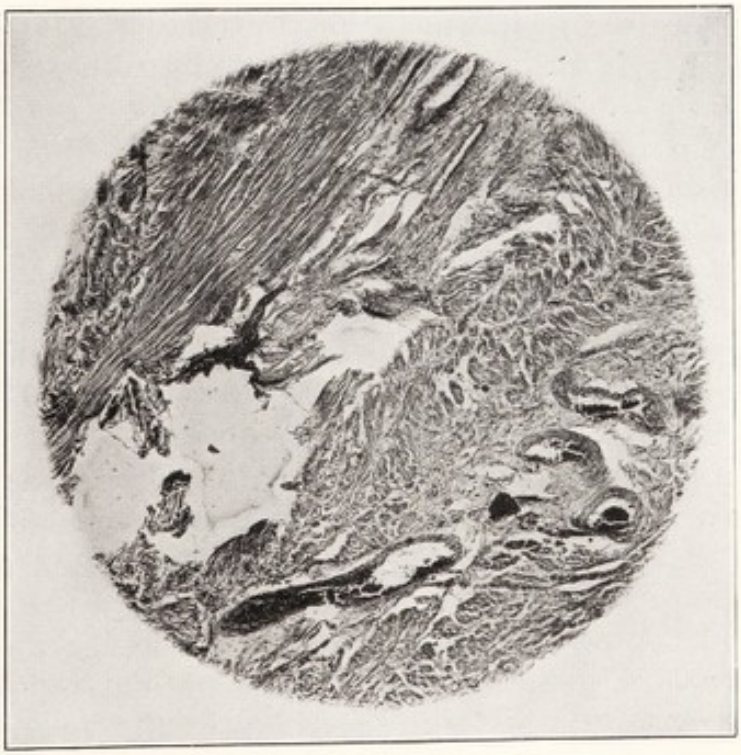

FIG. 21.—INFILTRATION OF LEUKOCYTES AT JUNCTION OF PLACENTA AND UTERINE WALL IN PRONOUNCED TOXEMIA.

sion and is spared the shock of its violence. If the uterus does not empty itself, the violence of the symptoms abate by profuse elimination and by partial anesthesia with carbon dioxid. If the uterus empties

itself, there is a temporary improvement in many cases, often followed by the continuance of the convulsions until elimination is established or the patient dies from exhaustion. In the present state of our knowledge, we are justified in considering the poisoned state of the woman's blood as of primary importance. The occurrence of eclamptic convulsions is of secondary gravity. Furthermore it has been abundantly proved that the termination of pregnancy does not immediately terminate the toxemia and that patients may die as the result of the toxemia as late as the second week after the emptying of the uterus.

We cannot intelligently consider this important topic without reference to the embryo or fetus. If pregnancy should be interrupted at any stage of toxemia, it will be because the process of embolism and thrombosis has produced hemorrhage at the site of the attachment of the embryo or placenta, thus causing separation of the product of conception and its expulsion as a foreign body. It is difficult to determine whether or not this process is taking place in a given case. In early pregnancy the occurrence of slight vaginal hemorrhage indicates the development of toxemia. Where the child is viable, the gradual cessation of fetal heart sounds and fetal movements and often the improvement in the mother's condition foretell the death of the fetus. Obviously no treatment can be directed to the saving of the product of conception alone, but whatever does the mother good increases the chance of the embryo or fetus. Since the product of conception shares in the pathological processes which threaten the mother, it is unjustifiable to submit the mother to risk in the hope of saving the product of conception.

The diagnosis of the toxemia of pregnancy is to-day the most important diagnosis in the field of obstetric art. When it is remembered that this process is the basis for the separation of the placenta, which, when premature, is exceedingly dangerous to mother and child, its importance may be appreciated. It cannot be too strongly emphasized that the diagnosis of the toxemia of pregnancy should not be based upon any one sign or symptom. The obstetrician should gain such knowledge as he can concerning the patient's heredity, childhood history and an accurate history of her general health. The several infections of childhood, such as scarlatina, a severe influenza or a dangerous attack of measles, all need to be included. Especial attention should be given to the narration of an attack of nephritis occurring in childhood or early life, and a tendency to obstinate or habitual constipation should not be neglected in recording the history. If the patient has passed through other pregnancies, their history, especially in the early months, is important.

The examination of the pregnant woman to determine the presence or absence of toxemia requires a minute physical examination supplemented by laboratory research. The physical examination should begin with the scalp and terminate with the feet. The general nutrition of the patient may be inferred from the condition of the hair and skin. The

widely dilated pupils denotes the presence of unstable nervous tendencies, while the habitually small pupils may give an index of a chronic cerebral irritation. The presence of exophthalmos calls attention to a lack of function in the thyroid. The condition of the mouth is also of importance, for septic absorption from rotten teeth may play an important part in the development of toxemia. The color of the gums indicates the presence or absence of infection or serious anemia; chronically inflamed tonsils may add their quota of toxins and a furred or heavily coated tongue indicates a sluggish and deficient action of the intestines. A slight enlargement of the thyroid cannot be considered pathological, but a considerable enlargement, or the entire absence of the gland on palpation in a comparatively young patient, should attract attention. The presence or absence of enlargement of the cervical lymphatics is important as indicating chronic infection or absorption from the region of the mouth and throat.

While the respiratory sounds are not directly indicative of toxemia, a chronic bronchitis indicates a sluggish condition of the mucous membranes, and impaired breathing at the bases of the lungs shows a tendency to congestion. The examination of the heart and its action may give results which are significant. It is now believed that many of the murmurs heard over the heart during pregnancy are caused by the circulation of altered blood through the chambers of the heart and are not the result of valvular lesions. While these murmurs, from the standpoint of the heart, are of no importance, they are significant in the detection of toxemia. Accentuation of the heart sounds is of considerable importance, indicating as it does a manifest and constitutional irritation.

Blood-pressure and Pulse Tension.—We have sufficient accurate data to inform us that the average healthy pregnant woman has a blood-pressure of 110 to 130 systolic and diastolic 65 to 85 and a pulse tension of 35 to 45 or 50. Alteration in the blood-pressure and pulse tension is one of the most valuable clinical signs of toxemia, but to ascertain this accurately the examination should not be made at the beginning of the patient's first interview with the obstetrician. Pregnant patients are easily excited and an accurate blood-pressure test cannot be made until the patient has become to some extent acquainted with the obstetrician and the element of timidity has been eliminated. Furthermore, to obtain an accurate idea of the patient's real condition, blood-pressure and pulse tension should be observed at regular intervals during the course of the pregnancy.

With these precautions, from our own experience we may make the following statement for practical clinical guidance in the study of pregnant women.

A habitual systolic pressure of 140 in the average pregnant patient is of sufficient importance to require strict regulation in the diet and hygiene; habitual pressure of 160 demands active medicinal treatment under accurate observation, preferably that of a nurse; a blood-pressure

of 180 calls for the admission of the patient into a hospital and 101 active treatment.

A systolic pressure of 200 or more is a symptom of great importance and in the early months may call for the interruption of pregnancy. While high blood-pressure is an indication of danger, a habitually and greatly diminished blood-pressure is an indication of great peril. The more thoroughly poisoned the patient becomes, the greater the degree of partial or complete paralysis in her functions. Some of the most rapidly fatal cases of toxemia of pregnancy are attended by extensive and profound alteration in the substance of the liver, disintegration of the blood and low blood-pressure. Hence the idea must not obtain that, because a patient's blood-pressure, systolic, is not above 90, she may not be in a highly toxic condition.

The examination of the thorax should always include pressure upon the sternum and the question addressed to the patient as to whether such pressure is painful and whether she has a burning sensation beneath the breast bone. In fulminant toxemia this symptom is pronounced. An important area in the examination of the abdomen is the epigastrium; this is more than usually sensitive in toxemic patients, unless the toxemia is so severe as partially to abolish sensation. In toxemia, the abdomen will be found on palpation to be more than usually distended, commonly by gas in the intestines, or in very severe toxemia the intestine may be practically collapsed. Palpation should be made so far as possible over the liver to determine the presence or absence of sensitiveness in this region. In very thin patients, enlargement of the kidneys can sometimes be detected, and it must be remembered that this condition is practically normal in many pregnant women. Care should be taken on examination of the abdomen that the urinary bladder of the patient is not very full, for this may greatly obscure palpation. Tenderness over the ovaries is usually found in all pregnant patients and is not an abnormal symptom. The presence of edema of the abdominal wall is significant and may be the result of anemia or of a toxic condition.

In examining the uterus and its contents in a toxic patient, in the early months of pregnancy, the location of the uterus should be ascertained so that the obstetrician may know when it is not in its normal position and that a retroverted uterus is not interfering with the discharge of urine. In later pregnancy it is of interest to recognize the fetal heart and to ascertain its average rate and vigor. If the uterus be found abnormal, tender on pressure, or in a state of spastic contraction, while the fetal heart beat cannot be heard nor fetal movements detected, a suspicion of partial separation of the placenta must be excited.

On examining the lower extremities, the presence or absence of edema should be noticed and also excessive dilatation of the veins of the lower extremities.

A vaginal examination during pregnancy in toxemic women will

give little or no information of value concerning the toxemic state. Such examinations should, however, be made at the first possible opportunity in dealing with all pregnant patients to determine as accurately as possible the condition of the pelvic organs.

During this examination the physician should closely observe the mental state of the patient. If the examination be conducted in a considerate and attentive manner, the patient cannot be displeased because the obstetrician gives evidence of care and attention to her health and comfort. A kindly interest in the patient's pregnancy and its successful termination will usually meet response on the part of the patient. A happy and more or less confident manner should be present. If this is lacking and the patient is highly excitable, profoundly depressed, melancholy, complaining of severe neuralgias, loss of appetite, indifference, frontal headache, obstinate constipation, or pressure from swelling of the lower extremities, or if she presents a greatly altered and impaired mental state, the whole psychic picture is of decided clinical importance.

The laboratory examinations should comprise the estimation of the blood urea and the examination of a twenty-hour specimen of urine, the obstetrician having knowledge concerning the patient's diet. Examination of the feces is rarely made, nor is it of essential importance. The Wassermann reaction is not essential, but if it can conveniently be included in the other tests it may be of service.

A marked increase in blood urea or marked decrease in connection with other findings is of importance. In the examination of the urine, as has been stated, a moderate quantity of serum albumen is not a symptom of importance, but a considerable quantity of globulin is now thought to have considerable diagnostic value. The nitrogen partition should show the urea percentage, the ammonia coefficient and also the quantity of creatin and rest nitrogen present. Indican is usually in excess even in healthy pregnancy. Acetone and diacetic acid indicate essential disturbance in the function of the liver. Considerable quantity of sugar, proved to be glucose, indicates a disturbance in metabolism. The reaction of the urine should be feebly acid, and a strongly acid or strongly alkaline urine is abnormal.

The writer in his experience studied the average quantity of urine excreted by the average pregnant woman upon an average mixed diet, the patients being up and about engaged in light housework and under accurate observation. In none was there any sign or symptom of complication of pregnancy and all could be considered in good general health. Under these conditions the average quantity of urine secreted in twenty-four hours was fifty-six ounces. While this quantity varies greatly in different individuals, this may be taken as a fair average.

Laboratory examinations should also include a microscopic examination of a centrifuged specimen of urine and also a study of the corpuscles of the patient's blood. A moderate number of hyaline casts are not significant; hyalogranular and fatty casts indicate a definite impairment in the structure of the kidney, and an abundance of epithelial

casts show an active degenerative process. Especially important in early pregnancy are crystals of hematin which indicate an important impairment in the blood.

The examination of the blood corpuscles in toxemia is of considerable value as indicating the violence of the toxemic process. In severe cases in early gestation, the red corpuscles are considerably disorganized and free hematin is found in the blood. A marked leukocytosis is not peculiar to toxemia, but moderate leukocytosis is often seen in the pregnant patient.

A minute study of the blood would include an estimation of the toxicity of the blood-serum by the injection of serum from the patient's blood into guinea pigs. This should be controlled by the injection of the patient's urine. In highly toxic conditions, the injection of blood-serum will often be followed by the development of symptoms of active toxemia in animals. Normal urine will often produce convulsions when injected into animals, while the urine of a toxic patient may be less poisonous.

Examination of the Eye-grounds.—In cases of toxemia with high-blood pressure and greatly altered urine and blood, the examination of the eye-grounds is of considerable value. The condition of the retinal vessels and the presence or absence of hemorrhage are important. Especially is this true in cases giving a history of toxemia in previous pregnancies, when the obstetrician is endeavoring to carry the patient through the present pregnancy and seeks information concerning the comparative condition of the patient from the examinations made by the ophthalmologist.

Treatment.—The treatment of the toxemia of pregnancy is most successful in prevention. It would be highly desirable if the patient could select her ancestors and thus avoid an inheritance of bad metabolism and worse nerves. Unfortunately this is impossible. The hygiene of childhood and early womanhood is exceedingly important in this respect. A healthy, vigorous, outdoor life, the avoidance of the use of narcotics and stimulants, simple habits of life, with abundant sleep, are all important.

Supposing the pregnancy to be a healthy one, the important factor in avoiding toxemia is moderation. It is probably useless in the average woman of fair health greatly to modify her diet during pregnancy, but the quantity of food taken may well be guarded. In cases where there is a tendency to excessive activity of the embryonal and fetal elements, the woman often develops an abnormally excessive appetite; this must be checked or, better, satisfied by the use of milk, fruit and bread in abundance. Milk is probably the most valuable article of diet for the pregnant woman, as it is rich in calcium which is essential for the health of the mother and the growth of the embryo and fetus. So far as possible, the mother's natural craving for fresh air, exercise, sleep and water should be abundantly satisfied even though this may bring discomfort to those about her. It cannot be too strongly urged that a

pregnant woman should be personally seen and observed by the obstetrician at frequent intervals during gestation; blood-pressure should be regularly and frequently taken, the condition of the digestive tract should be regularly ascertained and competent examinations of the urine made. The most difficult element in this situation is a partial or gradual failure in the normal nutritive processes of pregnancy, and gradual development of a toxemic condition. In the early months of gestation, many patients have an almost inordinate craving for rest. This craving should be satisfied. It is worse than useless for the woman in the early months to attempt to keep up the observances of society or other activities which are carried out at the expense of her physical feelings. The fate of the mother, and often of the embryo, is decided in the first four months when the immunizing principles of the mother's blood are most severely taxed to resist the encroachment of fetal elements. If this period be safely passed, the healthy woman is stimulated by pregnancy to increased physical and mental vigor.

With the failure of prevention, the treatment of the toxemia of pregnancy demands first of all an accurate observation of the patient. Genuine toxemia must be differentiated from intentional deceit from a desire to get rid of the ovum, or the hysterical disturbances which may counterfeit very closely the genuine condition. The obstetrician must be on his guard lest a story of excessive nausea and vomiting be pitifully told to him to induce him to perform a therapeutic abortion. On the other hand, the desire of the hysterical woman to play to the gallery and exhibit her abnormalities before an audience can be detected only by careful observation. When the obstetrician is convinced that a woman is honest and desires to continue the pregnancy, much may be accomplished by explaining to her the essential features in the case and getting her to coöperate loyally with him; thus, in the early months, she may keep a written record of the quantity of nourishment actually retained, the number of bowel movements, the hours of sleep, and oftentimes the quantity of urine passed. Such a patient will willingly modify her diet in hope of continuing the pregnancy and also of improving her own condition. From the malingering or hysterical patient, no voluntary help may be expected, and complete control must be obtained by an attendant, preferably a trained nurse. Oftentimes the psychic effect of putting a patient in a hospital under accurate obsrvation is exceedingly salutary, and has the added advantage of removing the patient from the interruptions and disturbances of home and friends. The malicious gossip so commonly imparted to pregnant women by their affectionate but hateful friends, who delight in narrating cases of disease complicating parturition, is an element to be avoided.

Unquestionably, Tarnier was right in his assertion that the majority of toxemic pregnant women, placed at rest with good care and given a diet essentially of milk, will recover. The difficulty lies in carrying out the treatment.

In the presence of actual and threatening toxemia in the early

months, the decision to prolong or interrupt the pregnancy becomes important; not only are the clinical symptoms to be accurately recorded and carefully studied, but the laboratory also should be called upon to give information of definite value. The microscopic examination of the blood and urine and chemical examination of the blood and urine, an accurate measurement of the intake and output, and an accurate observation of the phenomena afforded by the nervous system should bring about an accurate decision. The psychic element must not be disregarded and the physician should present to the patient's mind a hopeful, kind, attentive and considerate influence. If he can instill confidence in the patient, a considerable gain has been made.

When, however, a thorough trial has been made of rest, nourishment, attention to the functions of the body and mental encouragement, and a study of the case shows progress in the wrong direction no hesitation should be felt in terminating the pregnancy promptly.

A thorough examination of the pregnant patient will have demonstrated that the pelvic organs are in normal position and that there is no point of constant irritation in the pelvis, in fact, in any portion of the body.

To terminate an early pregnancy, the operation of dilatation and curettage is indicated. In these cases, anesthesia must be carefully chosen and skillfully administered. Nitrous oxid, although diluted, is dangerous with these patients, and ether and oxygen skillfully administered are safer. The operator must be prepared not only to dilate and, so far as possible, to empty the uterus, but also to give intravenous transfusion, lavage of the stomach and such stimulation as may be necessary.

In performing the operation, a large and blunt-ended curet should be chosen to avoid the possible danger of perforation of the uterine wall by a small sharp instrument. It is often difficult to curet away an early ovum, but the decidua can largely be removed, and, although the curettage may not entirely empty the uterus, a subsequent packing with sterile or 10 per cent iodoform gauze will cause the death of the embryo and prepare the way for its expulsion. This packing of gauze should be removed within forty-eight hours, when frequently the retained portion of the embryo will come away with the gauze. The obstetrician must not be surprised, however, if the patient expels portions of the embryo during the next ten days following the operation. Tonic doses of strychnin with fluid extract of ergot, to produce firm contraction of the uterus, are indicated. In the absence of fever and tenderness, the patient should be encouraged to get out of bed and use the commode, and this will often facilitate the discharge of retained portions. Vaginal douches of saturated solution of boracic acid are useful in stimulating uterine contractions and the discharge of fragments. Constipation must be avoided and anemia corrected by the proper agents. When the uterus has returned to practically its normal size, the pelvis being free from exudate and tenderness and the uterus in normal position with the vaginal discharge practically at an end, the patient may be considered

convalescent. If the urine is not normal or there is a considerable anemia, she will require care until these factors have disappeared.

The tendency of these patients to develop a subacute nephritis must not be forgotten, and such a patient should be kept under observation for at least a year after the attack of toxemia.

The question may be asked, How soon after an attack of toxemia may the patient risk another conception? And the inquiry may also be made, Does one attack of toxemia predispose to others? Each of these questions must be answered after a thorough study of each individual case. A year should certainly elapse, if possible, before another conception. In women of comparatively sound health, one attack of toxemia may be the last and the next pregnancy may proceed successfully. It is not the occurrence of an attack of toxemia, but the treatment which the patient receives and her willingness to give attention to her general health afterwards that will decide her future ability to bear children.

The treatment of toxemia of the later months of pregnancy is complicated by the interests of the fetus, but, as has been repeatedly shown, these interests are so easily jeopardized with those of the mother that no specific treatment on its behalf should be undertaken. What saves the mother saves the child. The treatment in the later months is essentially that of the early months, and in all periods of gestation the obstetrician may be called upon to meet cases of acute fulminant toxemia.

These are imperatively hospital cases; whether the blood-pressure is high or low, acute fulminant toxemia calls for bleeding, followed by the injection of sodium bicarbonate with or without glucose. Lavage of the stomach followed by the administration, through the tube, of calomel and sodium bicarbonate; repeated and copious lavage of the intestines with warm sodium bicarbonate solution; stimulation of the action of the skin by bathing with hot water and soap followed by rest in bed between dry blankets; the regular emptying of the bladder by catheterism, are all indicated. Morphin or codein is demanded in proportion to the condition of the nervous system, and its judicious use in conjunction with these other means of treatment will assist in promoting elimination. No attempt should be made forcibly to empty the uterus by dilatation. If labor develops, it may be assisted but not forced or necessarily induced.

The majority of obstetricians fortunately have passed through that period in which all cases of acute toxemia of pregnancy were treated by the rapid dilatation and emptying of the uterus.

One condition might arise where the prompt termination of pregnancy, in the opinion of the majority of obstetricians, is indicated. This would be in the case of a primipara at or near term, with fetus in good condition, where an acute toxemia manifests itself first by severe convulsions and then by rapid disturbance of metabolism. In such a patient, there is no preparation for labor, no dilatation of the cervix, little soften-

ing, and little if any engagement and descent of the child. In such a case the prompt performance of abdominal cesarean section, accompanied by transfusion and lavage of the stomach and followed by lavage of the intestines, may save the lives of mother and child. But the indications described must be present to justify such interference. The reason for the selection of abdominal cesarean section lies in the fact that it is the most rapid and certain method of emptying the uterus and is attended with the least violence, and that surgical anesthesia will probably save the patient from shock in this operation.

Obstetricians sometimes like to induce labor in patients whose toxemia is not of the most acute variety, and yet in whom hospital care and prophylactic treatment fail to improve the condition. In such cases, the writer has had the best results in anesthesia by ether and oxygen, followed by dilatation of the cervix, preferably with the fingers of the gloved hand, the separation of the membranes from the wall of the uterus as far as possible, and the introduction of bougies. During the development of labor, the patient may be given needed rest by the hypodermic use of morphin. When uterine contractions are well established, the bougies should be removed and, unless progress is uninterrupted, the patient should again receive ether and oxygen and the delivery be effected by forceps or version. If indicated at the time of delivery, bleeding, transfusion and gastric lavage may be employed.

The treatment of toxemia developing after the emptying of the uterus calls for the treatment described as indicated before the birth of the child. It is a mistake to suppose that such cases are not as grave as those occurring before labor, nor are the principles of treatment essentially different. In cases where the uterus is empty, toxemia may manifest itself by active disturbances of the cerebrum in the form of mania. This requires restraint, preferably by a canvas sheet, elimination and the use of morphin.

The feeding of toxemia patients, as they become conscious enough to swallow, is fortunately a very simple matter. Equal parts of fresh cow's milk and cold water should be given as often as the patient will take it, beginning with small quantities; the patient's thirst being, thereby, to a great extent satisfied.

The toxemia of pregnancy may develop in patients who have shown no signs of the condition before labor and who are delivered by an elective surgical operation. In the writer's experience, a comparatively young primipara, normally developed, went over term. The normal mechanism of descent and engagement failed without apparent reason, the fetus was evidently full size and well developed. With the cordial assent of the patient, husband, and family, an elective section was made, including, at their request, the removal of the appendix. The cord was found so wrapped about the child that its descent and engagement were impossible without destroying it by asphyxiation or separating the placenta. The operation proceeded normally, but within four days the patient died with vasomotor dilatation and pernicious nausea. She was

examined in consultation by a medical specialist and a surgical specialist, and it was interesting to observe that the action of the heart muscle continued to be vigorous, while the tone of the small vessels could not be brought back to normal. Nothing could be retained in the stomach, and attempts at rectal feeding were not followed by absorption. An autopsy was not obtained, but the abdominal wound was reopened and the peritoneum was normal. The wounds were practically closed and there was no evidence of infection.

In another case, a multipara, of bad physique and uncertain antecedents, ten months previously had a cesarean section for pregnancy complicated by accidental separation of the placenta. From this she recovered. She had already given birth to several children, and on this occasion she presented herself at the clinic near term, with the united request of the husband and herself that delivery be accompanied by sterilization. The patient had a moderate exophthalmos, but otherwise was in fair condition. Examination of the urine was negative. She was subjected to elective hysterectomy with the removal of the tubes, ovaries and a chronically inflamed appendix. A living and fairly developed child was born. The uterine scar of the former operation was sound and strong and the operation proceeded without difficulty; transfusion was given at the time and lavage of the stomach.

This patient developed a steadily advancing toxemia, attended with convulsions which were not eclamptic in severity. Repeated lavage of the stomach, the use of glucose and sodium bicarbonate and stimulants failed to influence the progress of the toxemia. When her condition became threatening, intravenous transfusion was practiced and two quarts of solution were readily absorbed by the vessels; sudden death by heart failure followed a temporary improvement.

A thorough autopsy was obtained, including examination of the brain. Aside from a wet brain, there was no distention of the ventricles. There was a subacute chronic bronchitis, the liver was very much softened and disintegrated, the kidneys showed evidence of a rapid disintegrating process and so did the spleen. There was no evidence of peritonitis or infection, operation wounds were clean and stitches were in place. A suture of the abdominal peritoneum had given way, probably from the antemortem distention of the abdomen. In this case the development of toxemia was characteristic and the condition of the liver, spleen and kidneys confirmed the diagnosis.

In the later stages of this condition, the obstetrician must be always on the lookout for the development of pulmonary edema or the extravasation of blood from the capillaries of the lungs. The first symptoms of pulmonary edema call for the prompt use of dry cups over the bases of the lungs and the hypodermatic use of digitalis, strychnin and atropin. Care must be taken, in supplying fluid by transfusion, that an excess quantity be avoided, and many believe that salt solution predisposes to this complication. Salt solution is readily sterilized and easily obtained, while unfortunately sodium bicarbonate solution can-

not be sterilized without destroying its chemical composition. But if sterile water and chemically pure sodium bicarbonate are used, the danger is negligible.

Prognosis.—A physician of experience avoids giving a prognosis in a case of pneumonia; here death often results, not from the process in the lungs, but from a sudden overwhelming toxic paralysis of the heart muscle and vital centers. A patient, though cured of the pneumonia, frequently dies. A similar condition exists in the toxemia of pregnancy. It was formerly thought that the number and severity of the convulsions afforded a valuable means of making a prognosis, but this has been shown not to be the case. The convulsions themselves require no specific treatment, for the treatment of toxemia controls the convulsions. The nervous system may be guarded, but not narcotized, to advantage. In dealing with the toxemia of pregnancy, it is safe to give no prognosis until two weeks have elapsed after the severity of the attacks has passed and the uterus has been emptied or still retains its contents. The writer has seen death occur from uncontrollable hemorrhage from the uterus, in the early months, in a patient supposed to be safe after an active attack of toxemia. He has also seen death from pulmonary changes in a young primipara who, during a convulsion, expelled her fetus and died two weeks after from the pulmonary complication.

In the present state of our knowledge, it may be well briefly to mention those methods of treatment which have been shown to harm the patient. First among these is the attempt to control the convulsions by the inhalation of anesthetics. Chloroform was formerly considered a specific, but we know that chloroform produces acidosis and interferes with the function of the liver. Another mistake has been the giving of depressing drugs or the use of depressing methods of treatment. The free use of Veratrum viride brings the patient to a condition requiring hypodermatic injections of strychnin and digitalis. The free use of the hot water pack and pilocarpin predispose to depression and pulmonary edema.

The writer is aware of the fact that there are numerous specific treatments, such as the so-called Stroganoff treatment, the intravenous use of corpus luteum and the copious administration of glucose solution, all of which are acclaimed as panaceas for the treatment of this condition. A critical analysis of the results of large numbers of cases treated by these methods does not, in the experience of the writer, justify their claim. They illustrate a frequent fallacy in medicine, wherein a physician will employ established and proved methods of value, and then add to this treatment some specific with which he is experimenting; if the patient recovers, the credit is given to the specific; if the patient dies, the credit is given to the nonspecific, treatment. It is an interesting observation that, during the recent period of war and ravage throughout Europe, toxemia of pregnancy did not markedly increase. This was probably due to the fact that there was an excess of food in none of the European countries and therefore that overfeeding was impossible, while

the enforced exertion and work aided in elimination. Children born during this period did not exhibit the result of deprivation to an extent which might be supposed.

While this is true of the average, on the other hand, in cases of extreme privation and hardship, the results in parturient women and their offspring were disastrous and appalling.

Mortality of Toxemia and Results of Treatment.—No reliable statistics are available on this subject. A given clinic will report a series of cases of the toxemia of pregnancy with a low mortality, and this will be followed by another series with a much greater mortality, the methods of treatment having been the same. At present we have no means of estimating the toxic power of those substances which threaten the mother. We do know, however, that prenatal care and medical treatment very greatly reduce the danger from this complication. We also know that the avoidance of the methods of treatment specified as injurious, and especially abstaining from rapid and violent emptying of the uterus, have reduced mortality. Further studies in pathological chemistry may give more accurate data. It is, however, pertinent again to remind the reader that cases of the disease which run a natural course to convulsions have a lesser morbidity in after life than do cases in which convulsions do not occur. This fact is of extraordinary and interesting significance.

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CHAPTER VIII

SYSTEMIC INFECTION

Pregnancy complicated by systemic infections—Influenza in pregnancy—Bronchopneumonia in pregnant women—Typhoid infection—The exanthemata complicating pregnancy—Tuberculosis affecting the pregnant woman.

Of recent years the most interesting and important systemic infection complicating pregnancy has been that known as influenza. This disease, originating in the native pilgrimages of India, following lines of travel and commerce, has been brought to the United States in various forms during the last thirty years. History gives curious examples of its presence in Europe as early as the time of Mary Queen of Scots, and it is probably as old as the race, but like many epidemics it becomes virulent at periods and then subsides. Under the name of epizoötic it attacked horses in the United States at one time with great vigor. Later on, it was called grip and, with the outbreak of the late War, a mixed infection known as influenza culminated in the epidemic of 1918. Of the general etiology, pathology, diagnosis and treatment, it is not the province of the writer to treat, but the disease has, in pregnant women, certain striking peculiarities.

Its onset is usually gradual; soreness of the throat, slight swelling of the tonsils, nasopharyngeal catarrh, a rectal temperature of 101° to 102.5° F., a pulse of 100 to 120, respiration of 30, more or less general aching of the muscles, diarrhea or constipation, a slight cough, considerable thirst, impaired appetite, and headache are the principal symptoms. On examination there may be found tenderness over the frontal sinuses, the mucous membranes of the nose and throat reddened, the tonsils moderately enlarged, the follicles containing mucopus and the tongue furred and coated. The skin is more or less hot and often dry and, on auscultation, there are a few bronchial râles and sometimes slight dullness at the root of one or both lungs. The action of the heart is fairly vigorous and irritable, the first sound sometimes accentuated, and there may be slight murmurs. There is often slight tenderness at the epigastrium and moderate distention of the abdomen from gas in the intestines. If the patient is in late pregnancy, fetal movements may be more frequent than usual and the fetal heart possibly a little quicker.

The progress of the disease is usually decided and rapid. In forty-eight to seventy-two hours the symptoms abate and, beyond a slight and irritating cough, the patient is troubled but little as she recovers. When, however, she endeavors to exert herself, her weakness and pros-

tration are out of all proportion to the violence of the initial attack. Convalescence is unduly prolonged, with neuralgias of various sorts, pain referred to the middle ear, aching and pain over the frontal sinus and often an obstinate nasopharyngeal catarrh.

In other cases the infection proceeds rapidly, bronchopneumonia develops, often without any large area of apparent consolidation. There is decided prostration; increasing distention of the intestines with failing peristalsis. The urine shows globulin and casts. The patient becomes actively toxic and the uterus empties itself. This is followed by an overwhelming toxemia and death, often with little warning. At autopsy in these cases, the frequent phenomena are those of toxemia with cloudy swelling of the heart muscle and often complete and rapid dilatation of the right heart.

A significant fact in influenza attacking parturient women is the rapid and fatal influence exerted by the termination of pregnancy; so extraordinary is this that one might almost base the prognosis in a given case upon this fact. The reason for this is not evident, unless it is that the termination of pregnancy results in embolism and thrombosis from the site of the attachment of the ovum or fetus, or that the termination of pregnancy is aggravated by the rapidly developing toxemia and the death of the patient results. Death in these cases strongly resembles that seen in the most acute and fulminant forms of toxemia. If the fetus is viable at the time of its expulsion, it may or may not survive. The majority do not.

In the presence of an epidemic of influenza, the pregnant woman should take especial precautions; she should avoid going into crowds, the condition of the nose and throat should receive attention, and a laryngologist or specialist in diseases of the nose and throat should examine her thoroughly and suggest the form of local disinfection most advisable. The general health should be safeguarded, and it is of especial importance that any member of her household showing signs of influenza should keep away from her. This is of the utmost importance, for unquestionably the disease is conveyed by secretions from the nose and throat of the affected person, by sneezing or coughing, by soiled handkerchiefs or utensils or by contact of the lips. While these precautions may seem excessive, in view of the uncertainty and mortality of influenza complicating pregnancy, they are justifiable.

When the disease attacks a pregnant patient, she should at once be put to bed under the care of a skilled attendant. The nose and throat should be thoroughly and skillfully disinfected, preferably by a specialist and with as little discomfort and irritation as possible. The intestines of the patient should be promptly and thoroughly emptied. A compound cathartic pill, followed by saline and copious high irrigation, is demanded. Irritation in the respiratory tract and excessive secretion are to be avoided. The writer has had exceedingly good results by giving the patient a mixture containing codein, atropin, liquor potassii citratis and syrup of lemon, mixed with a quarter to a half glass

of water. From ¼ grain to ½ grain of codein may be given every two to four hours, and from 1 : 800 to 1 : 1200 grain of atropin at the same time. The milder alkalies should be given as freely as possible and citrate of potassium or cream of tartar lemonade may be used in addition. Fruit juices and water are as important as drugs, and of fruit juices that of the lemon, lime and pineapple, without sugar, are the best. Any form of water which the patient will take should be pushed. All sources of mental and nervous irritation should be avoided and the diet should consist of albumen in the form of the whites of fresh raw eggs combined with fruit juice, strained gruels, fresh raw egg beaten up with fruit juice, or chicken broth. No milk should be used unless the patient craves it excessively, when buttermilk or Bulgarian tablet milk may be given. It is of great importance that the bowels move freely each day and that the patient's cough, if such develops, should be controlled. If there is pain and irritation about the head and chest, mild counterirritants, with the use of a hot water bag, are indicated. Severely irritating applications should be avoided. The action of the skin should be maintained by sponging with soap and hot water and by placing the patient between blankets.

The majority of these cases, if taken promptly and treated in this manner, do well, but the obstetrician must remember from the first that it is the toxemia which may kill the patient; hence the necessity for the emptying of the bowel, the administration of alkalies, the use of fruit juice and water, the rousing of the action of the skin and the placing of the patient at physiological rest. No food should be given which will leave a residue in the intestines. The development of toxemia may be inferred by the loss of intestinal peristalsis and the development of distention.

Unfortunately, up to the present time, in the rapidly severe cases, treatment has been of little avail. The great mistake of inducing labor must not be made. It is a clinical rule with pregnant women not to induce labor in the presence of acute systemic infection. The disturbance caused by the emptying of the uterus and introduction into the circulation of substances formed at the site of attachment of the ovum or placenta may turn the scale against the patient. The life of the product of conception will rarely be saved by this method. While treatment has been unavailing in the severe forms of influenza complicating pregnancy, the action of the heart must be sustained with these patients, avoiding the introduction of excessive quantity of fluid, and the fight must not be abandoned so long as life persists. Death, however, often comes with startling rapidity and apparently treatment is largely unavailing.

Bronchopneumonia.—The anatomical conditions existing in the pregnant patient are favorable for the development of congestion and infection at the roots and in the lower portion of the lungs. The pressure of the uterus in the abdomen interferes with the movements of the diaphragm and with the circulation of the lungs. Bronchopneumonia may be the result of exposure to cold, sudden chilling of the surface of

the body, infection of the nose and throat and, as has been stated, of influenza. When it is caused by a mixed infection and not a specific condition such as influenza, the symptoms are those of a gradually developing cough, more or less expectoration, disturbance of the pulse and temperature, increased respiration and a gradual development of toxemia. The case will become serious in proportion to the extent of lung tissue involved and the condition of the heart muscle and respiratory center.

On examination, the obstetrician must not expect to find a large area of dullness, as in a classic pneumococcus infection. The physical signs in the chest may be out of proportion to the severity of the attack, and these signs may change often and at brief intervals. An index of the severity of the infection is found in the respiratory rate and in the behavior of the heart. The more rapid the pulse and the breathing become, the more severe the infection. In the later stages when toxemia develops, a mucopurulent secretion poured out from the bronchial tubes may block the terminal bronchi, and small areas of consolidation will be scattered throughout the lung. At autopsy, if such a lung is cut and squeezed, mucopus will be seen to exude from points through its surfaces. These points indicate the position of the terminal bronchi.

This infection may be conveyed to the fetus. In the experience of the writer, a mother died of bronchopneumonia; in the last hours of her illness she gave spontaneous birth to a living child which passed through a typical attack of bronchopneumonia and recovered.

Prophylaxis.—The prophylaxis of this serious disease consists first in the hygiene of the nose and throat. During pregnancy there is always congestion in the membranes of the nose and about the throat and often considerable and annoying irritation. Whenever possible, pregnant patients should be examined by a specialist and such treatment or applications be ordered as are best. While the writer has never seen the tonsils become infected because of pregnancy, chronically infected tonsils are a source of danger to the pregnant woman.

Care must also be taken, when bronchopneumonia is epidemic, that a pregnant patient avoids crowds and contact with all persons who have severe colds and cough.

Diagnosis.—The diagnosis of bronchopneumonia complicating pregnancy is made by the symptoms which have been described and by physical examination. No large area of consolidation will be found, and the most reliable factors in diagnosis are the pulse, temperature and rapidity of respiration. If the sputum in these cases is examined, it will be found to contain streptococci, staphylococci, pneumococci, and often other varieties.

Treatment.—The treatment of the condition consists essentially in that which has been described in dealing with influenza. First in importance is the control of cough and irritation, preventing the tendency to profuse secretion which plugs the tubes and diminishes the patient's ability to get oxygen. This secretion should be checked to some extent by the

use of atropin; mild alkalies are required very freely as the disease progresses. The blood-pressure and the action of the heart should receive attention, and the heart should be supported if it is necessary. The patient should be urged to expectorate freely and the sputum should be received upon gauze and burned as promptly as possible. As the violence of the pulmonary infection begins to subside, it must be remembered that enough of the secretion will pass into the stomach and bowels to set up an infection there. As toxins are produced in the intestines, peristalsis will be diminished and severe distention will result and toxemia may develop; hence the necessity for giving no food to these patients which leaves a residue in the bowel. During the later stage of such an attack, intestinal lavage should be given each day and strychnin administered in tonic doses. For pain in the chest or pain and distention in the abdomen, counterirritants are useful and with this should go the application of water bags, hot or cold. If the temperature is high, a dry ice bag will give the patient comfort, or, if there is considerable shock and distention, a hot water bag which does not leak. Underneath this should be placed flannel wrung out of chloroform liniment or a mild solution of turpentine. The patient should take water freely and her nourishment should consist of albumen in the form of whites of raw eggs, broths, beef extract or strained gruel with the free administration of fruit juice and water. The danger of labor must be remembered and, if the uterus is irritable and shows a tendency to contract, morphin should be given to a moderate degree by hypodermatic injection. The occurrence of labor will increase the chances against the mother, and the birth of the child is no guaranty that it will not suffer from the disease.

The patient's convalescence is a matter of great importance. If the circumstances are favorable, a change of air is useful, and fresh air is necessary at all stages of the illness. Some patients bear cold fresh air exceedingly well and others require a room to be somewhat hot although the air should be fresh. If the climate serves, the patient should be in the open air during her illness and convalescence as much as possible.

The danger of the development of tuberculosis after such an attack should not be forgotten. The physical signs in the chest should be studied and the sputum examined with sufficient frequency to prove the presence or absence of tubercle bacilli. Infection of the lymph-nodes in the mediastinum is an unfortunate complication of the disease, and may account for the continued fever and prostration after the physical signs in the lungs have disappeared. In severe cases, pericarditis and pleurisy may add to the patient's suffering. Should empyema develop, the judgment of the surgeon and his skill may be needed to determine the question of drainage. If possible, this should be effected by infiltration, without inhalation anesthesia, and this can usually be accomplished.

Prognosis.—While the prognosis in these cases is always doubtful when the disease is grave, if the patient's respiration, temperature and pulse

are not very high, if the abdominal symptoms are not indicative of severe toxemia, and the patient's strength and ability to take nourishment are maintained, there is good reason to hope for her recovery. The most dangerous symptom is the development of prostration and severe toxemia indicating the degree in which the patient's vital strength is overwhelmed.

Typhoid Infection.—Pregnancy is no bar to the occurrence of typhoid infection, and there is every reason to believe that typhoid bacilli, like many others, may pass through the placenta and affect the fetus. The degree of temperature attained by the mother is to some extent indicative of the danger to the child.

In the observation of the writer, a robust multipara passed through, during pregnancy, a very severe typhoid infection. She did not miscarry and her female child was born near term. Although this child grew in stature and maintained a fair degree of nutrition, the nervous system showed the effects of the mother's infection; the child was bright mentally, but the power of speech was impaired and so were some of the motor muscles. By good care, atrophy was largely avoided, but the child remained at adolescence, permanently damaged in the ability to speak and to use the limbs naturally. Other children of these parents were remarkable for physical and mental development.

Diagnosis.—A diagnosis of typhoid complicating pregnancy will depend upon the development of the usual clinical symptoms; distention of the intestines, the characteristic rose spots, the furred and coated tongue, moderate fever, diarrhea or constipation, apathy and, in the beginning of the disease, with young persons, headache and nosebleed. The Widal reaction should be of great service in making a positive diagnosis. It may sometimes be necessary to watch a patient closely for a short time before a diagnosis can be confirmed. It must be remembered that tuberculous infection of the peritoneum and surrounding tissues complicating pregnancy may simulate typhoid. A mild attack of appendicitis or colicystitis, or both, may also obscure the diagnosis. Colon bacillus infection of the lymphatics of the intestines may produce symptoms resembling typhoid. Fortunately for the patient, the essentials of treatment are the same unless a focus of infection can be identified which is susceptible of removal by surgical means.

The course of typhoid infection complicating pregnancy does not differ from that in the nonpregnant. Abortion, premature labor or labor at term will depend considerably upon the severity of the infection and the degree of the patient's fever. It is commonly thought that, when the temperature exceeds 104° F. for any length of time, the risk of interruption of pregnancy is very considerable.

In cases that do well, the temperature never rises to an extreme degree, the symptoms do not indicate a very severe infection, the patient is able to take nourishment and to rest, and the case runs the usual course with a duration of between three and four weeks. Repeated Widal reactions may be obtained to advantage; the degree of emacia-

tion displayed by the patient is of importance, and frequent examinations of the urine should be made to determine the condition of the kidneys. Some indication may be obtained of the degree to which the fetus is suffering from the infection, by observing fetal movements and fetal heart sounds. When the mother's temperature is highest, the child is often most disturbed. A moderate infection will not destroy the fetus, while a severe infection with high fever may result in the final expulsion of a dead child.

Treatment.—As in all disease, the first essential is that of accurate diagnosis, but even before this is possible the cardinal features of treatment should be kept in mind. Enforced physical and mental rest, maintenance of the action of the skin by warm sponging, very gentle emptying of the lower bowel by warm enemata, a diet leaving in the bowel no residue, an abundance of water, are all essential. To control the patient's temperature, drugs should be avoided and the intelligent use of hot or cold is of especial importance. To modify a very high temperature, the susceptibility of the patient must be carefully ascertained. If she should be severely shocked by the infection, hot sponging with water containing pure alcohol may give the best results. Ordinarily, however, cold sponging with water containing ammonia or alcohol and a dry ice bag at the epigastrium will control the temperature most successfully. The best of nursing is greatly needed for these patients to provide constant attention day and night, to watch the temperature and to control it as may become necessary.

If the patient becomes delirious or very sleepless, sedatives are required. In this stage the value of alcohol as a sedative is undoubted. The best quality of whisky or brandy well diluted, given in the afternoons or through the night, together with external use of heat or cold, will give throughout the disease better results than the administration of drugs. If opium is needed, morphin by hypodermatic injection should be given.

The existence of pregnancy should not forbid prompt abdominal section should symptoms of perforation develop. With this complication, the patient's chance is desperate, but the chance should be taken.

The mortality of typhoid complicating pregnancy cannot be accurately estimated because different classes of patients react differently to the infection. It is well known that typhoid is most dangerous in young persons and, so, a young primipara will suffer more from the disease than a multipara between the ages of thirty and forty. Patients whose general health has been bad, and who are toxic before they become infected are also bad subjects. Prolonged high temperature is a very serious symptom as regards prognosis. The occurrence of abortion or labor greatly adds to the mother's risk.

As previously stated, it is perfectly possible for a woman of good physique and constitution to pass through a moderately severe typhoid infection during pregnancy without serious damage to herself or child. This hopeful view of the case should always be kept before the patient,

although the gravity of severe symptoms should be impressed upon her friends and attendants. In the event of childbirth, if the child is living, it requires especial care. If the weather is cold, the child should be given abundant artificial heat, the intestine thoroughly but gently irrigated to remove its contents and the child artificially fed from the moment of birth. The temperature should be accurately observed and a temperature chart kept for the infant. An infant with a severe typhoid infection will rarely recover, but with a lesser degree of the disease it may survive.

Exanthemata.—The question often arises, whether a pregnant patient should be guarded against exanthemata and other infections by prophylactic inoculations. There can be no hesitation in giving such a patient the usual vaccination against variola. If the pregnant patient must travel into a region where she may encounter typhoid infection, she may receive the usual antityphoid inoculation. Should she receive a wound which threatens tetanus, she may receive the usual prophylactic injection. In the presence of diphtheric infection in her household or in her own person, antitoxin should be used as vigorously as in the nonpregnant. In mixed and streptococcic infection, if the blood stream has become involved, it is questionable whether antistreptococcic serum may not do more harm than good. In acute anemia developing during pregnancy from ruptured ectopic gestation, transfusion with the blood removed at operation from the abdominal cavity is remarkably successful. This blood should immediately be citrated and injected into a vein. On the other hand, immediate transfusion of blood in patients suffering from abortion followed by septic infection not only does no good, but often does harm. Apparently anaphylaxis is present in these cases.

Smallpox, chicken-pox, scarlatina, measles, cerebrospinal meningitis, the bubonic plague, may all attack a pregnant woman. Their symptomatology is not modified essentially by pregnancy. A hint in the diagnosis may often be given by the history of exposure or by the presence of an epidemic in the place where the patient is dwelling or has been traveling. A diagnosis made and the question of the use of antitoxin decided, action is imperative and the treatment should be conducted along the usual lines.

The tendency to toxemia and the danger of premature termination of pregnancy are the two important factors to be kept in mind. Especial attention to the intestinal tract is required, with careful selection of food and the modification of fever and other symptoms which threaten the life of the embryo or fetus. These diseases are transmitted to the fetus; and a child has been born, showing the characteristic rash of variola, from a mother suffering from the disease. A mild variola is not especially dangerous in pregnancy, but the infection of measles in a pregnant adult may be exceedingly severe and may be followed by death from bronchopneumonia. Scarlatinal infection calls for especial attention to the condition of the kidneys and also the development of complications in the region of the nose, throat and ears. In cerebrospinal

meningitis, unless the patient has been seen in the early stages of the disease, it may be impossible to differentiate between a puerperal septic condition in a woman who has just aborted or miscarried, and a cerebrospinal meningitis. The eruption sometimes seen in the two conditions is identical.

When one of these diseases attacks a pregnant woman who is in her home and who has other children, the question of isolation becomes exceedingly important. If the patient can be taken at once to a hospital and isolated, her home disinfected and prophylactic inoculations given the children, the disease may be limited to the one patient. If she has measles and must remain at home, it is practically impossible to limit the contagion. On the other hand, if she has scarlatina, she may be successfully isolated and pass through the disease in her own home without infecting others. In cerebrospinal meningitis and bubonic plague, the danger of contamination or infection is very great. The responsibility to other patients of the obstetrician who finds himself in charge of one of these patients is a matter of importance and concern. Under no circumstances should he go from such a patient to a woman in labor. He must face the choice of two courses of action: one, to immediately retire from the infected case, and, after a period of cleaning and disinfection, to resume his other practice; the other, to devote himself to the one case with proper precautions. Obviously the best course lies in the prompt transfer of the infected patient to a suitable hospital, but unfortunately this is not always possible. At least, the patient should be isolated in her home, and her physician should not attend other parturients.

When pregnancy is interrupted in these patients, the life of the fetus is rarely preserved. Its care is essentially that already outlined, and its escape from infection would depend more upon the violence of the disease than upon any other circumstance.

The convalescence of these patients may be retarded by a general toxemia, and very careful attention to diet and hygiene may be necessary before the action of the kidneys and intestine is satisfactory.

Infection of the Nose and Throat.—One of the most dangerous infections complicating pregnancy is streptococcic angina in which the nasopharynx is severely infected. In these cases the streptococci often gain prompt access to the blood and become hematolytic. The symptoms of active septic infection develop and, if abortion or premature labor occur, the patient may be considered as having a form of puerperal septic infection. The appearance of the throat in these cases is that seen in similar infections in other patients. The diagnosis must be made by taking cultures from the throat and by observing the constitutional manifestations of infection which develop. Such patients should be promptly isolated, and the management of the nose, throat and ears requires special skill and attention.

The general treatment is that already outlined. In cases where the infection seems severe, good may be accomplished by the hypodermatic use of sterile horse serum in doses of 20 c.c. three or four times in the

first twenty-four hours. After the first twenty-four hours, the dose should be limited to one at night and one in the morning.

The writer has rarely seen disease of the tonsils of an ordinary form and swelling of the tonsils complicate pregnancy. That a streptococcic infection will produce characteristic lesions in the frontal sinuses or middle ear is a matter of familiar observation.

Tuberculous Infection.—While this subject is too large to permit of an exhaustive discussion, it might not be amiss to draw attention to some of the salient points in this disease. Tuberculous infection complicating pregnancy may be limited to the pelvic organs and peritoneum or located in the lungs, liver, spleen and kidneys, or in the meninges of the brain or about the joints. There is a radical difference between pregnant patients who become tuberculous and tuberculous patients who become pregnant. In young women in their first pregnancy who have had average health and strength before the tuberculous infection developed, the chance of resistance to the infection and a successful termination of pregnancy is not to be disregarded. On the other hand, the tuberculous patient who becomes pregnant will have the disease greatly accentuated and, under ordinary circumstances, her life materially shortened.

Diagnosis.—The diagnosis is made as in other patients. In pelvic tuberculosis the signs and symptoms are those of chronic peritonitis and salpingitis. Where the abdominal peritoneum is involved, gradual distention of the abdomen with accumulation of a moderate quantity of fluid is observed. In pulmonary tuberculosis, the characteristic cough and sputum draw attention to the disease and the diagnosis is confirmed by physical examinations of the chest and demonstration of the bacilli in the sputum. Tuberculous meningitis in pregnancy is usually violent and rapid in its course. Tuberculous infection of the joints may be detected by pain, redness, swelling and an examination of the contents of the joint by aspiration and culture.

It is a moot question whether tubercule bacilli pass through the placenta and infect the fetus. It has not been definitely proved that this occurs, nor is it the view at present that the child of a tuberculous mother must necessarily become tuberculous. Cattle breeders believe the offspring of tuberculous cows may be considered as practically sound. It must not be forgotten that, in pregnant women who are tuberculous, the infection may also attack the mammary glands and that in some cases this is the only site of infection. Obviously if an infant nurses a tuberculous breast, it will receive tuberculosis bacilli in the mother's milk and may develop tuberculous infection of the abdominal viscera.

Prophylaxis.—The prophylaxis of tuberculosis in pregnant women consists in attention to hygiene, abundant fresh air and sunshine, good food and the avoidance of crowded rooms and buildings. A pregnant woman living with a tuberculous individual may still escape, if scrupulous care be taken to receive and destroy the sputum of the sick person.

Treatment.—If a pregnant patient becomes tuberculous and this is the first infection, and specially if this be the first pregnancy as well, the obstetrician must carefully consider what resources are available in the care of the patient. If she has hitherto had good general health and if all possible is done for her, there should be no thought of interrupting the pregnancy. Every attention to supporting and building up the patient with an open-air life should be employed. There is every reason to hope in such a case that, unless the infection is widespread, the patient may get the better of the disease and successfully terminate her pregnancy. Where multiparous women in the pregnant condition become tuberculous, the case is somewhat different. Here much depends upon what can be done for the patient and, if she has good general health and all possible means are at her disposal, she may make an attempt under close observation to resist the infection. Unless, however, the symptoms of tuberculosis promptly subside, her pregnancy should be interrupted.

In cases where a tuberculous woman in bad general condition and with advanced tuberculosis becomes pregnant, it must be remembered that the pregnancy will increase the violence of the tuberculous process and the patient's life will be shortened because of the pregnancy. Her maternal instinct will probably plead against the interruption of the pregnancy and due attention must be given to this view of the case, but, if the pregnancy is an early one and the woman already has children needing her attention, the pregnancy should be stopped as soon as possible in the hope of lengthening her life.

At the present time, obstetricians are inclined, in cases where multiparous patients become tuberculous, and especially where tuberculous multiparae become pregnant, not only to interrupt the pregnancy, but to do so with sterilization of the patient. In patients who can have but little care, who have been greatly depleted by hard work and anxiety and who have children more or less dependent on them, it is useless simply to interrupt the pregnancy, for the tuberculous process will go on with greater activity than usual and the patient's life will be shortened.

The operation of election in these cases is abdominal section followed by hysterectomy, with the removal of the tubes and, if the patient be forty years of age or more, the removal of the ovaries as well. Under favorable conditions, a chronically inflamed appendix should also be removed. If the pulmonary condition is so bad that inhalation anesthesia is prohibited, the operation may be done with local infiltration, using ½ per cent novocain; to precede this, the patient may be given morphin and hyocin or scopolamin until she is in a sleepy condition, the ears tamponed with cotton and the eyes covered with a bandage. Absolute quiet in the operating room is essential. After the bladder has been completely emptied by catheterism, the abdominal wall may be infiltrated and the abdomen opened without pain. It is well to infiltrate the peritoneum separately. Traction cannot be made upon the broad ligaments without producing suffering unless they are infiltrated sep-

arately. When that has been accomplished, the broad ligaments and their vessels may be ligated and hysterectomy performed. In comparatively early pregnancy, supravaginal hysterectomy, without opening the uterus, is usually best. The operation is simpler and more efficient if the body of the uterus, tubes and ovaries are removed, the layers of the broad ligaments stitched together and the stump of the uterus covered with peritoneum. Before removing the appendix, the peritoneal folds about it should be infiltrated.

In cases where the pulmonary condition is not bad, the writer has seen remarkably good results with inhalation anesthesia of ether and oxygen. A preliminary hypodermatic injection of morphin and atropin greatly lessens the quantity of ether and oxygen necessary, and oxygen often may be used during the latter part of the operation without ether. It is sometimes difficult to avoid distress to the patient when the uterus is pulled up and traction made upon surrounding tissues; and should the patient suffer severely, inhalation anesthesia should instantly be given.

The writer has, in a number of cases, seen the best results follow the sterilization of tuberculous multiparae during early pregnancy. The general health and weight have improved, the tuberculous symptoms have grown less rather than more; and the patient has been greatly benefited mentally by the knowledge that she cannot again be exposed to the dangers of pregnancy. Many of these patients are in very bad general condition and complications may arise from the depleted state of the blood. In one of these cases, oozing hemorrhage developed from the abdominal incision and, judging by palpation and other symptoms, within the abdomen. This was checked by the intramuscular use of sterile horse serum. A patient having a tuberculous hip-joint with pulmonary lesions, already the mother of several children, was greatly improved in health by such sterilization.

The majority of obstetric opinion at the present time would spare the patient useless interference by simply emptying the uterus, and protect her from the danger of impregnation by the method of operation described or some other suitable method.

If pregnancy is at term, the woman may be spared the suffering of labor by elective cesarean section followed by hysterectomy. The tuberculous woman should not nurse her child and care should be taken that the child does not become contaminated by the mother.

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CHAPTER IX

THE HEMORRHAGES OF PREGNANCY

The hemorrhages of pregnancy—Does menstruation continue?—Rupture of varicose veins of the vulva, vagina and broad ligament complicating pregnancy—Accidental separation of the normally implanted placenta—Placenta prævia and cervical placenta—Hemorrhoids in the pregnant woman—Pregnancy complicated by bleeding from distended veins of the esophagus—By bleeding from the intestines—By bleeding from the gums and by haemophilia—The anemias of pregnancy.

Does menstruation continue during pregnancy? This question has occasioned considerable discussion in view of the fact that irregular hemorrhage from the uterus during pregnancy may obscure the diagnosis.

Before the ovular and uterine decidua unite at about the fourth month, there is no anatomical reason why a discharge of blood from the uterus should not occur. It is more than probable that ovulation may persist throughout pregnancy and hence there is no reason why menstruation up to this time may not occur. After this period the occurrence of menstruation must be looked upon as unusual and exceptional.

That intermittent hemorrhage may occur from the uterus during pregnancy there can be no doubt. This occurrence should always excite the suspicion of a low attachment of the placenta and call for unusual caution upon the part of the patient and the physician. An excessively swollen condition of the mucous membrane of the cervix may cause irregular hemorrhage which may simulate that of menstruation.

In general it may be stated that menstruation during pregnancy is unusual, although its presence cannot be denied. Hemorrhage from the uterus during pregnancy, however, does not occur to any extent during a healthful gestation and should be viewed with suspicion.

Rupture of Varicose Veins of Lower Extremities.—Pregnant patients not infrequently suffer from varicose veins of the lower extremities; the pressure of the growing uterus and its contents, the tendency which successive pregnancies bring to a weakening of the tissues and the increased labor thrown upon the heart and vessels sufficiently account for this occurrence. The usual complication of varicose veins, namely, irritation of the skin, may also be present. While this is annoying, usually it can be sufficiently managed by the local use of lead water and laudanum with a supporting bandage.

Rupture of these veins is usually the result of direct violence, as when a patient makes a misstep and strikes an enlarged vein against a hard object. Hemorrhage will be sudden and may be sufficiently free

to cause alarm. This can be immediately controlled by having the patient lie flat upon the back and elevate the limb from which the hemorrhage is coming. Care must be taken to make no application of gauze or other material which is not sterile, and if any dressing is applied the entire extremity must be bandaged from the foot to the groin. Rupture of such a vein should be followed by rest and elevation of the extremity until the point of rupture has healed firmly, when the patient can resume her usual activities, wearing a supporting bandage or supporting stocking. It must be remembered, in such a case, that the worst thing that could be done would be to apply constriction around the leg or thigh just above the point of rupture. This would keep up the hemorrhage and complicate the situation very considerably.

FIG. 22.—PREGNANCY COMPLICATED BY VARICOSE CONDITION OF LEFT SAPHENOUS VEIN. (Bumm.)

The permanent cure of ruptured varicose veins during pregnancy does not call for a radical operation. In extreme cases, the ruptured vein may be ligated in two portions at the point ruptured, but extensive dissection or extensive ligation of veins, is not indicated. After the patient has recovered from the pregnancy and childbirth, the question of radical operation may appropriately be considered.

Rupture of Varicose Veins of the Vulva and Vagina.—These veins often become greatly enlarged and a fall or accidental blow may produce rupture. Hemorrhage is considerable and may be continuous, suggesting to the attending physician a sudden and severe hemorrhage from the uterus. The history of accidental violence can be obtained and a thorough examination with a good light should establish the diagnosis.

In dealing with these cases, surgical antisepsis is absolutely necessary. The bleeding points in the vein from which hemorrhage is occurring should be caught by hemostatic forceps and firmly tied with catgut or fine silk. If this does not check the bleeding, sutures should be passed beneath the vein above and below the point of bleeding, and it may be necessary to include considerable tissue in the suture efficiently to control the hemorrhage. A sterile vulval pad or vaginal packing with sterile gauze may be used for the first twenty-four hours after the accident. The parts should be kept surgically clean, especially after the urinary bladder or bowel is emptied. Infection following such an accident would result in most cases in abscess which might become extensive and severe.

Rupture of Varicose Veins in the Broad Ligament.—Any one who has opened the abdomen of a pregnant woman at full term must have been impressed with the size of the veins of the broad ligaments. They are often as large as the largest finger of an adult hand and distended with blood. These veins may rupture from the application of direct violence as a fall, a blow or a kick. The symptoms following the rupture would be the pain of the original injury followed by gradual faintness and shock from the loss of blood, with the physical signs and symptoms produced by bleeding. In these cases the blood would gravitate into the pelvis or between the folds of the broad ligament, forming a hematoma and suggesting on examination a ruptured ectopic pregnancy. An accurate diagnosis between rupture of the large veins of the broad ligament and ruptured tubal gestation would be difficult and might be impossible.

The accident calls for prompt opening of the abdomen, when the diagnosis can be established, and appropriate treatment instituted. If the case is one of rupture of the veins of the broad ligament, the ruptured vessels should be tied above and below the point of injury. If clotted blood is found in the veins, some operators would excise the vein throughout the extent of the clot to prevent the possibility of the development of infection. What should be done with the extravasated blood depends somewhat upon the condition of the patient. If she is not severely shocked and the blood has clotted, it might readily be removed. But if the patient is severely shocked, the blood should not merely be removed, but should be immediately citrated and returned to the patient by intravenous transfusion. The abdomen should be closed without drainage or packing, unless oozing hemorrhage, that cannot otherwise be controlled, should develop. Morphin should be used hypodermatically to prevent the emptying of the uterus after the operation.

ACCIDENTAL SEPARATION OF THE NORMALLY IMPLANTED PLACENTA

This serious accident complicating pregnancy has received various names; concealed accidental hemorrhage was formerly the term em-

ployed and lately Latin phrases have been suggested conveying the idea that the placenta is abruptly or violently separated from the uterine wall. As our knowledge of the pathology of the condition has become more accurate, we now know that violence is the least important and least dangerous of the causes predisposing to this complication. In the majority of these cases, the toxemia of pregnancy is the important predisposing cause. Hence it is probably more accurate in distinguishing this condition from placenta prævia to use the phrase accidental separation of the normally implanted placenta.

FIG. 23.—NORMAL ATTACHMENT OF PLACENTA. (Fairbairn.)

Etiology.—As has been stated, the most important predisposing cause is the toxemia of pregnancy. This results in alterations in the blood-vessels of the uterine decidua and also of the placenta, and destroys the cohesive power of the after-birth and of the uterine wall. Other predisposing causes are the relaxed condition of the uterine muscle and unduly irritable state of the uterine wall, and those conditions of the uterus in which spasmodic contraction occurs during pregnancy, often to the great annoyance of the patient.

The exciting cause of accidental separation of the normally implanted placenta is violent contraction of the uterine muscle, or direct violence applied to the uterus, usually at or near the site of the placental attachment. The importance of sudden and spasmodic contraction of the uterus is sometimes overlooked in these cases. A familiar example is that of a multipara near term, who, seeing one of her children about to fall or injure itself, suddenly stoops and picks up the child; the resulting muscular exertion not only causes the abdominal muscles to act, but also the uterine muscle, and a sudden and spasmodic contraction occurs which may loosen to some extent the placenta. In other cases, the patient makes a sudden violent movement to save herself from falling, or carries a heavy object up a flight of steep stairs or steps. The application of direct violence

in these cases occurs when the patient falls, striking upon the abdomen, or receives a blow at or near the site of the placenta. It must not be forgotten that the most insidious and dangerous of these cases occur without a clear history of a definite accident or injury. So gradually may the symptoms develop that the patient may ignore them as long as pos-

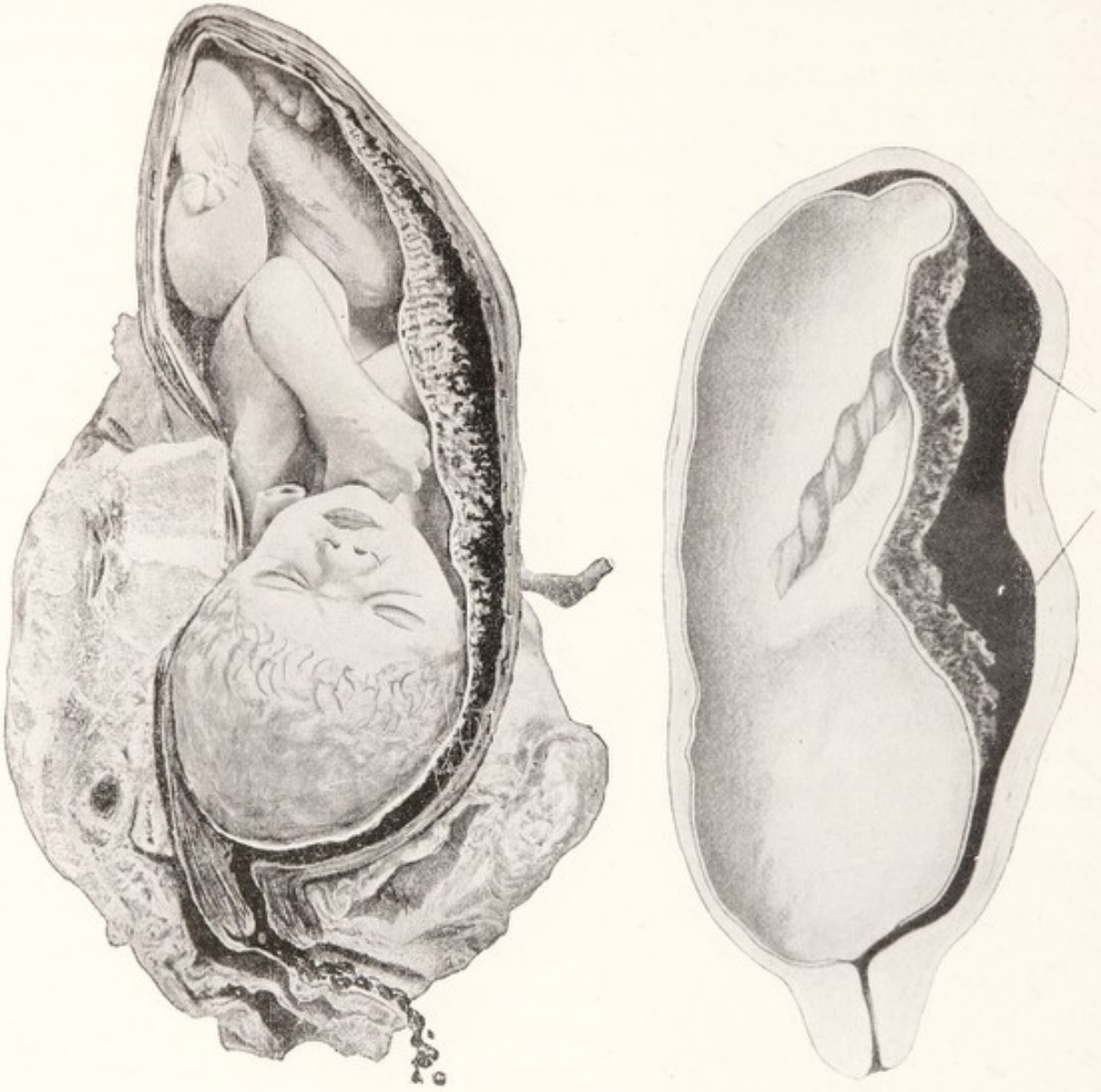

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FIG. 24.—EXTERNAL HEMORRHAGE FROM ACCIDENTAL SEPARATION OF NORMALLY IMPLANTED PLANCENTA. (Fairbairn.)

FIG. 25.—ACCIDENTAL SEPARATION OF NORMALLY IMPLANTED PLACENTA. (Bumm.)
This is shown with extravasated blood separating placenta and membranes, with some external hemorrhage.

sible and medical aid be summoned only when a condition of gravity is present.

Diagnosis.—The diagnosis of the condition is not clear unless it is remembered that, when the placenta separates, the extravasated blood is usually not all discharged; often little or none of it leaves the uterus until the uterus finally expels its entire contents. This retained blood, clotting between the separated portion of the placenta and

the uterine wall, acts as a foreign body and, irritating the uterine wall, produces a tense and tonic contraction of the uterine muscle. On palpating the abdomen, the uterus is hard, sensitive to pressure, remaining in a condition of tonic contraction without relaxation. It is impossible to palpate the fetus, to appreciate its motions, or to hear its heart beat. The patient complains of more or less abdominal pain, usually referred to the uterus, but sometimes indefinite. In proportion to the quantity of blood escaping from the vessels and the patient's general vigor, the constitutional effects of hemorrhage become apparent. The pulse rate gradually increases, there is slight elevation of temperature, more or less air hunger develops, respiration becomes more rapid and the patient is often anxious and sometimes frightened. She may complain that the movements of the fetus are unusually vigorous, or that they are less perceptible than usual.

On vaginal examination there may be no hemorrhage evident. The cervix may not be dilated and if a finger can be carried through the cervix it will not reach the placenta. No essential change in the consistence of the uterus can be made out by vaginal examination.

The Natural History of the Complication.—In cases where the toxemia of pregnancy is absent and the mother's general condition is good and her tissues are healthy, if a slight separation only of that part of the placenta nearest the cervix occurs, the separation may proceed no further than its original extent, hemorrhage may cease and the pregnancy may continue to a successful termination. In such cases there is a slight vaginal hemorrhage which gradually subsides. The uterus is little if at all sensitive, and the patient may think that she has a slight return of menstruation.

If, however, a considerable area of the placenta separates, and especially if the accident occurs at the upper part of the placenta, there will be little or no escape of blood, and the extravasated blood between the uterine wall and the placenta will gradually increase the area of separation until, in extreme cases, the entire placenta is loosened from its attachment. As this proceeds, gradually asphyxiation will develop in the child, preceded by unusually violent fetal movements, until the death of the fetus by asphyxiation occurs. The mother will feel the effects of the accident more or less in proportion to its rapidity, the area of placenta separating, and her power of resistance. Sooner or later its gravity will become apparent from her weakened condition.

Occasionally the uterus is aroused to action by the extravasated blood, and labor may develop. Uterine contractions may not be vigorous at first and only slight hemorrhage will be apparent. Finally, considerable uterine activity may develop and, if the cervix is soft and readily dilatable, the fetus, followed by a quantity of clotted blood, may be expelled. In such a case, on examination, the separated placenta is found in the uterus and postpartum hemorrhage is not infrequent. Severe shock usually follows the emptying of the uterus in these cases.

Prophylaxis.—It cannot be too strongly emphasized that this very

serious accident occurs under conditions which are often frequent. The hygiene of pregnancy which prevents toxemia will do much to lessen the frequency of this accident. Caution on the part of the mother to avoid sudden straining and lifting is essential. The protection of pregnant patients from accident and injury is of great importance. So far as the saving of the mother's life is concerned, it is imperative that par-

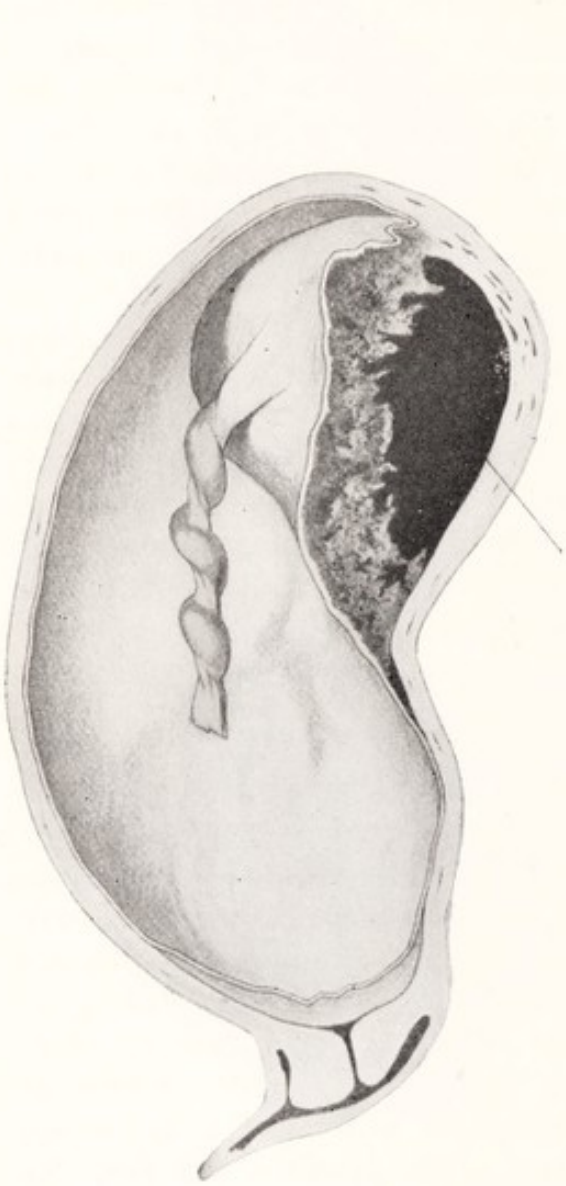

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FIG. 26.—ACCIDENTAL SEPARATION OF NORMALLY IMPLANTED PLACENTA WITH RETAINED BLOOD. (Bumm.)

FIG. 27.—CONCEALED ACCIDENTAL HEMORRHAGE FROM SEPARATION OF NORMALLY IMPLANTED PLACENTA. (Fairbairn.)

turient women be taught that genital hemorrhage, or symptoms of weakness and shock occurring during pregnancy, demand immediate medical attention. The facts that moderate vaginal hemorrhage ceases when the patient lies down, that she has little abdominal or uterine pain, and that she naturally minimizes her own ailments in the effort to care for her family, frequently result in the loss of the mother's life. If alarm

is taken early, most of these mothers can be saved. The fetal mortality depends more upon the extent of placental separation than upon the treatment employed. If more than one third of the placenta is separated, it is doubtful whether the fetus can survive unless it is extracted by abdominal section as soon as signs of danger develop.

Treatment.—Two methods of treatment are indorsed by obstetricians at the present time. The one must sacrifice the child and may be carried out by the obstetrician or practitioner without much assistance or hospital surroundings. The other calls for prompt abdominal and uterine section.

For the first method, the Rotunda Hospital of Dublin, Ireland, and its various masters, notably Tweedy, stand as sponsors. It consists essentially of narcotizing the woman with opium and bringing as much pressure as can be borne upon the uterus by tamponing the vagina, placing a pad above and upon the uterus and tightly bandaging the abdomen. According to this method, the vaginal tampon cannot be applied without some previous training and experience. After the urinary bladder of the patient is emptied by catheterism and the vagina has been rendered as aseptic as possible with the use of a speculum, masses of cotton about the size of a small hen's egg, wrung out of an antiseptic solution, are packed about and in the cervix as firmly as the patient can endure. The vagina is completely filled with this material to the vulva. An antiseptic vulval dressing, kept in place by a T-bandage, is added. A large pad is placed above the fundus of the uterus and, beginning from above, a many-tailed abdominal binder is firmly applied over the abdomen and uterus. Morphin is given by hypodermatic injection until the pulse is slow and the patient more or less narcotized. The urinary bladder of the patient must be emptied at frequent intervals by catheterism, and, if nourishment is given, it must be liquids which leave no residue in the stomach. The obstetrician watches for the appearance of a discharge of blood at the vulva. He expects that uterine contractions will gradually develop and considers their appearance a favorable sign. Judgment and experience are necessary to know when to interfere with the packing, but if uterine contractions become considerable and there is a free hemorrhage, the packing is to be removed under antiseptic precautions. If, on examination, the cervix is so largely dilated that the membranes can be ruptured, dilatation, completed by the hand, if necessary, should be done, and the child immediately delivered by forceps or version. If, however, dilatation is but partial and vaginal delivery would be attended with considerable injury and violence, the vagina and cervix should again be tamponed as before and the narcosis continued. The necessity for interference and for emptying the uterus will be shown by the development of explusive uterine contractions.

When the emptying of the uterus by this method occurs, the obstetrician must be prepared to treat shock and postpartum hemorrhage. The uterus should be completely emptied after the birth of the child by

the gloved hand, irrigated with hot antiseptic solution and firmly packed with sterile or 10 per cent iodoform gauze. Hypodermatic stimulation, intravenous transfusion, or hypodermocylsis may be required.

Hemorrhage in these cases, as in others, predisposes to septic infection. Hence, these should be, regardless of the method of treatment employed, hospital cases where the advantages of hospital asepsis and antisepsis can be given to the patient.

Obviously, under the method of tamponing and narcosis, the fetal life is lost. Those who favor this method of treatment claim for it a considerable percentage of recovery, the avoidance of major surgical operation with its risks, and the more prompt recovery of the mother.

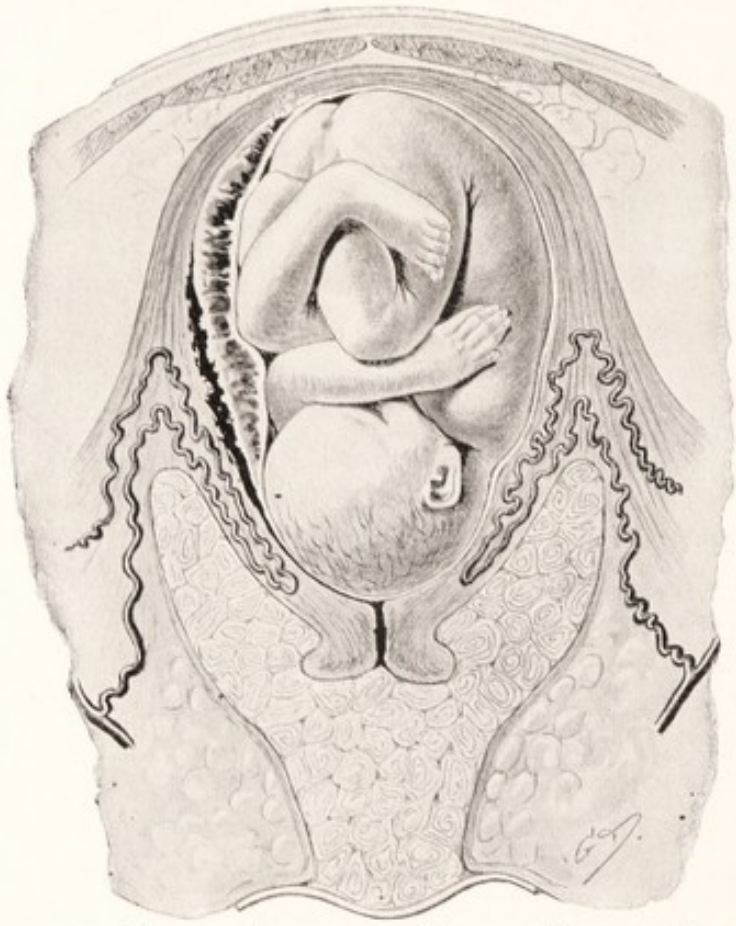

FIG. 28.—COMPRESSION OF UTERINE ARTERIES BY TIGHTLY PACKING VAGINA WITH PLEDGETS OF COTTON. (Fairbairn.)

It is also claimed that this method can be carried out by any properly trained person with the aid of a nurse.

A considerable number of obstetricians believe that, with the modern hospital facilities, these patients should be promptly treated by abdominal and uterine section, unless the hemorrhage is so slight that rest in bed, the introduction of a suppository of the aqueous extract of opium from ½ to 1 grain in the rectum and absolute quiet cause the hemorrhage and the symptoms to disappear. If there is a history of direct, but not excessive, violence in a patient in good condition, the pregnancy need not invariably be interrupted. She should, however, be in the hospital under accurate observation and the obstetrician should be ready to

operate if it becomes evident that the placenta is continuing to separate and the patient begins to suffer from loss of blood.

Preparations for section should be accompanied by preparations to give intravenous transfusion if there is the prospect that it might be advantageous. The abdomen and uterus are opened in the usual manner and the uterus emptied as quickly as possible. As a result of little or no dilatation of the cervix, the operator must pass one or two fingers through the cervix from above to permit the escape of lochia. The uterine wall should be gently but thoroughly wiped with dry gauze and the obstetrician should inspect the uterus carefully.

It will be remembered that freshly extravasated blood in a pregnant uterus may attack the uterine wall by the process known as necrobiosis. This softens the uterine muscle, producing an area of dark, currant-jelly color, the disintegration becoming in some cases so complete as to justify supravaginal hysterectomy. This process is one of the results of the toxemia of gestation and, hence, in a toxemic patient its occurrence is of especial significance. Unless this condition be pronounced, the operator may risk the retention of the uterus by tamponing its cavity by sterile or 10 per cent iodoform gauze and bringing the end of the gauze through the cervix into the vagina. The uterus and the abdomen should be closed in the usual manner. The vagina should be thoroughly sponged with an antiseptic solution and a moderate vaginal packing of sterile bichlorid gauze should be inserted.

Convalescence of such patients may be retarded by toxemia. In some cases, oozing hemorrhage from the uterus persists and may become dangerous. These patients require the intravenous or hypodermatic use of sterile horse serum or some other substance adapted to restore the coagulating properties of the blood. If the uterus has been packed with gauze, this should be removed within forty-eight hours. The convalescence of such cases may be retarded by the development of infection, by thrombosis, or by embolism. The pathologic and anatomic conditions are such that this latter is especially apt to occur.

To summarize, this important complication of pregnancy is most frequent and dangerous in the toxemic patient. Vaginal hemorrhage in pregnancy is always suspicious and calls for thorough examination and careful diagnosis. Such patients are best in a hospital or under the care of a reliable nurse who is instructed for what she should carefully watch. The insidious nature of the accident renders it especially dangerous. A further complication of importance is the fact that the resisting power of patients differs so greatly that a patient apparently may not be in a dangerous condition, when the emptying of the uterus will show that the placenta is almost entirely separated and sudden and fatal shock may develop. Unquestionably, the greater number of lives will be saved if every precaution is taken as soon as the first, although slight, symptoms develop. While no specific effort should be made to save the life of the child, in cases promptly subjected to early abdominal and uterine section, and in which a portion only of the placenta has been separated,

the child may be saved. The medical profession can render parturient women a decided service if they will instruct all pregnant patients promptly to become alarmed at the occurrence of a genital hemorrhage.

To the question, What is the mortality and morbidity of this accident? it is difficult to give an accurate estimate. So much depends upon the prompt recognition of the condition and its accurate treatment. Without medical aid all children are lost and a greater number of mothers, if not from hemorrhage and shock, from subsequent septic infection. In treatment by narcosis and tampons, fetal mortality must certainly be 90 per cent. Maternal mortality is variously estimated at from 10 to 25 per cent. Under abdominal uterine section, from one to ten of the children at or near term may be saved. The maternal mortality will depend upon the extent of placental separation and the promptness with which the operation is done. Under favorable conditions of early diagnosis and prompt operation, the maternal mortality should not exceed 10 per cent.

PLACENTA PRAEVIA

Varieties.—We distinguish anatomically four varieties of attachment of the placenta in such a manner that it may become separated before the expulsion of the child during spontaneous labor. These are central and complete placenta prævia, partial, marginal and lateral. In this division not only do we refer to the cervix and os uteri, but also to the lower uterine segment. Thus a central, complete placenta prævia entirely covers the internal os. A partial placenta prævia covers a portion of the internal os. A marginal placental prævia is attached to the cervix and lower uterine segment at the edge of the internal os. A lateral placenta prævia is attached to the wall of the uterus on the lower segment and may not be as low as the internal os.

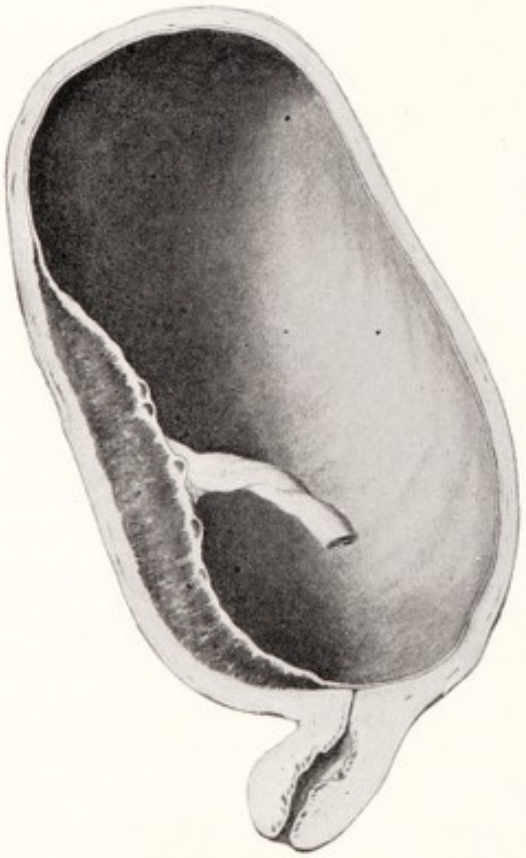

FIG. 29.—LOW ATTACHMENT OF PLACENTA. (Bumm.)

Clinically speaking, we divide placenta prævia into two varieties: complete and partial. In the first, the examining fingers find, in the internal os, nothing but placenta. In the second, there is an area where the examining fingers come against the membranes or, if they have ruptured, against some portion of the fetus. There is a

radical difference in treatment for the two varieties which justifies this simple classification.

Etiology.—Whatever interferes with the normal development of the uterus before and after impregnation, whatever interferes with the growth of healthy ovular and uterine decidua or whatever brings about an abnormal and pathological condition of both uterine muscle and decidua, predisposes to placenta prævia. Thus, in poorly developed patients, where the lower segment does not develop normally, the impregnated ovum may pass to the internal os and there become adherent. A greatly relaxed and distended uterus, often observed in anemic multiparae, may predispose to a placenta prævia. An abnormal condition of

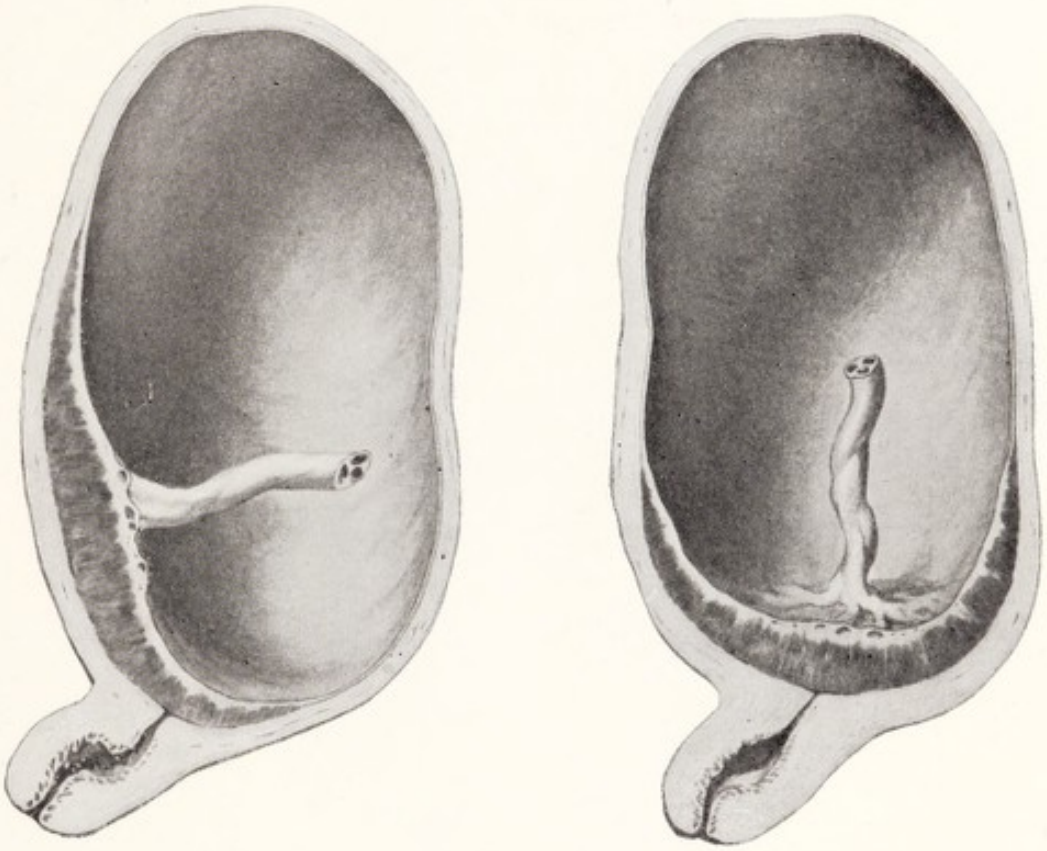

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FIG. 30.—PLACENTA OVER A PORTION OF THE OS. (Bumm.)

FIG. 31.—A COMPLETE CENTRAL PLACENTA PRAEVIA. (Bumm.)

the ovular and uterine decidua, preventing the normal nidation of the ovum, predisposes to placenta prævia. If a patient suffers once from this complication, it does not follow that it will again occur. Lack of development, repeated parturition with impairment of general health, and pathologic processes in the decidua are the principal causes of this condition.

It is, properly speaking, a variety of ectopic pregnancy. The normal point of attachment of the impregnated ovum is on the posterior uterine wall, near the point of entrance of the fallopian tube through the uterine wall. It is an important factor in the development of the normal development and presentation of the fetus. Observation shows that, where

a large placenta is attached to the anterior uterine wall, the back of the child is more often posterior to the placenta, more often rotates posteriorly during labor. Where the placenta becomes a placenta prævia, the pregnancy is as truly ectopic as when the impregnated ovum fails to reach the uterine cavity and remains in the fallopian tube. Furthermore, placenta prævia under modern conditions is more dangerous than tubal gestation. In placenta prævia, the site of attachment of the

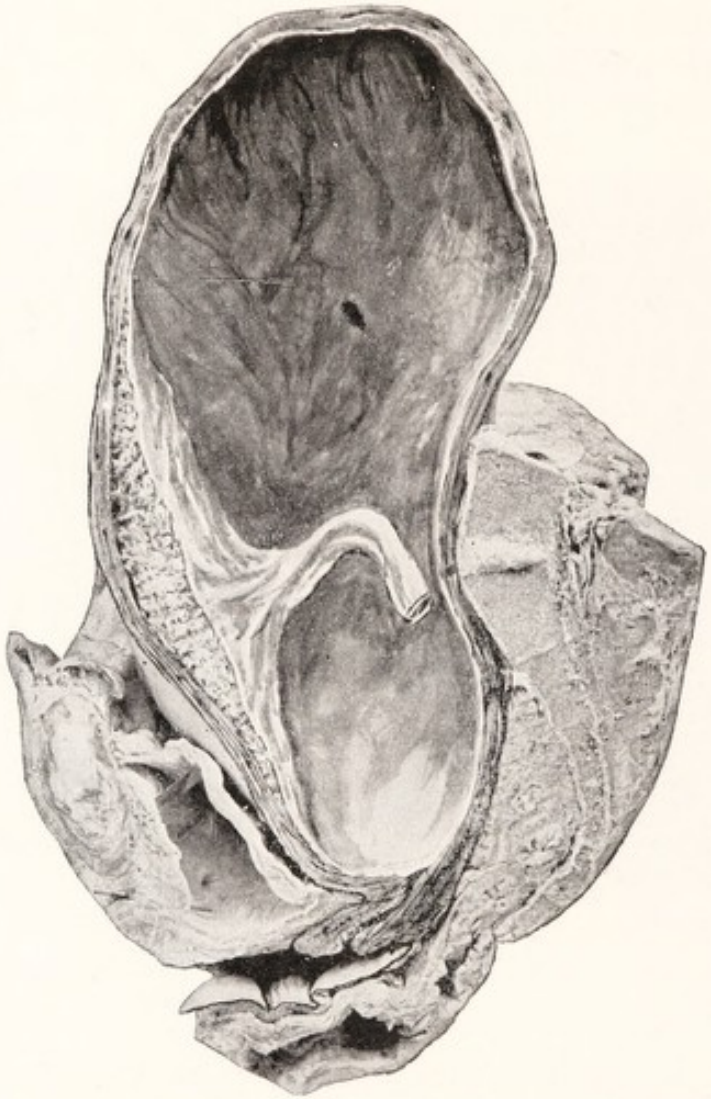

FIG. 32.—A LATERAL PLACENTA PRAEVIA. (Fairbairn.)

placenta is in direct communication with the vagina and the external surface of the body. Repeated vaginal examinations and manipulation favor the development of septic infection at the placental site. The indiscriminate use of the tampon in placenta prævia is an important factor in the mortality of the condition by causing septic infection. Although placenta prævia is feared, in the minds of patients or the profession, it has not the same importance that attaches to the condition known as ectopic pregnancy. The patient with placenta prævia is often not deemed a hospital case, while, unless in emergency, cases of ectopic pregnancy are sent to the hospital. The patient suffering from ectopic pregnancy is operated upon by skilled operators with every antiseptic precaution.

A woman having placenta prævia may be examined by any medical person and infected by such examination. Recent methods of treatment, whereby hemorrhage and shock are successfully combated in ectopic pregnancy, and its early diagnosis have greatly reduced its mortality and morbidity, while the mortality and morbidity of placenta prævia have been but gradually lessened. When placenta prævia is considered as dangerous and important as ectopic pregnancy and treated with the same surgical precautions, many lives will be saved.

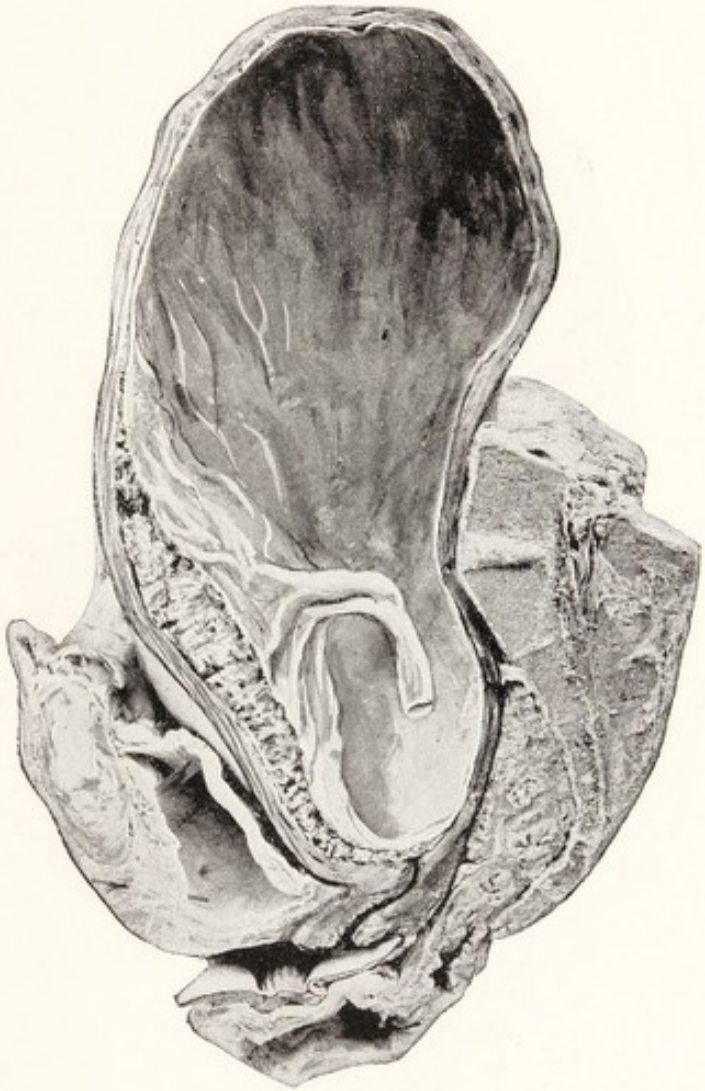

FIG. 33.—PARTIAL PLACENTA PRAEVIA. (Fairbairn.)

Diagnosis.—The essential element in the symptomatology of placenta prævia is the occurrence of vaginal hemorrhage at any period of pregnancy, without pain, tenderness or soreness about the uterus. In accidental separation of the normally implanted placenta, vaginal hemorrhage is present to a greater or less extent, but on palpation the uterus is tender and contracted. In placenta prævia, the hemorrhage is proportionally greater and there is a striking absence of pain, uterine tenderness or uterine contraction.

This was strikingly illustrated in the experience of the writer by the case of a primipara in good general health at term. While at her break-

fest table she became conscious of a vaginal hemorrhage. Medical aid was promptly summoned, a central placenta prævia was found to be present and the patient was delivered on the afternoon of the day, losing her child. This was before the days when abdominal and uterine section were considered justifiable or practicable under such conditions. In this case there was no sign or symptom preceding the initial hemorrhage. The patient's urine had been recently examined, she had been under accurate observation, under good hygiene and was apparently well.

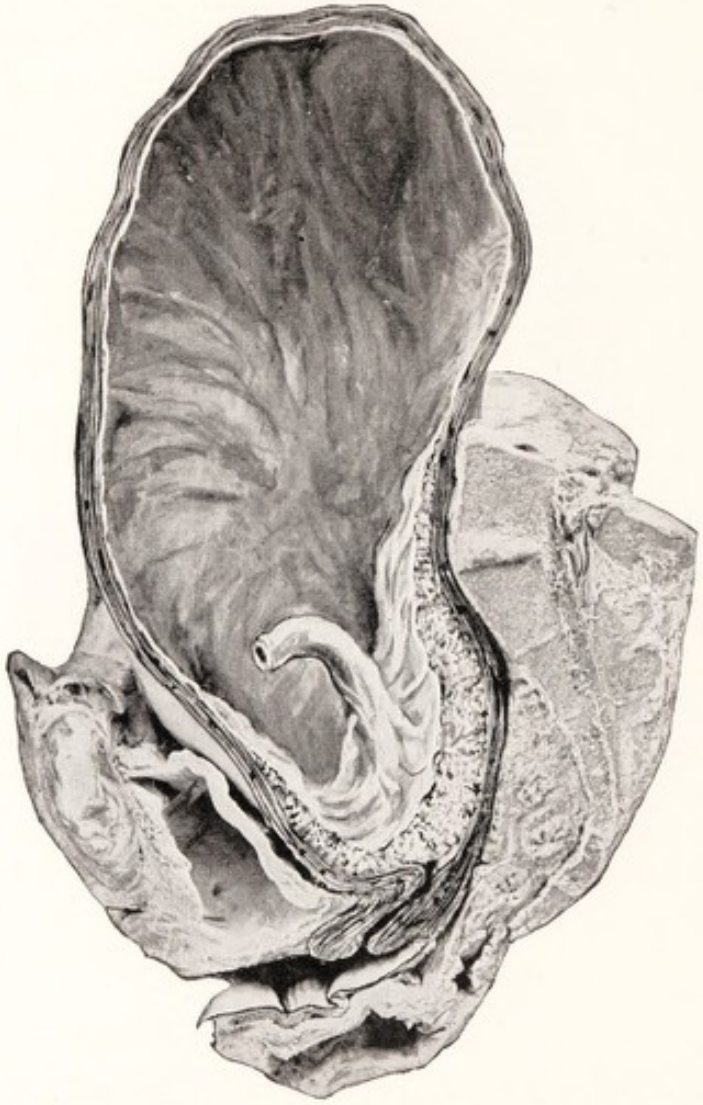

FIG. 34.—COMPLETE PLACENTA PRAEVIA. (Fairbairn.)

In making a diagnosis of placenta prævia, the mistake must not be made of failing to recognize a low implantation of the ovum in the early months or weeks. Cases are occasionally brought to the attention of coroners where women have died after copious vaginal hemorrhage without apparent cause. Some of these are police cases and are subjected to autopsy. An early pregnancy, with the attachment of the ovum over the internal os, has been found in these patients. In some of these, intoxication with alcohol or opium has rendered the patient unconscious and prevented her from becoming alarmed as the bleeding

developed. At least, these cases prove the possibility of fatal hemorrhage from low implantation of an early ovum.

The Natural Course of the Complication.—When enough of the placenta separates to threaten the fetus with asphyxia, its movements become violent and labor is often excited. Otherwise there is nothing to bring on labor by the complication. The abnormal position of the placenta interferes with the descent of the presenting part. If labor does not develop, the patient may die from hemorrhage or, if she lives long enough, from infection. If labor develops, uterine contractions are usually not vigorous, but finally they may become efficient and the placenta is born before the child, followed by the expulsion of a dead fetus. Severe and often fatal shock ensues. Obviously central placenta prævia is most dangerous, while the other varieties may give evidence of their presence during the first part of the labor, and then the hemorrhage ceases as the presenting part engages, makes pressure against the placenta and descends.

Marginal and lateral placenta prævia are often present without the attending physician making a diagnosis or suspecting their existence. As labor begins, there is vaginal hemorrhage of moderate extent. This ceases with descent and engagement, but the physician may notice that there is more than usual hemorrhage after the expulsion of the child. The placenta may follow the child more quickly than usual. When these phenomena are brought together and considered, it will be seen that a marginal or lateral placenta prævia has been present from which hemorrhage was controlled by the pressure of the fetus, but which left a bleeding surface in the noncontractile portion of the uterus after delivery.

The preservation of the life of the child obviously will depend upon the degree of placental separation, the amount of hemorrhage and the position of the placenta. In the central or complete variety, the inevitable risk to the child is so great and the danger to the mother so imminent that the mother's interest obviously must be exclusively paramount. In the other varieties of placenta prævia it may be possible, by prompt delivery, to save the fetus.

Prevention.—The prevention of placenta prævia calls for the best possible hygiene during puberty and the reproductive life of the patient. At the period of development, if possible of prevention, nothing should be allowed to interfere with a healthy, vigorous physical development. Abundant exercise, abundant plain food and outdoor active life, with the development of the skeleton and muscles of the body, are of primary importance. During the active reproductive life of the patient, the hygiene of pregnancy and the avoidance of toxemia must not be neglected. In childbirth, complete recovery from parturition so far as is possible must not be omitted. If lacerations have occurred, they must be closed and properly united. Subinvolution, acute or chronic infection, anemia, dislocation of the uterus, relaxation and prolapse are all to be prevented. Too rapid childbearing is to be avoided and the patient

maintained in the best possible state of health. It is realized that it is difficult to fulfill these indications, but the effort is certainly worth the trial.

Treatment.—We must again repeat that a pregnant patient having genital hemorrhage must be closely watched and that she is safest in a well-appointed hospital. When the diagnosis of a complete central

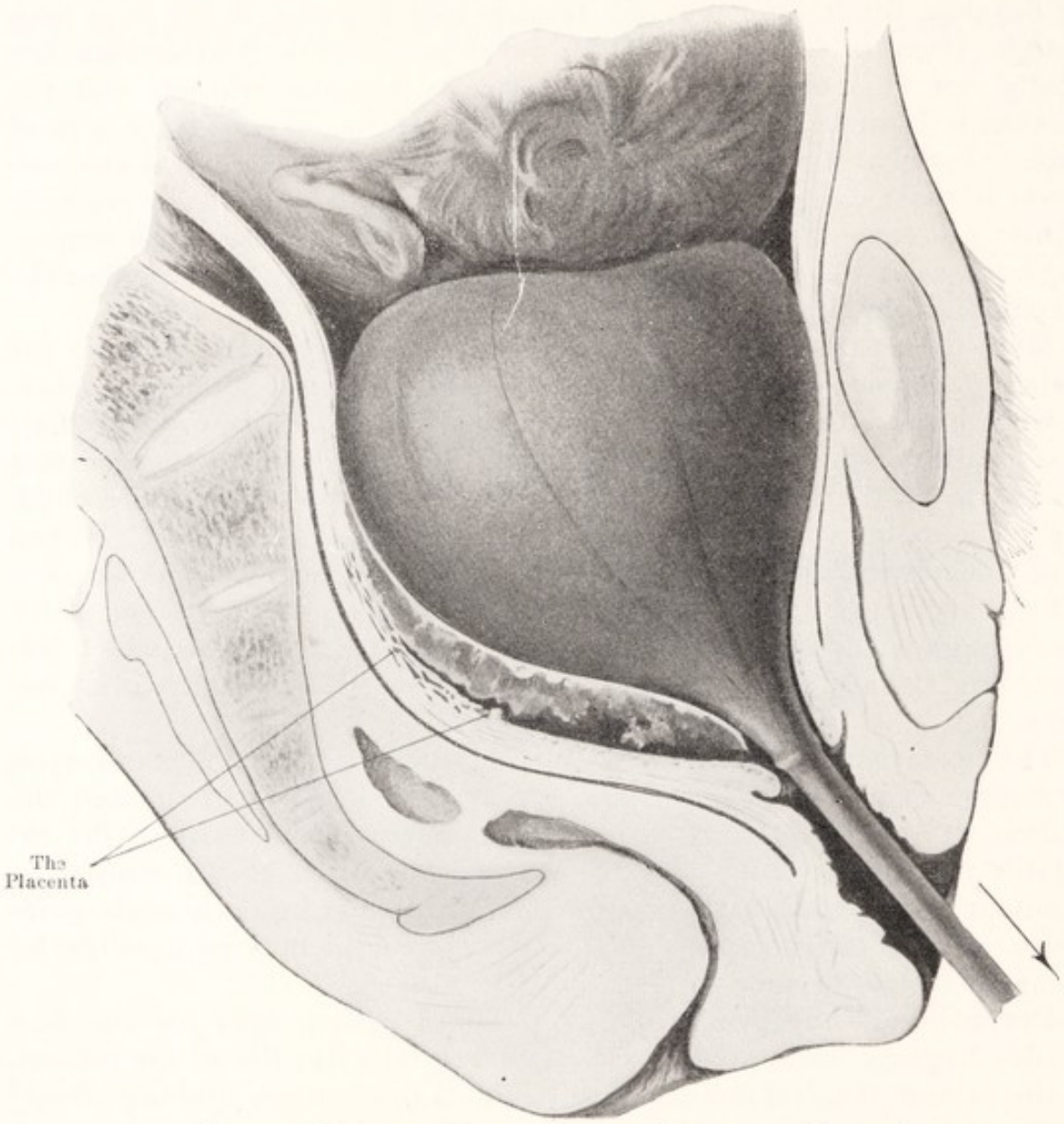

FIG. 35.—DILATING BAG IN PLACENTA PRAEVIA. (Bumm.)
Checking hemorrhage by pressure.

placenta prævia is made, the patient being in a hospital, two methods of treatment must receive consideration. The first avoids a so-called radical operation and may be termed somewhat conservative. This method consists of bringing pressure to bear upon the placenta while promoting dilatation of the cervix until the uterus can be emptied, for obviously, in central complete placenta prævia, hemorrhage cannot be permanently controlled until the uterus is emptied. This method pays

no attention to the life of the child, but so grave is the complication that this is entirely justifiable.

The old and classic method of carrying out this principle of treatment consisted in anesthesia, then in tearing through the placenta with the hand of the operator, grasping one or both legs of the fetus and bringing the fetal thighs and breech into the cervical canal to act as a plug or tampon and stop hemorrhage. If the operator was prudent and

FIG. 36.—COMBINED VERSION AND GRASPING A FOOT IN CENTRAL PLACENTA PRAEVIA. (Liepmann.)

cautious, he did not proceed to extraction. If the cervix was but partly dilated, the low attachment of the placenta would probably have softened it sufficiently to permit the gradual introduction of the hand. The fetus was left in the cervix, the patient received stimulation, if needed, and the obstetrician waited for the spontaneous expulsion of the child. Uterine contractions finally developed and a dead child and placenta were expelled, followed by more or iess postpartum hemorrhage.

A peculiarly dangerous and fatal method of treatment consisted in the rapid and forcible dilatation of the cervix in central placenta prævia, followed by version and the immediate extraction of the child. One has only to recall some of the cases where Bossi's metal dilator was used, followed by version and extraction, and the high maternal mortality and morbidity are explained.

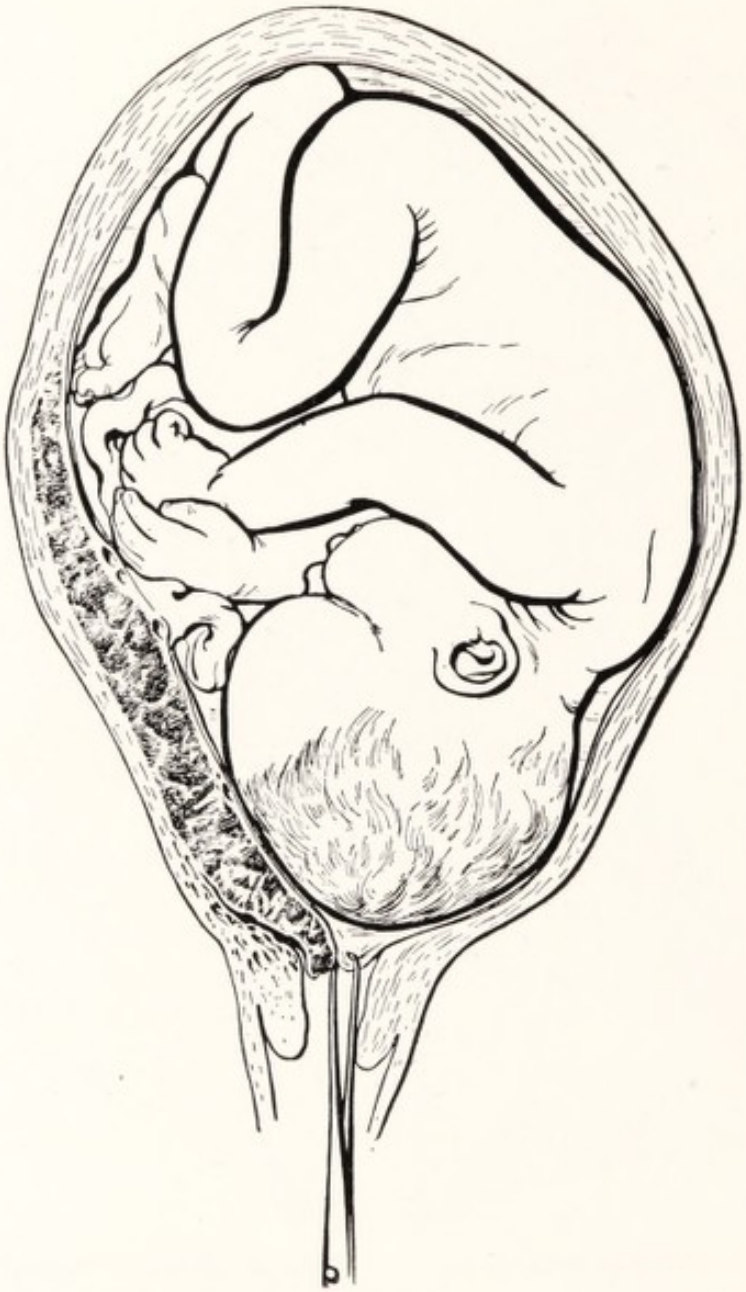

FIG. 37.—RUPTURING MEMBRANES WITH TENACULUM FORCEPS IN PARTIAL PLACENTA PRAEVIA. (Liepmann.)

More recently the use of the dilating bag has been substituted. This is employed in one of two ways: it may be introduced against the placenta and gradually distended, thus compressing the placenta between the bag and the presenting part; or the operator may perforate the placenta, carry the bag into the cavity of the membranes and completely distend the bag, thus compressing the placenta more efficiently than by

the first method. In expert hands, and in the hospital, this method frequently gives good results so far as the mother is concerned. It is not attended with the mortality and morbidity from septic infection that accompany the use of the vaginal tampon of gauze. While the life of the child is usually lost, this is not inevitable, as occasionally the fetus survives.

For this treatment to be successful, the largest size bag which can possibly be introduced should be used and the bag should be in good condition. Pressure upon the bag should be gradually increased by adding to the quantity of fluid, and, if the bag is in poor condition, it will

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FIG. 38.—COMPRESSION OF PLACENTA AFTER RUPTURE OF MEMBRANES BY DESCENT OF HEAD. (Liepmann.)

FIG. 39.—COMPLETE PLACENTA PRAEVIA. (Liepmann.)

burst and fail to accomplish its purpose. Its introduction should be carried out after the urinary bladder of the patient has been completely emptied by catheterism, under strict antiseptic precautions, and, if necessary, with light anesthesia. Sterile water, or sterile salt solution, or sterile solution of boracic acid should be used for injection. The injecting must be done with a piston syringe and fluid may be added at intervals of from one half hour to an hour. The bag should be kept in place by a moderate vaginal tampon of 10 per cent iodoform gauze. The occurrence of bright vaginal hemorrhage indicates that the cervix is dilating and that additional pressure must be made by the bag.

When uterine contractions are well developed, the bag has ceased

to be useful and the obstetrician must prepare to deliver the patient. Even if her condition is critical, anesthesia to some extent may be necessary and ether and oxygen is the anesthesia of choice. Abundant assistance is required and all hospital facilities for maintaining antisepsis; hypodermatic stimulation undoubtedly will be necessary. Under these conditions the vaginal packing with gauze may be removed, when it may be found that the bag has been expelled through the cervix into

FIG. 40.—VERSION PARTIALLY COMPLETED IN PLACENTA PRAEVIA BEFORE BREECH IS BROUGHT DOWN. (Liepmann.)

the vagina. The placenta may have accompanied the bag and occasionally the presenting part of the child has passed through the placenta and emerged from the cervix. Delivery should be effected as gradually as possible; after delivery the uterus should immediately be emptied entirely of its contents by the gloved hand, irrigated with hot antiseptic solution and thoroughly packed with gauze. The softened condition of the cervix seen in placenta prævia predisposes to laceration and hemor-

rhage and, if bleeding vessels are present in the cervix, they should be stopped by closing lacerated surfaces with catgut stitches. A firm vaginal packing should be inserted and, if there is laceration of the pelvic

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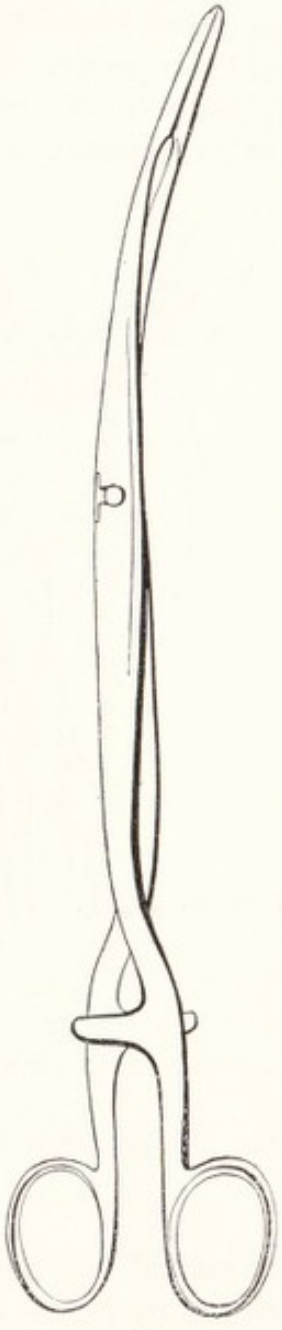

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FIG. 41.—COMPRESSION OF PLACENTA BY BREECH AND BY LEG OF CHILD WHICH HAS BEEN BROUGHT THROUGH PLACENTA. (Liepmann.)

FIG. 42.—FORCEPS ESPECIALLY DESIGNED FOR INTRODUCTION OF DILATING BAGS. (Liepmann).

floor and perineum, closure may be postponed until the patient is in better condition. Intravenous transfusion, hypodermatic stimulation, the external application of heat, raising the foot of the bed, bandaging the extremities from the toes to the groins and from the fingers to the

shoulders, inhalation of oxygen, and stimulation of the heart by the electric current may all be necessary. Should the infant survive its birth, it should receive prompt attention.

It is impossible to obtain an accurate statement of the mortality and morbidity accompanying the treatment of central placenta prævia and the use of the bag, because no two cases are in precisely the same condition when admitted to the hospital, and hence the chance of each patient's recovery differs somewhat from that of another. It is, however, undoubtedly true that central placenta prævia is especially dangerous in primiparae in whom the cervix is unusually resisting and dilates

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FIG. 43.—CARRYING DILATING BAG THROUGH MEMBRANES BY FORCEPS BEFORE EXPANDING BAG. (Liepmann.)

FIG. 44.—DILATING BAG INTRODUCED INTO VAGINA COMPRESSING PLACENTA AGAINST FETAL HEAD (Liepmann.)

with unusual difficulty. As the only hope of the patient's safety lies in the emptying of the uterus, whatever is an obstacle to that increases her risk. On the other hand, a multipara with relaxed tissues will occasionally, with strong uterine contractions, separate a central placenta and expel placenta and child. An operator, however, who can treat a considerable number of cases of central placenta prævia by the use of the bag, with a maternal mortality not exceeding 15 per cent and a fetal mortality not exceeding 90 per cent, may believe that he has been at least fairly successful. Morbidity following this condition arises largely from septic infection and from anemia.

The extension of abdominal cesarean section has included central

placenta prævia in its scope. There is undoubtedly a growing tendency on the part of obstetricians to consider central placenta prævia a valid indication for abdominal cesarean section. The writer may again refer to the analogy between pelvic ectopic pregnancy and placenta prævia and again draw attention to the greater danger in placenta prævia through infection. These facts in the mind of the writer strengthen the claim of cesarean section in these cases rather than weaken it.

FIG. 45.—THE BAG DISTENDED AFTER ITS INTRODUCTION INTO FETAL SAC MAKING PRESSURE AGAINST HEAD AND PLACENTA. (Liepmann.)

The majority of obstetricians now agree that the primiparous patient at or near term, with little softened and undilated cervix, in whom a central placenta prævia is revealed by a sudden sharp hemorrhage, is a clear case for abdominal cesarean section. In central placenta prævia with multiparae, there is a difference of opinion, some urging that by the use of the bag or version it is possible to deliver the patient with comparative safety through the cervix and vagina.

The decision to choose cesarean section in the minds of some is

influenced by the presence or absence of septic infection. This may more often be inferred than demonstrated in such a case, but recent experience shows that frequent vaginal examinations in a case of placenta prævia and the introduction of gauze or other material for tampon in the vagina predispose to infection, and hence all cases which have thus been treated before entrance to the hospital are justly considered as suspicious. The question then arises whether it is proper to subject a patient, possibly already infected, to the risk of abdominal cesarean section in central placenta prævia.

FIG. 46.—A TRANSVERSE POSITION OF FETUS COMPLICATING A CENTRAL AND COMPLETE PLACENTA PRAEVIA. (Liepmann.)

The answer to this question must depend considerably upon the general condition of the patient, the amount of previous hemorrhage and the degree to which the patient has become exsanguinated and shocked. With a woman in desperate condition, obviously whatever is done must be accomplished with the least possible disturbance and added shock, while, on the contrary, a patient in good condition who has had no dangerous hemorrhage may safely bear a cesarean section. In dealing with suspicious cases of section, the development of infection can be hindered and often prevented by packing the uterus at section with 10 per cent iodoform gauze which can afterward be withdrawn through the cervix and vagina or, if other indications favor, by the performance of hys-

terectomy. Unless the patient's condition does not justify resort to section, the writer is accustomed to treat central placenta prævia in both primiparae and multiparae by abdominal cesarean section.

When this operation is undertaken, every facility should be in readiness. The intravenous transfusion may be done during the latter part of the operation. Hypodermatic stimulation to some extent, and to some extent the application of heat, are feasible. Under these circumstances the shock of the operation is greatly reduced and is practically less than that which accompanies rapid dilatation of the cervix and the rapid extraction of the child. Furthermore, the uterine wound is left accurately and firmly closed, while, after vaginal delivery in these cases, there is a tendency to hemorrhage from the cervix and lower uterine segment. In choosing the point of incision in the uterine wall, the operator should not carry the incision too high over the fundus nor too low into the lower segment. The writer prefers to close the uterine wall with sutures of silk, adding a continuous suture of catgut to close the peritoneal layer.

Few professional experiences have been more satisfactory to the writer than some abdominal cesarean sections done for central placenta prævia. The prompt cessation of hemorrhage, the immediate turn in the condition of the patient for the better and the steady and gradual recovery from shock and prostration have been most gratifying. On one occasion, on a very cold winter's night, a patient in a desperate condition was so treated; and after operation her bed was placed before a large open coal fire, the foot of the bed so much elevated that the patient was practically in the Trendelenburg posture, with her head as near the fire as was safe. There she remained, with the bed being gradually lowered, for forty-eight hours after the operation, gaining steadily in strength and finally making an uninterrupted recovery.

It is interesting to note that the performance of abdominal cesarean section for central placenta prævia leaves the patient in a condition susceptible of spontaneous labor afterward. In the writer's experience, an affirmative answer can be given to this question. These patients recovered from the operation as well as did others and the writer has repeatedly seen spontaneous labor terminate subsequent pregnancies.

Treatment to Be Avoided.—Frequent, prolonged and unnecessary vaginal examinations may lose the life of the patient. The existence of the condition can be inferred by the sharp vaginal hemorrhage with the absence of pain. This justifies alarm and transference to the hospital, but, when vaginal examination is necessary to establish the diagnosis, no other vaginal manipulation should be practiced, and least of all should tamponing with cotton or gauze be permitted. How would an obstetrician consider a case of ruptured tubal pregnancy if the physician who first saw the patient introduced his finger into the abdomen to make the diagnosis of hemorrhage? Would not the case be considered as probably already infected?

There can be no doubt that central placenta prævia is becoming less

dangerous than formerly. The writer recalls cases to which he was summoned in consultation after a period of desultory and useless treatment had been carried out occupying from twenty-four to forty-eight hours. With the patient practically moribund, a specialist was summoned to terminate the case!

Partial Placenta Prævia.—With a history closely resembling that of central placenta prævia, considerable vaginal hemorrhage in the pregnant patient without pain, the obstetrician on examination, if there is at least partial dilatation of the cervix, may be able to bring his finger or fingers against the fetal membranes. This shows that some portion of the internal os is not covered by placenta.

Natural History of Such Case.—If there be sufficient membranes in the internal os partially to engage in the os, the escape of amniotic liquid after rupture will be followed by the development of uterine contraction. This will force down the presenting part through the lower segment against the internal os and placenta and thus greatly lessen or check the hemorrhage.

Imitating this natural procedure, the safest and most efficient treatment of partial placenta prævia consists in rupturing the membranes and stimulating the action of the uterus. A pair of closed uterine dressing forceps should be carried up along the border of the hand and the palmar surface of the inserted fingers and through the membranes, and the membranes torn as extensively as is possible. Following this, a tonic dose of strychnin should be administered when labor will develop and the presenting part will be forced against the placenta. Some advocate the use of pituitrin in small doses, but it must be remembered that the occurrence of placenta prævia softens the cervix and the lower segment and that violent action of the uterus may cause fatal laceration.

When uterine action develops, labor will proceed with more or less promptness and vaginal delivery can be effected if necessary by the use of forceps. The same precautions are required in dealing with postpartum hemorrhage and preventing uterine relaxation which were necessary in central placenta prævia, except that manipulations are conducted through the vagina and cervix.

Some have urged the use of the bag in partial placenta prævia, but it has no practical advantage over the method described and its insertion is more difficult and sometimes more dangerous than the rupture of the membranes.

Cases of partial placenta prævia are seen where hemorrhage has been so slight that the child is in excellent condition, and the question arises whether the rupture of the membranes and stimulation of uterine contraction will not throw an undue risk against the child which might be saved by a prompt cesarean section. The choice of cesarean section in partial placenta prævia should depend upon the relative proportion of the internal os and cervix covered by placental tissue, the softened or unsoftened condition of the cervix and the degree to which the cervix can readily, or with difficulty, be dilated. Obstetricians are becoming

more prone to believe that many cases of partial placenta prævia are best treated by abdominal cesarean section.

The mortality and morbidity of partial placenta prævia depend upon the degree to which the os and cervix are covered by placenta, the extent of hemorrhage and also of manipulation and interference. While septic infection is not so frequent as in central placenta prævia with undue interference, still the danger is considerable. A mortality rate of 10 per cent for the mother in partial placenta prævia is not an excessive one. For the child, from one third to one half of the number may be saved under favorable conditions.

Marginal and lateral placenta prævia, as has been said, may not be recognized during the conduct of labor. If the placenta can be touched at all by vaginal examination and hemorrhage begins, the membrane should at once be as extensively ruptured as possible. Considerable hemorrhage while the fetus is pressing against the cervix and lower segment is practically impossible, but postpartum hemorrhage may be dangerous and persistent because the attachment of the placenta has not been to that portion of the uterus which most promptly and efficiently contracts. Hence the necessity for firm intra-uterine packing and also for packing the vagina about the cervix and lower segment.

It is interesting to note in these cases the extent of placental separation by examining the placenta after labor. Very often, in a case where there has been more than usual hemorrhage during labor, a portion of the placenta will be found somewhat discolored and covered with a thin, but comparatively firm clot. This has separated during labor and its premature separation accounts for the hemorrhage.

Obstetricians are accustomed to refer to the lessened mortality and morbidity of the mother and child in cases of contracted pelvis as one of the great improvements in modern obstetric science and art. While the improvement is not so striking in the management of placenta prævia, still there has been a considerable gain and to-day the greatest danger for such a patient consists in undue interference and the effort to check hemorrhage by vaginal manipulation or application. When these cases can be brought to the attention of the medical profession and the laity in such a manner that they are reckoned as dangerous and as important as other varieties of ectopic pregnancy, a further improvement will follow.

Early Pregnancy Complicated by Placenta Prævia or Low Attachment of the Impregnated Ovum.—These cases may also be considered under the head of inevitable abortion, but from the present point of view a diagnosis of the condition may be made by the occurrence of red vaginal hemorrhage, without pain, in a patient in early pregnancy. No effort should be made to save the ovum in such a case. Unquestionably the safest procedure is immediate transference to a hospital and a dilatation and curettage followed by packing. But if this is impossible, under antiseptic precautions a firm packing of antiseptic gauze should be carried through the cervix, if possible, and around the cervix distending the

vagina, and tonic doses of strychnin should be given. This will usually be followed by the spontaneous separation and expulsion of the contents of the uterus. The case then becomes practically one of recovery from abortion. It is important for the profession to understand that, even before the formation of the placenta, the impregnated ovum may lodge at the internal os, that the continuance of such a pregnancy is impossible, and that the mother's safety lies in a prompt emptying of the uterus by surgical means.

CERVICAL PLACENTA

In the Monatsschrift für Geburtshülfe, Band 60, 1922, page 15, Zangemeister and Schilling contribute a paper of considerable interest upon this topic. They distinguish a cervical placenta as one which develops partially or entirely on the cervix and they make a distinction between this condition and placenta prævia. In the latter, they hold that the primary attachment of the placenta is in the body of the uterus and that its lower attachment is secondary.

Some writers have styled these cases those of isthmian placenta, while others follow the custom of the writers and apply the phrase "cervical." They believe that the term cervical placenta is better than placenta prævia.

It is a recognized fact that the mucous membrane of the cervix does not develop decidua, but changes which produce a tissue closely resembling decidua may occur in the upper portions of the cervical canal, on the internal os or even lower. This is analogous to what occurs in tubal gestation where the ovum is implanted without the presence of the typical decidua.

There are now on record a considerable number of cases of cervical placenta where no doubt exists concerning the condition present. The writers have observed 38 of these cases and in collecting the reports of a considerable number of labors, they find a frequency of 0.03 per cent. In one case which they describe, the patient had been operated upon previously for retroflexion of the uterus and subsequently conception occurred. She was again admitted to hospital, pregnant, suffering from bleeding without uterine contraction. The internal os was found covered by placental tissue and a dilating bag was introduced, which produced hemorrhage. The bag was forced out and under considerable bleeding the patient collapsed, but rallied and was delivered by version. The removal of the placenta was very difficult as it was adherent, and very free hemorrhage resulted. The patient was given a transfusion of citrated blood, but fatal hemorrhage recurred. On autopsy, the cervical attachment of the placenta was clearly demonstrable and the cervix had enlarged to accommodate the growing placenta. The specimen was hardened and a minute microscopic examination confirmed the diagnosis of cervical placenta.

These patients give a history of disturbed menstruation before pregnancy. In some there is impaired condition of the general health and many of them have had some operation done upon the uterus. By studying the specimens of a number of postmortems in these cases, it is found that the mucous membrane in the cervix takes no part in the development of the placenta. The ovum attaches itself to the muscular tissues. The greater portion of the placenta remains within the body of the uterus, but a part sufficiently large to cover the internal os develops in the muscular layers of the cervix. This becomes firmly adherent and the vessels of the cervix greatly enlarged. There is little or no decidua developed in the cervix as the greater part of the placenta remains within the uterus.

The writers distinguish three varieties. In the first, the placenta is largely developed in the body of the uterus, a portion attaching itself to the uterine muscle and dissecting between these fibers, dividing them into two layers. The inner surface of the cervix remains smooth; the vessels develop luxuriantly and the umbilical cord is inserted low down in the placental tissue not far from the internal os. The fetal membranes remain in the body of the uterus.

In the second group only a portion of the placenta adheres to the inner wall of the cervix. This portion becomes greatly dilated, with abundant development of vessels.

In the third group, the body of the uterus in the internal aspect remains smooth; the site of the attachment of the placenta is rough, is found in the cervix and ceases on the retraction ring. The placenta is attached in a circular manner around the cavity of the cervix, going into the tissues most deeply at the anterior wall, and enormously distending the cervix and the vessels, which are very greatly enlarged.

Various causes are assigned for this abnormality. Whatever disturbs an early pregnancy may produce it. In some of these cases, the placenta is enormously increased in size. The villi of the chorion are found degenerate and in some cases there is evidence of the development of connective tissue. In about one fourth of the cases there was no hemorrhage until labor began. In others there was bleeding in the early months of pregnancy. In the latter months of gestation the bleeding is less common and severe than in placenta prævia. This is explained by the fact that in these cases the development of the placenta in the cervix begins at the earliest possible moment after the impregnated ovum lodges in the cervix. If pregnancy terminates spontaneously in these cases, such a process usually begins, in more than half of the cases, at the end of the tenth month, and this is in contrast to placenta prævia.

Clinically, these cases are important because the methods of treatment which are usually successful with placenta prævia fail in these cases. The rupture of the membranes, the use of dilating bags and the performance of version are attended with such hemorrhage as in some cases to bring about a fatal result. Especially dangerous is the manual removal of the placenta. So firm is the attachment of the placenta

to the cervix that frequently it must be removed in small pieces, and this is always attended with severe hemorrhage. So obstinate and complicated are these cases, that the writers urge delivery by abdominal caesarean section, or in the worst cases, delivery by section followed by hysterectomy.

The distinction which these writers make between cervical and placenta prævia may not be obvious, but the paper is of interest as explaining some cases which do not yield readily to the usual treatment.

Pregnancy Complicated by Hemorrhage from Hemorrhoids.—Many patients, especially multiparae, or those who have suffered from hemorrhoids before pregnancy, are exposed to considerable inconvenience by the excessive distention of these hemorrhoids. It can readily be seen that the rupture of these distended veins might be followed by considerable hemorrhage. Ordinarily the obstetrician is summoned with the statement that the hemorrhage is from the vagina, that abortion is beginning, or that placenta prævia is suspected. Visual examination with a good light will establish the correct diagnosis.

The treatment of the condition calls for the ligation of the ruptured vein or veins at each extremity of the point of rupture. If a clot be present in the vein, this should be turned out and the cavity of the vein disinfected by the application of iodin; then the vein should be carefully tied through sound tissue with a good-sized catgut suture, taking in enough of the subjacent tissue to give a firm hold. This should be done under surgical antisepsis and preferably with moderate anesthesia. The bowels of the patient should be irrigated with sterile salt solution or sodium bicarbonate solution and, at the conclusion of the operation, a rectal suppository of ½ to 1 grain of the aqueous extract of opium should be left within the bowel. Operation upon the rectum during pregnancy is especially apt to be followed by abortion or premature labor, and hence precautions must be taken against this accident.

In cases where hemorrhoids become bleeding and exceedingly painful during pregnancy, it may be necessary to remove them. Here, under surgical antisepsis, the operator may choose the method with which he is most familiar, employing the clamp and cautery or ligation. The sphincter should be moderately stretched before the operation to prevent spasm and lessen irritation. The rectal use of opium is indicated until the disturbance produced by the operation has subsided.

Bleeding from Distended Veins of the Esophagus.—While this is one of the rarer complications of gestation, it is sometimes puzzling and trying to both patient and physician. This develops in patients of relaxed fiber, often with varicose veins in the extremities or vulva, with a history of distention of the stomach and intestine and possibly of previous spitting of blood from a source not clearly discovered. Sometimes after a heavy meal, or when excessively fatigued, a patient will experience some irritation about the lower portion of the throat; will have a warm salty taste in the mouth and expectorate blood, evidently, from its color, not arterial. Such hemorrhage is rarely excessive and

usually subsides with the external application of cold or sometimes the use of pieces of ice in the mouth. Should the hemorrhage continue and become threatening, sterile horse serum, or one of the derivatives given to increase coagulation of the blood, should be administered by hypodermatic injection. If the hemorrhage has resulted in swallowing a considerable mass of blood, the patient may be taken with nausea and vomiting and may eject the contents of the stomach. This might suggest hemorrhage from gastric ulcer, but the dark color of the blood in these cases should aid in establishing diagnosis. Diagnosis in these cases may be obscured by the fact that there may be no external hemorrhage for some time.

Hemorrhage from the Gums or Other Mucous Surfaces.—In very severe toxemia, sometimes in pernicious malarial intoxication, and in severe infections which extensively disintegrate the blood, the pregnant patient may suffer from oozing hemorrhage from the gums, mucous membrane of the mouth, gastro-intestinal tract, bladder or genital tract. Purpura may develop, often to an alarming extent. Some idea of the severity of the condition is to be obtained, not only by observing the quantity of blood extravasated or discharged, but also by examining the blood taken from the vein by the microscope. If the red cells are extensively disintegrated and hematin is present in crystals or flakes, the condition is evidently serious.

Treatment.—The toxemia producing this complication must be treated in the manner already described. In the absence of typical toxemia, the intestine must be regarded as the probable source of the material causing disintegration of the blood. Very copious irrigation of the entire large intestine is indicated in these cases. To accomplish this successfully, the urinary bladder of the patient is first emptied. All constriction of the abdomen is removed and the patient is placed upon her left side, with her hips raised. In some cases it may be best to put the patient in the knee-chest posture. From two to four gallons of fluid is necessary at a temperature from 100°-110° F. This fluid should preferably be bicarbonate of sodium solution, and there is no objection to combining glucose with it. A medium-size, soft, rectal tube, thoroughly lubricated, is introduced while the fluid runs from a retainer not more than three feet above the patient's body. The tube should be gently carried to its full length into the bowel and, if resistance is experienced, the tube should be held in its position without further effort to advance it until the resistance ceases. If the fluid is warm and is introduced gently, the pressure is comforting and not distressing to the patient. Some prefer to use the two-way tube or catheter, but in the experience of the writer this is rarely necessary and, if fluid should accumulate more than is desired, slight stretching of the sphincter of the bowel with the finger will bring about a copious discharge. If the patient cannot retain the knee-chest posture with comfort, she can probably take it during the first part of the manipulation. Much may be gained thereby, and she may lie upon her left side with the thighs and legs

flexed during the latter portion of the treatment. This treatment should be carried out once or twice in twenty-hour hours and is often followed by considerable benefit.

The hypodermatic use of sterile horse serum, thromboplastin or other similar substance is indicated. Direct intravenous transfusion of glucose and sodium bicarbonate or of sodium bicarbonate and acacia may be tried. In some cases the hypodermatic use of iron seems to help, although the effect of this is usually too gradual to be of service in desperate conditions. The occurrence of fever and jaundice points to a rapidly developing fatal condition. At autopsy in these patients, the substance of the liver is found extensively disorganized and disintegrated, especially in those patients in whom fever and jaundice develop.

Hemophilia Complicating Pregnancy.—The history of a bleeder should put the obstetrician on his guard in caring for such a patient during her pregnancy. A study of the blood by all available methods should be made, and an accurate history of the patient and her family obtained. It may be found that the diagnosis of hemophilia is not accurate, that the occurrence of hemorrhage after some one complication has given rise to a mistaken idea. The treatment of the patient during pregnancy must be suggested by the laboratory findings and clinical symptoms. Toxemia must be carefully avoided. The best of hygiene, prenatal care, if possible, in a maternity hospital, is urgently needed, especially for those who cannot procure the proper treatment for themselves. In using remedies by hypodermatic injection, it must be remembered that points of puncture may bleed persistently in these patients, and also that some of these remedies predispose to the development of thrombosis and embolism. Especial precaution must be taken to avoid abortion and premature labor, and the patient should be encouraged to believe that pregnancy may so improve her general health as to give her at least transient immunity from her constitutional danger. These cases are by no means hopeless, and, if accurately studied and thoroughly treated, the pregnancy may continue to a successful termination.

THE ANEMIAS OF PREGNANCY

No more interesting and promising field for study in the physiology and pathology of pregnancy can be found than the condition of the mother's blood. While it has been a comparatively simple matter to study the quantity of iron present and the character of the cells, we know little about those immunizing and stimulating substances which are of especial importance.

It is agreed that the entire quantity of blood in the mother increases during pregnancy; that the red cells and hemoglobin, in proportion to the general conditions present, are well maintained. The condition and especially the contour of the red cells is very valuable as affording an index to the mother's general condition.

The white cells increase somewhat during pregnancy, and in healthy women it is noticed at labor that the blood coagulates promptly and efficiently. The coagulation time of the blood in a healthy pregnancy must be fully normal. The salts in the blood are undoubtedly increased and, as would be expected, calcium salts and phosphates are greater than normal, while sodium chlorid seems to remain the same. The iron is somewhat less.

Probably to aid in the increased oxidation necessary, the fat in the mother's blood increases very considerably and so does cholesterin. That the ferments in the mother's blood increase there can be no doubt, but we are not as yet informed which they are, nor exactly what is their nature.

Pernicious Anemia.—Fortunately this serious complication occurs more often after labor than during pregnancy. The patient becomes exceedingly pale, there is edema, great breathlessness on exertion and progressive weakness. On examining the blood, there is an accumulation of hemoglobin apparently at the expense of the red cells. These become greatly altered in contour and number, and various types of red cells are present. The condition is exceedingly grave and the interruption of pregnancy seems to do no good. Fowler's solution, pushed to the physiological limit, is first in importance in treatment. Whatever form of iron can be assimilated comes next, and oxygen, whether by direct inhalation or in good air, is most important.

A trial should certainly be made of sterile serum, for the direct transfusion of blood has not been as valuable as was hoped. The diet should be abundantly provided with nitrogenous material and every means employed to promote assimilation. Copious, gentle, high lavage of the intestine with sodium bicarbonate or salt solution is indicated.

Leukemia.—This is an unusual and rapid increase in the white cells in the blood of the pregnant woman. No one definite cause has been proved for this condition, but many factors in pregnancy undoubtedly have influence. A very high leukocyte count is often obtained. In leukemia, complicating pregnancy, as in other patients, the spleen is enlarged, and the removal of it has been suggested as a method of treatment.

Unlike pernicious anemia, leukemia seems to be little influenced by pregnancy or its termination. So far it has resisted treatment during pregnancy to a more than unfortunate degree.

Every effort, however, should be made to reënforce the patient's blood. Here, again, the study of the blood serum and the metabolic processes of the body should be of definite value. There can be no harm in giving the extracts of the ductless glands in such cases. For, in our present ignorance, we can only hope that such might be of service. Pregnancy is sometimes prematurely and naturallly terminated, but there is no proof that this is of essential value.

The Blood in Pregnancy.—No more important service can be rendered a pregnant woman than the intelligent study of her blood. So

close is the relationship between toxemia and the abnormal conditions of the blood that a considerable variation in the latter should suggest the former. There is one clinical fact of importance which should not be neglected, namely, that a depraved and altered condition of the mother's blood calls for a search for toxemia and the treatment of the general toxic condition. Of especial importance in this connection is the thorough flushing of the large intestine. This can be done properly only by a trained person.

With the patient in the knee-chest or left lateral posture, the hips in either case being considerably raised, a very large soft catheter or soft rectal tube is attached to a receptacle containing several gallons of warm sodium bicarbonate solution. This receptacle should not be more than three feet above the patient; as the tube is introduced, the fluid should run, and the tube should be carried very gently to its full length. The temperature of the fluid should be from 105°-110° F. on introduction; if a two-way tube is not employed, by slightly stretching the sphincter muscle, a free return flow can be secured. If this is properly done, and the tube is very thoroughly lubricated, the sensation often is one of positive comfort and never of pain. In some cases it is well to inject a few ounces of warm olive oil into the bowel, or to give a low enema to remove hardened feces before giving the irrigation. The purpose of this treatment is not so much to remove fecal matter as to improve the condition of the mucous membrane of the intestine, and to wash out accumulated mucus and decomposing cellular products.

In the anemias of pregnancy, the hypodermatic use of iron, with the free use of saline water and fruit juices as a beverage, may be found of great value.

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CHAPTER X

ECTOPIC PREGNANCY

Ectopic pregnancy—A resumé of its etiology—Pathology—Diagnosis and treatment—The phrase ectopic pregnancy preferred to extra-uterine pregnancy—The analogy between placenta prævia and cervical placenta and other varieties of ectopic pregnancy.

While this topic is fully discussed in one of the monographs of this series, it may not be amiss to state briefly our modern knowledge in relation to topics with which we have especially to do.

Ectopic pregnancy is a better term than extra-uterine pregnancy. There can be no essential choice between the words "pregnancy" and "gestation." If the term "extra-uterine pregnancy" or "extra-uterine gestation" be employed, it implies that the impregnated ovum becomes attached outside the uterus. This is not accurate. One of the most dangerous and insidious forms of ectopic gestation or pregnancy is that in which the impregnated ovum lodges in the wall of the uterus, where it is pierced by the fallopian tube. Interstitial pregnancy is a not uncommon variety, but it is not extra-uterine.

Again, placenta prævia, in which the impregnated ovum lodges below its point of usual attachment, and to some extent develops at or near the internal os, is a pathological condition of gravity, and yet this is not an extra-uterine pregnancy but is ectopic.

Varieties.—Tubal, interstitial, ovarian, abdominal and placenta prævia are all recognized varieties. The name contains the description.

Etiology.—Lack of development in some portion of the genital tract or subacute inflammation are the principal causes. Lack of development produces interstitial pregnancy and placenta prævia and may have to do with tubal pregnancy. The latter is undoubtedly caused more frequently by chronic inflammation and its results than by any other factor.

Both these conditions influence decidedly the course which an ectopic pregnancy may take. Where lack of development is the essential cause, rupture of the abnormal envelope of the impregnated ovum may readily occur. Where chronic inflammation and its results are present, the tissues surrounding the abnormal location of the ovum may have become involved in the process and may somewhat limit or direct the course taken by the ovum.

Symptoms.—While the symptoms depend upon the variety, to some extent all cases have something in common. Disturbance of menstruation is invariably present; indefinite pain and aching are practically

always described by patients. If a blood count is made, a leukocytosis of some degree is present. These symptoms, though vague, become suggestive when contrasted with the symptomatology of other conditions.

Sooner or later, signs and symptoms of hemorrhage and shock of varying duration develop. Where the impregnated ovum is in the wall of the uterus, or outside the uterus, the shock is produced by the rupture of its envelope. In placenta prævia the shock follows hemorrhage. Sudden, and almost complete, rupture of the tissue covering the impregnated ovum, accompanied by free hemorrhage, will cause severe pain and shock. A very gradual parting of the tissues, with slow and oozing hemorrhage, will produce irritation and some pain and will slowly alter the patient's general condition. Where shock is sudden and great, it may be accompanied by nausea and vomiting. In some cases, shock is different from that which follows hemorrhage and is out of proportion to the quantity and character of the bleeding.

If the embryo develops to the fetus in its abnormal position, although the pregnancy is ectopic, the patient may pass through many of the complications of an entopic gestation.

Diagnosis.—At the present time, we lack an absolutely accurate method of diagnosticating an early ectopic pregnancy. In the most skillful hands the X-ray cannot definitely outline and identify the impregnated ovum in its abnormal position. There is no biochemical reaction which is absolutely certain in its decision.

Here the history may be of great service. When a patient states that she has been married for some time without conception, and that the condition which brings her to seek medical advice is attended by the first essential disturbance of menstruation since marriage, this should put the obstetrician on his guard.

On the other hand, the history, although it may be given as accurately as the patient can give it, may be a source of considerable confusion. The statement that the patient suffers from indefinite pain and soreness in the right lower abdomen suggests appendicitis of a chronic nature. Chronic salpingitis may also simulate the irritation of a growing ectopic pregnancy. Pelvic tubercular peritonitis and salpingitis may be present. Fortunately for the patient, an intra-abdominal condition which causes chronic irritation and affects the general health can be dealt with properly only by abdominal section, and this would immediately establish the diagnosis and lead to the correct treatment.

In making a diagnosis of the condition, it must be remembered that occasionally a double tubal pregnancy, or pregnancy in both fallopian tubes, may be present, also that there may be a twin pregnancy, one ovum in the uterus and the other outside the uterus. In some instances a pathological condition of the pelvic organs may be accompanied by an ectopic pregnancy. But in all these cases the general rule applies that intra-abdominal disease which threatens health or life requires abdominal section.

Prophylaxis.—The prophylaxis of ectopic pregnancy comprises whatever can be done to secure a good development and the building up of sound health in the young girl. Pelvic inflammation occurring at any time should not be neglected, but should receive careful attention. Should pregnancy and abortion occur, it is especially important that abortion should be considered as an important influence upon the health of the patient, and that she should afterward be put in the best possible condition. The occurrence of a healthy pregnancy and spontaneous labor should not damage the general health.

Treatment.—The treatment of ectopic pregnancy may be largely elective if the envelope of the embryo has not ruptured or if the placenta has not begun to separate. Under these circumstances shock and hemorrhage have not developed, hence, there is not the urgent necessity for prompt and often operative treatment.

The diagnosis of ectopic pregnancy or placenta prævia should immediately put the patient under close observation. In either case the patient is not safe until the product of conception has been removed. In ectopic abdominal or pelvic pregnancy, as soon as the diagnosis is made, under favorable conditions the abdomen should be opened, the embryo and, if possible, its appendages removed. The circumstances in such a case are favorable for the prompt recovery of the patient. The question may sometimes arise, If a ruptured ectopic pregnancy is found on one side and on the other chronic salpingitis, shall the nonpregnant tube be removed? The answer to this question will depend somewhat upon the age and circumstances of the patient. In a comparatively young woman who is able to care for her health, the nonpregnant tube should be left, unless it shows evidence of being a chronic pus tube. If, however, the patient is near the end of the childbearing period and her general health has suffered from chronic pelvic inflammation or infection, then it may be wise to remove diseased pelvic organs as extensively as the conditions may suggest. If the patient is in good condition, the removal of the appendix should be included.

Where central placenta prævia or a partial placenta prævia completely or largely covering the internal os is diagnosticated, but separation has not begun, the patient should immediately be sent to the hospital and measures taken to empty the uterus as promptly as possible. As in other varieties of ectopic pregnancy, in many of these cases abdominal cesarean section is indicated.

A considerable number of these cases do not come to the attention of the physician until rupture of the envelope of the embryo has occurred and shock and hemorrhage excite alarm. Under these circumstances, the choice must be made of immediately opening the abdomen or of delaying possibly for a short time.

The obstetrician must first decide whether he can transport the patient to the hospital or not. If he finds her in her home in a condition of profound shock, she should not be disturbed. The hypodermatic injection of morphin and atropin, the application of warmth, injection

into the bowel of warm salt solution and a dry ice bag upon the abdomen will usually bring about an improvement in the general condition. At this time, if the hospital is not far away, she may be carefully taken to the hospital, all preparations having previously been made, and immediately subjected to abdominal section. If, however, the conditions point to a partial rupture only, with moderate shock and hemorrhage, the patient may be sent to the hospital as soon as she is seen. While it is true that the patient cannot be considered safe until after an operation, a reasonable delay under close observation may be of benefit. The obstetrician must be prepared to interfere during this period at any minute.

Operation should be as rapid as is consistent with safety. The point of rupture should be found at once, the tube ligated and removed, or the embryo removed and its point of attachment secured by tying or stitching. In well-appointed hospitals the effort may be made to give the patient the benefit of her extravasated blood. This should be removed by the gloved hand of the operator from the abdomen, citrated, strained through sterile gauze, and given to the patient by intravenous transfusion. The results in these cases have been excellent. In some large clinics all healthy blood obtained at operation or in spontaneous labor is saved, citrated and kept in sterile receptacles. It may then be used in any emergency.

Shock and acute anemia in these cases are to be treated in the usual manner. Where transfusion does not accompany operation, the immediate transfusion of blood may be done at any time afterward under suitable precautions. Anemia must not be neglected in the management of the case.

Repeated ectopic pregnancy is not infrequently observed, and may be accounted for by the fact that in many patients both fallopian tubes share in the same chronic inflammation.

The management of placenta prævia, when hemorrhage has declared itself, has already been described in treating that condition. It may again be stated that the analogy between other forms of ectopic pregnancy and placenta prævia demands attention, and that the successful treatment of placenta prævia, especially when complete or largely complete, must be conducted on strictly surgical lines.

Ectopic Pregnancy Near Term.—It is recognized that an impregnated ovum, after rupture of its envelope, may attach itself to surrounding tissues and reach the point of viability, and sometimes go nearly to full term. The question then arises as to the life of the child, as well as the life and health of the mother. The diagnosis of this condition is often missed, because the patient, if she has other cares and anxieties, may neglect her own condition and avoid coming to a doctor until the abdomen has become so large that she believes herself near term. Where a patient is under accurate observation, it should not be difficult to recognize an ectopic pregnancy and also to identify the probable time when rupture of the envelope occurs. Evidently it is only in cases long under

observation that the embryo can proceed to develop; for, if the patient was under medical care when the rupture of the envelope of the embryo took place, she would undoubtedly be subjected to operation. The risks, however, of an ectopic pregnancy are so great that the removal of the ectopic embryo is indicated at any stage.

When an abdominal pregnancy with a living child is recognized, the question arises as to whether the pregnancy may be continued to viability in the patient and the child saved. If this attempt is to be made, the patient should be in the hospital after the sixth month. It must be remembered that a false labor develops in these cases, followed by the death of the fetus. When this takes place, the patient has abdominal pain, simulating that caused by uterine contractions. After a brief period, these pains cease and so do the movements of the child. On examination its heart beat cannot be heard. If the patient is accurately observed, it will be found that the abdomen slowly decreases in size. The patient finally remains with an abdominal tumor, of the nature of which she may be ignorant. If she has not been seen by physicians during her pregnancy, and is first examined in this stage of the case, it may be difficult accurately to diagnosticate the nature of the tumor.

If undisturbed, the fetus may become largely infiltrated with calcareous matter and the formation of a lithopedion may occur. Sometimes the fetus becomes mummified, and occasionally the development of adipocere follows; in any of these conditions the fetal body may be retained in the abdomen of the patient indefinitely, and only discovered years afterward when death has occurred from some cause in no way connected with the pregnancy. If bacteria gain access to the placental site and the chorion, pus will form and burrow in the direction of least resistance; the soft parts of the fetus will be liquefied by the leukocytes and, acting as a foreign body, the bones of the fetal skeleton may make their way out of the mother's body by ulceration. Thus fetal bones have been extracted through an opening following the bursting of an abscess at the umbilicus. In other cases, they have made their way into the urinary bladder or into the rectum. If such a pus sac is opened and freely drained, and the contents completely removed, it usually closes.

Where the abdominal fetus is in good condition and viable, an effort should be made to save its life by operation. The abdomen should be opened, the child removed, and every effort made to control the blood supply of the placenta and to remove it. Should this be impossible, the membranes may be stitched to the edges of the abdominal incision, the cavity, from which the embryo was removed, thoroughly packed with 10 per cent iodoform gauze, and the placenta be allowed to separate and discharge itself gradually. A sinus will result, which should be kept open until it heals from the bottom. It will ultimately close. This method is tedious and trying for the patient, but safer than profuse hemorrhage in the effort immediately to separate the placenta.

The Differential Diagnosis in Ectopic Pregnancy.—We have alluded to some of the conditions which may be confused with ectopic pregnancy.

In the progress of a case, certain occurrences may render an accurate estimate of what is taking place somewhat difficult. Another complicating factor is seen in the fact that shock is often out of proportion to the quantity of blood extravasated. This depends largely on the individual peculiarities of the patient.

Both these points may be illustrated by the following case: A woman, ill developed physically, but highly developed mentally, aged about thirty, had been married for some years without conception. Menstruation had usually been regular, but on one occasion had been delayed about ten days. At this time she rode upon a bicycle three quarters of a mile, and during the ride felt pain in the right lower abdomen. She was able to ride back to her cottage, whereupon she became very faint and summoned a physician. On examination, considerable shock had developed, no tumor could be made out, nor could an early pregnancy be absolutely diagnosticated. The patient was the wife of a surgeon; her illness occurred during the summer at a small seaside place, and at the time the husband was absent. The patient was immediately put in charge of a good nurse and, under treatment addressed to the condition of shock, slowly became better. It was possible to communicate with the husband, who immediately returned. The attending physician made the suggestion that ectopic pregnancy was probably present and that operation should be done as soon as possible. The surgeon wished a professional friend to operate and he was immediately summoned, although from a considerable distance. During the following night, the patient did fairly well until toward morning, when there was increased pain, never very acute, a slowly increasing pulse rate, and the patient did not seem so well. In the early morning the surgeon arrived and the abdomen was immediately opened. The right tube had been pregnant and had torn very gradually, apparently on two different occasions; first while the patient was riding her bicycle, and second when the pain increased toward morning. On the first occasion, the point of rupture had been closed by a clot; on the second occasion, the rupture had been greater, but the entire quantity of blood extravasated was surprisingly small. The tube was immediately ligated and removed, but the patient died very shortly afterward, apparently from shock.

Similar phenomena have very frequently been seen and their significance appreciated. Where shock develops gradually and a pregnant tube is tearing slowly, this may be inferred by the occurrence of repeated shock, indicating that the rupture of the tube is extending. These facts may be of service to the obstetrician in determining the necessity for operation and estimating the condition of the patient. It cannot be denied that many cases of ectopic pregnancy, not placenta prævia, and especially of tubal pregnancy, will recover without operation if kept at

absolute rest in a well-appointed hospital. This is entirely independent of the question of rupture of the tube. A gradual recovery will ensue in a majority of cases, whether the tube ruptures or not.

If, however, these patients are examined one or two years after the occurrence, they are found in ill health. There is chronic inflammation in the pelvis, menstruation is disturbed and sterility may have developed. In urging early operation in ectopic pregnancy, the operator will save, not only the life, but the health, of his patient.

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CHAPTER XI

ABORTION

Abortion complicating pregnancy—Extra-uterine. Its etiology, pathology, diagnosis and treatment and also that of intra-uterine abortion—Discussion of threatened, inevitable, incomplete and complete abortion—Criminal abortion in drugs or other abortatives—Criminal abortion by interference from the patient—The work of the criminal abortionist—Means for preventing abortion—The relation of abortion to sterility—Indication for and description of therapeutic abortion.

Abortion may be divided into extra-uterine and intra-uterine. Extra-uterine abortion is commonly distinguished from the termination of extra-uterine pregnancy through rupture of the envelope of the embryo or fetus. This latter is called ruptured extra-uterine pregnancy. The term "extra-uterine abortion" is used to express the expulsion from the fallopian tube of an impregnated ovum into the pelvic or peritoneal cavity, the ovum usually lodging upon the peritoneal surfaces. It is commonly destroyed by the epithelia of the peritoneum or by extravasated blood or leukocytes.

The cause of this occurrence is the peristalsis of the fallopian tube which is roused to action by the pressure of the growing ovum. If the tube is well developed and the ovum situated near the fimbriate extremity, it is easy to understand how this may happen. If, on the other hand, the tube is poorly developed or bound down by adhesions, it may burst, or, if the impregnated ovum lodges near the uterine wall or in the actual substance of the uterus, it may finally pass on to its normal destination.

The signs and symptoms of extra-uterine abortion are those which accompany extra-uterine pregnancy, namely, disordered menstruation, indefinite pain at the side of the uterus, followed by a period of sharper, better defined pain which ultimately ceases. If the ovum is destroyed by the cells of the surrounding parts, there are no further symptoms and the patient resumes her usual health.

Diagnosis.—The diagnosis of this complication of pregnancy is first that of extra-uterine pregnancy, followed by the occurrence of a period of pain which ceases without development of further symptoms. In the absence of abdominal section and visual examination of the parts, extra-uterine abortion cannot positively be demonstrated, but it has been seen sufficiently often at operation to establish its existence as a clinical entity.

Treatment.—An extra-uterine abortion without complications obviously requires no treatment. Should, however, an expelled ovum

ingraft itself upon surrounding tissues and live and develop, the case becomes one of extra-uterine pregnancy to be dealt with accordingly. Whether operation is indicated will depend upon the cessation of symptoms, the failure of bimanual examination to find a mass at the side of the uterus which repeated examinations shows is still growing, and the absence of the symptoms of shock and hemorrhage which follow the rupture of a fallopian tube.

Differential Diagnosis.—Unquestionably some of these cases are mistaken for acute appendicitis, and an attack of acute appendicitis which suddenly subsides might be mistaken for extra-uterine abortion. Continued, accurate observation over a considerable time may be necessary to establish a correct diagnosis. If threatening symptoms persist, abdominal section is the only method of definitely deciding the question and relieving the patient from unsuspected danger.

Intra-uterine Abortion.—By intra-uterine abortion is understood the expulsion of the product of conception before viability, twenty-six weeks of intra-uterine gestation. Among patients, the term "abortion" has an unpleasant meaning because of its association at times with criminal procedures. Hence, the term "miscarriage" is usually applied. This, however, is without scientific meaning and is often used indiscriminately for any sort of emptying of the uterus, even to the time of full gestation.

Varieties.—Intra-uterine abortion may be threatened, inevitable, incomplete or complete. As the term indicates, in threatened abortion there are signs and symptoms which show that the uterus has begun to act abnormally and may expel its contents. When abortion is deemed inevitable, so much uterine contraction and hemorrhage has occurred that the life of the product of conception is undoubtedly lost and, as a foreign body, its expulsion becomes inevitable. Incomplete abortion is characterized by the expulsion of a portion of the embryo, the remainder being retained, while in complete abortion the entire embryo is practically expelled. It must, however, be remembered that no abortion is absolutely complete, and that the uterine decidua containing fetal elements may be retained and will gradually be discharged.

Causes of Abortion.—The causes of intra-uterine abortion are those which pertain to the mother, to the ovum, or to both the mother and the ovum. Foremost among maternal causes are altered conditions of the endometrium which make impossible the development of a healthful and normal maternal decidua. Such are chronic endometritis, diseased conditions of the vessels of the body, abnormal positions of the uterus which make the development of the embryo impossible and lead to its expulsion, and maternal infection which, by its violence, destroys the life of the embryo and thus ends the pregnancy. Accidents which affect the mother frequently produce abortion; such as a fall, the receipt of a blow, a sudden and great fright and an overwhelming and prostrating emotion. An intercurrent disease may indirectly cause abortion, as where the mother has an attack of severe bronchitis and the mechanical irritation of coughing produces uterine action which expels the embryo.

The ovular causes of abortion are those pathological conditions which definitely alter the ovum and render it incapable of development, such, for example, as vesicular degeneration of the chorion, syphilitic infection of the ovum and embryo, dropsy of the amnion, and the effect of severe constitutional infection of the mother transmitted to the embryo and causing its death. Obviously a direct mechanical injury to the uterus, which dislodges an impregnated ovum from its attachments or bursts its envelope, must result in abortion.

Those causes which are both maternal and ovular are principally the infections, of which syphilis is a familiar example, which attack both mother and ovum.

Predisposing causes of abortion are often difficult to isolate and more difficult to remove. Nervous instability and excitability, and that condition known as habitual abortion, may resist methods of treatment ordinarily successful. In many of these cases, no one factor can be isolated as the essential cause, and it can only be stated that the physical and psychic nature of the individual is such that she cannot carry an impregnated ovum to maturity. Many of these patients are neurotic degenerates, either from inbreeding of ancestors or the transmission of the results of alcoholism or syphilis.

The Pathology and Mechanism of Abortion.—Hemorrhage is the primary factor, mechanically and pathologically considered, that produces abortion. The hemorrhage may result from an altered state of the mother's blood, or from the mechanical rupture of vessels in the maternal decidua or the ovular decidua. If this hemorrhage is slight, and if the mother's blood is healthy and she is promptly placed at rest, both physically and mentally, the hemorrhage may cease; the impregnated ovum may not become entirely separated from the uterine wall and the pregnancy may continue to term. If the hemorrhage is considerable, and especially if it occurs in the substance of the chorion, the ovum or embryo dies and thus becomes a blighted ovum. This is essentially a foreign body in the uterus and its presence usually results in its expulsion by the uterine muscle.

The important effect of both disease and mechanical violence is practically the same, namely, hemorrhage into the chorion and decidua with resulting separation and expulsion.

Diagnosis.—The diagnosis of abortion demands first of all a correct diagnosis of pregnancy. When one remembers under how many various circumstances a pregnancy may exist, and how every effort will be made in some cases to conceal its existence, it can readily be understood that the obstetrician, called to treat a woman of the childbearing age who has some pelvic pain and hemorrhage may be misled by her intentional statements, together with the circumstances of the case, and may fail to suspect pregnancy or a beginning abortion. Unless the character and circumstances of the patient are known, most of the given history should be discounted. In view of the complications which often occur in these cases, the patient's statement should be recorded.

A diagnosis of pregnancy must first be made and from that point the case should be studied.

Circumstances sometimes arise in which the diagnosis of early pregnancy by ordinary methods is impossible. The following case will illustrate the truth of this remark.

A young married woman, after several months of amenorrhea, had what she described as an unusually profuse period. As she greatly desired pregnancy, the thought of abortion did not occur to her. A physician had examined her who said that she had not been pregnant, but that she had some inflammatory condition of the pelvic organs. She came under the observation of the writer, who found, on bimanual examination, the uterus in normal position but enlarged, the cervix softened and the lower uterine segment present. There was no essential uterine or vaginal discharge. There was slight morning nausea and the patient confidently believed herself pregnant. In order that the case might declare itself, the patient was kept in the hospital, under the observation of an experienced nurse, put absolutely at rest, and no interference practiced with the pelvic organs. Careful but gentle examinations at intervals showed that the uterus was growing smaller, the lower segment disappeared and after a few weeks normal menstruation returned. The patient undoubtedly had been pregnant and, at the time when she supposed she had had a rather profuse period, the product of conception had been expelled. When first seen by the writer, she was not pregnant, but the uterus had been so recently emptied that it still retained the anatomical characteristics of pregnancy. This patient afterward came to abdominal section, at which time an ovarian tumor was found on one side of the uterus and a somewhat cystic ovary in the other. The patient ultimately made a perfect recovery, but subsequent conception has not occurred.

To make a positive diagnosis of early pregnancy, some of the maternal or ovular decidua must be obtained and subjected to microscopic examination. The recognition of the characteristic decidual cells establishes the diagnosis.

The diagnosis of intra-uterine pregnancy having been made, it is next in order to observe whether or not the cervix is to any degree dilated. If the ovum is living and retained, the cervix of primiparous women should be closed in the characteristic manner; in the multiparous woman, the external os may admit the examining finger, but it should not pass the internal os without violence. If, however, the uterus is about to expel its contents, or if it has recently done so, more or less dilatation of the entire cervix is ordinarily present. A vaginal discharge of blood-stained mucus indicates threatened abortion, an abortion begun or an abortion just completed. The brighter the discharge and the larger the quantity of blood, the more active is the process. It is often impossible to obtain from the patient's history an accurate idea of how great has been the blood loss before examination. In dealing with these patients, experienced nurses are accustomed to count the number of

vulval dressings which are stained through with blood, and each dressing thus stained is supposed to contain from three to six ounces of blood. While the thickness of the dressing may vary considerably, this will give some idea of the quantity of the discharge.

The pain of threatened abortion closely simulates that of beginning menstruation, and primiparous patients, not recognizing the existence of pregnancy, frequently believe that a somewhat delayed period is beginning and so make no effort to obtain medical aid. The pain is usually low in the back, extending through to the front of the body, and may be accompanied by irritability of the bladder, and sometimes by straining in the vicinity of the rectum. There is usually slight disturbance of the pulse and temperature, but these are often no more than might be observed at menstruation. If, however, a diagnosis of pregnancy has been established, pain and hemorrhage call attention to the threatened abortion.

A confusing element in these cases arises in married women who may be nursing a child, in whom menstruation has not returned since the birth of the child, and who are completely unaware of the existence of pregnancy.

In the experience of the writer, the wife of a physician was nursing her infant after making a good recovery from childbirth, menstruation not having returned. She was attacked by pain in the back and lower abdomen, with some vaginal hemorrhage, slight in severity, and moderate disturbance of pulse and temperature. A mild epidemic of influenza was present in the community, and her husband was inclined to ascribe her symptoms to influenza. The patient herself thought that menstruation was returning. As the case developed, it proved to be an early abortion without complications. The exact cause of abortion could not be ascertained.

A diagnosis of inevitable abortion depends upon the accurate observation of considerable hemorrhage, with severe abdominal and back pain, these phenomena steadily increasing in severity. There must, however, always remain an element of doubt under such circumstances, for these conditions have sometimes developed under the use of drugs and the pregnancy has remained uninterrupted.

In the observation of the writer, a vigorous young woman, illegitimately pregnant, by describing an imaginary case to a druggist, obtained strychnin and fluid extract of ergot, of which she took double the recommended dose. Her abdominal pain became so severe that a physician was summoned. There was very slight bleeding and pregnancy continued.

Pain alone, or bleeding alone, does not prove an abortion inevitable, but both occurring simultaneously and increasing in severity are strongly suspicious. When both cease, unless the ovum is recognized upon the dressings, it may be found expelled from the uterus and retained in the vagina.

The *diagnosis* of incomplete abortion is made by a careful examina-

tion of all blood-clots and material passed from the uterus. An early embryo, for example, may be detected; but the sac or the embryo may be retained. The uterus does not decrease in size as rapidly as it does when completely empty and very often a slight but continuous discharge of thin blood remains.

The diagnosis of complete abortion is based upon the recognition of the complete embryo. Cases are not infrequently observed in which the entire product of conception, including the chorion and even the placenta, is, in some instances, expelled entire. There remains then only the decidua.

History of Incomplete Abortion.—This process is essentially a miniature labor with the exception of the fact that, to some extent, the ovum separates from the wall of the uterus before the contractions of the womb begin. In normal labor at term, where the placenta becomes altered before uterine contractions begin, unquestionably the supply of oxygen for the fetus is diminished; but in perfectly natural parturition, the placenta does not separate until after the child is expelled. In abortion, the resemblance to labor lies in the gradual development of uterine contractions and in their progressive increase in strength until the product of conception is expelled. The cessation of pain is very noticeable both to patient and physician, as is the cessation of pain after the birth of the child. If the abortion is complete so far as the embryo is concerned, the mother has still to deal with the decidua. In incomplete cases, this sheds off for a varying time with mucosanguinolent discharge.

In healthy vigorous women who are actively engaged, this process does not interfere with the general health nor with usual avocations under ordinary circumstances. However, unless the patient observes a period of at least partial rest with attention to the general health, she may acquire subinvolution of the uterus just as she may after a normal labor. The return of menstruation after abortion will depend upon the physical and sexual activity of the patient. Some patients do not know how often they abort, and only recognize those pregnancies which are successful; in others, menstruation is never, after an abortion, as it was before.

COMPLICATIONS AND RESULTS OF SPONTANEOUS ABORTION

Spontaneous abortion may apparently be a trifling affair, but, if these patients are followed in their subsequent histories, they may be found to have an unusually abundant menstrual discharge and, in some instances, repeated abortion or sterility. In these cases the uterus is never properly contracted, the endometrium has never been normally renewed, and while the patient's general health may apparently suffer but little, the power of reproduction has become permanently impaired. It is not

too much to say that, in many instances, a spontaneous and apparently trivial abortion has a more disastrous effect upon the reproductive power and general health of the patient than has a well-conducted spontaneous birth at term under proper care. It cannot be too strongly impressed upon women who desire to have children that an abortion is a serious matter, and that their future ability to have a child and their good health will depend upon a complete recovery from this accident.

Treatment.—In the presence of an established pregnancy and symptoms of threatened abortion, physiological and mental rest are imperative. To obtain this is often a difficult matter, and, if necessary and unless the transfer would be attended with too much physical and mental disturbance, the patient should be taken to a hospital and put under the care of a competent nurse. If she is to remain at home, much of the nurse's duty will consist in policing the patient's surroundings and keeping away sources of disturbance. Absolute rest in bed, the use of a bedpan for emptying the bowel and bladder, physiological rest for the digestive organs and the use of sedative medicines are indicated. It is often useless to attempt to enforce desired rest without the assistance of an experienced nurse. Patients will assert that they cannot empty the bowel and bladder without assuming a sitting posture, and they cannot appreciate apparently the necessity for absolute rest, yet the majority of spontaneous abortions occur while a patient is straining to empty either the bowel or the bladder.

In selecting food for such a patient, that which is most readily digested and which leaves as little residue as possible in the bowel should be chosen. Milk should be avoided at first for it frequently, in nervous patients, forms a curd which is digested with difficulty. No attempt should be made to empty the patient's bowel in the beginning of the treatment. If she becomes uncomfortable and cannot spontaneously empty the bladder, she should be catheterized as skillfully and as gently as possible. From the first she should be told confidently that abortion is by no means inevitable, that many patients recover and go on to term whose symptoms are as threatening as hers. This may be unwelcome intelligence to her, but if such is the case she is usually ashamed to acknowledge her real desire in the matter.

A guarded statement should be made to her husband and family that, with desired rest and precautions, there is every hope that the pregnancy may continue.

To control uterine pain, opium is usually efficient; this may be given by hypodermatic injections in the form of morphin, while some think that opium placed as near the uterus as possible is especially useful, advising the introduction into the rectum of a suppository containing ½ to 1 grain of the aqueous extract of opium, repeated under the observation of an experienced nurse as the symptoms indicate. The difficulty with the use of these suppositories lies in the fact that the rectum may be full of hardened feces and that absorption is more or less uncertain and slow. Hypodermatic injections of morphin, on the other

hand, act with more certainty and greater promptness. For the psychic effect upon the patient, it is often necessary to give some medicine which can be swallowed and thus tasted. A solution which, in the hands of the writer, has never done harm, consists of sodium bromid, 2 drams, tinct. hyoscyamus and fluid extract of viburnum prunifolium of each 2 drams, with 1½ ounces of simple elixir. This is sufficiently pronounced in its taste to give mental comfort to the patient, and may be used as her nervous condition indicates. It is questionable whether drugs taken into the stomach by nervous patients have much effect.

The specially important part of the treatment is the avoidance of disturbance of the pelvic organs, external asepsis and the careful examination of soiled dressings and all discharges. It is usually necessary for the physician to make one thorough vaginal examination, and this should give him information concerning the condition of the cervix and os and give him some idea of the violence of the pains and character of the discharge; repeated examination should be avoided. As soon as the patient is under the care of the physician, the external parts should be thoroughly cleaned, a dilute solution of ½ to 1 per cent of lysol used, sterile vulval dressings applied and kept in place by a T-bandage. The soiled dressings should be kept for the inspection of the physician, and the number of dressings used in a given time recorded. The usual clinical chart should be kept from the first.

Cases are sometimes seen in which external applications of cold seem to be beneficial. These are usually robust individuals who normally menstruate very freely. Over the lower abdomen should be placed a thin dry flannel (the urinary bladder should first be emptied, if necessary by catheterism) and then upon the flannel a good-sized ice bag which does not leak. This may act as a sedative without bad effect. In some patients there is a certain amount of psychic and physical shock in the case which would forbid the external use of cold. The patient should avoid ice water or swallowing pieces of ice, but her thirst may be quenched with small quantities of fluid as desired. Stimulants should be avoided, even tea, coffee and tobacco, if possible.

The *prevention* of abortion by the treatment just described will depend upon the promptness with which the patient is placed under control, the degree of separation already present in the embryo and the nervous state of the individual. As previously stated, if abortion is inevitable, pain and hemorrhage increase in spite of treatment. Under these circumstances the patient will usually have a paroxysm of severe pain followed by cessation. On changing the dressing, the nurse may find the embryo adherent to the dressing; or the physician, upon examination, may find the embryo, in greater or less integrity, retained in the vagina. If the abortion is complete, as demonstrated by the presence of the complete embryo and the cessation of symptoms, the subsequent treatment may be sufficient rest to procure involution, attention to the functions of the kidneys and digestive organs, examination of the blood to determine the Wassermann reaction and also the presence or absence

of anemia and, if necessary, stimulation of the uterine muscle to secure good involution. If the patient does well and is vigorous, she should use the commode within a week of the complete abortion, for this facilitates the drainage of the uterus and involution. She should not be declared fully recovered until her next menstrual period has come normally, and a normal menstruation has occurred. When this has happened and examination shows that the pelvic organs are normal in size, shape and position, the pelvis free from exudate and no evidence of infection, her recovery may be said to be practically complete.

Much discussion has been given to the treatment of abortion which cannot be demonstrated as complete so far as the discharge of the embryo is concerned. The diagnosis of incomplete abortion may be impossible without dilatation and curettage. Frequently the patient's ignorance of the phenomena of abortion, when taken with pain in the lower abdomen, may lead her to ascribe the pain to intestinal colic and, having a desire to empty the rectum, she may strain violently, and thus expel the embryo, together with feces from the bowel. As water-closets are in common use, the whole mass may be washed down the drain, and thus the embryo may never be seen. A physician called to such a case might have difficulty in making an accurate diagnosis.

Many patients abort because in the first pregnancy the uterus is too poorly developed to permit its normal evolution, and hence it expels prematurely its contents. In these patients thorough dilatation of the uterus, with solid dilators, followed by curettage, disinfecting and packing and the maintenance of the uterus in its normal position until involution is established, may so greatly improve the condition of the womb that subsequent pregnancy may be successful. The questions naturally arise, Shall every case of early abortion be treated by interference? or, Shall only those which furnish positive indications be so treated? and, Does the retention of a portion of the embryo justify dilatation and curettage?

In an attempt to answer these somewhat vexing questions, one must distinguish between the preservation of the patient's life and the saving, not only of her life, but her health, and especially the preserving of the power of reproduction. Unquestionably, cases of abortion receiving none but casual attention are more apt to result in sterility and poor health than cases of abortion, whether complete or incomplete, treated by dilatation and curettage properly performed. The question then arises, When shall a dilatation and curettage be performed? Some believe that the time of the abortion is the favorable opportunity, others would allow the woman to recover from the abortion and, just before or just after the next period, would do the dilatation and curettage.

Abortion, though spontaneous, may be complicated by infection. The vagina in pregnancy always contains bacteria in abundance and these may readily make their way into the uterus. The importance of the beginning abortion may not be realized by the patient, and infection may occur from direct contact.

In the experience of the writer, one of the most virulent streptococcic infections which he has ever seen arose in a married woman in early pregnancy who, when vaginal hemorrhage began, introduced her fingers into the vagina to ascertain the cause of the hemorrhage; although the abortion was spontaneous, a very severe infection developed.

The *treatment* of spontaneous abortion complicated by infection is a matter upon which the obstetrical profession is divided. A considerable number of cases are recorded where such patients received no treatment which calls for interference with the pelvic organs; rest in bed, counterirritants and cold over the abdomen, laxative medicines, forced feeding, fresh air in abundance and such sedatives as are thought necessary to secure sleep made up the treatment given. On the other hand, other clinics, notably those of continental Europe, recently published statistics showing a surprisingly low percentage of morbidity and mortality in spontaneous abortion complicated by fever after prompt and thorough dilatation, emptying and dilatation and disinfection of the uterus. It may aid in making the decision whether to interfere or not, if one considers the question of hemorrhage. If the patient, having had a recent abortion, develops infection and hemorrhage complicates this infection, the indication for interference seems to be accentuated. The hemorrhage seems to point to the retention of some decomposing material. In removing this, it must be remembered that the wall of an infected uterus, recently pregnant, is very easily punctured; hence gloved fingers only should be employed or a very large, blunt-ended curet. In these cases a decomposing piece of early placental tissue or a mass of infected decidua and chorion is frequently found. The emptying of the uterus, the application of iodin to the uterine cavity and the prevention of further hemorrhage by tamponing with 10 per cent iodoform gauze are usually of decided benefit and, in the mind of the writer, this treatment seems indicated. The decision to interfere in a case of spontaneous abortion or to abstain entirely from interference is one of the difficult decisions of obstetrics, and at the present time there are abundant statistics to prove the value of each procedure. It is, then, a matter of individual judgment in a given case and each obstetrician will be guided somewhat by previous experience. It must be remembered that interference with a recently pregnant uterus is an operation demanding skill, experience and judgment, and that the perforation of such a uterus may be followed by fatal peritonitis.

An interesting question arises, Can anything be learned concerning the pathology of a given case of spontaneous abortion by the pathological study of the material expelled from the uterus? In repeated examinations, the writer has found the phenomena of degeneration of the blood-vessels and blood channels of the embryo and decidua to be the predominating pathological entity present. Where the chorion is subjected to microscopic examination, the development of chorionic buds and the condition of their blood-vessels may be of some value.

From these statements, the inference may fairly be drawn that an abortion has resulted from an acute cause, such as mechanical disturbance and, if this is true, the prognosis for future pregnancy is good. If, however, in studying the embryo, the phenomena of degeneration are preeminent and little healthy chorionic or decidual tissue can be found, this points to an infection of the embryo and a chronic toxic process in the mother. An examination of the mother's blood by the Wassermann reaction and an examination of material expelled from the uterus for

FIG. 47.—INCOMPLETE ABORTION AT TWO MONTHS. (Bumm.)
Emptying the uterus by combined manipulation.

spirochetes should establish with reasonable certainty the presence or absence of syphilis.

CRIMINAL ABORTION

The term "criminal abortion" is used to describe the interruption of pregnancy without proper justification.

It must be remembered that, so long as the embryo or fetus is retained within the body of the mother, although it may cease to live, abortion, premature labor or labor at term has not occurred. Criminal is to be distinguished from therapeutic abortion, in which some indica-

tion threatening the life or health of the mother is present and the pregnancy is rightfully terminated.

Criminal abortion may be done by the individual herself or by another. In the eyes of the law, any one aiding or abetting the performance of a criminal abortion shares in the crime.

Criminal abortion is not limited to the unmarried. Frequently married women, not desiring children, deliberately bring about, or cause to

FIG. 48.—PREGNANCY COMPLICATED BY ERODING VESICULAR MOLE. (Bumm.)

be brought about, abortion. Hence, the fact of criminal abortion does not necessarily mean that pregnancy has been illegitimate.

Methods.—Perhaps the crudest method of performing criminal abortion is that in vogue among some of the savage races where the pregnant woman is violently shaken, and the abdomen beaten, until the contents of the uterus are expelled. Among so-called civilized nations, criminal abortion is brought on, or supposed to be brought on, by the use of drugs, by introducing some foreign substance or body within the uterus, by the

use of very hot or very cold baths, and occasionally by intentional violence, as in jumping, running, tight bandaging of the abdomen or rubbing or kneading the abdomen.

So far as the use of drugs is concerned, as already stated, there is no drug which is an absolute specific in the production of abortion; only those drugs whose action is excessively irritating to the genito-urinary organs, taken in large doses so as to produce strangury, may produce abortion; so the irritant poisons, taken sometimes with suicidal intent, during the last hours of the patient may produce abortion. Drugs commonly used for this purpose are: ergot, strychnin, nux vomica, oil of tansy, preparations of so-called Spanish fly—cantharides—quinin in large doses, croton oil, pituitrin and, for suicide, arsenic, bichlorid of mercury and carbolic acid. When opium is used by those intending suicide, laudanum is the preparation most often taken.

The effect of the irritating drugs is to produce violent diarrhea with severe intestinal pain and great irritability in the bladder with frequent passage of urine, pain in the back and in the uterus, vomiting, straining, prostration and, finally, exhaustion. Among suicides, the irritant drugs produce their characteristic symptoms, and opium its fatal narcosis.

The most usual and successful method of producing criminal abortion is by introducing into the uterus a foreign substance which ruptures the envelope of the embryo and causes hemorrhage. The result of this is uterine contraction, death of the embryo and its expulsion. In the hands of the criminal abortionist this is frequently done without antiseptic precautions. A nonflexible metal uterine sound, a speculum and tenaculum forceps for grasping the cervix are instruments most often used.

Sometimes metal or glove finger dilators are employed to open the mouth of the uterus. The more successful criminal abortionists are most careful in avoiding detection. The patient never sees the abortionist nor the abortionist the patient. The patient enters a waiting room, is received usually by a woman assistant, placed in the dorsal position upon a table, the limbs separated by stirrups, the table pushed sufficiently into an adjoining room and a curtain lowered so that the abortionist can perform his manipulation without seeing the upper portion of the woman's body, nor does she see him; for as soon as he has done his work the table is withdrawn and the patient sent away from the office as promptly as possible. She is told that everything has been adjusted and that her period will come on; hemorrhage promptly follows and abortion may or may not become complete. Unfortunately for these patients, the criminal abortionist is not always careful in his antiseptic precautions and septic infection not infrequently develops.

In nonprofessional hands any metallic object or firm rod is thrust into the uterus, an applicator, a piece of wire, a straightened hairpin, the rib from an umbrella, a catheter, a wooden rod are some of the objects not uncommonly used. Occasionally an irritating injection is made into the uterus such as tincture of iodin or glycerin, several ounces, with the

idea of setting up uterine contractions. When the attempt to introduce a foreign body into the uterus is made by unskilled persons, a false passage is frequently made. This is especially true when the woman tries

FIG. 49.—CRIMINAL ABORTION WITH RETROVERTED PREGNANT UTERUS. (Liepmann.)
The sound of the abortionist perforates the uterus.

to operate upon herself. The bladder has been punctured, the rectum has been entered, or a foreign body has been pushed into the abdominal cavity.

On one occasion, a woman presented herself at the Clinic of the Maternity Department of the Jefferson Hospital stating that she was a married woman and had several children. She was pregnant, and had determined that the pregnancy should cease. She had endeavored to introduce an ordinary glass female catheter into the uterus, had put it into the vagina and pushed it up as far as she could when it disappeared; her fingers in the vagina could not find it nor were there symptoms following its passage. She came to the Clinic because she was frightened, and because she had some indefinite pain in the lower portion of the abdomen. Examination showed an early intra-uterine pregnancy and behind the uterus, apparently in the pelvic cavity or at the brim, it seemed that the catheter could be felt by bimanual examination. The tissues were relaxed and the parts dilated by previous pregnancy so that examination was not difficult. The patient was told that in all probability the catheter had been forced into the abdominal cavity, and that unless she received prompt attention very serious consequences might follow. She accordingly entered the Maternity Ward, and under anesthesia and antiseptic precautions the writer opened the abdomen. The catheter was lying among the intestinal coils, a portion projecting above the pelvic brim, and some of the intestines had prolapsed into the pelvic cavity. There had been no bleeding, and by inspection the point could not be found at which the catheter had entered the abdomen. The catheter was removed intact, and the abdomen closed without drainage. The patient made an uninterrupted recovery and went to term and subsequently gave birth to a living healthy child. The catheter was found to be filled with dried material and the patient stated that it had not been used for a long time; this dried material looked like dried urine and sediment. The catheter was sent to the Bacteriological Laboratory where it was broken and its contents examined; bacteria in abundance were present in the catheter.

The only reasonable explanation of the case seems to be that the woman had probably pushed the catheter into the cervix and then through the lower uterine segment into the lower abdominal cavity. Her uninterrupted recovery demonstrated the power of the peritoneum to resist infection.

With rude and violent manipulation there seems to be no limit to the variety and fatal character of injury which may be inflicted in the effort to produce criminal abortion.

Medicolegal Aspects.—Certainly, in most of the states of the United States, criminal abortion is definitely held as criminal and the performance is punishable by confinement in the penitentiary and by fines for the perpetrator and abetter. The criminal character of the performance is sometimes masked by the so-called operation of dilatation and curettage, performed for chronic endometritis. This may be performed by a legally qualified physician and may be done in a sanitarium, so-called, or at the home of the patient. Antiseptic precautions are observed, anesthesia is carefully given, the uterus is dilated and its contents, so far

as possible, removed by the curet. Packing is then inserted and the case is treated competently by the usual methods. As might be expected, the majority of these cases recover without complication. The detection of the pregnancy is sometimes made by nurses and attendants when the material removed from the uterus is inspected, but often the operator proceeds in such a manner that this material is not available for inspection. Occasionally a designing patient, wishing to rid herself of an impregnated ovum, will go to the office of a physician and request a thorough examination. She may have learned the symptoms of chronic endometritis and, describing them without making known her purpose, she may induce the physician to make a thorough examination, including the introduction of a sound. Hemorrhage may follow immediately or, if not, the patient will leave the office hoping and expecting that abortion will shortly occur. In such a case the physician may not have intended to do a wrong action, but he has been indiscreet in introducing, within the uterus of a patient, a foreign body without a thorough examination and diagnosis before invading the uterine cavity.

The detection of criminal abortion and the apprehension of the perpetrator is not always an easy matter. Where women perform the operation upon themselves, the authorities are usually lenient with the woman, and rarely cause her arrest even though the crime becomes known. As a rule, the patient will not give the name of the abortionist and, as she may never have seen him, she probably cannot identify him. When such a patient becomes fatally ill, officers from the coroner's office or from the police department can sometimes procure from her the name of the guilty person.

Physicians are often greatly annoyed by finding themselves concerned with these cases. A physician is called to a young woman, unmarried, who complains of a very painful menstrual period, and who is found with fever, moderately distended abdomen and signs and symptoms of pelvic peritonitis. There is a bloody discharge from the vagina. A false story or the absolute refusal of the patient to say what has happened may be the only information obtainable. The question arises, What is the duty of the physician under these circumstances? He may be morally sure that a criminal abortion has been produced or certain that an attempt has been made, and yet the proof is not at hand.

In the experience of the writer, it seems wisest immediately to transfer these patients to a hospital, and then from the hospital to notify the authorities that a suspicious case has been encountered. The name of the patient need not necessarily be given, and her confidence and reputation should be guarded as carefully as possible. At the same time, the physician should at once place himself on record as communicating with the authorities as soon as his suspicions are aroused. As a rule the authorities will instruct him to treat the case to the best of his judgment. If in any way the name of the abortionist becomes known, such information should be given to the authorities. If the patient becomes critically ill and a fatal termination is feared from septic infection

and peritonitis, the authorities will take a statement from the patient and endeavor to ascertain the name of the guilty party. Should death occur, the case becomes a coroner's case and he will perform an autopsy and do all in his power to secure the ends of justice. In this way it is believed that no professional confidence is violated. The reputation of the physician himself is safeguarded and the ends of justice are best served.

Some curious and extraordinary complications arise in the matter of criminal abortion. On one occasion, the writer was called in consultation with other specialists by the father of a young woman who had recently married. There was much wealth and social position, and the mother of the patient was ambitious that, in the first year of her married life, her daughter should have a brilliant social success. Some irregularity of menstruation occurred and the mother became convinced that her daughter was pregnant. As social activities must not be interrupted by pregnancy, the mother took the daughter to a criminal abortionist who introduced a sound into the uterus and told the mother and daughter that matters would adjust themselves speedily. Considerable fever and pain developed and two physicians were called in who curetted the uterus. The patient grew worse and the father then interfered, changed the school of practice and summoned two obstetricians, a surgeon and an ophthalmologist. Among these was the writer. We found a fearful case of streptococcic infection which had penetrated the blood stream. Every laboratory facility was employed in making the diagnosis concerning which there could be no doubt. The case ran a most violent and rapid course, blindness supervening from embolism of both retinal arteries. Meningitis developed and the patient died a miserable death. In the irony of fate, neither my colleague nor myself could find the slightest evidence that the woman had been pregnant.

Married women sometimes acquire by personal experience a knowledge of what to do to rid themselves of impregnated ova. A patient once remarked that if she could become thoroughly seasick she knew that she could be relieved; she accordingly welcomed an opportunity to go upon a yacht for a day's sail, and at the end of the day landed thoroughly nauseated and sick. As soon as she could go to a toilet and empty the bowels, she emptied the uterus at the same time.

Treatment.—The treatment of a case suspected as criminal abortion consists in transferring the patient to a hospital, absolute rest in bed under the care of an experienced nurse and, certainly at first, the avoidance of interference with the uterus. A dry ice bag over the abdomen, laxative medicines, liquid food and sedatives may be used. The blood should be at once cultured to determine the question of a blood-stream infection. If a vaginal examination is made, it should be done as gently and as carefully as possible. The condition of the cervix is to be noted, material found in the vagina should be examined and a note made of the presence or absence of tenderness about the uterus. After the authorities have been notified, the obstetrician is free to invade the uterine

cavity if he thinks it advisable. If he does this at once and the patient dies, and an abortionist is charged with the crime, the counsel for the abortionist will maintain that the abortionist, if he really treated the patient, did no harm and that she died as the result of the curettage

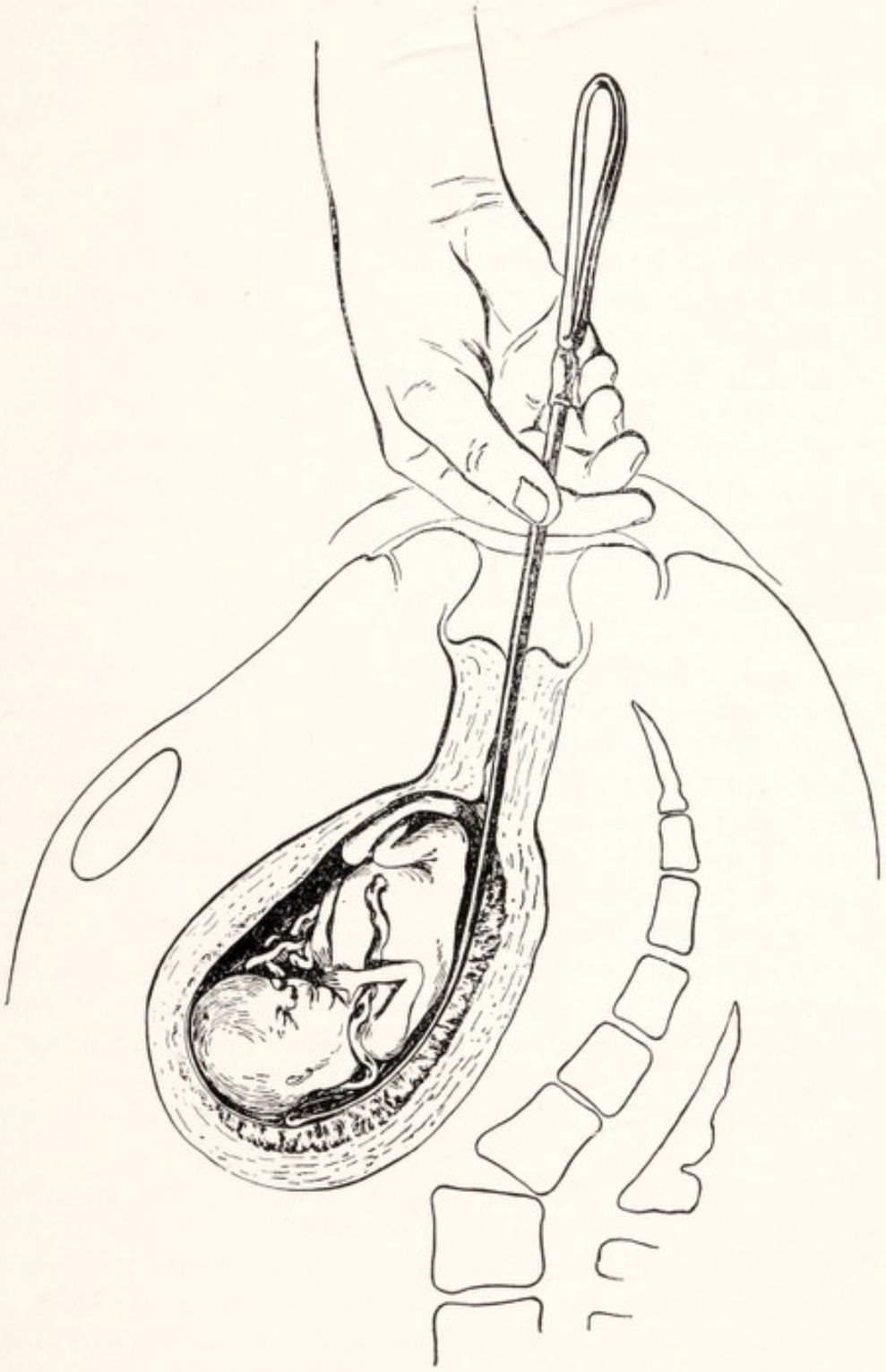

FIG. 50.—TERMINATION OF INCOMPLETE ABORTION BY INTRODUCTION OF CURET. (Liepmann.)

done in the hospital. Hence, the precaution must be taken to establish the patient's condition before the curettage.

As to whether the uterine cavity should at once be invaded or not, is still under discussion among obstetricians. If the blood culture shows the presence of streptococci, the invasion of the uterine cavity will do

little or no good; the disturbance thus created may only aggravate the situation. If, on the other hand, the blood is sterile, the cervix is partly open and there is hemorrhage, it is justifiable from the standpoint of obstetric science to clear out the uterine cavity. This may be done very cautiously with a large, blunt-ended curet or with the fingers of the gloved hand. There is great danger of perforating the wall of the uterus in these cases, hence the utmost precaution must be taken. It is well to abstain from douching the uterus, but it may be gently wiped out with sterile gauze. Tincture of iodin and a light packing of 10 per cent iodoform gauze may be used.

If the uterus is retroverted, it should be placed in the proper position and retained there by a moderate vaginal packing. A dry ice bag over the abdomen, frequent emptying of the urinary bladder, laxatives, liquid diet and such sedatives as are needed may complete the treatment. The packing should be removed within forty-eight hours and thoroughly examined to observe the presence of fragments of the ovum. The patient's convalescence should not be hurried and she should not be discharged as well until the pelvic organs are normal in size, shape and position, the uterus naturally movable and no exudate or evidence of inflammation in the pelvis.

The Treatment of Septic Infection.—Treatment of these cases is often rendered difficult by the fact that many of them bleed profusely before they obtain reputable and proper care. There is often added to shock the depressing influence of the knowledge of the patient's desperate plight and sometimes the fear of death. Under these circumstances, powerful and depressing remedies should be avoided. The writer is not convinced that antistreptococcic serum or autogenous vaccines do these patients good. He has, however, seen the best of results from 20 c.c. of sterile horse serum injected two or three times daily, fresh air, forced feeding and good nursing. The circulation may require stimulation by strychnin and digitalis. Alcohol is useful as a sedative, and the application of dry cold. Hysterectomy is rarely if ever indicated for, when the indications are clearly established, the infection has entered the blood stream, as a rule, and the operation is too late. The opening of pelvic abscesses through the posterior vaginal wall is always indicated, or, if the operator prefers to open the abdomen behind the pubes and introduce through and through drainage, this is occasionally successful. In the first days of the treatment, persistent hemorrhage, partly dilated cervix and a large uterus justify dilatation and the emptying of the uterine cavity, but afterward this should be avoided.

Results of Criminal Abortion.—The mortality of these cases, from the circumstances in which they arise, must always be considerable. The sooner they enter a hospital under reputable care, the better for the patient. The morbidity is that of chronic pelvic infection, and will depend considerably upon the vigor of the patient, her power of resistance and the conditions under which she lives. Radical operation should be deferred until ample time has been given for the pelvic infection to clear

up. It might finally be necessary to remove an infected tube, but this should not hastily be done.

THERAPEUTIC ABORTION

Indications.—When a woman is pregnant and the pregnancy so complicates her health and vigor as to jeopardize her life or the success of her pregnancy, it may be right to end the pregnancy. A clear case of the sort is found in a patient with a badly diseased heart in whom compensation is maintained with the greatest difficulty and who unfortunately in this condition becomes pregnant. Pregnancy is followed by rapid and great increase in the patient's distress and compensation begins to fail; all other methods of treatment are faithfully tried without success and there is no reason for believing that the patient can carry the product of conception to viability. Under the best of conditions the pregnancy will shorten the patient's life, and it is justifiable from the standpoint of obstetric science to terminate the gestation.

Severe toxemia in early pregnancy, characterized by pernicious nausea, is another condition which may justify therapeutic abortion. Pregnancy occurring in tuberculous women, or a multipara living under unfavorable conditions for the maintenance of health and life, may have the pregnancy stopped; but, if this be done, sterilization should accompany the termination of pregnancy. In patients who have every desire to produce healthy children, a first pregnancy may be difficult, the labor complicated and the mother's recovery also prolonged and complicated. Although precautions are taken to avoid conception, within a year this patient may find herself again pregnant. In cases such as this it may be best to terminate the early pregnancy and put the patient in the best possible condition before another pregnancy supervenes. If the woman be in the early years of childbearing, she may subsequently bear children without injury to her health and with the production of vigorous offspring.

The determination to produce therapeutic abortion in cases under the care of a general practitioner should not be hastily made. A physician must be sure that he is dealing with an honest patient who is not endeavoring to work upon his sympathies to accede to her desire to rid herself of the ovum. It is well in these cases to have a consultation of one or more physicians of acknowledged reputation. An envious rival in the community may take the opportunity to circulate rumors injurious to the reputation of a recent comer in the profession, if a pregnancy is hastily interrupted.

When cases are under the care of specialists whose reputation for scientific knowledge and judgment is established, it is not usual to hold a consultation. Obstetricians do not interrupt pregnancy without good reasons and their knowledge in diagnosis is such that they are not easily deceived.

In proposing therapeutic abortion, the obstetrician may find that the

patient and her friends have religious scruples against the interruption of pregnancy. An effort is sometimes made to avoid this issue by stating that the embryo is already dead, that the disease or condition which threatened the mother has destroyed the life of the product of conception and, therefore, the operation proposed is simply a dilatation and curettage and not therapeutic abortion. This is begging the question, and if the religious scruples of the patient and her friends forbid the operation, they must assume the responsibility and consequences of their decision.

Method.—It must be stated as plainly as possible that, at the present time, the induction of therapeutic abortion has been abandoned in the great majority of cases.

It is true that packing the cervix with sterile gauze will ultimately produce abortion; so will the injection of glycerin into the uterus; so will the introduction of a slender bougie. But all of these methods are uncertain, tedious, annoying to the patient and very depressing. As anesthesia has become a specialty in obstetrics and surgery, we are enabled to give these patients anesthesia by different agents with preliminary treatment, so that it is exceedingly rare to encounter a case that cannot be safely anesthetized. Ether and oxygen is the anesthetic of choice. The patient may ask for gas but, if this is used, it should soon be discarded for ether and oxygen. The operation consists of dilatation by solid dilators, the urinary bladder being completely emptied by catheterism. The obstetrician having made a thorough bimanual examination, the cervix is grasped by tenaculum forceps, and the cervix gradually dilated. When the largest of the solid dilators can be carried through the cervix, a large, blunt-ended curet may be cautiously inserted and gently carried back until it strikes against the posterior uterine wall, keeping in mind that the wall of the uterus is softened by pregnancy and that it may easily be perforated. This will give the obstetrician a good idea of the size and contour of the uterus. The curet should then be carried over the surface of the uterine wall from behind forward, and the character of the material brought away should be noted as it emerges. Decidua will certainly appear and very probably a part or all of the embryo. The dilator should again be inserted, and the uterine cavity gently sponged out and packed with 10 per cent iodoform gauze. The uterus should be placed in good position and the cervix carried backward by a moderate vaginal packing of sterile or bichlorid gauze. All packing should be removed within forty-eight hours and, during convalescence, if the cervix has been eroded, it is often useful to give a daily vaginal douche of 1 per cent lysol. Strychnin and ergot may be given in tonic doses and attention to the correction of anemia, or whatever condition may have been present which justified the interference, must not be neglected.

In the toxemia of early gestation, with pernicious nausea, the patient's nausea is at once relieved by the dilatation and curettage. In heart cases, the relief is not so prompt; and in tuberculous patients,

the morning sickness of pregnancy should immediately cease and the appetite of the patient should promptly improve.

In skillful hands, therapeutic abortion has almost no mortality, and in properly selected cases its results are very gratifying.

Abdominal Therapeutic Abortion.—Newell, under this heading, has called attention to the interruption of pregnancy for therapeutic purposes, accompanied by sterilization and effected by abdominal incision. Continental obstetricians have also employed this method. Many of these patients cannot bear inhalation anesthesia; if the condition justifies it, such may be given morphin and scopolamin hypodermatically, the ears filled with cotton and the eyes bandaged, and the patient brought into a somnolent condition. The abdominal wall is infiltrated with ½ per cent novocain; the broad ligaments are infiltrated after the abdomen is opened. The uterus is opened, its contents removed and the finger or forceps passed through the cervix to permit drainage, and perhaps a strip of gauze is left through the cervix as a drain. The uterus is then closed and sterilization is effected by excising the uterine end of the fallopian tubes and also a considerable portion of the tubes. The wound in the uterine wall is accurately sutured.

In a pregnancy near term complicated by a serious condition of the heart, the writer, under local infiltration, opened the abdomen, incised the uterus, emptied and closed it, and then infiltrated the broad ligaments separately and completely removed both fallopian tubes, closing over the peritoneal edges of the broad ligaments. The patient suffered little or no pain during the operation; convalescence was uninterrupted. The child was born living, and the patient subsequently enjoyed as good health as the condition of the heart would permit.

In other cases, where inhalation anesthesia may be given, the writer prefers to perform abdominal therapeutic abortion by supravaginal hysterectomy; in young women, removing the tubes as well and allowing the ovaries to remain; in women of forty years or more, removing the ovaries as well. If the patient's condition justifies it, the appendix should be removed.

In a number of tuberculous patients, with a preliminary injection of morphin and atropin, ether and oxygen have been well borne; there has been no bronchitis nor pneumonia afterward and the patients have made uninterrupted recoveries.

The Prevention of Abortion.—No reliable statistics can be collected concerning the frequency of abortion. Women do not tell of its occurrence under ordinary circumstances, and many cases never come to the observation of a physician. Among vigorous women who do out-of-door labor, the patient may not take more than a day or two of rest after a spontaneous abortion and, unless inflammation follows, no more after a self-inflicted abortion; hence they do not come under medical observation as sick persons.

The prevention of abortion is connected in the minds of the public, and of those who are working for the betterment of the race, with the

question of birth control. It is recognized that conditions may arise where children cannot safely and properly be produced. The question of the propriety of physical examination of men and women before obtaining a license to marry may properly be considered, but at present no such uniform regulation exists. There is, however, an increasing tendency among thoughtful and conscientious persons to have a physical examination in both men and women before marriage, and this tendency the medical profession should encourage.

Among those upon whom the burden of life rests heavily and yet who desire to fulfill every duty, including that of mutual affection, married persons may find that they have as many children as they can hope to care for, and the health of one or both parents is such that an additional burden cannot be undertaken. Under these circumstances, advocates of birth control are themselves fertile with suggestions regarding abstinence from intercourse and methods taken to prevent conception. These suggestions are more the result of ignorance and audacity than of good sense and experience. The difficult problem arises, How shall such persons continue a natural and affectionate life without unduly increasing their burdens?

Obstetricians here have a distinct duty which they should not avoid. It is perfectly justifiable to use simple methods to avoid conception such as a vaginal douche immediately after intercourse; but all methods of preventing conception, except total abstinence, often fail when there is the best of reasons for their success, while persons who earnestly desire children and should have them are frequently unsuccessful; hence no positive reliance can be placed upon advice on preventive measures.

Obstetric surgery under proper conditions can solve the question by the performance of abdominal section, supravaginal hysterectomy and removal of the fallopian tubes. In younger women the ovaries should be left, while in women near the menopause, they may properly be removed. The removal of the appendix may complete the operation. In the observation of the writer, the best of results have followed this procedure. If a pregnancy be present, unless there is an urgent indication for terminating it, the patient should be carried to full term and elective cesarean hysterectomy should be done. This spares the woman the uncertainty and pain of labor and secures the child. If thought best, the uterus and ovaries may be left and the tubes removed.

The after health of these patients is excellent; where one or both ovaries remain, the patient menstruates through the uterine stump; menstruation is usually regular and painless and the patient escapes the inconvenience of a sudden menopause. In other cases the removal of the ovaries seems to benefit the general health, and especially is this true if the operation is done at full term and if the mother is successful in nursing her child. Lactation is indefinitely prolonged in these cases, and this fact and the maternal interest in the new child reduces the annoyance of the menopause to a negligible degree. Obviously the decision to perform sterilization is to be made by experts only, with the

full consent of husband and wife, and the medical profession is the safest and most truly considerate guide for these patients.

Abortion and Sterility.—Some of the saddest disappointments of married life arise in patients who lose the first product of conception and have no further pregnancy. If an accurate history is obtained, it usually is found that the abortion was badly managed; the cause of the abortion was not accurately recognized and not afterward removed. For example, a woman with an ill-developed uterus, ignorant concerning matters of reproduction, becomes pregnant not long after marriage and, busy with everything but the care of her health, through carelessness, overexertion and exposure, has an early abortion. Too careless or too heedless to have proper medical attention, she makes light of the fact and there supervenes a condition of chronic endometritis, salpingitis and perimetritis. After some time this becomes evident in painful menstruation, indefinite pain and distress in the lower abdomen, and suspicion of appendicitis may be aroused. In some cases the appendix is removed, but the patent is only slightly benefited. There is no formation of pus in these patients, but there may be some adhesions which limit the mobility of the uterus and the patient's general health is permanently impaired. Sterility may result from the chronic salpingitis and endometritis. Many of these patients have a sharp flexion of the uterus which might have been greatly lessened by the proper management of the abortion.

The campaign against abortion requires mental and moral education, addressed to men and women alike, and also certain economic reforms. For the good of the nation and of ourselves, comparatively early marriage is desirable, but this is impossible without the means of earning a livelihood. Hence, a living wage, decent living conditions and the ability to accumulate savings are important in encouraging marriage and the production of healthy children and the avoidance of purposeful interruption of pregnancy. Vice and crime are lessened in proportion as healthy early marriage becomes possible.

The education of boys and girls alike, to inform them concerning gonorrhea and syphilis, should tell them of the essential facts of reproduction and give them some idea of the benefit and happiness which healthy children may bring to healthy parents. Clergymen of all denominations are always a great aid to the medical profession in the effort to give proper advice and education, and oftentimes doctor and clergyman may combine their efforts to advantage. In schools, in large manufacturing establishments, wherever young people are thrown together, by education, whether from books or from illustrated lectures, the essential facts of reproduction and sexual hygiene should be clearly taught. The false shame and modesty which leads a woman to conceal the fact of legitimate pregnancy should, if possible, be removed.

It is of especial importance that women should be impressed with the gravity of an abortion as regards their future health and the avoidance of sterility. With a working woman it is easy to understand that

she minimizes her illness and accidents to do the work which she believes to be necessary. Among others devoted to pleasure and fashion, pregnancy may not be desired, but such will usually heed the fact that an abortion may injure their general health, ruin the beauty which they imagine they possess and interfere with their social obligations. A woman who is proud of her record in sports may be willing to recover properly from abortion, fearing, if she does not, that it may injure her golf game!

The prosperity of a nation depends in no small degree upon prevention of abortion among its population. Before the late War, the armies of continental Europe had, constantly under arms, large numbers of men forbidden to marry; cohabitation was not only not forbidden, but encouraged; continental governments provided hospitals and infant asylums to save the population thus produced, since boys were needed for soldiers and girls for servants. Under these conditions, the percentage of criminal abortion was surprisingly small, for pregnancy was considered a natural thing, even aside from marriage, the results being cared for by a government which believed it a wise policy to take these precautions.

Under our civilization, a different state of affairs has existed, and the percentage of criminal abortion has, unfortunately, not been small, because in many instances economic conditions make early marriage very difficult or impossible. The remedy for this state of affairs lies not in a large standing army with a government control of the population, but in just, decent and fair economic conditions which make a decent and natural life possible for all.

The Mortality of Abortion.—As in many other cases, the reported mortality of abortion varies greatly. A low estimate by those who do not favor interference gives 2 per cent without interference, 11 per cent with interference. On the contrary, those who favor interference might be inclined to reverse these statistics. Unquestionably interference improperly made, and the presence of streptococci, greatly increase mortality. Where no streptococci are present, although a mixed infection may develop from staphylococci, the mortality should not exceed 4 per cent. With the presence of streptococci and interference, it may readily reach 8 or 10 per cent.

Frequency of Abortion and Its Relation to Labor.—In pre-wartimes it was observed that young women most often aborted, and that the percentage of abortions in the Negro was less than in the Caucasian. An estimate of 25 per cent of all pregnancies terminating in abortion is probably not too great at the present time, and shows the influence of disturbed conditions throughout the world. In the centers of war and famine the percentage of abortion rose to between 80 and 90 per cent in all pregnancies. Fever develops after abortion in from 20 to 25 per cent.

The relation of abortion to subsequent labor in ordinary times has been reckoned as one abortion to from five to ten labors. Among

peoples and in cities suffering most from war, fifty abortions occurred and one natural labor. In the population of the United States under ordinary circumstances, the proportion of abortion to labor is practically the same, 4.54.

It is interesting to observe that those who have not had experience in obstetrics will often decide that pregnancy must be interrupted when such is not the case. Thus, in large maternity hospitals, from 40 to 50 per cent of the cases sent in for therapeutic abortion are found not to be suitable, and the operation is declined by obstetricians.

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CHAPTER XII

INFECTION OF THE GASTRO-INTESTINAL TRACT

Pregnancy complicated by infection of the gastro-intestinal tract—Appendicitis in pregnancy—Colicystitis complicating pregnancy—Inflammation of Meckel's diverticulum during pregnancy—Enteritis and gastritis complicating pregnancy—Pregnancy complicated by ulcer of the stomach and duodenum.

The development of abdominal surgery and bacteriology has taught us to recognize infection of the gastro-intestinal tract as a frequent source of disease. Before this period, the pregnant patient was known to be often obstinately constipated and, like other patients, occasionally to be the victim of inflammation of the bowels. Further than this our knowledge did not go concerning this subject.

At present, we recognize the fact that during pregnancy mechanical conditions predispose to the development of infection of the gastro-intestinal tract. Bacteria are always present in this portion of the body during life and digestion. The pressure of the growing uterus and its contents interferes with the circulation of the blood and lymph in the stomach and intestine, with the discharge of bile from the gall-bladder and with the passage of the secretions of the gastro-intestinal tract. Fecal matter is unduly retained, and hence bacteria which swarm in the intestine have an extraordinary opportunity to increase in number and virulence. Chief among these is the B. coli communis, accompanied by the streptococci, staphylococci and less virulent forms of bacteria.

It must be remembered that it is not the presence of fecal matter alone in the intestine which predisposes to infection, but the condition of that fecal matter and other factors. The writer had occasion to investigate by autopsy the abdomen of a woman who died of pneumonia soon after delivery. On opening the intestines, dried and hardened fecal matter was found present to a considerable extent, which had become so thoroughly dried and hard that, under the pressure of the pregnant uterus, it was about to perforate the wall of the intestine. Had the woman survived this accident, undoubtedly peritonitis must have developed, but, as she did not live to have actual rupture of the bowel occur, there was no sign of peritonitis at autopsy.

If the pregnant or recently delivered patient who has been constipated is given salts in several rather large doses, the bowels may discharge freely, but the patient will also have considerable disturbance of pulse and temperature, often accompanied by sweating. This is an active toxemia produced by the absorption of dissolved fecal matter.

On the other hand, if the pregnant patient is given compound licorice powder in small but repeated doses for several days until fecal matter has been softened, and then refined petroleum is freely given, followed by copious irrigation of the bowels, the bowel may be emptied thoroughly without irritation.

Modern medicine seeks to escape the irritation of the patient's intestine by the use of purgative drugs for repeated and habitual constipation. Refined petroleum, irrigation of the bowels, calisthenic exercises and selected diet, free use of water and fruit juices, massage of the abdomen, the external use of heat, cold baths, or bathing and electrical treatment, are all invoked to avoid the irritation of the mucous membrane of the gastro-intestinal tract by purgatives and drugs. There has been also a pronounced change in the attitude of abdominal surgeons concerning the preparation of patients for operation in the abdomen which may call for operation upon the intestine. It is recognized that the use of purgatives and laxatives just before such an operation may be the cause of an accumulation of fluid or semiliquid feces in various portions of the bowel. This material swarms with bacteria and if, during a resection of the intestine, it soils the wounds or points of suture of the intestine, infection may develop. Hence, we now abstain from the use of purgatives or laxatives for thirty-six hours preceding an operation, contenting ourselves with simple enemata to cleanse the lower bowel.

The same principles of treatment apply in the care of pregnant patients to avoid the development of infection of the gastro-intestinal tract. The use of irritant purgatives during pregnancy may be followed by an acute infection of the intestinal lymphatics and death from peritonitis. This the writer demonstrated in the case of a negro dwarf who, at the latter part of pregnancy, endeavored to destroy her fetus and secure its expulsion by taking irritant drugs which produced a violent diarrhea. It was necessary to deliver her by operation, which was followed by peritonitis and death. At autopsy, the operative wounds had closed and were sterile as shown by inoculation and culture. The lymphatics of the mesentery and omentum were actively injected and, on opening the intestine, small points of ulceration were found scattered throughout its surface. On culture these were found to contain colon bacilli, streptococci and staphylococci, but no evidence of typhoid infection could be found. So intense was the process and so extensively involved were the intestinal lymphatics that a rapidly fatal general peritonitis had developed. The same fatal process is occasionally seen in the nonpregnant.

The lesson from these facts, as applied to the care of parturient women, is that the obstetrician should be on the lookout for the development of infection of the gastro-intestinal tract complicating pregnancy. In selecting methods of treatment for the habitual use of pregnant women intended to avoid obstinate constipation, the use of irritant drugs should be omitted. The regular employment of refined petroleum, fruit juices, water, cereal foods, vegetables and the habitual use

of other hygienic measures should be considered of great importance and maintained during the patient's pregnancy.

APPENDICITIS

Probably the most frequent infection of any portion of the gastro-intestinal tract complicating pregnancy, which develops sufficiently to be diagnosticated and treated, is appendicitis. This may occur as an original and acute attack or may be the lighting up of a chronic process which has been present for some time. The infective agent is usually the colon bacillus, with streptococci and staphylococci. The symptoms are pain over the region of the appendix, followed, or accompanied by, nausea and vomiting and rigidity of abdominal muscles; pain also referred to the left side of the lower abdomen; loss of intestinal peristalsis; irritability of the bladder and rectum; sometimes a chill; fever of varying degree; disturbance of pulse and considerable leukocytosis or an abnormally low leukocyte count and considerable general discomfort and often nervous disturbance.

The Differential Diagnosis of Appendicitis.—This is sometimes by no means an easy matter. In cases of chronic appendicitis complicating pregnancy the pain may be no more severe than that of a slowly developing right tubal gestation. During pregnancy, both ovaries are unusually tender and, when the obstetrician examines the abdomen of the patient, pressure in the lower abdomen on both the right and the left sides causes pain; so, too, may a distended bladder on pressure. An acute intestinal colic with ovarian tenderness may simulate appendicitis. A slowly rupturing tubal right-sided pregnancy may give the tenderness, partial rigidity of abdominal muscles, leukocyte count, slight fever, disorders of pulse, nausea and vomiting of a mild appendicitis. Conditions may arise in which an absolutely accurate diagnosis of the intra-abdominal condition may be impossible before operation.

But, while this may be true, the conditions may be such that the indication for prompt abdominal section is clear. Of two evils, prompt abdominal section in competent hands and in a good hospital is far less dangerous than the uncertainty of a slowly rupturing tubal pregnancy or developing appendicitis, intussusception and ruptured vein in the broad ligament, or any other intra-abdominal complication. Hence, the obstetrician may feel no hesitation in operating promptly where any of several conditions may be present to justify the procedure.

Comparative Severity and Danger of Appendicitis.—The later in pregnancy appendicitis develops, the greater the danger. The earlier in pregnancy appendicitis develops, if it be promptly recognized and treated by operation, the less the danger. This arises from anatomical conditions peculiar to early and late pregnancy. In early pregnancy, even though the appendix is adherent, the operator can gain access to it without great difficulty. Even though appendical abscess is present,

the size of the uterus in early pregnancy is no great obstacle to its proper drainage. After the fifth month of pregnancy the size of the uterus is an important complication. If an abscess is not present, the removal of the appendix may be accomplished with comparative readiness, but, following the operation, the uterus is of sufficient size to cause pressure upon the intestine and thus increase the liability to distention of the bowels and of ultimate intestinal paralysis. If appendical abscess has formed complicating late pregnancy, it may be necessary first to empty the uterus by cesarean operation and, after this has been accomplished and the uterus closed, to deal with the appendical abscess.

In removing the appendix during pregnancy, it must be remembered that the operation and the disease expose the patient to the danger of prompt emptying of the uterus. In the later months the uterine contractions may disturb the site of the appendectomy and, if adhesions have been many and complicated, the action of the uterus may open fresh surfaces, induce hemorrhage and further the development of intestinal adhesions. The risk of abortion in early pregnancy following appendicitis is not great and, in the experience of the writer, abortion has been of rare occurrence under these circumstances. Where the appendicitis did not produce adhesions, abortion need not increase the patient's risk. So great, however, is the added danger of appendicitis at term that many obstetricians would, without the presence of abscess, first empty the uterus by abdominal section and then remove the appendix.

Prevention.—This serious complication should if possible be prevented, and what has been said about the conditions predisposing to infection of the gastro-intestinal tract suggests that the most successful method of preventing such development is in the hygiene of pregnancy.

Treatment.—The majority of obstetricians at present remove the infected appendix as soon as an accurate diagnosis of the condition can be made. So uncertain is this complication that the temporary subsidence of the attack of appendicitis complicating pregnancy should not give a false idea of security to patient or physician. In performing the operation in the earlier months of pregnancy, it must be remembered that incision in the median line is preferable. Women wear the appendix habitually in any but the usual location, and the pregnant woman outdoes her sisters in the extraordinary positions in which she locates the appendix. Three abnormal positions of the appendix may be recognized during early pregnancy: first, the appendix may be attached to the right broad ligament, sometimes to the uterus; second, it may be behind the ascending colon, practically upon the posterior wall of the abdomen; and third, it may be as high up in the abdomen as possible. When, therefore, it is not readily found at or near the usual location, these three possible sites should be investigated,

In preparing the pregnant patient for appendectomy, as has been suggested, purgation should be avoided. At most a simple enema is all that is necessary. The operator should be prepared to irrigate the

patient's stomach before she wakens from anesthesia, for this may considerably lessen her discomfort during her convalescence. A preliminary injection of morphin and atropin is often of advantage.

The method of removing the appendix during pregnancy depends upon the individual experience of the operator. Care, however, should be taken in all cases to make as little traction as possible upon the tissues and to disturb the uterus, tubes, ovaries and broad ligaments as little as possible. The opportunity should, however, be taken thoroughly to examine the pelvic organs, for occasionally a small ovarian tumor, or a salpingitis, or some other abnormal condition may be discovered. After the removal of the appendix, lines of suture should be covered by very fine suture material which brings together clean peritoneum. Intestines should be gently replaced in their normal position and the abdomen closed.

Where appendical abscess is present, drainage should be effected by a stab wound of the abdominal wall at the most advantageous point. Such drainage may be effected by a soft rubber tube or a rubber-wrapped strip of gauze. Several strands of silkworm-gut tied together, a narrow piece of thin rubber tissue or a narrow strip of gauze may be used.

If the obstetrician were confronted by an appendical abscess with many adhesions and chronic suppurative inflammation in the fallopian tubes and surrounding tissues and the patient were at term, the question would arise of the necessity for emptying the uterus, performing supravaginal hysterectomy with removal of affected tubes and draining the appendical abscess. While such a serious complication is rare, it has occurred and occasionally may be encountered.

After-treatment.—The after-treatment of the pregnant patient from whom an infected appendix has been removed consists in absolute rest and quiet and the hypodermatic use of sufficient morphin to bring relief from pain. If the patient can swallow and retain fluid, water should be given in small quantities as freely as possible and thus the necessity for giving fluid by the bowel may be avoided. Should the patient's blood-pressure be low at the time of operation, it may be wise, while she is under anesthesia, to give a moderate intravenous injection of glucose and sodium bicarbonate. This provides fluid for the time immediately following the operation. Unless positive indications arise, the bowels should be disturbed as late as possible after the operation, this not only to avoid disturbing the site of operation, but also to spare the patient the risk of exciting uterine contraction. If she can take liquids such as fruit juice, albumen, strained gruel, broth, raw egg, peptone with fruit juice, which leave no residue in the bowel, the moving of the bowel may be postponed for a number of days. When this has been accomplished and the patient is taking semisolid food with a normal pulse and temperature and without tenderness, her convalescence has begun. An unusual period of rest should follow the operation in a pregnant patient to be sure that the interruption of pregnancy is not excited. If there is drainage in the abdomen, she should cautiously assume the Fowler or

similar position, and this position may be taken by any pregnant patient if the indications demand. Here, again, in late pregnancy it might be very difficult to have such a patient in the Fowler position after appendectomy and this is one of the reasons for emptying the uterus before removing the appendix.

Does Pregnancy Tend to Cause a Recurrence of Appendicitis?—Unquestionably patients who have the condition known as subacute catarrhal appendicitis, if they become pregnant, are exposed to greater danger than those who have not this condition. This is one of the conditions justifying the obstetrician, when operating upon the pelvic organs of patients not in a pregnant condition, in removing the appendix. On the other hand, it cannot be shown that repeated pregnancy exposes the patient to an additional risk of appendicitis, but pregnancy without hygiene and with lack of attention paid to the condition of the intestines predisposes to the development of appendicitis during the pregnancy or in the puerperal period. The fact that some of these patients may go through the pregnancy without the recognition of appendicitis and, during the puerperal period, develop the disease to such an extent as to call for operation, shows how insidious and inveterate is this complication.

CHOLECYSTITIS

The recognition of this complication of pregnancy is comparatively recent so far as any attempt to deal with the condition is concerned. At the present time, surgeons are more and more substituting for drainage of the gall-bladder its removal, and this has its bearing upon the consideration of this topic.

Etiology.—Cholecystitis complicating pregnancy is the result, in the majority of cases, of the infection of the gall-bladder by the colon bacillus, often allied with other germs. This may follow typhoid infection. It often occurs coincidently with, or after, appendicitis; it may develop after an attack of catarrhal jaundice, or may be one of the many relics of influenza. While appendicitis can often be distinctly traced to influenza, a cholecystitis is not so frequent a result. In many instances cholecystitis develops gradually in women who, before pregnancy, have been troubled with chronic intestinal catarrh, usually the result of constipation. There is no doubt that pregnancy aggravates a preëxisting cholecystitis. That the pressure of the uterus at term and the metabolism of pregnancy causes congestion of the liver is true in many patients and it is undoubtedly true that this may favor the development of cholecystitis.

Signs and Symptoms.—Cholecystitis complicating pregnancy produces pain in the region of the gall-bladder and liver, tenderness over the gall-bladder on deep pressure in some patients, accompanied by more or less jaundice. In an acute attack, there is fever, quickened pulse, sometimes nausea and vomiting and more or less general dis-

turbance. In the chronic cases, the patient complains of tenderness on making certain motions, the appetite is impaired and digestion may be interfered with.

Diagnosis.—The diagnosis is made by palpation, the character of the pulse and temperature, the abdominal conditions which accompany the cholecystitis and the patient's general symptoms.

Prevention of the Condition.—It is difficult to see how cholecystitis can be prevented during pregnancy except by attention paid to the hygiene of the gastro-intestinal tract. No specific inoculation against this condition has as yet proved of value.

If the opportunity is given to treat the patient before she becomes pregnant and it is found that she suffers from chronic intestinal catarrh, the cure of the intestinal condition should exert a favorable influence in protecting the patient from cholecystitis. It has not yet been proved that the removal of the infected appendix lessens the danger of cholecystitis, but it is probable that the cause of the appendicitis may also produce the lesion of the gall-bladder.

Results of This Complication.—In many cases cholecystitis complicating pregnancy injures the general health, depresses the patient and indirectly interferes with the nutrition of the fetus without distinctly bringing into peril the life of the mother. Where the liver and the gall-bladder become the site of an acute septic process, often termed acute yellow atrophy of the liver, a rapidly fatal issue occurs. There is very high fever, delirium, intense jaundice, tenderness over the liver and death from violent toxemia. On autopsy the substance of the liver is lessened in bulk, intensely bile-stained and disintegrated. Whether the infecting streptococcus finds its point of attack in the gall-bladder or liver is not clear. Cholecystitis rarely brings on premature labor or abortion unless the case is complicated by peritonitis. A violent jaundice in the mother, indicating a profound disturbance in her blood, will be communicated to the fetus.

Treatment.—It is the disposition of obstetricians and surgeons at the present day to palliate cholecystitis complicating pregnancy and, when a woman has recovered from gestation, to drain or to remove the gall-bladder. On the part of the general surgeon, there is a marked reluctance to operating on the gall-bladder in pregnant women. Unquestionably in advanced pregnancy the congestion caused by pregnancy is an unfavorable element. In extreme cases, where infection of the gastro-intestinal tract has attacked the appendix and gall-bladder as well, it may be necessary, first, to perform cesarean section, second, to remove the appendix and, third, to drain or to remove the gall-bladder.

In a case coming under the observation of the writer, a young Italian woman was profoundly toxic in the last month of her first pregnancy. Treatment by rest in bed, selected food, lavage of the intestine, free use of alkalies and other such measures as seemed to promise well failed to improve her condition. The patient became very toxic and her nutrition was greatly lessened. While there was no very active process present,

the existence of infection could not be denied. Accordingly the live fetus was removed by abdominal cesarean section. The appendix was then removed, and the gall-bladder drained. The patient made an uninterrupted and complete recovery. On examining the appendix, an acute catarrhal inflammation was present and the same condition was found in the gall-bladder. The placenta showed evidences of toxemia. The child, although well developed, was poorly nourished. The mother was too toxic to nurse it, but the child gradually developed and ultimately became vigorous with artificial feeding. The writer does not mean to convey the impression that cases are often seen where so extensive an operation is indicated, but on several occasions he has done this with good results.

Whether it would be advisable to drain or to empty the gall-bladder with a patient at full term without first emptying the uterus, is a question for obstetricians to study and to decide. The uncertain element lies in the fact that if, for example, the gall-bladder was drained and, before drainage had become complete and healing had occurred, the patient were to come into labor, the contractions and emptying of the uterus would so alter intra-abdominal conditions that the drainage of the gall-bladder might be interfered with and a bad result might follow. Obstetricians are coming to believe more and more that, in the event of an intra-abdominal condition of importance complicating pregnancy at term, it is safer first to empty the uterus and then to deal with the complicating condition. Evidently interesting knowledge should be obtained by the study of the possibilities of cholecystectomy complicating pregnancy. In early pregnancy, there can be no reasonable objection to such procedure, but whether this could be done without first emptying the uterus at full term must be decided upon further evidence.

Infection and Inflammation of Meckel's Diverticulum.—This rare complication might result from the causes already enumerated which produce infection in other abdominal organs. In recognizing the condition, the obstetrician must not be deceived by the reflected pain on the left side of the abdomen, which often accompanies appendicitis. Should this unusual condition develop, it would probably scarcely be recognized accurately, except upon abdominal section. Then the treatment usual for the condition should naturally be employed. In dealing with this complication of pregnancy, again the question of first emptying the full-term uterus would come up for consideration, and unquestionably this should first be done, the ample median incision giving abundant room for the treatment of the infection of the diverticulum.

Enteritis.—A patient having a chronic colitis or enteritis and becoming pregnant might, in the early months, suffer slight, if not severe, exacerbation of the original condition, but, as the size of the uterus increased and the intestine was more or less compressed and carried up and at the sides of the abdomen, the resultant stasis must aggravate the original condition.

Etiology.—What has already been said concerning infection of the gastro-

intestinal tract applies to the general inflammation known as enteritis. This condition is almost invariably the local expression of an infection, possibly one of the most frequent, and an important exception is that state of malnutrition known, for want of a better term, as gout. These unfortunate patients usually inherit an irritable state of the gastro-intestinal mucous membrane and, if a marked neurasthenic condition supervenes, the expulsion of casts of the intestine at intervals complicates the situation. A chronic catarrhal inflammation of the gall-bladder, and also of the appendix, frequently accompanies this condition and, while there may be no definite symptoms pointing to either one of these organs, it is scarcely possible that they should escape the general condition. The condition known as rheumatism, accompanied by the indefinite pain commonly called neuralgia, may either cause an irritable condition of the intestines or may greatly complicate pregnancy. In some patients this causes attacks of colic which may be mistaken for beginning uterine contractions and produce a false alarm of labor.

In other cases, ptomain poisoning may produce a violent enteritis in the pregnant patient. This usually follows the eating of partly decomposed fish, olives, cheese, meat in bad condition or other articles of food, such as rotten fruit, obviously unfit for use.

Diagnosis.—The diagnosis of enteritis complicating pregnancy is made by the evident interference with the normal peristalsis of the bowels, the presence of more or less distention and accumulation of fluid and gas, intestinal pain often severe and colicky in character, moderate fever and elevation of pulse rate, inability to take food, diarrhea or constipation and nausea and vomiting. In ptomain poisoning, the severity of the symptoms will depend upon the dose and virulence of the ptomains which the patient has taken; and in extreme cases, such as botulism, a rapidly fatal result may follow.

Treatment.—The treatment consists in prompt and very thorough lavage of the stomach and intestinal tract with large quantities of warm alkaline fluid, preferably bicarbonate of sodium solution. Nothing equals in prompt result and value this treatment if it is thoroughly and promptly carried out. The giving of simple enemata or the drinking of a few glasses of warm water is of little or no value. In ptomain poisoning, shock is often severe and may be preceded by a violent, copious diarrhea or discharge of serous fluid from the bowels. This should not forbid the lavage of the intestine, for the lavage of the intestine will bring away the irritating material and stop the exhausting discharges. So great may be the loss of fluid that the patient's blood-pressure may fall to the danger point and require the prompt use of intravenous transfusion with glucose and sodium bicarbonate. The nervous system should be sustained by the hypodermatic use of morphin and atropin; the circulation, by the use of strychnin and digalen given hypodermatically. External warmth should be freely supplied and this treatment repeated, entirely or in part, in accordance with the patient's condition. When it is possible for the patient to swallow, and retain, equal parts of fresh milk and

water may be used freely in beginning nutrition. It is useless to attempt to give medicine by the mouth, and nothing but the most thorough and vigorous eliminative treatment will benefit the patient.

In gout or rheumatic enteritis, with frequent colic, the patient should take alkalies in large quantity. Lavage of the intestine and possibly of the stomach will be of great benefit, but, in addition, the patient may use liquor potassii citratis or sodium bicarbonate in hot water, or alkaline beverages, such as Vichy, as freely as possible. In some patients this colic is controlled by aspirin, but in others aspirin produces nervous and mental depression. A carefully selected diet, with an abundance of alkaline water as a beverage, is indicated. In some cases of chronic enteritis, the patient is much improved by a diet composed largely of lactic acid milk obtained from the churning of cream, or by the action of the lactic acid bacillus on the whole fresh milk. The difficulty with this treatment is the fact that it becomes monotonous, and that it is almost impossible to induce the patient to keep strictly to the limited diet.

In the presence of an attack of colic in a nervous, frightened patient near term, it may be difficult for the obstetrician to satisfy himself that labor is not beginning. A hypodermatic injection of morphin followed by copious warm lavage of the intestine will usually end the colic. After labor has really begun, uterine contractions will then become evident and increase steadily in vigor and frequency. In some neurotic, gouty women the occurrence of pregnancy diverts their attention for the time being from the gastro-intestinal tract, stimulates appetite and, if the appetite is kept within bounds and satisfied reasonably, considerable improvement may temporarily result. Pregnancy, however, is not to be recommended as a permanent cure for this condition.

Gastritis.—What has been said concerning enteritis may properly be applied to inflammation of the stomach complicating gestation. The obstetrician must not mistake the nausea and vomiting of toxemia for gastritis.

Diagnosis.—In making a diagnosis of this condition, the physician must not be misled by the fact that if a pregnancy exists it cannot be legitimate. Not infrequently a woman, who cannot be legitimately pregnant, may seek medical advice for gastritis, and in the experience of the writer he has not infrequently seen these patients when the toxemia of early pregnancy had reached a dangerous point, after they had been for some weeks or months receiving treatment from a medical internist for gastritis. In any woman in the childbearing period who seeks medical advice concerning disorder of the stomach, pregnancy must be confirmed as existing or absolutely ruled out, without regard to the circumstances or reputation of the patient.

The diagnosis of gastritis complicating pregnancy may be made by the presence of gastric pain, inability to digest food, altered gastric secretion, deficient or excessive hydrochloric acid, and the result of the usual tests employed by medical internists diagnosticating the condition. That the toxemia of pregnancy can aggravate a preëxisting gastritis

there can be no doubt. That pregnancy alone often causes gastritis is scarcely possible. When, however, the condition is really present in pregnancy, the hygiene of pregnancy adapted to prevent the development of toxemia should first be thoroughly put in force.

Treatment.—The specific treatment of gastritis complicating pregnancy would require the coöperation of the medical internist, the obstetrician having made the diagnosis of pregnancy and taken steps to prevent the development of the usual toxemia of gestation. A pregnant patient can receive the proper treatment for gastritis without danger of interrupting the pregnancy, if the treatment is considerately given and prolonged and painful manipulations are omitted. In addition to her selected diet, in some cases, dilute hydrochloric acid; in others, alkalies; in others, the addition of digestive ferments, as pepsin and pancreatin; and, in other cases, lavage of the stomach may be employed. If there is a strongly neurotic element in the case, possibly complicated by an inheritance of gout or rheumatism, it may be difficult greatly to improve the patient until the pregnancy ends.

Gastric or Duodenal Ulcer.—This may be seen in young anemic individuals or in women whose tissues are more or less sluggish in activity and nutrition and in whom one may suspect the gradual development of malignant change.

Young women of the servant class, who come to this country and suffer from amenorrhea as the result of change of climate, may become pregnant and develop gastric or duodenal ulcer. The characteristic disturbance of digestion may be continuous with the pernicious nausea of early pregnancy. When, however, the latter can be eliminated and the hygiene of pregnancy instituted, it may be possible to make the diagnosis of gastric or duodenal ulcer.

Treatment.—In young patients every effort should be made to palliate the condition and, by hygienic measures, to hope for the gradual recovery of the patient as pregnancy advances. In older patients this may be too much to expect, and the possibility that carcinoma of the stomach may develop from a chronic ulcer may suggest operation. Obviously early pregnancy would be the period of election for such treatment for both gastric and duodenal ulcer. If the symptoms require operation in pregnancy at term, the uterus should first be emptied by cesarean section and then the gastric or duodenal condition dealt with as the circumstances suggest. In duodenal ulcer, gastro-enterostomy may be successfully performed during early pregnancy or at the termination of gestation. In excising a portion of the stomach for suspicious ulcer, the general hyperemia of pregnancy might somewhat embarrass the operator, but should not prevent the attempt to cure the patient. Unless these conditions resulted in perforation and the development of peritonitis, there is no reason why they should bring about a premature emptying of the uterus or the development of septic puerperal infection.

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CHAPTER XIII

INFECTION OF THE URINARY ORGANS COMPLICATING PREGNANCY

Infection of the urinary organs complicating pregnancy—Cystitis in pregnancy—Colon-bacillus infection of the kidney (the pyelitis of pregnancy)—Infection of the ureter (ureteritis in pregnancy)—Pregnancy complicated by nephritis.

CYSTITIS

It will be remembered that in the fetus the urinary bladder is an abdominal organ. Possibly no organ in the female body varies so constantly in size, shape and position. In the nonpregnant, the retention of urine to an unreasonable degree is not uncommon and is often encouraged by the circumstances in which the patient finds herself. The bladder may thus become chronically distended and, as a result, a condition of subacute vesical catarrh may be present. In a healthy patient, the bladder is emptied at reasonably frequent intervals and usually retains its position at the pelvic brim, being neither forced down into the pelvis by abnormal pressure of clothing or pushed up into the abdominal cavity by unnatural distention. Operations done for the relief of prolapse may interfere with the natural position and distensibility of the urinary bladder, but extensive interposition operations for prolapse are rare. They should never be done upon women in the child-bearing age, and so the abnormal position of the bladder resulting from these operations rarely complicates pregnancy.

Etiology.—Cystitis in pregnant women results from mixed infection, usually with the colon bacillus, streptococcus, staphylococcus, sometimes the pneumococci, occasionally the diphtheria bacillus and those of lesser virulence. This may arise from the upward passage of bacteria from the vicinity of the meatus in cases where cleanliness is not practiced and where the bladder is frequently overdistended. It is also a not infrequent and unfortunate result of the use of the catheter after labor or after operation, producing a vesicle catarrh, often difficult to cure. In some cases an exceedingly sensitive, highly inflamed area of the bladder may develop which may cause considerable suffering and the remedy of which may be very difficult. Acute cystitis in pregnant patients may develop promptly as the result of exposure to cold and wet. This may occur under circumstances which favor the retention of urine for an unusual period. What was at first a simple catarrh becomes, by the added presence of bacteria, a cystitis. Gonorrheal infection complicating pregnancy may also produce cystitis.

In attempted criminal abortion, if a patient attempts to introduce some foreign body into the uterus, she may introduce it by mistake into the urethra or even from the vagina may pierce the bladder. The taking of irritating drugs to procure abortion may result in a violent and acute catarrhal inflammation of the bladder. Influenza is sometimes its originator and, unfortunately, as physicians, we have always to contend with a gouty or rheumatic bladder.

Diagnosis.—Whatever may be the immediate cause, the signs and symptoms remain essentially the same. Irritability of the bladder is shown by the desire to empty the organ with increased frequency and often with increased difficulty. Smarting and burning behind the pubic region at the neck of the bladder and an altered condition of the urine, which may become alkaline and offensive, containing strings of mucus or mucopus, moderate fever and altered pulse, impaired digestion, and inability to sleep, as rest is frequently interrupted by the necessity of emptying the bladder, are signs and symptoms readily confirmed by a critical examination of the bladder by cystoscopy.

To do this efficiently, the patient should go to the hospital, or to the operating or examining room where the proper appliances are available. Thorough antiseptic precautions with instruments and appliances, the wearing of rubber gloves and sterile gowns are demanded. The services of one or more trained nurses are necessary. A properly adjusted electric light and, preferably, not only those instruments adapted for examining the bladder, but ureteral catheters, as well, should be in readiness. If a patient is suffering excessive pain and distress, she had best remain in the hospital for examination and treatment. A preliminary hypodermatic injection of morphin and atropin may be necessary, and the sensitiveness of the urethra may be mitigated by the use of novocain or cocain. Usually the cystoscopist prefers to test the capacity of the bladder by introducing warm saline antiseptic fluid and withdrawing it at his convenience. With the aid of an electric cystoscope the mucous membrane of the bladder is thoroughly examined, and especial attention is given to the orifices of the ureter and the trigon of the bladder. In acute cystitis, the mucous membrane is brilliantly red and angry; in chronic cystitis of pregnancy, a deeper color; and, if an ulcer is present, patches of mucopus, with roughness of the surface at various points, or slight excavation are observed. If the condition is complicated by ureteritis, the orifices of the ureters are more than usually evident, because the tissues surrounding them are red, swollen and angry in appearance. Since much of the suffering in cystitis arises from strangury or spasm of the bladder, the cystoscopist may, for therapeutic purposes, distend the bladder as much as the patient can well tolerate at the time of the examination.

Prophylaxis.—The prevention of cystitis during pregnancy is accomplished by the very thorough and careful enforcement of certain simple and thorough hygienic rules. First, pregnant women must remove pressure from the abdomen at whatever sacrifice of fashion or pref-

erence. The pelvic organs must be free to develop, the urinary bladder must be free to fill and dilate to a moderate and healthful degree. The patient should be made to empty the urinary bladder at comparatively frequent intervals. During early pregnancy, every six hours is a reasonable limit and this should be done regardless of the condition of discomfort. In addition to thorough cleanliness in the matter of the toilet, if the patient is subject to attacks of irritability of the bladder, it is well carefully to avoid chilling of the surface of the body. This may require the wearing of union suits of silk and wool during the comparatively mild period of the year, such as spring and autumn. In winter there can be no question of the value of this precaution.

It is often difficult to persuade pregnant patients that water is a fluid intended for more than bathing purposes, and that water without tea or coffee is a useful beverage. If the patient can be made to realize this and can be induced to drink water plentifully, this will greatly assist in maintaining a healthy condition of the mucous membrane of the urinary tract. The avoidance of constipation, omitting from the diet highly spiced dishes, very strong tea and coffee, and indigestible and irritating food should greatly lessen the risk of vesical catarrh. So important and so simple are these precautions that only with the utmost difficulty can many patients be induced to consider them.

In the presence of an acute infective cystitis complicating pregnancy, the patient should immediately be put at rest in bed. Liquor potassii citratis can be given in the form of a solution, or the citrate of potassium in 40-grain doses every three or four hours in as much water as the patient can conveniently take. To relieve vesical pain and irritability, counterirritation over the bladder and the use of a perfectly dry and tight hot-water bag is most comforting to the patient. A flannel wet with chloroform liniment, or equal parts of chloroform liniment and olive oil, with a hot-water bag, make a useful combination. If the inflammation is acute and severe and the patient robust, she may prefer an ice bag. In spite of the disturbance, the patient should be encouraged to get out of bed to empty the bladder. Local treatment will consist in the application to the mucous membrane of the bladder of antiseptics, preceded by thorough irrigation with a mild alkaline fluid to remove mucus and pus. This manipulation calls for skill and experience and only the most competent nurses can successfully undertake it. Frequently the obstetrician himself must give this treatment. Few patients can endure this more often than once or twice in twenty-four hours, especially in severe cases. The antiseptics of choice are tincture of iodin, one teaspoonful to the pint or quart of warm water; saturated solution of boracic acid; and, by some obstetricians, mercuric iodid in solution or some of the more recent combinations of mercury and iodin. In dealing with the most vigorous antiseptic substances, care shouid be taken that not too much is allowed to remain. The patient's diet should be largely of acidulated milk, or fresh milk, green vegetables and toast. Dilute fruit juices should be used if grateful to the patient and if they

are well digested. Tea and coffee, if taken at all, must be used in great moderation. Tobacco in moderation does not seem seriously to prejudice the recovery of the patient. Constipation is to be avoided by the use of saline laxatives.

The recovery of the case will be evidenced by the fact that the symptoms grow progressively less severe, that the patient is more comfortable, the bladder more tolerant of urine, the urine more nearly normal in character; cultures from the urine show that the bacteria are disappearing and the formation of mucopus steadily grows less. The question may be raised of the use of an autogenous vaccine in these patients, but the evidence is not conclusive that such is essential. The successful treatment of a cystitis is the best prevention of abortion. Very rarely, however, does cystitis induce the emptying of the uterus, and the patient may be comforted with this assurance. Should pain become threatening, the hypodermatic use of morphin or codein is indicated.

URETERITIS

Ureteritis complicating pregnancy is usually an ascending infection from an infected bladder. In the right ureter, the pressure of the enlarged uterus may bring the ureter into such contact with the bowel and cause such stasis that bacteria from the bowel, the colon bacilli, may make their way into the ureter and set up infection. Some believe that bacteria in the blood stream can infect the urinary organs.

Diagnosis.—The diagnosis of ureteritis complicating pregnancy is made by the existence of pain over the course of the ureters. This pain may be largely, or almost entirely, the result of the distention of the ureter through obstruction to the passage of urine. To test this, the pregnant patient should be put in the knee-chest posture, and caused to assume this position at intervals of a day or two. Immediately after taking this posture, she should endeavor to empty the urinary bladder and, if the discharge of urine is obviously increased with some relief to the distress in the region of the ureter, it may rightly be inferred that distention of the ureter from mechanical obstruction is a factor in the case.

An accurate diagnosis of ureteritis complicating pregnancy is made by cystoscopy, by observing the orifices of the ureters and catheterizing each ureter separately, and by carrying the ureteral catheter to its furthest limit and examining separately the urine taken from each ureter.

Treatment.—This condition is almost never disassociated from cystitis, pyelitis, or both; and hence the treatment of ureteritis is that of cystitis or of pyelitis. It is a point of importance, however, that mechanical obstruction to the ureters should be detected if possible and, by the simple expedient of altering the posture of the patient, this obstruction should be relieved as frequently as possible. If, for example, the patient complaining of pain in the region of the right ureter is asked

while in bed to lie as much as possible on her left side, her distress may be somewhat relieved. If, on the contrary, the pain is on the left side, she may find that lying upon the right side gives her improvement. This simple expedient does not call for the use of a ureteral catheter and hence may readily be applied.

PYELITIS

For the complete diagnosis of this condition and its accurate recognition, we are largely indebted to the work of American obstetricians. It is now recognized as a not infrequent complication of pregnancy which, fortunately, is amenable to treatment in a very satisfactory manner.

Etiology.—There is abundant evidence to show that the B. coli communis is the principal cause of the pyelitis of pregnancy. It will be remembered that this bacillus thrives in acid media and that it is questionable whether there has been obtained a specific antitoxin for it. It is probably the most abundant bacillus in the human body, swarming as it does in the intestinal tract, and being constantly discharged from the body by the opening of the bowel. It is not strange, then, that it should make its way into the urinary bladder and into the vagina and cervix, and that its abundant presence in the intestine should cause complications in the abdominal viscera. Associated with this, in cases where there has been repeated catheterism or thorough manipulation, are the staphylococci, less frequently the streptococci and other germs.

Diagnosis.—The diagnosis of pyelitis complicating pregnancy is made by the patient's complaint of pain, frequently described as lumbago or rheumatism, in the muscles of the back. It will be remembered that, in early gestation, a habitually prolapsed right kidney may descend nearly to the brim of the pelvis. Should pyelitis occur in such an organ, the pain would be referred to the erector spinae muscle, and possibly the quadratus lumborum and be pronounced muscular or rheumatic. In later pregnancy, a movable kidney is pushed up to practically its normal position and then the lumbago would be in the upper portion of the back. When the pelves of both kidneys are infected, the pain is bilateral. Often accompanying this pain is a sensation of burning or smarting along the course of the ureter and this disagreeable sensation may be continued even in the region of the urinary bladder. In the severe cases, where the infection becomes acute, there may be nausea and vomiting. Occasionally the symptoms counterfeit those of acute appendicitis. There is often some interference with the intestine and moderate distention of the bowel, with gas, is present. The affected kidney, or kidneys, increase in size from the retention of urine, sometimes of pus. In patients whose tissues are thin and elastic, enlargement of the right kidney not infrequently can be discerned during early pregnancy by causing the patient to lie upon the back with the thighs and legs completely

flexed and breathing gently with the mouth wide open; then take the kidney between the two hands, and outline its contour by gentle pressure. Deeper pressure will elicit pain. The right kidney should be examined first because it is most often involved but the left should not be neglected.

Essential for the accurate diagnosis of the pyelitis of pregnancy is a study of the urine and the examination of the blood. The urine is acid, containing many pus cells and swarming with the B. coli communis, which on culture is obtained in the pure growth. The blood shows a leukocytosis which is frequently high, reaching from 25 to 30,000.

The Natural History of the Disease.—The natural history of the infection is that of an acute and chronic, or complicated, course, influenced to a greater or less degree by treatment. In acute cases, the infection rapidly becomes severe and the patient has chills, with a temperature of 104° F. There is considerable kidney pain as the pelvis of the kidney becomes more and more distended with retained urine and pus. If not relieved, the substance of the kidney may become infected and so-called surgical kidney may develop. The patient then shows the effects of toxemia, septic infection gradually becomes established and, accompanying infection, an inflammation of the ureters and sometimes of the urinary bladder are present. In mild cases, infection subsides, symptoms abate, the urine becomes sterile, and the patient returns to her accustomed health. In chronic cases, the patient may pass through pregnancy to a successful termination, but, during the puerperal period, attacks of pyelitis may occur which may persist for several months or a year.

Treatment.—Certain important facts in the etiology of this condition must be recalled in deciding upon the course of treatment. The mechanical element must receive attention. It is held that the right kidney is most often affected because of the obstruction to the passage of urine through the right ureter by the pressure of the enlarged uterus, and that the colon bacillus makes its way from the obstructed bowel to the adjacent ureter and, by an ascending infection, reaches the pelvis of the kidney. A blood-stream infection and an ascending colon infection from the urinary bladder are also cited as explaining the etiology of the occurrence. There can be no question of the fact that both the kidneys may be involved.

In these conditions, in the treatment of the case, it is necessary as soon as possible to secure the unobstructed flow of urine through the ureters into the bladder, especially from the infected kidney. If the symptoms indicate a mild infection and the obstetrician is not prepared to undertake skilled manipulation, he should first try to overcome the obstruction by causing the patient to assume the knee-chest position, or the lateral position, and then have the urinary bladder of the patient emptied as soon as possible after this manipulation has been tried. The patient should be put at rest in bed to avoid chilling the surface of the body and to prevent the irritation of motion. The diet should be limited

to milk, water, green vegetables and toast. A limited quantity only of tea or coffee should be allowed. Water in abundance should be taken. It is thought that the drug known as urotropin acts as an antiseptic to the urinary organs when taken into the stomach. The writer has never seen it do harm in these cases, but he has never seen a patient treated exclusively by this drug and, therefore, he is unable to determine whether it has the value commonly ascribed to it. Others prefer to give citrate of potassium freely, while still others rely upon rest, diluting the urine, maintaining the action of the bowels and limiting the diet of the patient. Mild counterirritation is useful and, in nervous patients, codein and bromids are indicated. The patient should empty the urinary bladder frequently and should get out of bed to accomplish this.

Where cases are more severe and the obstetrician believes that the risk of manipulation is less than the danger of noninterference, with the aid of a cystoscope, the ureters should be catheterized. This requires skilled judgment, experience and thorough surgical antisepsis. The assistance of a trained nurse is desirable and the patient, if possible, should be in a hospital. Under the precautions already described in treating cystitis, the ureters are separately catheterized, the urine collected from the pelvis of each kidney separately and examined. The emptying of the ureters by the catheter often results in a surprising improvement in the patient's comfort. The relief of distention in the pelvis of the kidney is frequently followed by the cessation, for some time, of pain and suffering. This indicates the importance of the mechanical element in these cases. Utilizing the opportunity of catheterism, the obstetrician may irrigate the pelvis of one or both of the kidneys by an appropriate antiseptic solution, warm salt solution, warm saturated solution of sodium biborate, or dilute iodin, and very rarely mercuric salt is employed. Too much must not be expected from the relief afforded by this manipulation. An immediate cure is impossible and, if this treatment is well borne, it may be repeated in twenty-four hours. With the general treatment already described, this local treatment may be maintained until recovery or until the patient grows so much worse that surgical measures must be employed.

In some cases, it may be necessary to expose the kidney, or kidneys, by the usual loin incision; bring the diseased kidney up to the surface of the wound with its convex surface presenting; fasten the kidney in the wound by stitches passed through the capsule out through the extremity; then, incising the capsule, pass one or two fingers of the gloved hand through the substance of the kidney into its pelvis. A free discharge of blood accompanies this maneuver which hides the discharge of urine. A drain of 10 per cent iodoform gauze wrapped in rubber sheeting to form a cigar or cigarette drain is then passed into the pelvis of the kidney and retained in place by a silkworm-gut stitch passed through the skin in the line of incision, or the pelvis of the kidney may be packed with a strip of iodoform gauze which emerges from the lower angle of the wound. The extremities of the incision are brought together by

sutures, a copious dressing is then applied, and the patient is given the general and usual treatment of the condition. The writer has performed this operation on a number of pregnant women in whom medical treatment failed to improve the condition. The results were entirely satisfactory. Pregnancy was interrupted in none and recovery followed in all. This operation was undertaken before the common employment of cystoscopy and catheterism of the ureters. Six cases in all were successfully treated. In no case did a bad result follow. At the same time, it is obvious that this is a more formidable proceeding than catheterism of the ureters in skilled hands. Hence, it should be reserved for those cases where the development of surgical kidney is threatened and where medicine and manipulative treatment fail to check the progress of the disease.

The treatment of surgical kidney calls for incision, exploration of the kidney and in extreme cases for nephrectomy. Tuberculosis of the kidney complicating pregnancy demands nephrectomy, if tubercular disease has infected a considerable portion of the kidney; but, fortunately, nephrectomy for mixed septic infection of the kidney complicating pregnancy is of rare occurrence.

Subsequent pregnancy in a patient with but one kidney, and successful pregnancy in a patient having but one kidney, is possible and not of very rare occurrence. In the observation of the writer, this has happened several times. In one exceedingly interesting case, the patient, from whom a tuberculous kidney had been removed, subsequently became pregnant, developed toxemia and eclampsia. From this she successfully recovered and successfully terminated her pregnancy.

NEPHRITIS

What is known as the kidney of pregnancy has long been recognized as a condition very closely bordering upon the pathological. These kidneys are congested, somewhat swollen, the vessels engorged, the epithelia swollen and the filtering power of the kidney so impaired that serum albumen to some extent is often present in the urine. When one considers this condition and observes cases in which women pass through a number of pregnancies, successfully regaining good health and never developing nephritis, the adaptive power of the organism is demonstrated in a remarkable degree.

Nephritis complicating pregnancy is often the lighting up of a pathological condition, the first of which had developed about the period of adolescence. Such is the familiar example of nephritis during pregnancy in a patient giving a history of scarlatina at the age of thirteen or fourteen, followed by nephritis. In these cases the picture is that of an acute process, but the casts found in the urine are not only epithelial, but granular and even fatty as well, indicating a previously acute process. In other cases, the nephritis complicating pregnancy is a first attack. It may follow sudden and extreme exposure to cold, often with exposure

to dampness; a heavy meal of very irritating and indigestible food; infections like influenza; or the occurrence of sudden failure of assimilation, often complicated by exposure to cold or damp.

Diagnosis.—The diagnosis of nephritis complicating pregnancy is made by altered blood-pressure, disturbance of the nervous system indicated by an altered rate of the pulse, lack of appetite, tenderness at the epigastrium and, sometimes, the development of nausea and vomiting. The feet and ankles remain swollen throughout the night as well as during the day and, in extreme cases, the face and hands may be swollen. There is violent frontal headache. The breath has an odor suggesting that of urine, blood-pressure becomes high, the action of the heart accentuated, vision is disturbed and intoxication with poisonous products may develop.

The diagnosis is made by observing the blood-pressure and pulse tension, by examining the urine and blood and the eye-grounds, and by thorough general inspection of the patient. Blood-pressure will be above 130, rising in severe cases to over 200, and pulse tension will be increased accordingly. In cases of acute and severe nephritis, examination of the urine will show a considerable, or large, percentage not only of serum albumen, but also of globulin. The urea percentage will be distinctly lessened, the blood urea increased, the rest nitrogen increased; creatin and creatinin and the ammonia coefficient will also be greater than normal. Casts will be epithelial, granular or fatty in accordance with the period of the nephritis and its severity. The quantity of urine may be greatly diminished, its specific gravity may be decidedly increased, and its color may become dark and the urine abnormal. The urine may also contain blood in considerable quantity.

History of the Disease.—Without treatment these cases tend steadily to increase in severity. The quantity of urine steadily diminishes. The percentage of albumen and other abnormal substances increases, casts become granular and fatty, the quantity of blood varies but is constantly present in the urine, blood urea is persistently high and increases, and edema becomes worse. The patient is unable to retain nourishment, becomes drowsy and apathetic, or has convulsions. If a profound general toxemia is added to the condition, eclamptic convulsions may complicate the situation. When death ensues, it happens through heart failure, induced by cloudy swelling of the heart muscle and rapid dilatation. Hemorrhage into the ventricles of the brain is not unusual, accompanied by edema of the lungs.

Prevention.—It has long been the ideal of the medical profession completely to stamp out the contagious and infectious diseases of childhood. It has been alleged that there is no reason for the frequent occurrence of scarlatina, whooping-cough and measles; that these and similar disorders can be entirely removed and absolutely prevented. Unfortunately, this time has not yet arrived, and hence girls will be exposed to scarlatina and, in some cases, nephritis will develop. So common and important is this complication that, in dealing with pregnant women, a

clear history of a previous scarlatina or the absence of scarlatina should always be sought and obtained. Whenever possible, the history of the patient's convalescence from scarlatina is of primary importance and this as well should be elicited. To prevent the development of nephritis in adult life, girls during adolescence should be especially guarded from infection, not only that of scarlatina, but of practically all the infective disorders.

In cases where there is a history of rheumatism and gout in the family, and where the patient herself has had these disorders to some degree, there is reason to believe that her kidneys may readily become overburdened during the pregnancy. The hygiene of pregnancy throughout its entire course is of the greatest importance not only in preventing toxemia, but also the nephritis of pregnancy. The regular examination of the urine, physical examination of the patient at frequent intervals during pregnancy, the avoidance of constipation and the conservation of all that brings about a healthy digestion and assimilation are of great importance. There are very few patients that do not require modification of diet during gestation.

Treatment.—Treatment will depend naturally upon the intensity and extent of the nephritis. Where the process is evidently comparatively mild, threatening symptoms are absent and the patient can readily be controlled by modification of the diet—reducing it at first to milk, fruit and bread, and gradually adding starches, vegetables, fish, white meat of fowl, chicken, lamb and sweetbreads. These precautions will often clear up a condition where nephritis is threatened. So far as drugs are concerned, purgatives and laxatives are most useful, although it is curious to observe that physicians of intelligence and experience have sometimes believed that there were actually specific remedies for this condition. Thus, by an acquaintance of the writer, an obstetrician, who had a very large and successful private practice, benzoate of soda was considered an absolutely sure preventative of the nephritis of pregnancy, of toxemia and eclampsia. This physician's faith in drugs was so great that he treated placenta prævia by giving vaginal douches of alum solution.

A selected diet, purgation and the use of laxatives will, as has been said, control mild cases. In addition, the avoidance of cold and wet, rest in bed for patients who are easily fatigued, massage, plentiful use of water and mild alkalies are indicated. The difficulty will lie in inducing the patient strictly to follow a given diet and adopt hygienic precautions, unless she becomes severely ill.

If the condition is threatening, the patient must be in the hospital and prompt and vigorous treatment must be instituted. Rest in bed between blankets; thorough lavage of the stomach followed by the ingestion of from 2½ to 5 grains of calomel, with bicarbonate of sodium; copious lavage of the intestine; the diet limited to milk and water; the free use of bromid of sodium or bromid of ammonium to control obstinate headache; and, if the blood-pressure is very high and the heart action labored and strong, bleeding followed by the cautious and very moderate trans-

fusion of sodium bicarbonate solution and glucose will be indicated. If additional medication by sedatives is required, codein or morphin, hypodermatically administered, is indicated. The progressive improvement of the patient may be accompanied by a gradual increase in the diet, but to such a patient during her pregnancy diet becomes a matter of paramount importance. Meat should be forbidden, the patient's safety during the remainder of her gestation depending largely upon diet and the regular and efficient action of the bowels.

One attack of nephritis in pregnancy makes the patient susceptible to toxemia and a recurrence of the condition. Hence every precaution should be taken to keep such a patient under observation and care.

Surgical Treatment of Acute Nephritis.—The remarkable results obtained by Edebohls in the decapsulation of kidneys in acute nephritis of pregnancy must be remembered. Patients thought suitable for this operation were those in whom the condition had developed suddenly, with greater or less toxemia; in whom the secretion of urine was very scanty; pulse tension and blood-pressure high; headache severe; urine loaded with albumen and globulin and casts; and in whom medical and other treatment failed to improve the condition.

The operation consisted in exposing one or both kidneys by the usual loin incision, incising the capsule of the kidney and stripping it back from the kidney substance. At operation in these cases, the kidneys were found swollen, the parenchyma dark in color and engorged with blood, the capsule in some cases separating from the parenchyma with difficulty. In patients not already dying of toxemia, the results have been sometimes surprisingly good. Secretion of urine increased almost immediately. The abnormal elements in the urine grew steadily less in quantity, the patient's symptoms rapidly became better. Recovery followed in many of these patients, with apparently the complete restoration of the kidneys to a healthy condition.

At the present time, the majority of obstetricians recommend and practice this operation only in the acute stage and in cases where active, intelligent and hospital and medicinal treatment failed to improve the condition of the patient.

The Treatment of Subacute or Chronic Nephritis.—Unfortunately, many of these patients never recover from an attack of acute nephritis complicating pregnancy. A careful examination of the urine shows perhaps a small quantity of serum albumen or globulin. By the use of the centrifuge, a few granular casts are found, accompanied by a considerable number of hyaline casts. The blood-pressure and pulse tension never become perfectly normal. The patient shows signs of a chronic or a mild toxemia, digestion is impaired and the physician is constantly anxious lest an acute nephritis may be superinduced. Should pregnancy again occur, the risk is considerable, and the tendency to a chronically impaired condition of the kidney would be much increased.

Some years may pass before this condition makes itself felt in the patient's health. A patient who has passed the menopause may consult

a physician for various symptoms and be found to have a chronic nephritis. If a careful history of her previous health is obtained, it may be found that during a pregnancy she had severe vomiting and nausea with the symptoms pointing to nephritis. In the observation of the writer, slowly proceeding, but fatal, nephritis developed in a patient over fifty years old, in whom the first indications of impaired health followed a pregnancy during which she suffered from pernicious nausea, with other symptoms showing that the kidneys were involved.

Treatment of Chronic Nephritis Complicating or Following Pregnancy.—Treatment consists in the careful modification of diet, the moderate use of water, precautions to secure an adequate daily movement of the bowels, good hygiene, a selected climate and the careful avoidance of exposure to cold and dampness. A guarded prognosis as to health and, possibly, as to life, must be given in these cases because they are so insidious that alarm may not be taken until too late. Parturient women will sometimes inquire, If the kidneys of the mother are affected during pregnancy, what effect will this have upon the child? The answer may be, that there is no direct evidence that nephritis in the mother need produce nephritis in the fetus. A toxic process, as has been seen, may result in the death of the fetus; but apparently an acute nephritis is so brief in duration when complicating pregnancy that, if it receives prompt and adequate treatment, there is no reason to believe that the fetus is materially damaged thereby.

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CHAPTER XIV

DISEASES OF THE CARDIAC AND CIRCULATORY SYSTEM

Diseases of the cardiac and circulatory system complicating pregnancy—Congenital lesions of the heart disclosed by pregnancy—Pregnancy and valvular heart disease—Pregnancy complicated by disease of the heart muscle and vessels—Myocarditis and endocarditis—Varicose veins complicating pregnancy.

Some of the conditions unfavorable in pregnancy have long produced confusion regarding the diagnosis and management of pregnant patients thought to have disease of the heart. Recent development in physical diagnosis, the use of the cardiograph and blood-pressure apparatus and improved laboratory methods have enabled us to diagnosticate diseases of the heart more accurately than when we relied largely upon recognizing murmurs by auscultation.

It is estimated that during pregnancy the quantity of the maternal blood is increased one twelfth. That the composition of the blood is altered by toxemia is abundantly demonstrated. That the situation of the heart may become abnormal from mechanical influence, is a matter of familiar observation. The nervous system of the pregnant woman is in a proverbially unstable condition, and hence the action of the heart may readily be altered. These factors led to the frequent diagnosis of heart disease complicating pregnancy because, in examining the patient, murmurs over the heart were heard, the pulse rhythm varied greatly and pregnant patients sometimes suffered from edema which was thought to indicate an essential disease of the heart.

At the present time, little or no stress may be placed upon many of the phenomena which we have just described. In pregnancy, the condition of the heart can never be considered entirely apart from the condition of the blood-vessels or the lungs, and hence we must study cardiac pathology in a somewhat different manner from former times.

Etiology.—The etiology of diseases of the heart complicating pregnancy may take the obstetrician back, in his study of the case, to the intra-uterine life of the pregnant woman. A carefully obtained history will often show that the patient in childhood was said to have a weak or bad heart. If her mother is living, or if the patient herself knows the history of her mother's health, a history of toxemia of the mother, before the birth of the pregnant woman in question, may be obtained. Occasionally there is a history of a severe nervous shock, or some profound alteration in the general health and condition of the mother of the patient. If the patient herself was a "blue baby," and she has lived

to become an adult and pregnant, the blueness could not have been caused by a very pronounced anatomical abnormality. Such individuals rarely reach adult life, but mitral stenosis is not infrequently of congenital origin, often manifesting itself during childhood and adolescence. If precautions are taken to avoid the development of hypertrophy of the heart, such a girl may reach adult age and enjoy good average health, providing no especial strain is thrown upon her heart. When, however, pregnancy develops, and especially immediately after labor, the condition may become evident.

The persistence of a defect from the inaccurate closure of the foramen ovale is sometimes seen in women in whom any abnormal condition of the lungs produces labored and imperfect action of the heart. There is usually the history of an abnormal childhood and youth, with repeated colds and congestion of the lungs, and an inability to take the usual exercise of childhood.

In many cases heart disease complicating pregnancy is traced to a classical rheumatic attack at about the period of puberty. These are the valvular cases where the diagnosis is evident and the history clear. In some pregnant patients, a history of a severe previous influenza may elicit the fact that, since the influenza, the patient has never been able to take active exercise, has frequently suffered from shortness of breath and has been considered as having some weakness of the heart. A severe constitutional infection, as typhoid, or a severe pneumococcus infection of the lung, may leave the heart muscle in a somewhat weakened condition. So far as actual disease of the heart developing during pregnancy is concerned, the causes which produce it in the nonpregnant in an acute degree may also be potent during pregnancy.

The influence of repeated parturition upon the heart and its condition must not be overlooked. It is now thought that during pregnancy the heart undergoes no essential hypertrophy, and that the increased labor thrown upon the heart during gestation is accomplished by increased rapidity in action and the modification of the vessels to meet the general demand. In studying diseases of the heart complicating pregnancy, hypertrophy of the heart muscle must not be credited with frequent occurrence.

Diagnosis.—Diagnosis of cardiac disease complicating pregnancy requires a thorough and careful study of the entire individual and the physiological behavior of the circulatory organs. In questioning patients, inquiry should always be made as to whether they suffer from shortness of breath, or disturbance of breathing power; whether any particular form of activity is burdensome and interferes with breathing; whether they notice a high degree of humidity in the atmosphere; and whether any particular posture prevents them from sleeping comfortably. If there is an abnormal condition of the heart complicating pregnancy, the patient will complain that her breathing is labored or rapid, that the action of the heart is readily disturbed on comparatively slight exertion, that she notices dampness in the atmosphere very quickly, and

that she cannot assume certain positions to sleep comfortably. Pain about the region of the heart in pregnant patients may be an indication of an altered state of the heart muscles or vessels, but it may also be the result of distention of the stomach displacing the heart, causing disturbance in its action and, at the same time, pain in the stomach and epigastrium which is referred to the heart. So, too, distention of the intestine with gas, with an attack of acute colic accompanied by disturbance in the action of the heart, may be thought by the patient to be an attack of heart disease. The history of swelling of the lower extremities in pregnancy must not be ascribed to a diseased condition of the heart and vessels, unless nephritis and toxemia can be excluded and, since both of these conditions affect the heart, they must first be excluded before a diagnosis of heart disease can be established.

To make an accurate diagnosis of heart disease complicating pregnancy, we must remember that valvular lesions from rheumatism, or other preëxisting diseases, will declare themselves by murmurs. On the other hand, the condition of the heart muscle is a matter of special importance and may be difficult accurately to determine. Here the rhythm, vigor of systolic sounds, degree with which the vessels are filled by the action of the heart, absence of congestion at the bases of the lungs, absence of disturbance of breathing and of attacks of fright or apparent dyspnea and syncope must all be taken into consideration. Blood-pressure and pulse tension are naturally of considerable value, but it must also be remembered that an attack of acute nephritis in a patient with a damaged heart may cause a temporary high blood-pressure and pulse tension.

The cardiograph is often of considerable value in making an accurate diagnosis of the condition of the heart. This was illustrated in the experience of the writer in a recent case in which a fairly nourished multipara, in the last month of pregnancy, applied to the hospital for care because her heart beat was so rapid as greatly to interfere with her breathing and made her practically unable to work. She was accustomed to do her own housework, caring for her husband and several children. On examination, there was moderate swelling of the lower extremities, but the patient's urine was practically normal. The action of the intestine was deficient, and the skin was dry, but the patient had little or no headache. Blood-pressure and pulse tension were somewhat below the average and, while the patient's general appearance did not indicate serious disease, she was evidently overworked and overtired. There were no murmurs over the heart which could be located as valvular; no evidence of mitral disease nor of valvular lesion; but there was an indefinite murmur which varied with the patient's posture. The patient was examined by the cardiograph and a negative report given. It was thought that her condition was the result of fatigue and a moderate intestinal toxemia. She was accordingly placed in bed at absolute rest, the intestine gently but thoroughly emptied and the patient's diet selected with the view of absolutely avoiding irritation of the bowels

and giving physiological rest to the organs of assimilation. For a short time, drugs were administered, then completely withheld, with the exception of laxatives. No drug tried up to the point of excessive administration did any good; but with the simple treatment by rest and elimination, the patient's heart action steadily improved. She formerly had been greatly averse to moving, could not lie down to sleep at night and was suffering great discomfort with considerable fright. These symptoms steadily subsided, and heart action became progressively slower, blood-pressure slowly rose, until the patient asked to be allowed to get out of bed. She was allowed to do so, and finally to use a commode, but remained practically in bed until the development of labor. This was spontaneous and successful and, following a normal puerperal period in which the pulse rate became normal, the patient made a good convalescence without return of the cardiac symptoms. In this case, the enforced rest, mental, nervous and physiological, seemed to be the one element required.

In diagnosticating disease of the heart, the obstetrician must first eliminate the presence of toxemia. If this is pronounced it may be the predominant and essential pathological condition present and not disease of the heart itself as an organ. In recognizing toxemia, the obstetrician is prepared to find changes in the tension of the vessels, if not in the actual composition of the vessel wall. The correction of the condition of toxemia will very often clear up a supposed pathological state in the heart and vessels.

History of Cardiac and Circulatory Disease.—In comparatively young and sound patients who have not borne many children, pregnancy and labor are survived in an extraordinary way, although the heart and vessels may be damaged. Much depends in these cases upon the character of each labor. If the patient has a strong and vigorously acting uterus and children are born promptly, even with damaged heart and vessels, she may escape serious or fatal complications. On the other hand, multiparae, in whom the uterine muscle undergoes degeneration, frequently have a corresponding condition in the heart muscle, and here the combination is dangerous and may become fatal. Another element of great importance as regards these cases is the ability of the patient to take rest during pregnancy, or the necessity under which she lives for physical exertion more or less arduous. Of all the means of treatment for these patients, rest is the most valuable. Hence, the patient who needs it most and can have it least has the chances largely against her. The occurrence of an acute infection during pregnancy, in a patient with damaged organs of circulation, is always attended with danger. In these cases, influenza becomes rapidly fatal, pneumonia is a great risk and other infections are also serious complications. In no class of cases is the benefit of intelligent prenatal care and medical observation more strikingly shown than with these patients. The contrary, that the absence of this care greatly increases the mortality and morbidity in the presence of this complication, is unfortunately true.

Treatment.—The treatment of disease of the cardiac and circulatory organs complicating pregnancy requires careful study and thorough diagnosis and attention to details. An accurate history is important and should be obtained as minutely as possible. This informs the obstetrician of the presence or absence of such disease in the early life of the individual, and gives other information which is of great importance. The history of adult life before pregnancy occurred must also be obtained, and the fact that the patient will often neglect the most important occurrence, or mention it casually, must not be lost sight of. In the history of the pregnancy, the period of gestation at which the patient began to suffer from cardiac discomfort is interesting, and also the results of any form of treatment to which the patient has been subjected.

The first question to be decided as regards treatment is whether the heart of the pregnant woman is doing its work properly. In medical terms, Is compensation established and maintained? Realizing the unusual conditions of pregnancy, this inquiry seeks to determine whether or not the heart has sufficient healthy tissue to adapt itself to these unusual conditions and whether this adaptation has really taken place. In order to determine the question of compensation, the patient must be thoroughly examined to ascertain the presence or absence of edema and overdistention of the vessels. The lower extremities should be examined and all portions of the body searched for evidence regarding this condition. This is especially true if there is a history of a marked irritative cough with some difficulty of breathing; here, on examining the lungs, the obstetrician may find evidences of congestion at the base of the lungs, with a tendency to a subacute bronchitis and, occasionally, to pulmonary edema. The development of abdominal dropsy is also a symptom of value, for this should not be present normally during gestation. It is seen in cases of highly contracted pelves in the later weeks of pregnancy where the pelvic contraction prevents the normal descent and engagement of the presenting part. Blood-pressure and pulse tension below the average, disordered action of the heart, considerable disturbance on slight alterations of posture or motion and disturbance when respiration is in any way interfered with or impaired are all signs that the heart is laboring unduly. If compensation is not maintained, there will be congestion in the organs of the body whose function is closely related with the circulation. The kidneys will be unusually congested and the quantity of serum albumen present in the urine will be increased. The area of liver dullness may be larger than usual, there will be increased discoloration about the vulva and genital tract; the patient's face may become dusky and the lips comparatively dark in color. Dull headache and discomfort, if the patient lies flat in bed, are also present. The degree of failure of compensation can be determined by the rapidity and weakness of pulse, irregular action of the heart muscle, indefinite murmurs over the large vessels, pronounced edema and swelling, considerable albuminuria, difficulty of breathing,

impossibility of lying down for sleep, the pallor instead of the dusky hue in the face and, in extreme cases, the patient's fright and sense of impending danger, and threatened failure in the action of the heart.

In choosing a method of treatment to aid such a case, the patient's environment must first be studied to find what is constituting her greatest burden. If, for example, she be working in a factory, running a machine whose gear is too heavy for her, that must be obviated. If domestic work is overtaxing her, she must be relieved of this. If sudden mental or nervous shock or great depression are present, these must receive attention; but the first element of successful treatment will be the study of the patient's social conditions and the removal of the greatest exciting cause.

Next in order comes physiological rest. In almost all cases this requires confinement to bed or couch and, in extreme cases, strict confinement to bed with the use of the bed-pan. The patient's posture must be that most comfortable for herself. While she requires nourishment, this must be of such a character as to make the least demand upon the digestive organs and leave the least residue. In selecting the diet, the mistake must not be made to add greatly to the quantity of fluid ingested, for, if the patient's tissues are water-logged, she will not improve by the addition of fluid. She will, however, be greatly improved by the abstraction of fluid, and this may be most safely done through the intestine. Thus purgative medicines which produce free watery stools are indicated, such as the compound cathartic pill, the compound colocynth pill, small but repeated doses of Epsom salts in hot water and high purgative enemata, jalap in combination with drugs to prevent colic, calomel followed by salines, all are useful. The dryness of the diet must depend upon the condition of the patient's tissues.

The drug most useful in maintaining the compensation of these patients is digitalis, and there is room for considerable choice in the preparation administered and the mode of its use. Many experienced observers believe that the best quality of digitalis leaves is the most valuable form in which this can be used. The question of dosage depends entirely upon the behavior of the patient under the use of the drug. Beginning with a moderate dose, it may be increased in accordance with the patient's tolerance to the effect produced. A reliable tincture of digitalis has long been found a useful preparation; digalen, digitalin, fat free tincture of digitalis, are all of value. It is important, if possible, to use them without disturbing the stomach, but, if this cannot be done, then the drug must be given by hypodermatic injection.

Where there seems necessity for stimulating the heart muscle, strychnin may be added in varying doses. If the patient's stomach is not irritable, tincture of nux vomica may be useful. Where blood-pressure is very deficient and the tone of the vessels is greatly impaired, belladonna in small doses will do good. This may be used as a tincture or, if hypodermatic medication is employed, in the form of atropin. Tincture of strophanthus is not ordinarily required, except in extreme

cases where digitalis is not efficient. In cases where a high blood-pressure and pulse tension complicate diseases of the heart, the nitrite of sodium or minute doses of nitroglycerin may be indicated.

The effect of opium as a general stimulant and sedative will often be required for these patients. Usually the hypodermatic injection of morphin is the method preferred. The action of opium taken by the mouth may disturb digestion, and by its uncertainty and slowness of action may be of little comparative use to the patient. Before morphin is given, it may be well to try codein or, if there is an irritant cough, heroin, so that morphin may remain when a more powerful sedative effect is required.

The action of alcohol as a sedative and promoter of sleep must be remembered in these patients, and, if this will give the patient comfort when taken at bedtime, opium may be reserved for a greater need. If such treatment as has been suggested is successful, the patient will become more comfortable and will appreciate her improvement. Edema will grow less, there will be longer and better sleep, better appetite and assimilation, and less mental and nervous depression. The secretion of urine will be more abundant, and the urine will be more nearly normal. On the other hand, if the patient steadily fails, there may come a crisis in which death seems threatened. Under these conditions, prompt hypodermatic stimulation is necessary and, in the presence of intense congestion and cyanosis, the question of bleeding must be considered. While this is rarely necessary, it has, in appropriate cases, been successful.

Shall the pregnancy be interrupted in diseases of the heart? We may recall the general rule that, in the acute infectious diseases complicating pregnancy, gestation must not be disturbed; but in the condition which is essentially one of progressive degeneration of a vital organ, in which pregnancy is but an added burden and danger, the question arises whether or not, in the interests of the mother, the pregnancy should be interrupted. This decision calls for knowledge, large clinical experience and good judgment.

First of all, the circumstances of the patient's life must carefully be taken into account. The question of primiparity or multiparity is of cardinal importance. The presence or absence of degenerative processes in the important viscera must not be neglected. We may possibly make the matter more clear by citing illustrative cases, in one of which the pregnancy was not interrupted, and in the other, the pregnancy was terminated artificially.

A woman, aged thirty, of excellent nutrition, gave a history of rheumatism when a girl, after which she was told that she had disease of the heart. This had not, however, given her especial inconvenience, but she had been warned that serious disease or pregnancy might be a grave complication. She had had no severe infection since the rheumatism of childhood. She was several months pregnant and, so far, had done well with little or no toxemia and was in good general condition.

Knowing her previous history and wishing to satisfy the fears of her family, she requested an examination. She had an uncomplicated mitral leak, with the heart muscle, however, in good condition; the rhythm of the heart, good; the sounds, clear; no edema of the extremities; the urine, normal; the bowels moving regularly, and spontaneously; blood-pressure and pulse tension not increased. The only possible effect that could be attributed to the cardiac condition was the fact that the patient complained that, on going up the stairs or taking a considerable step, the heart beat slightly more rapidly than formerly. The patient was very desirous of continuing pregnancy and was told that she could do so if she would report regularly to her physician and carry out the hygiene which he suggested. Under these precautions, the pregnancy proceeded naturally, terminating in a successful spontaneous labor. On recovering from childbirth, the patient's condition seemed fully as good as before the pregnancy began.

A multiparous woman, aged forty, had already given birth to three children and was again pregnant. There was a history of rheumatism in girlhood, with two comparatively severe attacks of influenza in adult life, constant and hard physical work since adolescence and, at times, deprivation and poverty. There had been mental strain and worry because of poverty and the illness of husband and children. The patient was eight months pregnant, edema was pronounced, respiration easily disturbed, sleep obtained with difficulty and, at that time, a sitting posture being maintained, considerable albumen in the urine, constipation, chronic and irritant cough, changes at the base of the lungs and the patient's general condition one of suffering and stress. The heart sounds were neither clear nor vigorous. There was no demonstrable mitral leak, but the symptoms were those of mitral stenosis. There was a distinct interval in time between the ventricular contraction and the radial wave. The patient's condition was such that she greatly needed treatment and sought admission to the hospital. The effect of the treatment already described was tried on this patient for a few days, but without improvement. Labor was then induced and, after the delivery of the child, the treatment, which had been unsuccessful before labor, greatly lessened the patient's symptoms and finally enabled her to be up and about and to return to her home. Domestic help was given the family through the social service of the hospital.

In attempting to terminate pregnancy in these cases where the physical indication seems clear, the obstetrician may be delayed by religious scruples upon the part of the patient. There are ecclesiastics teaching that no complication which threatens the mother's life should lead to the sacrifice of the embryo or fetus. Under these conditions the writer has seen patients die from disease of the heart and vessels during pregnancy, when life could unquestionably have been prolonged for a considerable time had the pregnancy been sacrificed.

Management of Such Patients in Beginning Labor.—As pregnancy does not end until labor is over, it is not improper to consider the treat-

ment of these cases in the first portion of the labor. In extremely severe cases, the advent of labor is accompanied by great mental and physical distress. Uterine contractions seem to throw an almost intolerable burden upon the heart, the patient struggles for breath, becomes frightened and implores immediate aid and delivery. Asphyxiation may develop very rapidly, the appearance of the patient may become most alarming to her friends and relatives and the obstetrician may be urged immediately to deliver the child. Under these circumstances, his first inclination may be to give a remedy which will stimulate the action of the heart. Experience shows that it is the nervous system of the patient which should first receive attention. Usually a hypodermatic injection of morphin and atropin in full doses will help greatly, and shortly after this strychnin and digitalis may follow. The first stage of labor should be made as short as possible, distention of the urinary bladder avoided by the use of the catheter and, at the earliest possible moment, under ether and oxygen, the child should be delivered. The advice has usually been given to let the patient bleed from her uterus in these cases to afford relief to the circulation, but it must be remembered that the rapid emptying of the uterus is followed by a great change in the pressure upon the vessels in the abdomen, and that there will be a subsidence of blood from the heart following the birth of the child. Hence caution should be used in injecting fluid or in allowing too free hemorrhage. Physicians are sometimes afraid to use anesthetics in these patients during labor, but ether and oxygen will greatly stimulate the heart and respiration, while the relief which they afford the patient is immediate and most grateful.

Different Varieties of Cardiac Disease.—Least dangerous is the uncomplicated leak at the mitral valve. Next in importance, aortic disease. Most insidious and dangerous in its effects is congenital mitral stenosis. In extreme cases, two or three of these conditions may be present simultaneously. So disturbed may be the action of the heart that the condition of the various valves cannot be made out. It must again be repeated that it is not the condition of any one of the heart valves or a lesion at any one orifice which is the important factor in estimating the gravity of the condition of a patient with cardiac disease: the condition which the cardiac muscle presents, the presence or absence of toxemia, the condition of the vessels, the ability of the patient to rest and obtain nourishment and her mental and nervous state must all be considered.

Shall Patients Who Have Cardiac Disease Marry and Bear Children?—The answer to this question must depend upon the nature of the disease, the general condition of the patient, her surroundings and resources, the possibility of her following out a strict hygiene, the medical care which she can obtain and her patience in obeying the directions of the attending physician. It will thus be seen that the answer to this question cannot be based upon any one factor or given without due consideration.

When the obstetrician is asked by a multipara, overburdened physi-

cally and mentally and with whom the struggle of life is difficult and complicated, whether she may safely undertake another pregnancy, the answer must be that it will shorten her life and expose her and her child to very considerable risk.

Under these circumstances, should not the question of birth control and how it may be most efficiently carried out be considered? In the experience of the writer, these are the patients who justify, under favorable conditions, elective cesarean section followed by sterilization. By this means the patient is spared the strain and danger of labor and the danger of further pregnancy. What mode of operation the obstetrician selects will depend upon the condition of the patient, but, whenever possible, the writer prefers supravaginal hysterectomy, with the removal of both tubes and, in women of forty or more, removal of both ovaries. If the patient's condition justifies it, the appendix may be included in the removal. The writer has no confidence in methods for preventing conception, nor in advice given by those who have little or no practical knowledge on the subject. This method of birth control, we believe, in responsible and reputable hands, to be clearly indicated and to give satisfactory and permanent results.

Myocarditis and Endo-arteritis.—In some cases of acute septic infection, myocarditis and endo-arteritis, with rapid invasion of the cardiac muscle, may lead to a rapidly fatal termination. Such is occasionally seen in infection by the hemolytic streptococcus where the site of the septic process is chiefly the liver. Malignant jaundice, high fever, delirium and a rapidly fatal issue are the result.

Myocarditis complicating pregnancy is so fundamental a portion of all cardiac disease that its separate consideration is scarcely possible. It is essentially in the pregnant patient a degenerative process, a part of toxemia to be treated by remedying the toxic condition, and showing its effects principally in the development of toxic phenomena.

Varicose Veins.—We have already considered this subject in other phases of the complications of pregnancy, but it must be remembered that the most serious degeneration of the vessels is accompanied by disease of the heart. When veins give way from mechanical causes only, the cardiac condition remaining good and the general condition of the patient not being a serious one, the varicose veins can be dealt with with every prospect of palliation during pregnancy and subsequent cure; but where the whole circulatory apparatus is involved, the varicose veins become an important symptom of a serious underlying condition which it may be difficult or impossible to remedy. In these cases, the condition of the veins should be taken as an important symptom of what is going on, or has already been accomplished by disease, in the deeper organs of the circulation.

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CHAPTER XV

DISEASES OF THE NERVOUS SYSTEM

Disorders of the nervous system complicating gestation—Abnormalities in the organs of special senses—Diseases of the skin and of the hair—The sweat glands and of the organs of touch and sensation—Abnormal conditions in the eyes and ears and olfactory organs and organs of taste, complicating gestation—The appetite of the pregnant woman—Pregnancy complicated by disturbances or lesions of the cerebrospinal axis—The neuralgias of pregnancy—Pregnancy and tetany—Mania and melancholia in pregnancy—Pregnancy complicated by epilepsy and by chorea—Hysteromania and hysteria complicating gestation.

DISTURBANCES OF THE ORGANS OF SENSE

The pregnant patient is notably hyperesthetic as regards the condition of the skin. The mask of pregnancy, or chloasma, is, fortunately for the patient, not sensitive, and so far as is known there is no remedy for it except the termination of pregnancy. Many pregnant patients complain of a sense of unusual bodily temperature or heat to such an extent that they require much colder rooms than the nonpregnant. In other patients, hyperesthesia is present in different portions of the body without a general involvement. The sense of touch is often unusually acute during pregnancy, and in many patients a condition of extreme sensitiveness of the vasomotor and secretory nerves of the skin develops. Angioneurotic edema and excessive sweating frequently annoy these patients greatly. A hyperesthetic condition of the heart is often shown by pregnancy and usually most marked in the highly nervous individual. If there has been before pregnancy a point of disease or irritation about the scalp, it becomes exceedingly sensitive during gestation. Eruptions upon the skin accompanying pregnancy are principally those of the so-called mask, or chloasma. This pigmentation may cover the greater portion of the face; it is usually of a yellowish brown color and often may disfigure the patient greatly. Increased pigmentation during pregnancy also develops upon the abdomen and about the genital organs, and often to a very considerable degree about the nipples and other portions of the breast. This, however, does not occasion suffering, as these areas are not unduly sensitive.

The Skin.—The hygiene of the skin during pregnancy is of decided importance. As the nerves of the skin are unusually sensitive many pregnant patients easily become chilled and a thorough chilling of the surface of the body may precipitate an attack of toxemia or nephritis.

The skin being excessively irritable, the patient's rest and sleep may be disturbed and loss of strength may result. The hygiene of the skin during pregnancy demands frequent bathing, with the use of the mildest, and also the purest, kind of soap. Such are the genuine Castile soap, palm-oil soap of good quality and Ivory soap. Soaps made of vegetable oils are preferable if they can be obtained. The addition of bathing ammonia or bran to the water of the bath may also be useful. The use of very dilute ammonia, or alcohol, where there is a tendency to excessive perspiration and irritability of the skin, often gives comfort. If powder is employed, it should be of the simplest and purest sort. Highly perfumed applications of all kinds are injurious. The hygiene of the hair and scalp during pregnancy calls for the frequent and general use of the best quality of hairbrush. If there is a tendency for the hair to come out, the patient should receive competent attention by massage of the scalp, stimulating the roots of the hair; the application of an electric vibrator, with massage of the scalp; and the use of a simple and pure oily or fatty substance. The patient should be encouraged to remember that, after the pregnancy is over, the hair usually comes in with its usual vigor.

The Eyes.—We have already seen that a highly toxic condition may result in embolism of the retinal artery with permanent damage to sight. So, in some instances, there may be the same accident of embolism induced by very severe straining or coughing in a pregnant woman not in good condition. If a patient has had abnormalities in the sight before pregnancy, these may become accentuated. On the other hand, a patient whose vision has been weak, only, may see better during the gestation if it proceeds normally.

Pregnant patients are sometimes the despair of ophthalmologists. If they have worn glasses before pregnancy, they complain that these glasses no longer suit them and yet it may be difficult to find a good reason for the complaint. If the ophthalmologist attempts to make a new correction of vision he knows that this will be but briefly successful and that sooner or later the patient will again return for further attention. Should evidence of eye-strain develop during pregnancy, this should be at once relieved by the proper lenses. But in cases where no anatomical reason can be found for disturbance of vision, a very simple lens and psychic encouragement may tide the patient through the pregnancy. During pregnancy women often devote themselves without restraint to sewing and embroidering, notably in the making of infants' clothing, and vision is frequently overtaxed in this way. A serious disturbance of vision during the pregnancy is of considerable importance. Thus the complaint that the patient sees particles of fire before the eye strongly indicates an active toxemia. A habitually clouded vision denotes congestion of the vessels in the retina. Distinct impairment of vision may indicate the same complication. The obstetrician should, in the presence of an actual disturbance of vision, secure an expert examination of the eye-grounds.

The Treatment of Toxemic and Ocular Complications of Pregnancy.—Where, during acute toxemia, the eye-grounds are seriously affected, the treatment of the toxemia is evidently the essential factor; but something can be done if possible to minimize the damage to the patient's vision, with the hope that no permanent injury may result. The withdrawal of cerebrospinal fluid is often of value in the acute toxemia of gestation. This lessens the danger of retinal hemorrhage and improves the patient's vision.

In the case of pregnant women whose nutrition becomes very seriously impaired, perforating corneal ulcer may ruin sight. The detection of the ocular condition emphasizes the malnutrition of the patient and demands the most active and vigorous treatment. Pregnancy does not seriously injure the crystalline lens, and the pathology of the complications in the eye which accompany pregnancy are essentially those of engorgement of the vessels with possible rupture. The headache of eye-strain developing during pregnancy must not be confused with the severe headache of active toxemia. Headache of any sort in a pregnant patient suggests a thorough examination of the urine and, unless sufficient cause be thus found for the headache, the eyes should also be examined.

Pregnant patients will sometimes ask whether abnormalities of vision are transmitted by mother to child. It must be remembered that the child has two parents; and while the male child resembles more closely the mother and the female child the father, still a defect in the eyes which is not of a serious nature need not impair the vision of the child. In monstrosities, abnormalities in the development of the eyes are of scientific interest but not of practical importance.

The Ears.—A patient who before her pregnancy has had a chronic infection of the middle ear may be seriously inconvenienced by the lighting up of this process during pregnancy. The writer has had under observation a multipara in excellent general health, who has had four pregnancies, in each of which an old inflammation of the middle ear has required constant attention by the otologist and, during the first pregnancy, was so much increased as to demand operation. Infection of the middle ear will be more severe in the pregnant than in the nonpregnant patient. This is one of the reasons why all infections of the nose and throat in pregnant patients should receive prompt and adequate attention.

Disturbance of hearing during gestation may result from the physical condition of the ear, as an accumulation of wax, disease of the middle ear, partial or complete closure of the eustachian tube, rupture of the drum membrane, or some disease of the auditory nerve or its branches. Some pregnant patients suffer from a sensation of ringing or noise in the ears, probably the result of congestion, while some have disturbances of hearing for which no anatomical reason can be found. The hearing of the pregnant patient can thus be guarded by the prompt detection and treatment of infection of the nasopharynx and also of the

middle ear. Acute pain in the ear calls for examination by a specialist and in some cases for immediate incision of the drum membrane.

The size and shape of the external ear is often a matter of great interest to the prospective mother. The hope constantly arises in her mind that the newborn child will have ears which lie flat against the head. No matter how ugly may be the ears of the parents, each mother cherishes this hope and ambition. It is interesting to note that the external ear is that portion of the human body, unless the fingerprints be excepted, by which positive identification can be made. Peculiarities in the shape, size and convolutions of the external ear are hereditary and families are often exceedingly proud of a particular curve in the external ear. In highly nervous women, their fears concerning the development of the ear in the offspring may be allayed and they should be encouraged to believe that the shape of the ears of the child will be in accordance with its general beauty and perfect development.

The Olfactory Organs.—Many pregnant women are greatly annoyed by an excessive keenness in the sense of smell, exposing them to great inconvenience and discomfort. Others take a violent prejudice to a particular odor which may not have been obnoxious before pregnancy developed. In others, the irritation in the nose is so great as seriously to interfere with rest or sleep. Swelling and irritability of the mucous membrane of the nose is a sign and symptom of pregnancy and, in gouty, neuropathic individuals who have had children, this may be the earliest recognizable sign that a pregnancy has occurred. The more neuropathic the individual, the worse the irritation of the nose, and the condition is practically incurable during pregnancy. Much can be done, however, to mitigate the patient's sufferings by the attentions of a specialist who will, by the application of cocain or novocain, be able to cleanse thoroughly the nasal cavities and be able to make suitable applications to the mucous membrane. There is some danger to pregnancy in irritation of the nose, for violent attacks of sneezing have brought on abortion or premature labor. Hence the condition of the nasal passages during pregnancy is of considerable importance.

Taste.—The sense of taste in the pregnant woman is frequently disordered. This must not be ascribed to a purely nervous condition, for frequently it depends upon a toxemic state. In the neuropathic individual whose general condition is fairly good, pregnancy may greatly stimulate the sense of taste and the patient may greatly relish highly seasoned food which previously she could not tolerate. Pregnancy may also cause salivation and the phenomenon known as "cotton spitting" and altered secretion in the mucous membrane of the mouth and tongue. A sensation of a hot burning fluid coming into the mouth and excessive acidity in the mouth are not infrequent in pregnancy. These abnormalities should at once suggest a search for a toxemia of gestation. If this be absent, the patient's hygiene should be investigated and the character and quantity of her food. Attention to the digestive function is necessary and, if these precautions are taken, with the use of alkalies

in the stomach and mouth, abnormal sensations of taste may be greatly improved and lessened.

The condition of the tongue during pregnancy is of decided interest and importance in the matter of diagnosis. In some pregnant patients the papillae of the tongue become much more prominent. Some have a much cleaner, better tongue than in the nonpregnant state, while in others the tongue is heavily furred and coated. An excessively flabby and relaxed tongue is an important symptom, and the obstetrician will learn early in his experience to recognize the tongue of the tea sot. In maintaining the hygiene of the mouth, that of the tongue must not be forgotten. Often the epithelia grows in excess and fungi develop, and it may be well to clean the tongue daily as a matter of precaution. It is sometimes possible to scrape it gently, or to apply a toothbrush. The removing of sodden epithelia, or fungi, from the tongue is often very satisfactory in lessening the patient's gastric discomfort. The significance of the dry and brown tongue as an evidence of virulent toxemia, often of septic origin, must not be neglected.

Disease of the Cerebrospinal Axis—*Anorexia and Abnormal Appetite.*—One of the most common symptoms of pregnancy in which the physical and mental join is abnormality in the appetite of the pregnant woman. It must be remembered that appetite is a complex phenomenon, and that it depends not only upon hunger, but also upon the smell of food, its taste and the environment in which the food is taken. The stimulus to digestion which occurs under the most enjoyable circumstances is a familiar illustration. To the pregnant patient, appetite during the early months may be considerably deranged from the nervousness and timidity which the patient feels if the pregnancy is the first. As gestation goes on, this passes off and the increased nutrition of the patient may produce an abnormal appetite. The so-called cravings of pregnancy for acids or alkalies or large quantities of meat must be taken as indicating some want in the patient's body and in that of her child. These cravings should not be disregarded, and should first arouse the suspicion of some serious disturbance of metabolism. If this can be ruled out and the patient craves acids, they should be intelligently given. Alkalies may be required, and if there is an excessive demand for proteid this must be modified to avoid an unusually hard fetal skeleton. Care should be taken that the patient takes her food under favorable circumstances, and that nervous disturbance, irritation, or worry are prevented at this time. The appetite may be directed in such a manner as to be of great service to the patient. If she is told that milk contains calcium and that calcium is needed to make a proper skeleton for her child, she may be able to drink milk which formerly she refused. In directing her diet, her appetite may be consulted so far as possible, but a healthy appetite may often be formed if the reason for the selection of the article of food be given. A decided abnormality in appetite during pregnancy is a symptom of importance and its cause should be accurately ascertained.

Neuralgias.—The general fact must be remembered that neuralgia is a complaint of starved or poisoned nerves. This distressing complication may be excited by some point of irritation, as a diseased tooth, an adherent tympanic membrane and adhesion following previous disease in the abdomen, or a condition in the joints which remains a permanent source of irritation. Pregnant women often suffer from neuralgia in the chest wall in the intercostal nerves. One-sided facial neuralgia may often prove exceedingly annoying.

These neuralgias call for an accurate examination of the blood and urine of the patient to detect the presence of toxemia or anemia. An examination should be made for points of irritation, and the teeth should be examined with accuracy or by the X-ray. Other portions of the body may also be susceptible to this method. So far as medicinal treatment is concerned, the most important is that directed to the correction of anemia. A gouty or rheumatic tendency requires the use of alkalies and often bitter tonics. In the anemias of pregnancy, arsenic is more valuable than iron, especially where neuralgia is obstinate. If pregnant patients can assimilate an increased quantity of fat, this is often of decided value.

The majority of patients take aspirin freely for any kind of pain. If this fails and they can apply Baume Analgesique, this is the next resort and, after this, any remedy or application suggested by a friend. In gouty and rheumatic patients the salicylates and alkalies are indicated, but the remedy should be selected by a physician and used intelligently. In facial neuralgia the teeth must immediately be investigated and also the condition of the middle ear and nasopharynx.

Uterine neuralgia may greatly distress the pregnant woman. It is often accompanied by irregular but annoying contractions of the uterine muscle which may become so severe as to counterfeit beginning labor. This condition is usually seen in anemic and exhausted multiparae living under bad hygienic surroundings. Occasionally highly neurotic patients, although luxurious, will show the same condition. The obstetrician may be considerably disturbed by these patients, and they may summon him at all hours with the fear that labor is beginning.

This condition calls for a thorough review of the hygiene of pregnancy, and the administration of such sedatives and alkalies as may be indicated. The bromid of sodium in considerable doses is often useful. If, with this, codein is given, the bad effects of morphin are avoided. In gouty and rheumatic women appropriate remedies are indicated and occasionally cinchonidin salicylate gives prompt relief. These patients are sometimes afraid to move about because motion seems to excite painful uterine contractions, but, if their attention can be diverted, the more they move about the better, for exercise is needed for maintaining hygiene.

The differential diagnosis between uterine neuralgia and beginning labor may require a vaginal examination to detect beginning dilatation of the cervix, and descent and engagement of the presenting part.

Uterine contractions of labor return at regular but shortened intervals and have a definite character, while the spasmodic action of the uterine muscle in uterine neuralgia does not resemble that of labor. The irritation produced by an overdistended urinary bladder must not be forgotten in studying these cases and, if there be any suspicion that the bladder is overfilled, it should immediately be emptied by catheterism.

Neuralgia in any of the pelvic organs may cause considerable discomfort during pregnancy. Ovarian neuralgia may be obstinate and sometimes excites great apprehension on the part of the patient. The pain is to be differentiated from that of acute appendicitis or beginning labor. Neuralgia of the urinary bladder in gouty neurotic women may also develop, and great sensitiveness, pain and irritation about the rectum may produce considerable disturbance. In these patients the precaution must be taken that the bladder and rectum are not allowed to remain overfilled, that strict cleanliness is practiced, and that the general nutrition of the patient is good.

So-called neuralgia of the heart, if genuine, is recognized as angina. This would indicate the presence of some serious disease of the heart, but, in toxic and highly nervous parturient women, there is a so-called false angina which may possibly puzzle the obstetrician for a time. These attacks closely resemble the genuine. There is pain over and about the heart, the patient states that the pain extends down the left arm, the action of the heart is disturbed, there is considerable fright and apprehension; but, if the case be closely studied, it is seen that the disturbance of the heart is but slight, and that progressive attacks of this disorder tend to become less severe instead of worse. Such paroxysms are oftened observed in toxemic patients and, in the experience of the writer, one of the most interesting of these cases occurred in a parturient woman having a marked insufficiency in the action of the thyroid. She was for a time benefited by the administration of thyroid extract, but finally was treated by digitalis and, during the paroxysms, by morphin, and was under the care of a trained nurse in her home. She was examined by specialists in cardiac disease who could find no anatomical cause for the attacks. The patient was not hysterical, and was very much averse to being ill. After three years of treatment by cardiac tonics and sedatives, the patient's toxemic symptoms declined, the attacks resembling angina ceased and, while undoubtedly she has not a sound myocardium, she is in greatly improved health. Unquestionably there was a large nervous and toxic element in the early attacks.

Tetany.—Pregnant patients sometimes develop a condition of tetany which may affect several of the limbs. As in the nonpregnant, this is seen in anemic, overworked and greatly worried individuals. The condition is usually seen in pregnant women working in ill-ventilated rooms or factories. It may come on when an effort is made to move and to use the hands or feet. The spasm of the muscles is not extreme, the patient complains of moderate pain only, there is no essential alteration of pulse or temperature and the condition yields to mild sedatives and to tonics.

Tetany is important as indicating malnutrition and psychic depression in the individual.

Melancholia.—The so-called insanity of pregnancy is usually melancholia. This varies in all possible degrees from the simple apprehension of many pregnant women that the child may not live or that it will be deformed to a profound melancholia which suggests suicide. Two physical causes are usually present in these cases, and they must always be sought for and recognized or excluded. One is the toxemia of pregnancy and the other is septic infection.

The toxemia of pregnancy will become manifest if examination be made by methods already described. The condition of the mind may be the most predominant symptom and the others may be so inconsiderable as to escape ordinary observation. A nitrogen partition of the urine is of especial value in these cases, for it has been repeatedly shown during attacks of mental disease in the pregnant, or nonpregnant, that the excretory processes of the body are greatly disturbed. Melancholia may vary from the mildest form to that which becomes dangerous, and in its extreme form the patient may require constant observation and prolonged treatment.

The diagnosis of melancholia complicating pregnancy must not depend upon the statements of friends or relatives, or even upon the remarks of the patient herself. It is important to recognize the relation of the patient to her environment. If the latter is approximately what it should be, a continuous state of irritability and lack of harmony with the environment is a phase of melancholia. Prolonged and chronic ill temper is not natural in a pregnant woman. It may be difficult for the obstetrician to get the genuine viewpoint of the pregnant patient if she has melancholia. She may decline to discuss matters with him and may even refuse to answer unobtrusive questions. Here the observation of an intelligent and faithful attendant is necessary, and the patient's mental condition must be studied by one accustomed to observe closely and to report accurately. Very often the patient is greatly saddened by the fear lest those who formerly loved her have ceased to do so; that the child will not live or will be deformed; that she has committed an unpardonable sin; that great disaster is about to come upon herself and her family; or that she is the victim of oppression and injustice. These mental abnormalities may vary in extent from prejudice only to a pronounced and sick condition of mind. The psychic element in the case cannot properly be appreciated without minute analysis, and this is a process requiring some time and trained observation. The obstetrician must not make the mistake of questioning the patient concerning her views and feelings. If he can divert her mind for a moment, he will find that it will then spontaneously return to its principal abnormal subject.

A minute study of the patient's physical condition is necessary in these cases. A clear history of the patient's heredity is also valuable. All that has been said regarding the diagnosis of toxemia and anemia

complicating pregnancy applies to these cases and need not here be repeated.

Treatment.—Psychic and physical treatment must go hand in hand. Isolation from friends and relatives, including her husband and members of her family, is necessary. One who is accustomed to deal with the mind should patiently endeavor to win the patient's confidence and draw from her an account of the circumstances which are producing her depression. With time and patience this can usually be done without direct questioning. Other and brighter things should be suggested. Entire change of surroundings should bring the patient into a more agreeable environment. Thus, beautiful scenery, pictures, music, whatever interests and invigorates the mind, may be employed. Sometimes the patient's affections may become centered upon an animal or, if she has no child, upon a child. This may help considerably in breaking up gloom. If it is discovered that the patient has any predominant taste or talent, this tendency may be utilized in diverting her mind. Those about her should be hopeful, cheerful and uniformly patient. A very considerable degree of firmness is necessary, and the patient should be questioned as little as possible. She should not be asked whether she wants a thing, but it should be given to her with the implication that it will immediately be taken.

The physical treatment of these cases consists in correcting the patient's assimilation and digestion, using selected diet, and such tonics as may be needed. Alteratives should be given if the condition demands. The use of electricity, baths, massage, passive movements and, also, employment of out-of-door exercise is a matter of great importance.

Prognosis.—If there is a family history of insanity, or if the patient has ever previously been actually and pronouncedly insane, melancholia complicating pregnancy is a serious matter. Suicidal tendency may develop and the patient may succeed in taking her life. If she goes to full term and comes into labor, mania may ensue and in this the woman may attempt to kill her child and she herself may die of exhaustion. Melancholia in a woman of insane tendencies must be considered of grave import.

Where, however, the heredity is good through several generations of the family and where an abnormal physical condition, such as pronounced anemia or toxemia is present, or where the patient has had a bereavement or psychic shock and is in good average physical and mental development, the prognosis is by no means desperate. The coming of the child will usually be an important factor in curing the mental condition. The treatment which is indicated for the mother will fortunately be of the greatest service in producing a healthy child and, hence, the milder cases should be treated as thoroughly as are the more severe. If the woman has a pronounced taint of insanity and recovers from the attack of melancholia complicating pregnancy, there is reason to fear that a subsequent pregnancy will be complicated in a similar manner. If, on other hand, her heredity is good, her general health has been

good and there has been some extraordinary and definite cause for the melancholia and if the pregnancy terminates successfully, the patient may be well during subsequent pregnancies. The fact that she has recovered and has a living, healthy child will be a conclusive argument against a return of the disease.

There is little evidence that, in those without hereditary taint of insanity, the melancholia of pregnancy injures the child. If a woman is a neurotic degenerate she cannot expect to produce absolutely healthy children, but, if her melancholia is an acute and transient affair and she receives proper attention, the child will not suffer.

Mania.—Few more tragic experiences fall to the lot of the obstetrician than the study and treatment of acute mania complicating pregnancy. The attack of mania may be transient and, while temporarily severe, may end in recovery. Or the attack may be so violent as to terminate the pregnancy and sometimes the life of the mother.

Transient mania often follows eclamptic convulsions from toxemia. The uterus has usually expelled its contents when within forty-eight hours the patient becomes actually maniacal. The type of mania is frequently that of intense and active fear. In one case in the observation of the writer, the woman was convinced that her house was on fire and that her other children, husband, and friends were being consumed in the flames. She herself was in a hospital. In another case the patient became suddenly obsessed with the idea that her husband had gone before some authorities, had denounced her as worthless and unfaithful and had absolutely and permanently rejected her as his wife. Her cries and lamentation arising from this idea became violent in the extreme. Other patients seem obsessed with the fear that something is pursuing them or about to fall upon them, or that they themselves are about to fall from a great height. They struggle to get away, to escape from the hospital, to resist the attentions of nurses and occasionally they attack another adult person. It is never safe to allow such a patient to have her infant in her possession, for a sudden impulse may lead her to destroy it.

In these toxic cases, restraint is absolutely essential. The best form consists in the canvas retention sheet into which the arms of the patient are placed and which fits over the body in such a manner that the patient can move the trunk and legs and head freely, but cannot get up from the recumbent position and cannot get out of bed. The administration of sedatives is also needed and usually the hypodermatic use of morphin is most efficient. Sometimes such patients decline to swallow, stating that they are being poisoned. With the aid of a sheet, they can usually be managed sufficiently to give them fluid by the bowel and this should preferably be glucose and sodium bicarbonate. Overdistention of the urinary bladder must not be allowed to occur, and if necessary the catheter should be employed. If the patient is continually passing small quantities of urine, it must suggest the presence of overdistention. Care must be taken to introduce fluid freely into the body, and the urine

should be examined daily to determine the progress of the case. These attacks of mania often terminate favorably within a week, the patient returning to her accustomed mental condition. Gradually the violence of the symptoms subsides, she is able to swallow and retain milk and water, recognizes a nurse or doctor and is usually much surprised to find herself in a hospital. Attention to her general nutrition and the gradual withdrawal of morphin, substituting the bromids or veronal for it, are indicated as the patient improves.

In toxic mania complicating pregnancy labor should not be induced. The toxemia should be vigorously treated, the cessation of the mania depending upon the success of this treatment. The occurrence of convulsions would complicate the case considerably and the patient would be threatened with exhaustion. The emptying of the uterus would be an unfavorable occurrence.

Mania during pregnancy may be the result of an acute meningitis. In the experience of the writer, this has developed from acute infection of the middle ear which was not recognized, as the patient was brought to the hospital at term and actively maniacal. She died of exhaustion, with high fever shortly after labor, and a complete autopsy revealed the condition of the ear. In this case the mania was so violent that the patient attempted to kill the newborn child at the moment of birth, wrenched the knobs from the head of the bed and threw them at the attendants, tore with her teeth the coat of the attending obstetrician, escaped from the restraining apparatus and tried to throw herself from the window, and was practically uncontrollable until exhaustion closed the scene. Drugs seemed to have little or no effect upon her.

Mania may also be excited, in those chronically insane, by the incidence of labor. The insane patient is the most difficult person to manage during labor. Uterine contractions may put her into a condition of frenzy, or, on the contrary, she may pay no attention to them and give no sign that she is in labor. She may resist and resent examinations so that the obstetrician has great difficulty in diagnosticating labor and watching its course. Most insane women deliver themselves spontaneously, but they show a curious resistance to the induction of labor and, in the experience of the writer, an insane woman has tolerated the presence of bougies, or a dilating bag in the uterus at term, for more than a week. Uterine contractions failed to develop, and the effort to induce labor had to be abandoned. During pregnancy the habitually insane and maniacal patient should receive the treatment appropriate for the mental condition. It may be difficult to give her any treatment which a complication of pregnancy may suggest, but the effort should be made to prevent toxemia and anemia and to maintain the hygiene of pregnancy as well as possible. The difficulties of labor may be forestalled by obtaining permission from her responsible relatives, if necessary, to deliver her by abdominal cesarean section, followed by sterilization. While these patients are bad subjects for operation, this is a lesser evil than the excitement and injury of labor during mania. The

fact that women who inherit insanity should not marry is generally conceded, but where insane patients are in asylums pregnancy will sometimes occur in spite of precautions.

The influence of mania upon the unborn child must not be neglected. During the mother's paroxysms of violence, the movements and fetal heart beat of the child will become greatly altered and exaggerated. If the mania is acute and not the development of a chronic condition, the child will show no sign of this fact, if it survives its birth, for some time, and may never develop evidence of hereditary mental disease. If, on the contrary, the child is borne by a woman who has always been more or less insane and who inherits insanity, the physiological crises of life, such as teething and puberty, will excite mental disease. The character of the mental disease will be determined by the presence or absence of infection and the circumstances surrounding the patient.

Hysteromania.—The hysteromaniacal patient may give no history of previous disease. She is usually a neurotic upon whose statements no reliance whatever can be placed, and who has the stigmata of degeneration. Her attacks may occur at about full term and apparently be excited by the irritation of fetal movements. They may simulate eclamptic convulsions very closely. The pain of labor may develop an attack or the pain produced by the insertion of stitches in the perineum and pelvic floor after delivery.

The differential diagnosis between hysteromania and eclampsia requires detailed and systematic study. In a patient seen in convulsions and for the first time, the character of the convulsions may be identical in the two conditions. The hysteromaniacal woman has less cyanosis, she will not bite her tongue, although she may spit saliva with great freedom. She will not act without an audience and, if she be put in a room by herself and left entirely alone, her convulsions promptly cease. The attempt to treat her in any way by giving an enema or hypodermatic injection will excite convulsion. When she is not having convulsions, she is watching in a furtive manner the movements of those about her. If she thinks she is not observed, she will drink milk or water freely. Between the convulsions she may give the account of some impossible and extraordinary illness. She may pretend a great anxiety lest her child be injured. Hysteromaniacal convulsions rarely bring on labor. Eclamptic convulsions frequently produce uterine contractions.

Prevention.—The prevention of hysteromania complicating pregnancy should be the prevention of pregnancy. Hysterical and hysteromaniacal women should not be allowed to reproduce. When, however, the hysteromaniacal woman becomes pregnant, she should be kept in a suitable hospital throughout the pregnancy. Physical treatment to maintain the hygiene of pregnancy is necessary, and a firm, kind and impersonal discipline is absolutely required. The tendency to hysteria, outbreaks of temper or extraordinary behavior should be ignored, while the discipline of the institution is maintained. When the patient is at her best,

the effort should be made to interest her in the coming child, and to give her the idea that a great happiness may be in store for her. Evidences of maternal instinct should lead to its encouragement. When labor occurs, the patient should be given sedatives, if necessary, to reduce the irritation of labor to its lowest possible point. Delivery often can be best accomplished under anesthesia and, if the case seems a proper one for sterilization and the necessary consent can be obtained, the patient may be treated by elective operation, thus avoiding the disturbance of parturition. The confirmed hysteromaniacal woman is neither improved nor cured by pregnancy, nor parturition and, hence, in the interests of the race, she should not be allowed to reproduce.

The differential diagnosis of hysteromania is impossible unless the obstetrician has accustomed himself to examine all patients thoroughly and systematically. Experienced observers have been deceived by the character of the convulsions and the behavior of the patient. The differential diagnosis is of great importance, for the eclamptic woman requires prompt and vigorous treatment of one sort and the hysteromaniacal patient management in quite a different way.

EPILEPSY

Epileptiform convulsions very closely resemble those of eclampsia, and the recent pathology of epilepsy would indicate that there is much in common in the pathology of the toxemia of pregnancy and that of epilepsy. The epileptic woman may become pregnant, but cases in which epilepsy develops for the first time during pregnancy are not frequent. We recognize in epilepsy conditions, usually congenital, whereby the balance of assimilation is destroyed and poisons accumulating in the blood cause convulsions. Epilepsy not infrequently develops during adolescence. The history is characteristic and so are the convulsions.

Diagnosis.—An obstetrician called to a pregnant woman who is having epileptic convulsions might not be able to differentiate, at first sight, between the convulsions of epilepsy and those of eclampsia. After he has taken precautions to prevent the patient from biting her tongue and has put her at rest and had her clothing properly adjusted, if he observes the case closely he should soon be able to make a diagnosis. Under ordinary circumstances, the eclamptic woman tends to become more deeply cyanosed than does the epileptic; the convulsions of eclampsia, if well developed, are usually more severe than those of epilepsy; the epileptic as a rule recovers consciousness in a comparatively short time but remains drowsy and sleepy for an indefinite time; the eclamptic does not recover so speedily and tends to lapse into a condition of more profound unconsciousness. A reliable history that the patient had been subject to convulsions before she became pregnant would point to epilepsy, hysteria or hysteromania. It is comparatively rare for a patient to have eclampsia in more than one pregnancy.

When the physical examination of the patient is made, the eclamptic woman shows a strongly beating heart with accentuated first sound, a high blood-pressure in most cases, and an abnormal urine and abnormal blood urea; while, in the epileptic, a very moderate albuminuria may be present but the other symptoms of toxemia will be lacking. Both epilepsy and eclampsia may bring on labor through the mechanical disturbances of convulsions; both epilepsy and eclampsia may show the stomach partially filled with undigested food and the intestines perhaps packed with hardened feces.

The results of treatment in eclampsia and epilepsy will also be significant; the prompt and efficient treatment of toxemia in the eclamptic woman will produce, very shortly, a definite improvement and gradually bring about the termination of the acute attack; the epileptic woman will cease her convulsions without treatment, and, after a period of somnolence, will be as well as usual without necessarily going to labor. Fortunately no harm will be done if the epileptic woman is treated as if she were suffering from toxemia and, if modern pathology of epilepsy is correct, she may be considerably benefited; but the results will not be as immediate nor as striking as in the case of the toxemic.

Natural History.—There has been a common and mistaken belief that patients having pernicious diseases of the nervous system, such as epilepsy, may be benefited by pregnancy. If pregnancy produces any permanent effect upon the epileptic, it is to make her worse. If her epilepsy is aggravated in early pregnancy, convulsions may bring on abortion, when she will return to her usual state of epileptic health. If she goes on to late pregnancy, in some cases the convulsions are more frequent, in others they are less frequent. In comparatively young epileptics, pregnancy may cause a temporary improvement in nutrition, but this is short-lived, ceasing with the pregnancy. If the epilepsy is severe, it is doubtful whether a patient will go to term, and she may pass into a *status epilepticus* in which she becomes comatose and dies with very high temperature. Autopsy in these cases shows effusion into the substance of the brain, sometimes cerebral hemorrhage with great edema.

Prevention.—Except in the milder cases, little can be done under the best possible conditions. The patient should lead a quiet outdoor life with a limited diet from which meat is entirely excluded. The bowels should be caused to move freely and regularly and the patient given abundant hours of sleep in a well-ventilated room. The long-continued use of bromids and other antispasmodic drugs may tide the patient through the early months and bring her to viability or term. Labor may not be unusually difficult, for as a rule the fetus is not large and, in comparatively young patients, labor may proceed without complications. Epileptic convulsions occasionally occur during labor. The child usually shares in the mother's malnutrition and nervous inheritance, and it is usually thought best that the mother should not nurse the infant.

Treatment.—The treatment of epileptics who are pregnant consists in a very rigid regulation of diet. Milk, fruit and bread should be adhered to as strictly as possible. The action of the bowels should be made copious and regular. The patient should be, if possible, in the open air and should have abundant sleep. In the event of epileptic convulsions, bromids by rectum or by mouth, codein or morphin, hypodermatically, should be used to control the paroxysms.

Labor should not be delayed, and the patient should be promptly delivered, under surgical anesthesia if necessary.

The majority of obstetricians, and the laity as well, would agree that epileptics should not reproduce their kind. Under these conditions, the question of birth control again comes up, and the only efficient method of enforcing this would be elective section, as near term as possible, with sterilization.

It must be remembered that epilepsy may be due to a definite focus of irritation and that, in some cases, the removal of this focus cures the patient. If, for example, a pregnant woman known to be subject to epileptic convulsions were to be examined by X-ray, and fragments of bone were found in the cranium pressing on the brain, and she were subjected to operation and these fragments removed, it might be possible to cure her of her epilepsy.

The Epileptic Fetus.—That the tendency to epilepsy can be conveyed has been abundantly shown in the history of such individuals. Sometimes the epileptic person is the child of drunken parents, or those accustomed to use narcotic drugs. Syphilis does not ordinarily produce epilepsy in the offspring. The condition of the epileptic person is such that a child born of such parentage cannot be expected to develop normally. That persons of genius have had epileptic convulsions is one of those exceptions that proves the rule.

CHOREA

A patient who becomes choreic as a girl, usually during adolescence, is not a favorable subject for healthy gestation. Whatever may be the modern belief concerning the pathology of chorea, it does not tend to natural development. At least such an individual is usually neurotic and often of very unstable constitution.

Chorea may return during pregnancy, and patients who have formerly had chorea may adapt themselves badly to the changes incident to gestation. Such may have severe toxemia in early pregnancy, and as the uterus increases in size its progressive pressure may be the source of great annoyance. When to this are added fetal motions, there is abundant cause for the return of the chorea. The attack may be produced by exposure to cold and wet or by a sudden fright or nervous shock. The chorea may become localized, the patient having the choreiform movements, or in severe cases the disturbance may be general.

Diagnosis.—The diagnosis of chorea complicating pregnancy is not usually difficult. The movements of tetany, hysteria, hysteromania, petit mal may all resemble to some extent the movements of the choreic patient; but on careful observation the diagnosis can be made. If, in addition, an accurate history can be obtained of a previous attack of chorea, the diagnosis is established.

Natural History.—Much will depend upon the management of the patient and the circumstances in which she can be placed. The same régime, as to diet, exercise, and open-air life, may be instituted which was advised for the epileptic patient; but very often the choreic requires active stimulation to the processes of nutrition which the epileptic does not. The choreic will often be benefited by arsenic; usually given in the form of Fowler's solution in increasing doses until a limit of tolerance is reached, the initial small dose being then resumed and the dose again increased. If examination of the blood shows anemia, this treatment should greatly mitigate that condition. Some patients do well following the hypodermatic use of iron, others require forced feeding with the simplest but most nutritious food.

Choreic patients should be kept as quiet as is consistent with reasonable healthy life and, if necessary, the patient should be confined to bed with as little disturbance as possible until improvement manifests itself. Absolute rest, mental and physiological, is of more value than sedative drugs, but, when the latter become necessary, their employment is clearly indicated. Alcohol may be used at night as a sedative without fear of producing the habit, if the least palatable alcoholic preparations are used and always given by a reliable person. The judicious use of warm baths is also of value.

If the chorea is severe, the movements may bring on interruption of pregnancy; very often this is followed by no improvement and sometimes by increase in the chorea until high temperature develops and the patient dies from exhaustion. The usual rule obtains in these cases, not to empty the uterus if the patient's condition can be at all controlled, and, usually, when the interruption of pregnancy is undertaken as a last resort, it is too late.

That the fetus of the choreic mother suffers, there can be no doubt. Examination of the abdomen will often detect unusually rapid and violent fetal movements, and the child is usually puny and ill-nourished.

In cases of severe chorea, labor is to be avoided for the sake of the mother and offspring, and elective section and sterilization will be justified.

HYSTERIA

It is a familiar fact that the word "hysteria" implies some disease connected with the structure, condition or functions of the uterus. It is not strange, therefore, that pregnancy may excite a preëxisting hysteria. Nothing can be more fallacious than the idea that pregnancy

may be a cure for hysteria. In young women of good moral and mental fiber, who are sensitive to nervous impressions and sensations and who are not perfectly developed physically but who have good constitutions, a healthful pregnancy under good circumstances can complete the physical development of the young woman, and improve the general tone of the nervous system; but the hysterical person has a bad mental and moral background which pregnancy will not improve, and the condition of pregnancy will give abundant opportunity for the formation and strengthening of the hysterical habit.

Natural History.—These patients often have a morbid terror and aversion to pregnancy, and occasionally a great desire for it and exaltation in it. The hysterical woman is apt greatly to exaggerate the phenomena of pregnancy, especially in the early months; the slightest disturbance of the stomach in the morning hours is magnified to pernicious nausea; the slightest feeling of malaise will be exaggerated to prostration; and the patient may become proficient in the use of these new agents for gratifying her unstable desires. If she is not already adept in the art of deceiving, she will rapidly learn new lessons. If she be tided past the early months, it is possible that maternal instinct may develop to some extent and mitigate, somewhat, the course of pregnancy until the later months.

The beginning of labor will be awaited with abnormal terror or unusual desire. The slightest symptoms of uterine contractions will cause a premature alarm of labor and physician and nurse may be summoned on the slightest provocation. When labor finally does develop in the pronounced hysterical person, there is want of patience, self-control and bravery and, if the patient can be tided along with narcotics until descent and engagement and partial dilatation have developed, the case must usually be terminated under anesthesia by forceps or version.

If the hysterical person is bad during her pregnancy, she is worse during her puerperal period. The establishment of lactation, or the effort so to do, creates fresh disturbances and usually results in failure to nourish the child. The offspring of the hysterical individual can scarcely escape the inheritance of nervous instability.

Diagnosis.—The obstetrician may be greatly annoyed by the hysterical patient. If he has not seen her before her pregnancy, he cannot obtain from her an accurate history of hysteria and, if he questions her loving and admiring mother, he will usually be told that as a child the patient was very high strung! By which it is intended to convey the idea that she was a rare and wonderful individual. On closer questioning, the obstetrician may elicit the history of so-called nervous breakdowns, failure to complete education, transfer from one school to another, usually because the girl was not appreciated by her teachers, and gradually the sordid history of the hysteria is unfolded.

The first problem of the obstetrician may be to estimate, at their true value, the symptoms of supposed pernicious nausea which the hysterical pregnant woman glibly describes. Her narration has consider-

able value in betraying her mental condition, but is worthless as an accurate description of what really transpires. Frequently it is necessary to place such a patient under the care of a reliable and experienced nurse. If possible, the relatives of the patient may be told that she is threatened with prostration, and that she requires unusual observation and treatment, and that she should enter the hospital for several weeks. Sometimes the patient will welcome this as giving her new sensations and fresh notoriety; and, on the other hand, she may positively refuse; but, without accurate observation by strangers, the obstetrician can obtain no accurate idea of the conditions present. In dealing with these cases, endeavor should be made to rouse the better side of the nervous system, and encourage the development of maternal instinct and feeling of confidence in the attending physician. The mother of the patient may help and may also greatly hinder in accomplishing this; frequently she is the worst possible companion for her daughter. The mother-in-law, on the contrary, may rouse the girl's enmity and so steady her to that extent, but often either one or both of these are obstacles in the management of the case. The husband may be privately informed by the physician that the symptoms do not indicate a condition of danger, and that there is every reason to believe that with care and patience his wife will grow very much better.

To obtain an accurate idea of the condition present, the nurse must keep a record of the number of hours of sleep, the quantity of food taken, the quantity of output, the number of bowel movements, temperature, pulse and respiration and other such notes as may be of value. The blood and urine should be examined, and very often hysterical women welcome all sorts of examinations as it brings them into temporary notice. Audiences for their hysterical outbreaks should be limited at first and then omitted. It may not be possible to retire the patient from the stage immediately, but gradually this should be brought about; and it will aid greatly in this complication if the patient's maternal instinct is aroused and she is told that to have a child as beautiful as herself she must be absolutely quiet for a short time. When the obstetrician is sure that he is dealing with a hysteric and not pernicious nausea or some essential disease of the nervous system, he may conduct the pregnancy along the lines just indicated. The patient should be encouraged to get out of bed and go out of doors in decent weather and to do something which has some purpose; and oftentimes an entire change of scene and environment, provided the patient is accompanied by a reliable nurse, is most useful. Agitation, sympathy, and excitement are what the patient craves, but they are bad for her; however, the withdrawal of these must be a gradual process and requires experience and tact.

In the hysterical woman of average intelligence, curiosity may be strongly aroused concerning the formation of the child; it is well to give such patients a simple account of the growth of the fetus, laying stress on those conditions which help in its healthful development. Here it

will aid greatly if the physician has obtained in any degree the confidence of the patient. Again, maternal instinct may come to her rescue, and be the greatest possible aid in controlling the hysterical tendency. If the obstetrician finds that the patient has any one object of mental or psychic belief which will help her in self-control, this may be encouraged, provided the belief is genuine. Sometimes a religious belief demonstrates its true value with such patients. Occasionally a clergyman of good sense and experience may help greatly such an individual, but this ability is granted to few.

As the time of labor draws near, every effort should be made to persuade the patient that this is a natural occurrence, and that every effort will be made to spare her from unnecessary suffering and to safeguard her child and herself. If these patients have developed in a psychic way during pregnancy, they will sometimes show extraordinary bravery during labor, and again they may manifest many hysterical eccentricities by absurd behavior and utterances during parturition. These must be absolutely unnoticed, not remembered, and never alluded to afterward by physician or nurse. During the early first stage of labor, these patients may require sedatives or mild stimuli. They rarely complete labor unaided but, under complete anesthesia, they can usually be safely delivered. After they have recovered from labor, the stimulus of the maternal instinct may again be invoked, and it may be possible to institute healthy lactation and the healthy growth of the infant.

After History.—In estimating the future health of the hysterical woman who has passed through parturition, a thorough study of all the factors in the problem must be made; the degree to which hysteria was overcome by the experience of parturition is a valuable element in the case; the degree of shock, injury, hemorrhage or infection which accompanied or followed labor is also very important. Such patients cannot bear a prolonged labor, and if allowed to suffer uselessly the after result is exceedingly bad. If, however, labor is as short as is consistent with safety, they may look back upon it without horror. If the hysterical woman passes through parturition only to suffer from lacerations and pathological conditions in the pelvic organs, her subsequent condition will be worse than before. If a severe hemorrhage, followed by infection, should complicate labor, her health might be permanently ruined. Hence these patients require the best of care in the best surroundings. In estimating the future health of such a woman and the propriety of further reproduction, the obstetrician must differentiate between the confirmed hysterical degenerate who is practically incurable, and the sensitive, not entirely developed, young woman with good mental, moral and physical background. In the first case, reproduction is a calamity for the individual and the race, for there is a more than ample supply of degenerates already. In the second instance, the case is entirely different and, under favorable economic and social conditions, the patient may bear several healthy children, steadily developing herself mentally and physically. No greater responsibility devolves upon the

obstetrician than giving advice in these cases. His attitude should be that of kindness, consideration and thorough attention to each patient. Considerable tact is required to advise each patient in accordance with what he believes to be the actual truth.

Prevention.—It might not be considered the function of the obstetrician to decide the best means of preventing the development of hysteria in women. From the first, education is of primary importance, and this education should be physical as well as mental. Before the girl is informed by her friends and classmates concerning the phenomena of reproduction, the essentials in this knowledge should be given to her by an intelligent mother or by a well-informed teacher or medical person. She should be encouraged to cultivate a love for young things in every form of life and should be encouraged, if possible, to love children. Before adolescence her education should be more physical than mental. As puberty approaches, she may often with propriety be taken from school and, during this time, carefully and judiciously trained under the observation of an experienced physician. When her health is established, the same elements or ideals of the most natural and dominant factors in her development should be continued as the circumstances permit. The effort should be made to instill in the mind an earnest desire for doing good. With such care, if she develops to a considerable extent along natural lines, showing no strong tendencies of degeneration, an appropriate marriage may result happily for herself and others. But if luxury, laziness and deceit are her portion, her unfortunate tendency will be irrevocably established.

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CHAPTER XVI

PREGNANCY AND THE DUCTLESS GLANDS

Abnormalities in the ductless glands complicating pregnancy—Diseased conditions of the tonsils—Streptococcus infection of the tonsils in pregnancy—The relation of the tonsils to pregnancy—Diphtheria in the pregnant patient—Pregnancy complicated by mixed infection of the ductless glands—The relation of the thyroid to the various developments in the body of the pregnant woman—Hyperthyroidism—Hypothyroidism—The thyroid and labor—The thyroid and the mammary glands and lactation.

At present, modern pathology is largely occupied with more or less speculation concerning the functions of the ductless glands. Recent knowledge concerning their activities has been of dominant interest and importance to the obstetrician, and accurate information is available to a very limited extent.

In the development of women we know that the thymus is present in infancy, but we do not know how long the thymus gland persists. In men this gland is present, and of considerable size, in young adult life. During the late War, a German army surgeon interested in this question examined the bodies of a number of stalwart young men killed in battle; these were all of military age and in good physical condition, and in every one of them the thymus gland could be definitely made out and was of considerable size. In human infants we know that the thymus gland may enlarge suddenly under some circumstances and threaten the life of the infant by pressure upon the trachea; we also know that the X-ray will stop this enlargement and diminish the size of the thymus. What influence, if any, this gland has upon the female generative organs is not known.

We know that before birth the ovaries of the human fetus perform their function, and that ova are liberally generated; hence the essential element in female reproduction is coincident with intra-uterine life.

In the growing girl, the ductless gland which may first receive attention in the care of ordinary health is the tonsil. There has been much discussion concerning the function of the tonsils, and at present an effort is made to advise against their removal because of the condition of the throat after tonsillectomy, and also on the vague statement that they must have a function. If the tonsil has a definite function, it would seem to be natural that it would in some way be concerned with the condition of the health of the girl during adolescence. That it is the site of the development of infection is familiar knowledge. That all of the glands in the female body are unusually active during adolescence

is also known. But that the tonsil of the girl differs from that of the boy in any way in function or structure has not been demonstrated. Menstruation does not essentially alter the condition of the tonsil, except possibly to increase, in some girls, the congestion of the nose and throat until the flow is well established. There is no evidence that a healthy tonsil is a factor in a healthy pregnancy and, in the observation of the writer, pregnant women are not more susceptible to tonsillitis than are others. The writer can recall no case in which the establishment of lactation was accompanied by swelling of the tonsils or any tonsillar complication; hence, so far as the reproductive functions of women are concerned, we are, in the observation of the writer, without definite knowledge that the tonsil has an essential part.

That the remnants of adenoid tissue and the mucous membrane covering the turbinate bones may be swollen during menstruation and during pregnancy has often been observed.

The lymphatic glands of the body may or may not be included among the ductless glands. They communicate with lymphatics which may possibly be considered as having the function of ducts. That the lymphatic glands are more than usually active after impregnation is inferred from the physiological state of pregnancy; but it is not a usual thing to find the lymphatic glands of the abdomen enlarged when the abdomen is opened for the performance of delivery by cesarean section, nor are cervical lymphatics often involved during pregnancy. In rare cases, the establishment of lactation is accompanied by swelling of the glands in the axilla and of the connective and cellular tissues about the axilla and the neck and even the surface of the chest. This condition is seen most often in neurotic individuals, and usually subsides when lactation is fully established.

The glandular tissue of the nose and throat has a definite bearing upon pregnancy from the fact that it may give entrance to the blood stream of streptococci. A streptococcic angina has proved fatal in parturient women, and has been erroneously believed to be puerperal septic infection following abortion. But the same might be said of any poisoned wound complicating pregnancy; a streptococcic blood infection might result from a cut of the finger.

We now know that during pregnancy and labor any preëxisting septic focus in the body of the pregnant woman may be liberated, and that septic infection develops which is not the result of pregnancy or parturition. Thus, in the experience of the writer, a pregnant patient before conception had considerable trouble with her teeth. Among these was a dead tooth which the dentist carefully watched and which he believed to be practically nonseptic and quiescent. During and immediately after labor, the patient developed considerable fever with no symptoms which could be referred to the genital tract. The dentist was called in consultation, and on incising the gum over this tooth about a dram of exceedingly foul pus escaped. The cleansing of this cavity terminated the infection.

The Thyroid Gland and Pregnancy.—That the thyroid gland has to do with adolescence in the girl is a fact of familiar observation. That iodin is required at this time is also a clinical platitude. Pregnancy in healthy young women is accompanied by enlargement and development of the thyroid. As pregnancy advances in the healthy individual, the thyroid does not materially increase in size; and while its secretion is undoubtedly formed and is of definite value, it should not be either deficient or excessive. There is a distinct relationship between the possibility of conception and the condition of the thyroid, and probably the thyroid has an influence in stimulating ovulation. In a certain class of sterile women—those who are fat, flabby and neurotic, some of these also have some abnormality in the pelvic organs—conception may follow the correction of the abnormality by the use of thyroid extract in moderate doses for a considerable time, with a highly nitrogenous diet. The value of thyroid extract in putting a patient into a condition favorable for conception is undoubted. During pregnancy, the successful development of the breasts requires the normal action of the thyroid gland. This is shown by the relation existing between lactation and the thyroid in highly toxemic women.

During pregnancy we distinguish abnormality in the action of the thyroid gland in cases of hyperthyroidism and hypothyroidism. There may also develop cystic degeneration of the thyroid complicating pregnancy.

In hyperthyroidism, blood-pressure may be abnormally high, and the patient more than usually excitable. In multiparae, uterine contractions may be spasmodic and painful, and the breasts may develop rapidly and often unduly in size. There may be exophthalmos.

In hypothyroidism, the pulse tension may be abnormally low and there is a lack of that development in the mammary glands and in the genital organs which is usual in healthy pregnancy.

Altered secretions and pathological conditions of the thyroid complicating pregnancy may become actually dangerous when labor begins. In some of these cases the thyroid suddenly enlarges; there is dyspnea, tachycardia, sometimes exophthalmos; and the patient suffers severely from a disordered circulation to which is added the suffering of parturition. In extreme cases, the development of labor may be impossible and the patient may find her only safety in immediate anesthesia and delivery by section.

In the experience of the writer, a woman having an enlarged and somewhat cystic thyroid passed through her first pregnancy, but suffered intensely during labor from the symptoms just described, and lost her child. The relation between the condition of the thyroid and the complicated pregnancy had been recognized. Becoming again pregnant, she greatly feared a return of her former experience and sought advice. On examining her, the pelvis was found to be ample in size, and pregnancy had progressed to the fifth or sixth month. At that time the position of the fetus was normal; the blood-pressure was abnormal; and

the patient was depressed, anxious and very apprehensive about the future. She was put upon a restricted and selected diet, given thyroid extract in small doses and encouraged to believe that she could successfully bear a living child. Shortly before term she entered the hospital, where the conditions were found to be fairly good. The thyroid extract was discontinued and it was decided to see what would happen when labor developed. Preparations were made for a prompt section if necessary. Labor was ushered in by intense restlessness, followed by enlargement of the thyroid, threatened suffocation, and distress. Section was immediately performed under anesthesia, the patient breathing more easily as the operation proceeded, and a living child successfully delivered. On the patient's recovery from labor, she visited the Mayo clinic where thyroidectomy was successfully performed.

The relation of the thyroid to the toxemia of lactation is illustrated in a case coming under the observation of the writer, where a toxemic woman was first seen in the pernicious nausea of early gestation in which toxemia developed so severely that the pregnancy had to be sacrificed. Some time after another pregnancy occurred, followed by the successful delivery of a living child, and lactation slowly developed. As the breasts filled, the patient became restless and excitable, with temperature of 104° F. There were no signs or symptoms of puerperal septic infection to be found. Remembering the patient's toxemic condition, she was given thyroid extract in full doses. The symptoms subsided and lactation proceeded successfully. This patient subsequently passed through another pregnancy, terminated at her request by elective section, with a moderate toxemia but without evidence of direct thyroid involvement. For the last ten years, she has been habitually toxic and, at times, greatly benefited by the administration of thyroid extract.

The condition of the thyroid should receive attention in all cases of pregnancy. While the writer is not aware that thyroxin has been extensively used with pregnant patients, a reliable thyroid extract is well borne in these cases. We admit that indications for its administration are not definite; but that it has a definite function, and that failure of that function may induce toxemia, there can be no doubt.

Thyroid toxemia is characterized by an evidently diseased condition of the thyroid gland, usually that of cystic degeneration; exophthalmos is often present to a considerable extent, the patient is more or less restless, tachycardia may be present, the nitrogen partition of the urine shows an abnormal condition and the general state of the health is far from satisfactory. In these cases, the administration of thyroid extract, a selected diet, and the general attention given to toxic cases may greatly improve the patient's condition and enable her successfully to complete gestation. When the pregnancy is terminated and the patient is convalescent, the condition of the thyroid should then be investigated and, if necessary, thyroidectomy should be practiced.

The writer has twice performed abdominal cesarean section in patients having thyroid complications during pregnancy. One of these

cases has been narrated. The other was that of a multiparous woman whose thyroid enlarged considerably during pregnancy, but the administration of thyroid extract and general care enabled her to complete the pregnancy. She too gave a history of a disastrous first labor. The pregnancy was terminated by elective section, and on her recovery thyroidectomy was performed with the restoration of excellent general health.

There is no direct proof that complications originating in the thyroid gland seriously militate against the fetus, and the mother may be encouraged to believe that the life of the child will not be lost.

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CHAPTER XVII

THE MAMMARY GLANDS

Complications arising from the mammary glands in pregnancy—Normal development—Lack of development and excessive development of the breasts—Pregnancy complicated by inverted and cracked nipples—Mastitis during pregnancy—Tumors of the breast in pregnant patients—Adenomata and cancer—Tuberculous infection of the breasts complicating pregnancy.

While the mammary glands are not ductless, they are intimately connected in development and function with the endocrins. One cannot understand the part played by the latter in pregnacy without reference to the mammary glands. As has already been stated, the development of the mammary glands accompanies that of the thyroid, probably of the pituitary and possibly of others of which we have no certain knowledge. Abnormalities in the development of the mammary glands consist in a failure to develop and also in excessive growth.

Failure of development is seen in those badly nourished, ill developed young girls in whom the entire process of adolescence and puberty is badly performed. In some of these there is a hereditary history of tuberculous infection in the parents, pronounced gouty diathesis, and sometimes some blighting influence on the general health, like chronic alcoholism in one parent or hereditary syphilis. The skeleton of these individuals grows badly, the bones are long in proportion and slender, the pelvis retains, to a considerable extent, its infantile type, and the aspect of the individual is that of an ill-developed, undernourished person. In some of these cases there seems scarcely a perceptible development of the mammary glands. In others, the nipples are rudimentary and in some, not only rudimentary, but deeply inverted. There is hypothyroidism in these individuals and a general lack of assimilation and excretion. The nervous system shares in the deficient evolution.

Excessive development of the mammary glands is seen, especially in warm climates, where puberty is complete at twelve and thirteen, and, in exceptional cases, in temperate climates when puberty is established at about the same age. Some of these girls are brunette in type, with abundant development of the muscular and bony system and energetic blood-making apparatus, excellent nutrition, and abounding health and vigor. In these girls menstruation is often at first profuse and always abundant. The mammary glands develop symmetrically, but are sometimes so swollen as to be a source of annoyance to the girl, and occasionally the size becomes such that a support is required, especially just before or during menstruation.

Pregnancy and Abnormal Mammary Glands.—These girls, becoming women, will retain, usually, their original type. In cases of general lack of development, pregnancy is followed by considerable psychic and physical disturbance. The mammary glands, enlarged somewhat in size, are often so sensitve as to cause pronounced suffering. If the girl is a blond, the nipples are exceedingly tender and easily become irritated. Unless some attention is paid to them during pregnancy, when pregnancy ends and lactation is being established, the nipples frequently become fissured, are readily infected, and the breasts enlarge with difficulty. Secretion is scanty and fissured or cracked nipples, caked breasts, and mammary abscess are not infrequent. These patients demand special attention during pregnancy. They will early receive advice to use upon the nipple some astringent and hardening application, to avoid cracks and fissures when lactation begins. The better course is to promote in every way the general development of the breasts, including the nipples. If the breasts are tender and painful, gentle massage with warm olive oil will often give great comfort. The nipples should be pressed out with the thumb and finger, thoroughly washed with castile soap and warm water and a simple ointment applied. In the experience of the writer, ten grains of sodium biborate with two drams of lanolin and white vaselin, enough to make an ounce, is a useful ointment and produces a growth of healthy epithelia. Others use cocoa butter, some employ castor oil and some subnitrate of bismuth and castor oil. Any simple and nonirritating fatty substance is needed rather than alcohol, tannic acid or other applications, to harden the tender surface of the nipple. Inverted nipples should not be given up in despair. It is exceedingly rare for nipples to be so deeply inverted that they cannot gradually be brought out. Even if they do not remain prominent after manipulation, the infant, when nursing, will usually complete the development of the nipple. If the girl has worn clothing which constricts the breasts, such pressure should be absolutely removed.

The lack of development in the mammary glands of these patients and the diagnosis of hypothyroidism suggests the administration of thyroid extract in small doses for a period of several weeks, then stop, then resume. The general development of such a patient is helped considerably by this means.

Excessive size of the mammary glands during pregnancy will usually require mechanical means to relieve the patient of the sensation of weight and heaviness and the inconvenience that the size of the breasts produces. Nothing can be done until pregnancy is over and lactation established essentially to reduce the size of the breasts. It is noticeable that where exercise can be taken, this helps considerably; and a healthy, young pregnant woman may exercise to the point of reasonable fatigue to great advantage. A diet which is not rich in fats and sweets limits the excessive accumulation of fat and also the excessive development of the breasts in these cases where much of the size of the breast is owing

to excessive fatty deposit in its external tissues. Regular and copious action of the bowels is also useful, and constriction and interference with the circulation by clothing is as injurious in its way as in cases of deficient development.

Mastitis Complicating Pregnancy.—A mechanical injury to the breast in pregnancy may result in mastitis. The question may arise, Whence come bacteria which produce inflammation and the formation of pus in these cases? The nipple is not cracked or fissured. There has been no attempt by the infant to nurse and still infection may develop. When the pus in these cases is examined, staphylococci are found in both varieties and in pure culture. It will be remembered that these germs are not infrequently present in the blood stream, and thence they may make their way to tissues in the body where mechanical injury has produced the extravasation of blood and lymph. It has also been shown that, if fluid is taken from the breasts during pregnancy by a sterile breast-pump, before the infant has nursed, the staphylococci are found abundantly present in this fluid. The skin may contain them in large numbers, and it can readily be seen that they may make their way through the nipple into the acini of the gland.

Diagnosis.—The diagnosis of mastitis complicating pregnancy is made by observing the development of a hard, painful area in the breast, which becomes red, swollen and ultimately somewhat elastic on pressure. Such inflammation, unless neglected, rarely extends beyond one acinus. Unless the inflammation is diffuse, the axillary lymphatics are not involved. There is moderate fever, but only a little disturbance of pulse and general condition. If there is doubt concerning the diagnosis, the involved area may be aspirated by a sterile needle and the fluid withdrawn and examined.

Treatment.—As soon as a mechanical injury, such as a blow, has been received upon the breast of a pregnant woman, precaution should be taken to avoid inflammation. If the blow has been a severe one, the patient should be put at rest in bed, the skin of the breast gently cleansed with soap and water, and lead-water and laudanum applied over the injured area with a retention bandage of thin gauze and over this a dry ice bag. Pain should be controlled by morphin, saline laxatives should be freely administered, a simple diet without much fluid should be taken, and the application of lead-water and laudanum should be constant until pain and redness subside. If this treatment is promptly instituted and thoroughly carried out, abscess formation may often be avoided.

When, however, fluctuation develops, the area must be aspirated or incised and drained. Experience will show that it is often difficult to obtain distinct fluctuation in the mammary gland. The acini are bounded by a firm protective membrane of connective tissue, and another acinus must be involved and broken down before a large area of fluctuation can develop. A lessened region of infection will give a very indistinct sensation of imprisoned fluid. It is, however, better to err

upon the side of draining such an area too early than too late. If the obstetrician is in doubt, aspiration will confirm the existence of pus.

Some prefer to treat these cases by aspiration only, infiltrating the skin over the area with ½ per cent novocain and introducing a trocar and cannula of considerable size. Through this warm saline solution may be injected and the pus liquefied, if necessary, and then aspirated. The cavity should be washed out until the fluid runs clear. Tincture of iodin and alcohol, equal parts, may then be injected and the excess fluid allowed to return. A few strands of silkworm-gut, tied at the ends, or a narrow strip of rubber tissue may be inserted as a drain. Abundant aseptic dressing and a supporting bandage are also required.

If, however, the inflammatory process has been going on for some time, it may be better to incise the affected area. If the patient is highly nervous and very sensitive to pain, anesthesia may be best. If she is not toxic, nitrous oxid and oxygen, skillfully given, may be employed. If she is very sensitive to pain, nervous and apprehensive, ether and oxygen preceded by hypodermatic injection of morphin and atropin are indicated. In incising the breast, the obstetrician should make the incision parallel to the course of the milk ducts and never at right angles. Should a milk duct be cut across, a lacteal fistula may result and may give considerable inconvenience. The incision should go through the skin and fascia, and a gloved finger may then force its way gently into the abscess cavity. The opening should be enlarged by gentle pressure so that the finger can thoroughly explore the cavity, making pressure in all directions in order to observe whether the pus has passed beyond one acinus and involved several. The abscess cavity may then be irrigated and moderately packed with 10 per cent iodoform gauze. A drain of thin gauze is often useful while, if the cavity is not large, some prefer a sheet rubber drain.

Regardless of whether such abscesses are aspirated or drained by incision, the after-treatment is important. The drain should be retained until there is practically no discharge. When the original drain is removed, an effort should be made to flush the cavity again with the saline solution first employed. The skin opening should be kept patent by sheet rubber or a small drain of gauze until the entire infected tract is healed firmly from the bottom.

The occurrence of mastitis complicating pregnancy may result from any form of accident or injury. A fall in which the patient strikes the breast against a corner of a door or table will inflict such an injury. A heavy object may fall upon the patient. This complication has arisen from motor accidents to pregnant women. Fortunately, if the treatment is prompt and surgical, healing usually occurs without complication. The patient need not be apprehensive that lactation will cause further inflammation. Fortunately these injuries do not often produce abortion, but where this accident follows, it is usually from the general shock of the injury and not from the lesion in the mammary gland.

Adenomata.—We distinguish in the mammary gland adenomata which are solid in consistency and those which are solid and also contain a cystic portion. Such are probably congenital in origin and result from the inclosure of a small portion of fetal tissue. Their growth is stimulated by pregnancy, and they may attract attention by producing a lump in the breast which the patient feels when making her toilet. A lump in the breast at once suggests the suspicion of cancer, but in these cases the solid and cystic mass often is not near the nipple nor has it the peculiar firmness and solidity of carcinoma. These tumors in themselves are benign, but the difficulty arises from the fact that there is no way of positively knowing their character.

Diagnosis.—A differential diagnosis as to the nature of such a tumor must be made by mapping out, as accurately as possible, its contour and its relation with the nipple. A history of an accident or injury to the breast has a bearing in the case, for sometimes this condition develops after such an occurrence. Immediate exploratory operation is not always indicated, but frequently a careful examination is demanded. If the area grows larger and harder, and there is any evidence of cachexia, immediate operation becomes imperative. If the patient is imbued with the fear of cancer, the removal of the growth is advisable.

Treatment.—Under complete anesthesia a curved incision is made along the undersurface of the breast, and the breast is turned upwards upon the surface of the thorax in such a manner that it can be thoroughly examined by sight and by palpation. The abnormal area can be incised, the growth removed, its bed obliterated by catgut sutures, the points of hemorrhage ligated and the breast replaced and stitched in position at the edges of the skin wound. Several very small drains should be left at the lower portion of the incision so that the serum which may accumulate will readily be discharged.

A microscopic examination of the mass removed will confirm its identity.

Cancer.—The writer has already alluded to cancer of the breast complicating pregnancy. In this connection, it is sufficient to say that, the diagnosis once established, complete removal of the affected gland with exploration of the axilla and the removal of suspicious lymphatics is imperative.

Tuberculous Infection of the Breasts.—This may arise in patients without an hereditary history of tuberculosis, and with but little physical evidence of the disease. Such breasts usually become symmetrically enlarged, slightly bluish in color, without alteration of the nipple, and may readily yield a thin watery fluid. These breasts are larger than they should be in proportion to the development of the patient and the period of pregnancy. Such infection is often seen in excessively pale individuals, with thin skin and sensitive tissues, in whom one may recognize those conditions which invite tuberculous infection. This condition is sometimes apt to affect comparatively young women, but may be seen at any time during the childbearing age.

Diagnosis.—To diagnosticate this condition in pregnancy, palpation of the breast will show that there is no one hardened area such as occurs in the presence of carcinomata or adenomata, nor is there the red, tender and painful area of infection. A chronic, subacute, catarrhal inflammation of the milk ducts would give rise to some of the symptoms; but here again there is not the same sensation of enlargement, and the distribution of masses of tissue which are found in tuberculous infection. To confirm a probable diagnosis, an effort may be made to extract fluid from the breast by gentle pressure or a cautious use of a breast-pump. If this fluid yields tubercle bacilli, the diagnosis is confirmed. Direct aspiration of the breast substance may also be employed.

Treatment.—Should the condition be accurately recognized, must the breast be sacrificed? Some may argue that as the breast is a superficial organ, if the woman be a young and otherwise healthy primipara, she should be given the best of hygienic care in the hope that the tuberculous process will subside. Unfortunately, however, this is too uncertain a procedure to be justifiable. The wiser course is to remove the affected breast as soon as a diagnosis is accurately established. If one breast is involved, is not the other? And this suspicion must arise, although it may be impossible clearly to outline a tuberculous process in the second breast. If there be comparative doubt when the first breast is removed, the second may be inspected by the method described in dealing with adenomata. If, however, a positive diagnosis is very doubtful, the suspicious breast should remain and the patient be kept under observation. Fortunately, the tendency is to limit tuberculous infection of the breast to the breast itself, and hence a patient may escape a general systemic or pulmonary infection.

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CHAPTER XVIII

THE DUCTLESS GLANDS: ADRENALS, PITUITARY AND PLACENTA

Pregnancy as influenced by some of the ductless glands—The influence of the adrenals upon the circulation in pregnancy—The pituitary gland and its extracts—Pituitrin and others in pregnancy—The placenta as a ductless gland in the pregnant woman and its influence upon pregnancy and on lactation.

Adrenals.—In the present stage of our knowledge, we have no definite information concerning alteration in the function and structure of the adrenals complicating gestation. These glands are supposed to secrete a substance which has to do with maintaining the tone of the vasomotor nerves, and the administration of adrenalin is a familiar expedient in therapeutics. The thought would naturally suggest itself that the increased blood-pressure so often present in pregnant women may result from some abnormal activity of the adrenals. This, however, cannot be proved, because this abnormal pressure is always accompanied by an altered condition of the blood which contains substances acting as irritant poisons to the walls of the vessels and the vasomotor nerves. In those pregnant patients in whom blood-pressure and pulse tension are abnormally low, the toxemia is frequently of hepatic origin, and here the liver is so manifestly at fault that its altered condition seems at least to explain the abnormal vasomotor state. The healthy pregnant woman has a blood-pressure and pulse tension little, if at all, different from that of the nonpregnant person. The pregnant woman is susceptible to the action of adrenalin, as are other patients, when the vasomotor tone has been greatly diminished by hemorrhage or shock. The addition of adrenalin to a fluid employed in intravenous transfusion produces its characteristic result. It may be possible that further study of the adrenals in pregnant patients may show that excessive alteration in these bodies may be a factor in the toxemia of gestation.

The Pituitary Body.—The discovery and application of pituitary extract to obstetric practice has now been so thoroughly tested that we know something of practical value concerning the action of pituitrin. There is every reason to believe that pregnancy produces alteration in the anterior and posterior portions of the pituitary body, but exactly what is the result of this alteration is not definitely established. The action of pituitrin itself or pituitary extract upon the muscle of the uterus is a familiar phenomenon. There is no proof that this substance powerfully stimulates the nervous ganglia which innervate the uterine

muscle, but it does produce a prompt and vigorous action of the muscle itself. Muscular contractions thus originating soon reach the crest of the wave, rapidly followed by descent; hence the pregnant patient, so treated, will have a more or less strong uterine contraction, depending upon the quantity given, followed by a prompt and practically immediate cessation of muscular action.

Nothing has been more disastrous in obstetric practice than the indiscriminate use of pituitrin or pituitary extract in pregnant women. This was at first lauded as a great substitute for the use of obstetric forceps in terminating labor. It was given before labor had fully declared itself, often before the birth canal was dilated or the presenting part had reached the pelvic floor. As is often the case in using new substitutes, the first doses of 15 and 20 c.c. were excessive. The result was a violent and forcible expulsion of the child, accompanied by excessive laceration of the mother, and often by the death of the infant from pressure and intracranial hemorrhage. Rupture of the uterus was not an infrequent result of such treatment. Fortunately, at this time, this administration of pituitrin has somewhat subsided, but obstetricians with large hospital service still have cases, in which the child is dead or dying, admitted to their wards; the mother also in bad condition because some one has endeavored, by giving pituitrin, to force a child through a pelvis too small for its safe passage. The majority of obstetricians do not, at the present time, give pituitrin in the first stage of labor. In the beginning of the second stage, where the birth canal is dilated and the presenting part upon the pelvic floor and the position and presentation favorable, if what is needed is a vigorous, brief, uterine contraction, pituitrin is given. Promptly to check postpartum hemorrhage from relaxation of the uterus, pituitrin acts satisfactorily; but its effect is transient and, after this, secondary hemorrhage may readily develop.

Pituitrin is now used to bring on labor. For this purpose the dosage has been reduced to 5, or at most, 10 c.c. repeated several times. This method has been largely tried in combination with the administration of sulphate of quinin dissolved in diluted hydrochloric acid, and accompanied or preceded by the administration of a large dose of castor oil. Under these circumstances, how much of the effect produced is caused by the pituitrin cannot be accurately stated.

It must not be forgotten that there is a strong psychic element in these cases. This was illustrated in the experience of the writer in the case of a young primipara who had been a trained nurse and who married a physician. She and her husband were, therefore, familiar with medical matters. On examination during her first pregnancy, she was found to have a moderately contracted pelvis and circumstances were such that disproportion was anticipated. As operation was to be avoided, preparations were made to induce labor. These preparations included a thorough emptying of the intestinal tract, the antiseptic preparation of the external genital organs, the sterilization of gauze, the preparation of bougies and such other matters as might arise. On

the night before the day set for the introduction of the bougies, the patient came into labor without interference and was delivered by forceps. Twice afterwards the same preparations to induce labor were made with the same result, namely, that labor began purely from psychic effect without interference with the genital tract.

To carry out the combined pituitrin induction of labor, the patient must be assured that the method will be absolutely successful. On the night preceding the expected labor, the patient is to take at bedtime two ounces of castor oil in any vehicle which she desires. As soon as possible the next morning, she is given ten grains of the bisulphate of cinchona dissolved in dilute hydrochloric acid, taken through a tube, and followed by a moderate quantity of water. From one to two hours after this, she receives by hypodermatic injection 5 to 10 c.c. of pituitrin. This dose is repeated once or twice at intervals of one hour until uterine contractions are well established. Those who have employed this method claim for it a practically uniform success without complications, and a patient spared the danger and annoyance of direct interference with the genital tract. It must, however, be remembered that the action of drugs is not invariably the same, and that pregnant women differ greatly in their susceptibility to drugs. This is especially true of quinin and, although it was formerly thought that quinin almost invariably would produce labor, the writer has long since abandoned it for this purpose.

Pituitrin is also of value in threatened paralysis of the intestine, with greatly lowered blood-pressure, in highly toxic patients or after the uterus has been emptied of its contents. If it is to be used as a stimulant of the uterine muscle, the dose should preferably not exceed 10 c.c. and the action of pituitrin very carefully watched. It must be remembered that in no sense is it a tonic or stimulant to the nervous system of the patient or to the ganglia in the uterine muscle. In some cases where the patient seems to lack the normal development seen in pregnancy, small doses of pituitrin and thyroid extract are of use. Such patients are those in whom the mammary glands are deficient, and in whom the general development of the patient is much at fault.

The Action of Other Substances upon the Pregnant Uterus.—The action of the uterus can be excited by ergot, pituitrin, usually by strychnin, and by irritant poisons, if given to the production of a violent effect. The action of the muscle itself, once begun, may be immediately and thoroughly stimulated by the administration of glucose in the form of sugar. During pregnancy the maternal organism stores nitrogen for the ultimate activity of labor, and also absorbs and utilizes considerable calcium. Hence, the fact that so many pregnant patients profit by the abundant use of milk which contains considerable calcium, and also that pregnant patients often crave meat to excess or nitrogen in the form of peas or beans or other nitrogenous foods. Within reason, this craving for nitrogen should be satisfied, provided fruits, vegetables and water are abundantly taken and toxemia does not develop.

The Placenta.—That the placenta powerfully influences the metabolism of the pregnant patient is undoubted. We recognize the fact that it is usually proportionate to the size and weight of the child. It is also proportionate to the metabolism of the mother, for, in women exceedingly deficient in nourishment during pregnancy, the placenta will show evidence of the maternal deprivation. That the placenta contains substances which stimulate the action of the uterus and also the formation of breast milk has been abundantly shown by experiment. Although the Abderhalden test for pregnancy proved fallacious so far as the diagnosis of gestation was concerned, it rarely failed to recognize an abnormal condition of the mother's blood, with reference to some process in her body producing unusual nitrogenous combinations. Thus the Abderhalden test often indicated suppuration in both men and women. That the placenta contains substances having a powerful influence upon the blood under all conditions is thus established.

The function of the placenta during pregnancy is to act as the organ of oxidation of the fetal blood and thus to supply the child with oxygen. That it has another and very important function cannot be doubted, but in precisely what way this function is exercised is not at present apparent. That fetal death follows a diseased condition of the vascular portion of the placenta is one of the most familiar observations in obstetric pathology. That the placenta protects the fetus from infection and that bacteria can penetrate the placenta are also established. Tuberculous and syphilitic changes in the placenta are familiar.

It would be of decided benefit to the pregnant woman and her child if we were in the possession of another method of accurate diagnosis whereby we could learn the condition and functions of the placenta during pregnancy. Failing this, we can only fall back upon the history of pregnancy, realizing that, if the mother's condition be normal, so far as her blood and excretions are concerned, the placenta must be essentially normal; and that, if the mother and the placenta are normal, the best possible conditions exist for the successful development of the child. The position and relative size of the placenta can sometimes be recognized by the best X-ray examination. Marked increase in placental size accompanies some forms of disease of the embryo, and this would be a factor of importance in recognizing a possibly diseased condition of the child. Abnormal development of the placenta indicates abnormalities in the attachment and nidation of the ovum, but, other than these interesting studies in obstetric pathology, we are as yet without knowledge concerning any method of treatment addressed to the functions of the placenta, except those methods which succeed in the care of the mother.

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CHAPTER XIX

HOW PREGNANCY AFFECTS THE SKELETON OF THE MOTHER

Abnormalities of the skeleton complicating pregnancy—Lack of development and disease of the skeleton producing pelvic distortion and contraction—The pelvic joints, their development during pregnancy and their functions—Injury by strain or violence of the sacro-iliac joints during pregnancy—Injury by strain or violence of pubic joint during pregnancy—Accidents and injuries to the coccyx complicating gestation—Pregnancy complicated by rachitis—By osteomalacia—By tuberculosis of the bones and joints—Malignant and nonmalignant tumors of the bones complicating pregnancy.

During pregnancy in a healthy patient, the skeleton increases considerably in size by the deposit of bony material in all of its parts. If the stature of the pregnant woman is accurately measured, she is found to grow taller from one half to one and a half inches. This development is symmetrical in healthy normal persons. In women in whom the pelvis was not fully developed when impregnation occurred, there is a distinct increase in pelvic size conforming to the usual proportions of the female pelvis. This change in the skeleton depends for its success upon adequate nourishment, good hygiene and, especially, upon a diet which is abundant in those materials from which healthy bone is made. The phosphates, calcium, and the carbonates are of especial value. It is rarely necessary to attempt to supply these specifically, and the needs of the patient's development may safely be left to an adequate and well-selected food supply. The bones which form the walls of cavities, such as the cranium, are slightly thickened in healthy pregnancy.

THE JOINTS

The obstetrician is especially interested in the changes occurring in the joints during a healthy pregnancy. There is unquestionably an increased secretion of synovial fluid. The cartilaginous portions of the joints become thickened on the increased growth of cartilage. The pelvis becomes a mobile portion of the skeleton, its mobility sometimes increasing to a pathological condition.

One of the most interesting and extraordinary changes in the pelvis during pregnancy is that found in the sacro-iliac joints. It will be remembered that these are large, roughened surfaces whereby the ileum approximates the sides of the sacrum. So firmly bound together is the pelvis with ligaments that these were formerly looked upon as joints devoid of motion, but it is now a familiar fact that the sacro-iliac joints acquire a power of motion during pregnancy and that during labor their

mobility has a distinct function in the mechanism of gestation. The two halves of the pelvis in later pregnancy rotate upon the sacrum, and by such rotation increase the oblique and anteroposterior diameters of the pelvic brim from ¼ to ½ cm. In the phenomena of engagement and descent, this change in the capacity of the pelvis may render possible spontaneous delivery.

Pathological Changes in the Sacro-iliac Joints.—In patients of relaxed fiber, sometimes in comparatively young multiparae, the sacro-iliac joints may require such unusual mobility during the last months of pregnancy as greatly to embarrass the movements of the patient. A sudden motion is followed by a sharp pain in one or both of the joints; a gradual motion, such as bending or stooping, is accompanied by discomfort. If such a patient is examined while lying on the back upon a very firm bed or table, the obstetrician grasping the two sides of the pelvis and raising the two sides in alternation, the patient will immediately complain of discomfort.

The increased mobility of the sacro-iliac joints is exaggerated by direct injury. In the numerous motor-car accidents which now occur, pregnant women are sometimes included among the victims. In many of these cases the occupants of the car are thrown violently upon pavements or hard roads, sometimes striking on the back upon a curbstone. If the injury is not masked by a more severe disaster, the patient may be able to rise with assistance after the accident, but, on attempting to move, she will complain bitterly of pain in the back. The diagnosis can be made in the manner already described and also by asking the patient to relax completely the muscles of one thigh and leg while the obstetrician, flexing the leg on the thigh and the thigh on the pelvis, carries the thigh across the patient's abdomen and then downward, when the characteristic sensation will be elicited. In other cases there is no history of direct or considerable violence and the uncomfortable condition may have very gradually developed. Such cases occur among multiparae who have children running about, old enough to fall frequently and to get into trouble; seeing the child about to fall, the mother may lean forward and quickly pick up the child weighing from twenty to forty pounds. The result is a considerable strain on the sacro-iliac joints, and the rotation of these will have a considerable bearing in producing the pathological condition. In other patients, the lifting of considerable weights in the doing of household work, or stooping and packing trunks and lifting parcels may cause the trouble.

Treatment.—The treatment of the condition consists in putting the patient at rest in bed in the recumbent position. The pelvis should be supported and steadied by a broad bandage which takes its point of firmest attachment over the crests of the ilia and the trochanters of the femora. If a suitable binder of webbing or light canvas fitted with straps and buckles is available, this may be used. The most efficient simple device consists in a strap of the best quality rubber adhesive plaster, from eight inches to a foot wide and sufficiently long completely

to encircle the pelvis and overlap, usually at the pubes or over one of the iliac crests. When this is applied, the services of two persons are needed. The patient should lie perfectly flat upon the back, the plaster should be passed beneath the patient, drawn tightly, and gradually fixed upon the back, and then brought up smoothly over the sides of the pelvis and across the front. The comfort afforded by such a retaining strap is often immediate and gratifying. Patients are sometimes so much relieved that they want immediately to get up and resume their usual work. If there has been a considerable or a recent injury, this is a mistake, and the patient should remain quiet for several days until she is very much more comfortable on making moderate motion. Where there is no history of a sudden strain or injury, if the patient is of a gouty or rheumatic diathesis and the weather is cold or damp, this may have something to do with the pain. The retention strap should be applied, but the patient should also be given salicylates or alkalies to remedy the gouty or rheumatic condition.

Women, otherwise healthy, who are fond of outdoor life, should take moderate exercise, if the retention strap enables them to do so. In the experience of the writer, a comparatively young multipara suffered considerably during the last five months of her fourth pregnancy in the manner described. Living in the country, she was very fond of gardening and greatly missed the accustomed exercise. She was made so comfortable by the retention strap that she was enabled to do her gardening with caution throughout the greater portion of the remaining period of pregnancy.

These straps may be left in place as long as the plaster is holding well. This does not mean that the patient cannot get into a bathtub or, if the circumstances are favorable, go into water to bathe or swim. If the best quality plaster is used and soap is not brought in contact with it, the strap will remain in position and keep up tension for some time, even if it becomes wet. When, however, it becomes too loose, it should be removed, the skin bathed with alcohol, then lightly dried and the plaster renewed.

In cases of severe injury, the services of an orthopedic surgeon may be required, and retention with plaster of Paris or some other firm support may be necessary. A patient will probably inquire whether, after her pregnancy, she will suffer in the same manner; she may be assured that, if she can maintain her general health and strength and take exercise, she will gradually make a complete recovery.

Separation of the Pubic Bones.—The pubic bones may become so mobile as to cause the patient great inconvenience. She becomes aware of the motion of the two halves of the joint and, while the sensation may not be one of great pain, it is exceedingly disquieting and uncomfortable. This can in some cases be traced back to a severe labor, often terminated by the use of forceps. In other cases a general relaxation and wasting of the tissues seems to be the cause of the condition. A diagnosis is made by causing the patient to stand, and, placing the fingers of the

examining hand upon the pubis, asking her to take a step or to raise one foot and place it upon a chair; as this is done, the pubic joint can be felt to have increased motion. In other cases, a vaginal examination is made, the finger placed against the posterior surface of the pubis and the patient asked to move. The mobility of the joint can readily be demonstrated.

Treatment.—The treatment best adapted for the fixation of the sacro-iliac joints will also assist greatly in remedying the discomfort produced by the movable pubis. If the two halves of the pubic wall are to be brought tightly together, care must be taken that tissues in the vicinity of the urethra are not included. This would produce irritation in the neck of the bladder and cause frequent and painful micturition.

Separation of the Pelvic Joints.—This is an exceedingly rare condition and may result from a direct mechanical injury to the pelvis in which the pubic bone may be fractured, a compound fracture resulting, and infection may occur. If the patient has been healthy before the accident, she may escape abortion, but the case will require long-continued rest in bed, drainage, and surgical care. When recovery ensues, it will be by the development of callus and fixation, and the normal mobility of the joint will be lost.

Permanent Enlargement of Pelvis by Pubiotomy and Symphyseotomy.—In the operations known as pubiotomy and symphyseotomy, performed during labor to permit vaginal delivery, it is found that severing the pubic bone at the pubic joint is followed by a considerable increase in the capacity of the pelvic brim. When these patients recover, the pelvis is permanently, although not very greatly, enlarged. With this in view, the proposition has been made that a primiparous patient, having a moderately contracted and border-line pelvis, should be subjected to subcutaneous pubiotomy during pregnancy, with the hope of avoiding complications in labor. This has been successfully done in several cases and, while the majority of obstetricians prefer to wait for the test of natural labor after a natural pregnancy in a border-line pelvis, there is no logical reason why the pelvis should not be enlarged, if necessary, during gestation. If this is attempted, it is better to perform subcutaneous pubiotomy than to open the pubic joint. The latter requires greater interference and the patient would be subjected to a much longer restriction during convalescence, and to much greater discomfort than if pubiotomy were done.

Injuries to the Coccyx.—The mobility of the coccyx is an element of some importance in spontaneous parturition. If this mobility is entirely lost and, especially if the coccyx is ankylosed or in abnormal position, increased pain and delay in labor may be the result. If the pregnant patient is found to have a coccyx which has been fractured and which union has left in an unfortunate position, this may be appropriately remedied before labor begins.

Injuries to the coccyx during pregnancy may develop from a blow and especially from a fall, and the exact nature of the injury may not at

the time be apparent. The attention of the obstetrician would be called to symptoms of threatened abortion, but, if these were concealed, the patient's complaint of indefinite pain at the lower end of the spinal column might be confused with irritability of the uterus. Where there has been a fracture of the coccyx with imperfect union before pregnancy, there will be increased sensibility in this vicinity during pregnancy, and this may lead to examination and recognition of the condition.

It has been repeatedly demonstrated that, if an ankylosed condition of the coccyx hinders the delivery of the child during labor, the coccyx may be fractured and the child delivered; but this exposes the mother to pain and injury and leaves her in an unfortunate condition. Hence, if an unfavorable condition of the coccyx with ankylosis is discovered after the first month of pregnancy, it is well to remove the coccyx. This may be done under complete anesthesia, with a preliminary hypodermatic injection of morphin and atropin; the bowels having been previously thoroughly irrigated, the patient is turned upon the side and the buttocks are separated by an assistant. An incision is then made over the coccyx, as near its point of union with the sacrum as possible, and the operator with a blunt instrument separates the tissues down to the bone. It is sometimes a little difficult to find the tip of the coccyx, for it is firmly bound down with ligamentous tissue. The tip should be firmly grasped with bone forceps and the coccyx pulled backward and upward and cut off, with bone-cutting forceps, at the union of the sacrum. The ends of the sacrum should be trimmed smoothly, bleeding points tied with fine catgut, a small drain of silkworm-gut strands placed in the wound and the wound closed, taking care to leave no space for the accumulation of fluid. If opium is used after the operation, there is little danger of abortion. Union occurs in most cases without complications and the patient is cured of this disability.

Increased General Mobility in the Joints.—In some patients pregnancy seems to produce an extraordinary relaxation of all the firmer tissues of the body. Patients who have never had a dislocation of the patella may slip the knee cap out during pregnancy at very slight provocation. In the same patients the ankle readily gives way. Such patients require care in the motions which they make, and, in the case of loose ankles, the wearing of laced boots, properly fitted, is advisable.

Congenital Disease of the Pelvic Joints.—Congenital dislocation of the hip-joint may be present in a pregnant woman. The importance of this condition will depend entirely upon what influence it may have had on the development of the pelvis. If, by this congenital abnormality the child, the girl and the woman have been prevented from taking proper exercise, the pelvis usually will be deficient in development. This will not complicate pregnancy until its end, when the abnormal and possibly contracted pelvis may interfere with the descent and engagement of the presenting part. Pregnancy is not a favorable time for the cure of congenital dislocation of the hip-joint, and the removal of this dis-

ability must be deferred until after the patient has recovered from parturition.

Rachitis.—Rachitis rarely begins during pregnancy, but pregnancy often begins in rachitic individuals. In these cases, when pregnancy occurs at the earliest possible period in the life of the girl, unless unusual care be taken in her food and hygiene, if she has had rachitis, the disease will increase during her pregnancy. On the other hand, if she receives the best of hygienic care with the abundant use of those food elements necessary to check rachitis, the pregnancy may not only not make her worse, but sometimes better. Recent investigations have shown that cod-liver oil contains material, particularly fat, especially adapted to remedy the malnutrition of rachitis and, hence, the pregnant girl so afflicted should be given the best quality of cod-liver oil as freely as she can assimilate it; with this may be combined a tonic of hypophosphites, if the obstetrician thinks best. The question will naturally arise with these young persons, Can anything be done during pregnancy in a rachitic girl to prevent further deformity of the pelvis? Usually the pelvic deformity is part of her original rachitis and the mischief has already been done. All that can be effected in this direction is comprised in the care addressed to the limiting or lessening of the original disorder.

It will be remembered that rachitis heals by osteosclerosis, and that this process thickens the sacrum; hence, an accurate measurement of the size and capacity of the pelvis, in rachitic patients, cannot be obtained by external pelvimetry, as this gives no idea of the thickness of the sacrum. To estimate the actual condition of the pelvis in these cases, the cavity and the walls of the pelvis and its component parts must be thoroughly studied by the introduction of the fingers of the gloved hand; the height and thickness of the pubes should be ascertained, the comparative distance between the spines of the ischia, the contour of the pelvic cavity, and, especially, the thickness of the sacrum and the degree to which the thickened promontory encroaches upon the pelvic space. Internal pelvimetry should be practiced, and the true conjugate should be accurately measured. Such examination is best made by the X-ray if a skilled roentgenologist is available.

The tendency shown by rachitic individuals to yield readily to pulmonary infection is accentuated during pregnancy. Influenza, bronchopneumonia and pulmonary tuberculosis attack these patients with avidity, and the resulting disease is severe and often fatal; hence, aside from the condition of the skeleton, these patients require the constitutional treatment of rachitis during pregnancy.

Osteomalacia.—This disease, a process of softening in the bones, is rarely seen in this country in its stage of development. Its primary cause is deprivation of food, accompanied by an extraordinary and unusual activity of the ovaries. This latter element is hard accurately to explain, as we know practically nothing about it except that osteomalacia is cured by the removal of the ovaries; hence, there must be a

potent influence exerted by these organs in the production of the disease. Most of the cases seen in the United States come from continental Europe among the Latin races, where deprivation is extreme.

The signs and symptoms of osteomalacia complicating pregnancy are often described by the patient as multiple rheumatism. The patient is sore and painful all over; any and every motion is distressing. Pressure on the bones and joints shows tenderness, malnutrition is present; there may be slight elevation of temperature. The examination of the blood shows an essential anemia. The examination of the urine shows deficient metabolism, while the nervous system is in a state of chronic irritation. There is a history of deprivation and sometimes hard work under unfavorable conditions. Repeated and rapid childbearing is in the history of some of these patients.

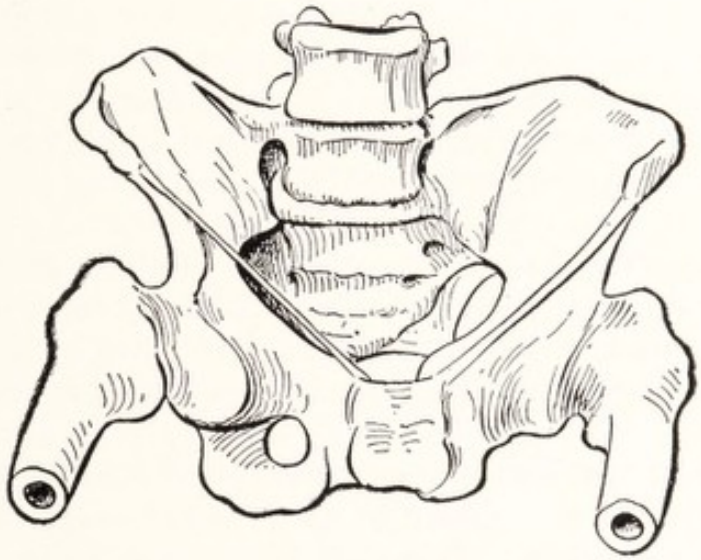

FIG. 51.—OSTEOMALACIC PELVIS.

In making a diagnosis of the condition, the obstetrician must not be misled by the patient's description of rheumatism. A thorough examination of the individual is necessary from the head to the feet. This should include an abdominal and vaginal examination and a thorough palpation and measurement of the pelvis. In osteomalacia there is pain, especially on pressure upon the sternum; usually the pain in the lower extremities becomes so great that the patient cannot walk; she can, however, sit, use her hands, and turn in bed with comparative freedom. As the disease progresses, she is unable to sit, for the spine is so tender that she cannot assume the sitting posture, pressure upon the tuberosities of the ischia producing pain; finally, as she lies in bed, she cannot turn or move because of pain and weakness, and in extreme cases she dies of exhaustion.

On examination of the pelvis, the most striking condition is the loss of the normal curve in the two halves of the pelvic brim. Our knowledge of the dynamics of the pelvis teaches us that the curve of the brim in the normal pelvis is a most important indication of the perfection of its

development and of the ability of the pelvis as part of the body to exercise its function in parturition. In the osteomalacic pelvis, this curve is greatly diminished and apparently the slack of the pubic bones is taken up at the pubes, with the result that there is a V-shaped neck or projection in the pubic bone at this point.

The loss of tone in the two halves of the pelvis permits the sacrum to prolapse downward and forward. The pelvic space is made much more narrow from side to side, shorter anteroposteriorly and, in extreme cases, the pelvis becomes a mere slit in comparison to its natural proportions.

Treatment.—Various forms of tonics, animal extracts and drugs have been employed in the treatment of osteomalacia. None of these acts promptly or efficiently, but the results of oöphorectomy are strikingly prompt and efficient and, following this operation, the patient can assimilate food and begins to improve in general strength. When the process is in abeyance, the skeleton gardually ceases to be painful, but it has lost so much of its calcareous content that the bones are lighter and more fragile than normal. In extreme cases, multiple fractures of various bones occur, sometimes by the mere act of attempting to turn in bed.

As pregnancy draws to its close in one of these patients, obviously abdominal cesarean section is indicated. The effects of the disease will be observed in the nourishment of the child, but an effort should be made to deliver the child alive and to give it a chance for its development.

Tuberculosis of the Bones and Joints.—Tuberculous infection of the bones was alluded to in treating of those mechanical conditions which may complicate gestation. Obviously a tuberculous joint, limiting the patient's exercise while a child and at puberty, will limit the development of the pelvis. Where ankylosis of the tuberculous hip-joint has resulted before pregnancy began, it may result, if the deformity is extreme, in an abnormal position of the uterus during development and, thus, occasion considerable discomfort as labor approaches. In extreme cases such ankylosis makes vaginal examination difficult and vaginal delivery almost impossible. Ankylosis of the knee-joint does not necessarily greatly interfere with the development of pregnancy, except in its influence before pregnancy upon the development of the pelvis.

The fear must always arise in the mind of the obstetrician that a woman having a latent tuberculous lesion of a joint and becoming pregnant may have this lesion roused to activity by the complication of pregnancy. That this can be prevented is scarcely possible, but the question might arise whether interruption of pregnancy with sterilization in such a patient might not be indicated. Uusually tuberculosis of the joints may ruin the health, but it rarely kills the patient; hence, if the patient pleads for the life of the embryo or fetus, although at the risk of added deformity or lameness, her request must be granted.

Surgeons are ordinarily averse to operating upon a tuberculous joint

during pregnancy, but, should a considerable accumulation of pus develop, drainage becomes imperative and this may necessitate complete or partial fixation. The hygiene and feeding of the pregnant woman, whose gestation is complicated by tuberculous disease of the joints, requires especial attention. A practically complete fresh-air life is of the greatest importance and the free use of cod-liver oil, cream, fat of meat, abundant fruit juice, fruits, vegetables and good bread are all necessary. Under these conditions the patient may be tided through the pregnancy with but little increase in the tuberculous process and, when the pregnancy is ended, the tuberculous disease may receive appropriate and radical treatment.

Malignant Disease of the Skeleton.—Osteosarcoma, during pregnancy, may attack the shaft of a long bone or the pelvic bones near a joint. The diagnosis of this condition may at first be difficult and may be confounded with periostitis. The size, shape, consistence, and rapid growth of the tumor and the appearance of cachexia should establish the diagnosis.

Although the patient is pregnant, the surgeon should not hesitate to follow the rules of surgery. In the writer's experience, he was called in consultation by a general surgeon in the case of a multiparous woman, pregnancy at term, who had an osteosarcoma of the femur at the knee-joint. Amputation at the hip-joint was proposed and the question arose as to whether this would inevitably bring on premature labor with loss of the child. The advice of the obstetrician was to disregard the pregnancy and operate at once, and this was accordingly done. A preliminary injection of morphin and atropin was given, and profound anesthesia was skillfully administered. Wyeth's method of checking hemorrhage by transfixion was carried out by the surgeon in the presence of its originator, and the amputation was successfully made. The patient recovered from the amputation and went to term and was delivered without difficulty. Of her subsequent history the writer is not informed.

Nonmalignant Disease of the Bones.—Enchondromata may develop at the pelvic brim during pregnancy, thus partially occluding the entrance of the pelvic canal. Such cases call for delivery by abdominal cesarean section and the elective removal of the tumor after the patient has recovered from her parturition.

Exostoses of irregular distribution, but nonmalignant, sometimes develop in pregnancy and may cause apprehension regarding their character, which fortunately is groundless. In rare instances, a considerable deposit of gouty material about a joint or beneath the periosteum may arouse suspicion of the beginning of malignant disease.

Luxations and Fractures.—Many pregnant patients are exceedingly unsteady upon their feet and, hence, readily fall and thereby sustain fractures or dislocations. The usual surgical treatment is demanded, with the administration of morphin, and the surgeon will be interested to know whether, in the event of a fracture, he may expect as prompt

and efficient union as if the patient were not pregnant. This will depend entirely upon her general condition, the hygiene which she has had and the care which she received after the accident. In young, vigorous healthy patients a fracture complicating pregnancy will unite as soundly as in any other person.

Raynaud's Disease and Gangrene.—These accidents are seen in ill-nourished, very anemic and emaciated individuals, usually multiparae. In Raynaud's disease, there is a history of a general malaise followed by redness and swelling in the fingers and hands, sometimes in the toes and feet. There is moderate fever, albuminuria, toxemia to some extent, sometimes history of exposure to cold, but always a condition of malnutrition and general debility. The redness in the fingers in these cases gives place to a darker color, then a purplish black and ultimately gangrene appears. The terminal phalanges will drop off, the extent of the gangrene depending upon the severity of the process.

Gangrene in one or both legs may occur in perfectly healthy women soon after labor, or sometimes in the pregnant state, without known cause. Such an accident must be the result of embolism, and in the affected limb the major vessels are pulseless and evidently occluded. There is no known method by which this accident can be prevented, and again the obstetrician must fall back upon the general hygiene of pregnancy.

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CHAPTER XX

THE DIAGNOSIS OF PREGNANCY

The diagnosis of pregnancy under ordinary conditions—The differential diagnosis of pregnancy—The duration of pregnancy—Conditions which determine the onset of labor.

No more difficult and familiar problem presents itself to the practitioner of medicine than the diagnosis of pregnancy. The physical conditions in a given case often tend to make the diagnosis difficult, and the mental atmosphere of the patient and her surroundings are even more confusing. Sometimes the reputation of a woman depends upon the diagnosis, and in other cases important plans must be made in accordance with the diagnosis. Possibly nothing injures the reputation of the physician for sagacity more seriously than a mistake in this diagnosis.

There is only one method by which errors can be avoided; fortunately this method pertains to other situations in medicine as well. In making this diagnosis, the physician should proceed in accordance with the same method under all circumstances. He is thus less liable to omit an important point. Furthermore, he should take the statements made by the patient as illustrating her mentality, but having little or no value as scientific evidence. Again, he should make no diagnosis without a thorough physical examination, including a bimanual vaginal investigation, and, if pressed for a positive opinion, he should decline to give it unless he has sufficient grounds for such a statement. In difficult cases, consultation may be useful; but, more than that, the opportunity to make an examination under favorable circumstances by the use of anesthesia should not be neglected. In skillful hands, nitrous oxid and oxygen are very useful for this purpose.

There may be, to a certain class of persons, some impression made by an offhand and confident diagnosis, but the laity are now better educated in medical knowledge, and are coming to appreciate more and more a thorough investigation, with the help of laboratory and other scientific methods. If these suggestions are followed, a physician can usually arrive at a reasonably accurate diagnosis of pregnancy.

History.—The best history for a diagnosis of pregnancy is an accurate, and systematically taken, general medical history. The heredity of the patient should not be neglected and the history of her childhood is of especial importance. A family tendency to twin pregnancy is interesting, and the medical history of the mother of the patient, especially

with regard to reproduction, is of value. Especial attention should be paid to the patient's childhood history in the matter of contagious diseases. Of these, scarlatina is most important, as it frequently leaves behind it damaged kidneys. The patient's menstrual history is also of value as indicating her development and the probability that pregnancy and parturition may also be normal. The length of marriage is important and the number of pregnancies; the patient's health during pregnancy, and the result of each. A history of an abortion or premature labor calls for a careful investigation of the causes of the accident. A difficult labor with injury or the loss of the child may give information of decided value in the management of the case.

If the patient be pregnant for the first time, she should be encouraged to give her version of her symptoms and sensations as fully as possible. Her statements may be worthless as regards the facts, but they will enable the obstetrician to form some idea of her mental processes and development. If he listens with respectful attention to what she has to say, he may thus win her confidence which is a matter of importance for both patient and physician.

A thorough examination to make a diagnosis of pregnancy requires the services of an assistant. In dealing with women of unknown character, an assistant becomes practically a witness, and hence a reliable person should always be selected. Examination may be made preferably at the office of the physician, although, if it will spare the patient great inconvenience and discomfort, the obstetrician may go to her dwelling. The services of the assistant are as much needed, or more, at the dwelling as at the office.

There are needed for the examination: an electric light which will illuminate the throat and mouth of the patient; a stethoscope (preferably one with a large disc); an apparatus for taking blood-pressue; a pelvimeter, tape line and clinical thermometer; sterilized rubber gloves; antiseptic ointment; and, if the obstetrician is accustomed to use it, some apparatus for holding the patient's limbs in position during vaginal examination. Sometimes time can be saved if the nurse goes to the patient's dwelling before the obstetrician and prepares the patient. A firm but comfortable bed or table is needed; the patient should be so clothed that the abdominal surface is absolutely without constriction and without clothing for examination. The urinary bladder of the patient should be thoroughly emptied before the examination.

With the patient lying upon the back in a comfortable position and with the abdomen covered by one thickness only of soft linen or without covering, care should be taken that in cold weather the patient does not become chilled. Additional covering may be required and utilized as the examination permits.

Beginning with the head, the condition of the scalp and hair should be noted; the eyes investigated; the nose and throat inspected; the condition of the tonsils, the tongue and the mucous membranes given careful attention; the thyroid gland, lymphatic region of the neck and

thorax investigated; and then the condition of the heart and circulatory apparatus, noted.

It is well not to take the blood-pressure at the very beginning of the examination, for, if the patient is nervous and frightened, it will increase the frequency of the pulse. It is well to explain something of what is desired before the blood-pressure is taken, so that the patient will not be apprehensive. The condition of the lungs should not be neglected, for the beginning of pulmonary tuberculosis may cause the cessation of menstruation and give rise to a suspicion of pregnancy.

For the examination of the abdomen, the legs and thighs should be flexed; the hands of the physician should be thoroughly washed in warm water so that the hands are warm. Palpation should first be done by the physician standing with his back towards the patient's head, and with the entire palmar surface of both hands placed upon the abdomen. He should map out the uterus and the position and presentation of the child. The effort to do this should give him information concerning the condition of the patient's intestine. If it is difficult to locate the uterus, it must be remembered that an overdistended urinary bladder and intestine filled with gas are not infrequently encountered; hence, an examination can much better be made if the patient's urinary bladder and bowels have been thoroughly emptied before the examination. Palpation of the abdomen as described will reveal the presence or absence of a uterus large enough to be distinctly located. If the uterus is distinctly felt, the pregnancy is advanced about four months. If the enlarged uterus cannot be located, and if the patient is pregnant, she is not four months advanced.

Percussion should give an idea of the condition of the intestine and also of the size of the uterus. Palpation and percussion should reveal localized tenderness. If pregnancy is advanced, the position and the presentation of the fetus may be made out. In late pregnancy, the physician should then turn, facing the patient's face, and palpate the abdomen with special reference to the upper extremity of the uterus. It should not be forgotten that breech presentation may be present, or that there may be more than one child. The examination should also reveal the presence of fluid in the abdomen, or of a tumor which is not the enlarged uterus.

The diagnosis of early pregnancy has its difficulties. Unless the urinary bladder is emptied and the patient relaxes her abdominal muscles, it may be very difficult, by palpation, to feel the enlarged uterus. Bimanual vaginal examination is absolutely essential. If the patient objects to this, the obstetrician has his choice of keeping the patient under observation and informing her distinctly that she takes the responsibility of error in diagnosis, or he may think it wise and best to retire from the case. Under ordinary circumstances the latter is the better course.

To make the bimanual vaginal examination, the legs and thighs of the patient should be completely flexed and supported in this position

as comfortably as possible. She should be upon a firm bed or table which is high enough to permit a good examination. The external genital should be cleansed with an antiseptic solution. Wearing sterile rubber gloves, the hands should be dipped in a warm solution of 1 per cent lysol, and sterile vaselin or any other sterile fat should be used as a lubricant. The condition of the external genital organs should be noticed and the presence or absence of discharge. It is usually necessary to insert two fingers, therefore; if there is spasm and pain, one

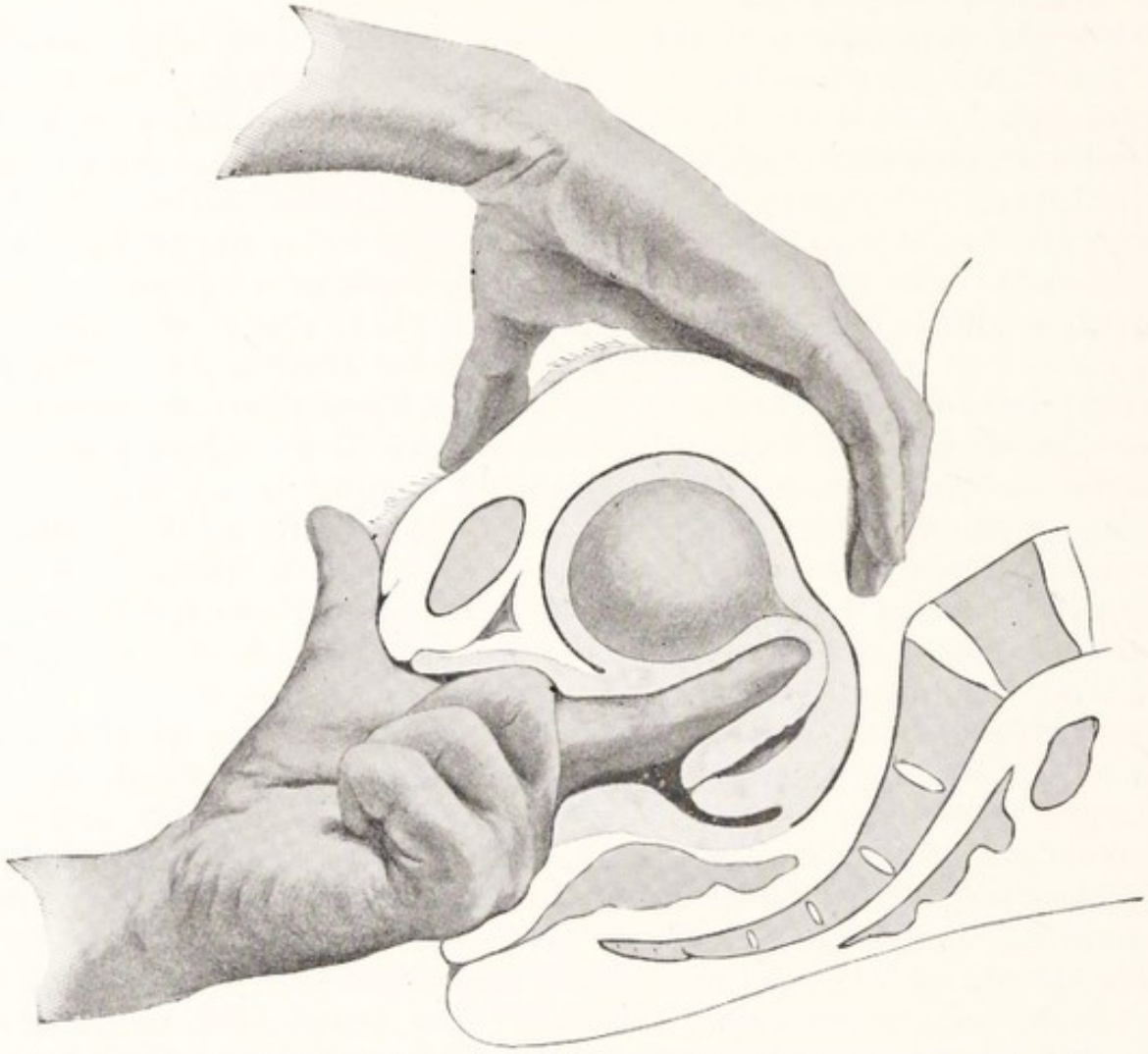

FIG. 52.—HAGAR'S SIGN IN DIAGNOSIS OF EARLY PREGNANCY OBTAINED BY COMBINED VAGINAL AND ABDOMINAL EXAMINATION. (Bumm.)

finger should first be inserted and steady but gentle pressure made upon the posterior vaginal wall until two can be used. If there is difficulty in finding the cervix, the patient should be turned upon her left side, and the perineum and pelvic floor drawn gently but firmly backward and upward, when the cervix can be found. Its condition and degree of dilatation are of interest and, if the cervix is sufficiently open, one or two fingers may be gently passed through the cervix to the internal os. Unless the obstetrician desires to induce labor, the internal os should not be entered by the finger. While the softened condition of the cervix is very characteristic of pregnancy, it is not proof positive

of that condition. In early pregnancy, reliance must be placed on the shape, size and consistence of the uterus and especially on the presence of the lower uterine segment.

To recognize this, the examining fingers should be carried in front of the cervix, pressing the tissues gently backward and upward. The external hand should be carried deeply behind the pubes and the uterus brought downward and forward. With this manipulation, the internal fingers should press gently into the uterine wall, when the enlarged upper portion of the uterus will be felt above the softened lower segment. In early pregnancy the body of the uterus is globular, and its contour can usually be appreciated upon bimanual examination. If the lower segment can be distinctly made out and enlargement of the body of the uterus can be clearly appreciated, a diagnosis of early pregnancy may be made with reasonable certainty. If, however, the physician is asked to make a positive and absolute statement, even this evidence is not sufficient. Unless he can distinctly hear the heart sounds of the child or feel its motions, an absolutely positive diagnosis of pregnancy should not be made.

In highly nervous patients and in complicated and obscure cases where it may be a medicolegal matter to make a diagnosis of early pregnancy, anesthesia may be required. Such examination should, if possible, be made in a hospital. If the patient is in good condition, nitrous oxid and oxygen may be given or, if desired, ether and oxygen. This should be carried to the point of complete relaxation and then the urinary bladder should be emptied by catheterism. Under these conditions the examination is rarely unsuccessful.

If, however, a diagnosis cannot be made under these circumstances, the only remaining resource is the microscopic study of the decidua or lining membrane of the uterus. This cannot be done without interrupting the pregnancy, except under unusual circumstances, and this method is rarely available, except in cases where conditions justify dilatation and curettage of the uterus. Examination by the X-ray is most successful in the later months of pregnancy.

Measurement of Pelvis in Pregnancy.—This does not become of importance until the pregnancy is so far advanced that the size of the product of conception promises to be an element in its successful expulsion through the pelvis from the uterus. In most cases, the measurement of the pelvis is of little practical importance before viability; twenty-six weeks of gestation.

At present the use of the X-ray has largely supplanted the measurement of the pelvis by instruments, but, as this method is not always available, the pelvimeter is still of value. No method of pelvimetry by artificial means equals in importance the thorough palpation of the pelvis by the hand, under anesthesia if necessary.

External pelvimetry should include: the measurement of the external conjugate, from beneath the spine of the last lumbar vertebra to the middle of the pubic joint in front, 20.5 cm.; the oblique diameters, from

the posterior superior spine of one side to the anterior superior of the other, 22 cm. plus (of these the right, is usually somewhat larger than the left); the measurement between the trochanters of the femora, 32.5 cm., giving an idea of the breadth of the pelvic cavity. If the distance between the anterior superior spine of the ilia, 26.5 cm., and the outmost points of the crests of the ilia, 28.5 cm., be compared, the outward curve of the iliac crest is apparent. This curve is lost or reversed in rickets. The distance between the tuberosities of the ischia (19.5 to 11.5 cm.) gives an idea of the width of the pelvic outlet.

The actual distance between the promontory of the sacrum and the posterior surface of the pubes may best be obtained by the introduction

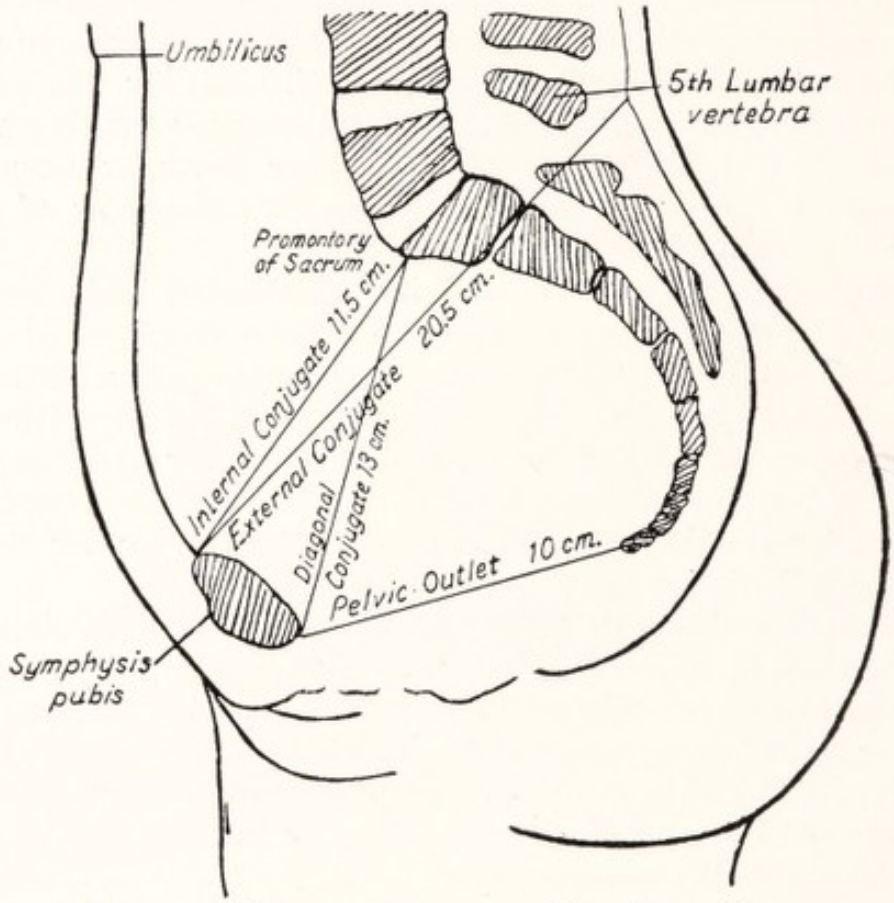

FIG. 53.—MEASUREMENTS OF THE BONY BIRTH CANAL.

into the vagina of two fingers of the clean gloved hand (the fingers used in the examination should not only be gloved but covered with a lubricant). To make this examination, the bladder and bowel of the patient should be emptied and she should be placed upon her back, at the extreme edge of a firm bed or table; she should be told to breathe gently with the mouth wide open. The index and next finger should then be inserted, the other fingers being flexed upon the palm and the thumb carried to one side. The pelvic floor should be pressed downward and backward and the fingers carried in until the posterior wall of the pelvis is reached; then, dropping the elbow, the fingers should be carried up until they touch the promontory of the sacrum. The examining hand is then brought up against the under border of the pubes, and the point

on the index finger near the metacarpophalangeal joint, which comes against the subpubic ligament, should be marked. The measurement desired is the distance from this point to the tip of the long finger which, in normal cases, is 13.5 cm.

The true conjugate may be estimated as follows: taking 20.5 cm. as the normal external conjugate, the internal may be reckoned by deducting from this 7 cm. for the thickness of the sacrum and 2 cm. for the height of the pubes, thus giving the internal or true conjugate as 11.5 cm.

Measurements in centimeters are of comparatively little value for clinical purposes. In general, however, the induction of labor should be declined, if the internal conjugate is not at least 8 cm., since it is very doubtful if a child at viability will survive vaginal delivery through a pelvis whose internal conjugate is less than 8 cm. The most valuable information given by external pelvimetry is the size of the oblique diag-

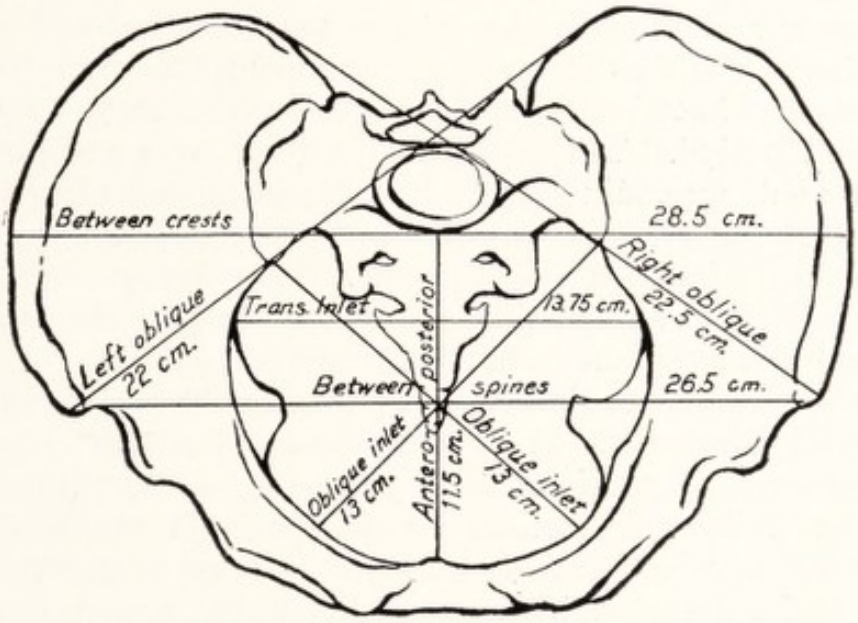

FIG. 54.—PELVIC MEASUREMENTS.

onals, as there is no satisfactory method of measuring these internally. External pelvimetry also enables the obstetrician to classify deformed or abnormal pelves.

The measurements of the bony pelvis in the skeleton do not interest the obstetrician from the clinical standpoint. Of importance to him is the condition of the birth canal in the living woman. Thus, in the skeleton, the greatest diameter of the pelvic brim is the transverse; but in the living patient this is lessened by the size of the iliopsoas muscles and, hence, the obliques become the largest diameters of the brim. The axis of the pelvis which, mathematically speaking, is a complicated line of constant variation, clinically is the line of direction taken by the fetus in birth. It is downward and backward from a point midway between the promontory of the sacrum and the pubes, until the pelvic floor is reached, when it is deflected upward and forward as the child emerges.

Other methods of pelvimetry which are a variation of palpation con-

sist in introducing, under anesthesia, the entire hand into the vagina, closing the hand into a fist and observing whether or not it can be accommodated in the pelvis. When the hand is withdrawn and again closed, the measurement of the fist gives approximately the measurement of the pelvic cavity. An exact tracing of the pelvis can be obtained postpartum if a thin ribbon of lead or other soft metal is drawn around the fetal head immediately after delivery; by placing this upon tracing paper, the contour of the bony birth canal may be thus recorded. Such tracings are of value as statistical data and in anticipation of future pregnancies.

Methods of pelvimetry by the X-ray require expert knowledge and experience to be accurate. Manges and others have perfected systems which in their hands are highly satisfactory.

But of great clinical importance is the X-ray examination of the pregnant patient by a skilled roentgenologist. In a recent case, Manges gave the writer a clear plate of a patient between four and five months pregnant, showing the skeleton and cranium of the fetus (see Frontispiece). Abdominal section confirmed the existence of intra-uterine pregnancy at that period. The patient's condition was complicated by a greatly diseased appendix which had to be removed. The skillful roentgenologist can give the obstetrician the exact location of the fetus and the position of the presenting part. Whether or not the head is entering the pelvic brim can thus be demonstrated. He can also diagnosticate multiple pregnancy and the presence of tumors or other complications which render vaginal delivery impossible or difficult.

Differential Diagnosis.—It is sometimes difficult or practically impossible to make a diagnosis of early pregnancy in a multipara. If subinvolution has followed previous pregnancies, the uterus remains enlarged and the development of the lower uterine segment may be so gradual as to be detected with great difficulty. Under these circumstances, it may be several weeks before even a provisional diagnosis can be made.

In primiparae the changes in the breasts are very characteristic. The areola of the breast deepens in color; the small follicles become enlarged; the breast is larger, firmer, and more sensitive; and, on gentle pressure, fluid exudes. With multiparae these changes may not develop sufficiently to be appreciable for several months, and these indications for a positive diagnosis may be wanting.

Pregnancy and Fibroids.—Where fibroids are interstitial, their gradual growth may exactly simulate a developing intra-uterine pregnancy. As in some women menstruation persists for several months during pregnancy, this would give no clue to the diagnosis. In a multipara the failure to recognize the lower uterine segment would not be unusual. It might not be possible, until the time had come to hear fetal heart sounds and appreciate fetal movement, to make a positive diagnosis.

Subperitoneal fibroids can usually be felt through the abdominal

wall. Their development should not, under ordinary circumstances, be mistaken for early pregnancy.

In the case of submucous fibroids, the uterus might be enlarged and the contour of the tumor could not be made out by palpation. The cervix might be somewhat softened by the presence of the tumor. Menstruation, however, would be, if anything, more profuse than usual; irregular hemorrhage might occur; the cervix would be partly dilated; if the finger were passed within, it might come against the tumor which could not be the fetal head or body in an early pregnancy. Should the presence of the tumor excite uterine contractions, it might be thought that the patient was beginning to abort, and the expulsion of the tumor might resemble very closely an early abortion. If the tumor could be seen or taken in the fingers or examined thoroughly by touch, its nature would easily be recognized.

Pregnancy and Other Uterine Growths.—Malignant disease commencing in the cervix should not readily be mistaken for pregnancy. The altered state of the cervix, the development of a foul and bloody discharge, pain and impairment of general health with the extension of the disease should establish the diagnosis. Sarcoma of the uterus might produce symmetrical enlargement, disturbance of menstruation and counterfeit pregnancy.

The writer was once asked by a general surgeon to examine an unmarried woman, upon whom the general surgeon had decided to operate by extirpating the uterus. The diagnosis was sarcoma of the uterus. There was the history of failure of menstruation, the gradual enlargement of the uterus, vaginal discharge of indefinite character and a slow but steady failure of health. It was thought that pregnancy could not be present because the woman was unmarried and because the history and the size of the uterus would not account for a pregnancy. If the duration of a possible pregnancy and the duration of the patient's illness were compared, the size of the uterus was not what should have been present.

The office nurse who assisted by preparing the patient for examination noticed that the patient's corset was unusually long and tightly laced, and that additional strips of thin steel had been fastened into the anterior portion of the corset. On examining the abdomen, it was found that the patient had evidently exerted extraordinary pressure upon the abdominal contents. On listening carefully, fetal heart sounds were plainly heard and fetal movements could be felt. So great had been the corset pressure that the child had been forced into the pelvic brim and the contour of the abdomen entirely altered. A diagnosis of intra-uterine pregnancy with the child prematurely forced into the pelvis by corset pressure was readily made. The hysterectomy was postponed.

It must not be forgotten that a uterine tumor and a pregnancy may exist at the same time. The pregnancy may be ectopic or entopic. If the latter, the tumor may so alter the uterus that the pregnancy cannot be recognized.

Ovarian Tumors and Pregnancy.—Ovarian cysts of considerable size, containing also a solid portion, may be mistaken for a pregnant uterus. A large cyst of the ovary may be thought to be polyhydramnios. In these cases the failure to recognize fetal heart sounds and movements and information given by a vaginal examination should make the case clear. The presence of a small ovarian tumor, forced down upon the pelvic floor and often with twisted pedicle, may complicate pregnancy without detection. Such tumors have been recognized only when the uterus was empty.

Tumors Other than Pelvic Complicating the Diagnosis of Pregnancy.—A prolapsed kidney or spleen may give rise to a suspicion of pregnancy. In the case of the kidney, it can usually be replaced and bimanual examination will reveal the condition of the uterus. So the prolapsed, enlarged spleen should be recognized.

Tuberculous Peritonitis Simulating Pregnancy—A tuberculous peritonitis with encysted fluid may give fluctuation, on palpation, resembling that from the amniotic liquid. If there is also the deposit of tuberculous material in the abdomen, the whole may be mistaken for an intrauterine pregnancy with considerable fluid. Failure to recognize heart sounds and movements, with the history of the case, should establish the diagnosis.

General Ascites.—In this condition, exact examination may be impossible and, if necessary, fluid may be withdrawn before a critical examination under anesthesia is made. A difficulty may arise in distinguishing between pregnancy with excessive amniotic liquid and general abdominal dropsy.

Pseudocyesis.—The exact explanation of this condition is not at present forthcoming. It may exist in warm-blooded animals, and, in the human subject, is usually seen in those cases where there is an abnormal condition of the mind or nervous system. Frequently women who have not conceived, but greatly desire offspring, develop pseudocyesis.

Aside from the gradual distention of the abdomen, the signs and symptoms all pertain to the mind and nervous system. The physical functions of the body are uninterrupted. Menstruation continues, the uterus enlarges so slightly, if at all, that the enlargement cannot be recognized; but even the recognition of these circumstances does not shake the patient's faith that pregnancy is present. The symptoms of early pregnancy are exactly counterfeited so far as nausea and vomiting, changes in the breasts, and, in some cases, gradual enlargement of the abdomen and the expectant frame of mind which characterizes a normal pregnancy are present. As the abdomen continues to enlarge, so the patient becomes more than ever confident. If the condition is not detected, a spurious labor occasionally develops, but, in the greater number, the failure of labor to appear exposes the abnormal condition.

Such patients are usually averse to physical examination. They frequently avoid physicians and will take the advice of any one who accepts their diagnosis.

The invariable rule of subjecting all patients coming with a history of disturbance in the functions of the pelvic organs to physical examination, including a bimanual vaginal examination, would clear up most of these cases. If the physician allows himself to put confidence in the patient's statements, he may become unwittingly as badly deceived as she.

To make the diagnosis absolutely sure, examination under an anesthetic, in the presence of the husband of the patient or of a responsible relative, is the one method of efficient treatment. As anesthesia proceeds, the abdominal enlargement disappears. When the patient is completely asleep, the hand can be carried into the pelvic brim with the abdominal wall before it, and it can be positively demonstrated that a living child could not be present. On the patient's recovery from anesthesia, the witness should tell her what was actually seen and usually the cure is immediate.

Mistakes on the Part of Physicians in the Diagnosis of Pregnancy.—On one occasion, consultation was sought by two physicians who, for several days and nights, had closely watched a patient apparently in labor. There was the history of the gradual enlargement of the abdomen in a multipara. Menstruation had been greatly lessened or absent. The general health had suffered somewhat. When the abdominal tumor was about the size of the uterus at term, the patient complained of indefinite abdominal pain. This pain was intermittent in the back and front, and, as the woman had had children, her statement that this was labor pain was received with considerable respect. The diagnosis of pregnancy had been made some time previously, and preparations were then instituted for labor; but nothing developed except intermittent pain.

On examination, no heart sounds or movements could be detected. There was a solid and cystic tumor in the abdomen the size of a full-term pregnancy. The cervix uteri was unchanged, and, on careful examination, a small uterus could be made out separate from the tumor. The patient had a solid and cystic tumor of the ovary. There was no pregnancy.

The Maternity Department of the Jefferson Hospital received a telephone message from physicians in an adjoining state, saying that a woman was in labor and that delivery was rendered impossible by the presence of a pelvic tumor. These physicians brought the patient to the hospital as soon as possible, where, on examination, the writer found the head of a full-term fetus in the pelvic cavity. On delivering the child by forceps in the presence of the physicians, he explained to them the nature of the tumor.

It is not strange that mistakes in diagnosis should occur in detecting abnormalities in health among parturient women. The circumstances of these cases are often abnormal; the patient may intentionally try to mislead and, if the physician forms a definite outline of what he believes to be present before he makes an examination, especially if he accepts mentally the diagnosis made by the patient, or if he omits the exam-

ination, he may be very readily deceived; hence, the rule should be invariable that thorough physical examination must be made.

Malingering Pseudocyesis.—This can best be illustrated by the narration of a case.

A young girl sought admission to the hospital, stating that she was pregnant and accusing a certain man of her condition. The abdomen was distended, she recited fluently the symptoms of pregnancy, and her general nutrition was somewhat deficient. Fetal heart sounds and movements could not be discovered, although the size of the abdomen and the story of the patient indicated a late pregnancy. She was kept under observation and it was observed that, when the patient was alone, the size of the abdomen grew considerably less. If the nurses were instructed in her hearing to have her ready for a clinical demonstration at a certain hour, the abdominal enlargement would be fully developed at that time. On investigating the case, it was found that the girl was depraved and that she could not accuse any one man of wrongdoing. No pregnancy existed.

The Duration of Pregnancy.—While the legal limit of pregnancy has been variously established in the courts of different countries, the obstetrician is interested in endeavoring to estimate or approximate the limit of gestation, and in determining what it is that produces labor. Many have been the theories, satisfactory and unsatisfactory, upon this question. The observation and experience of the writer lead him to believe that, during the reproductive period in a woman's life, her physiological existence consists in periods of ovulation whose accomplishment is characterized by a rise in blood-pressure with or without a menstrual discharge. That this rise of blood-pressure is caused by substances circulating in the blood seems probable, and the old idea of a toxic condition at this time is not unreasonable. The increased pressure at this period is normally followed by the return to the average pressure, with average conditions of metabolism and circulation.

In pregnant patients who are closely observed and who give an accurate statement of their sensations and symptoms, the phenomena of these crises, already described, persist to a large extent during pregnancy. Pregnant patients frequently feel uncomfortable and have slight backache or headache during pregnancy at those times when the menstrual discharge should have occurred had pregnancy not supervened. There is also a characteristic variation in blood-pressure and, to some degree, a toxemia at this period. On an average, the crisis which occurs 270 days after the last period and 280 days after conception, so far as we know, results in the development of labor. This seems to be independent of the vigor and frequency of fetal motion, although it must be somewhat influenced by this factor. That a very considerable variation can occur is shown in the fact that gestations lasting from 200 to 320 days are not very rare; while the longest recognized legitimate pregnancy is 331 days.

The writer is aware that this explains nothing, but that these clinical

phenomena are practically consistent, and that they may be observed, he believes.

In dealing with patients, one of the questions most interesting to the prospective mother is the probable time when pregnancy will end. To answer this intelligently, it should be stated that the precise date of confinement is unknown. An accurate history should be obtained of the patient's menstrual habit and of the average time elapsing between periods. She should be asked to notice whether, during her pregnancy, she can detect the time of these periods by altered sensations. If she can, these periods should be counted and, on an average, pregnancy will end usually on the tenth, sometimes on the ninth, of these periods. Intelligent patients become interested in this explanation, and will coöperate with the obstetrician in observing and reporting their sensations. Those who are unintelligent will take the statement of each friend, and the more improbable the statement, the more firmly will it be believed.

Confident and dogmatic statements concerning the duration of pregnancy greatly impress patients, if the statement happens to come true in the occurrence of labor. The writer has predicted labor within twenty minutes of its actual occurrence, and again has predicted labor within four weeks of its occurrence! Under the observation of the writer, a young healthy primipara, who had been a nurse, married a physician. She had very carefully studied the course of her pregnancy, and husband and wife had made a very careful estimation of the time of confinement. The patient was remarkably normal in her condition. She entered the hospital in time for the supposed labor, all of the conditions coinciding accurately with the history of the estimation. She was normally delivered of a healthy child four weeks after this time. Neither husband nor wife desired interference; the patient was not worried by the delay, for the phenomena of descent and engagement developed perfectly; and, evidently, when the next crisis of blood-pressure developed, a perfectly spontaneous natural labor was the result.

The end of gestation may be inferred with considerable accuracy by watching the patient in the last month of her pregnancy and, when the average period for labor arrives, making a thorough vaginal examination. This may render subsequent vaginal examinations during labor unnecessary. We know that labor cannot occur without the softening, thorough preparation and beginning dilatation of the cervix; hence, if the cervix is found in perfectly normal condition, there is no obstacle to labor; again, engagement and descent must develop, especially in primiparae and, when the presenting part is in the cavity of the pelvis, we know that this portion of the preliminary stage of labor has been accomplished.

The metabolism of the patient is often improved as pregnancy approaches its end, as evidenced by the examination of the urine. The nitrogenous waste is better cared for; there is less irritability of the vasomotor system; the increased space in the thorax following the descent of the child improves the action of the heart and the patient's

respiration; and she is more comfortable and can exert herself with more satisfaction. On the other hand, when one or several of these essential phenomena pointing to the termination of pregnancy is absent, we may infer delay in the beginning of labor. It is a safe clinical rule that when, in a primipara, descent of the presenting part does not normally develop before the time when labor in the average period should begin, the case is a complicated one.

In multiparae there is often little or no warning of the approach of labor. In these cases, the obstetrician must not overlook prolapse of the pregnant uterus; not only the protrusion of the cervix through the vagina, but the falling forward of the fetus, must be detected. This is seen in women with weak abdominal muscles, and may become so pronounced as greatly to hinder or prevent the development of labor.

The psychic influence which stimulates labor must not be neglected. The writer believes that intelligent women should be fully informed concerning the essential phenomena of a healthy parturition and that they should know what to expect and the way in which nature reckons periods, not by time, to help accomplish a certain physiological process. Many pregnant women become greatly interested in such information, and it helps very much to prevent undue anxiety and to stimulate the natural occurrence of parturition.

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CHAPTER XXI

COMPLICATIONS OF PREGNANCY AFFECTING THE FETUS

Complications of pregnancy which arise from the fetus or affect the fetus—The normal relation of mother and child during pregnancy—The acute infections of the mother complicating the condition of the child—Toxemia and its degenerative processes and their influence upon the fetus—Mechanical violence to the pregnant mother affecting the fetus—The effect of the premature separation of the placenta upon the unborn child—Changes in the fetal tissues which threaten both mother and child—Chorio-epithelioma—Hydatid degeneration of the chorion—The blighted ovum and its significance—Polyhydramnios and its dangers for mothers and child—Multiple pregnancy.

Obstetricians are accustomed to regard the fetus as essentially a parasite and, by the law of evolution, the nourishment of the fetus persists in a manner disproportionate to that of the mother. There is abundant evidence to show that only extreme deprivation will so reduce the nourishment of the mother as seriously to affect the fetus. Normally the fetus develops in proportion to the degree of development of the parents, and especially in proportion to the condition of the mother's nutrition and assimilation. The balance between the two organisms seems to be maintained largely by the placenta, and this must be considered as a clearing house between the two; not only does the fetus receive oxygen through this source, but immunizing substances are produced in the placenta, and also substances which have the property, when isolated and injected into a pregnant animal, of causing contractions of the uterus. That placental substances can stimulate the secretion of milk is a matter of familiar observation, not only with the human animal, but with other warm-blooded animals. Whether some of the other ductless glands of the mother's body have to do with the development of the child is not yet clearly established. There is reason to believe that pregnancy causes a recession in the mother to somewhat the male type of the individual, and this is ascribed to the action of the pituitary gland; during the early months of pregnancy the anterior lobe is active, and during late pregnancy the posterior lobe; both increase in size and function during pregnancy. When the action of this gland is excessive, there is excessive development in the individual, and an extreme type of this phenomena is seen in acromegalia. It is known that during pregnancy the mother's body retains calcium which must be useful in the growth of the fetus, and also nitrogen; the latter probably to increase the vigor of muscular action in labor.

The size and development of the fetus, as has been said, are proportionate to those of the parents. The common belief that the female

fetus is more allied in development to the male parent and the male to the female parent seems to be demonstrated. The transmission of peculiarities in development from grandparents to grandchildren and the persistence of certain types of development in certain families are familiar and interesting phenomena.

The influence of the mother's diet upon the development of the fetus has long been recognized. Possibly the most striking illustrations of this are seen in vigorous young primiparae in whom an abnormal appetite for meat and heavy food develops, and who gratify this appetite without restriction. Overgrowth of the fetus, with a skeleton unusually endowed with calcareous matter, is the result. It is also observed that the duration of gestation has something to do, not only with the size and development of the fetus, but also with the sex, or, to state this more accurately, the sex of the fetus probably has something to do with the length of gestation. A gestation above the average has long given rise to the expectation of a male child and this has frequently proved to be correct. Some observers believe that a young primipara in vigorous health is more apt to produce a male child than in later life, while, on the other hand, a woman who has had one or two female children, upon reaching the crest of her reproductive wave, may produce one or more male offspring.

A practical question has arisen whether or not it would be possible to limit the size of the fetus by regulating the mother's diet. A moderately contracted pelvis, with disproportion which might be overcome by good uterine contractions, would justify such an experiment, and various diets have been proposed. Unquestionably the diet, from which is excluded the heavier meats, fats, sweets and starches in profusion, may limit somewhat the size and weight of the fetus. The ideal diet for fetal development and maternal health is comprised of milk, fruit and bread; and, if articles which can be prepared from these substances are used, the diet is not excessively rigorous, and may be sufficiently varied to be acceptable. There is nothing more difficult than strictly to limit the diet of a pregnant patient unless she is under the care of an experienced and intelligent nurse. It is often possible, however, to inform the mother that a large child means a hard labor, and that if she will limit her diet it will lessen the risk to the child and also diminish her own suffering. Very frequently, in early gestation, the patient can take but a small quantity of food, and she may be fearful lest she is starving the embryo which is developing within the uterus; but the embryo will live and thrive at the expense of the mother and hence, if she satisfies her appetite, diminished though it be, by small quantities of food frequently taken, she need have no fear for the welfare of the child.

In late pregnancy, most women are willing to omit the heavy meats and to limit somewhat the diet. Often a reasonable diet, reduced in quantity only, is satisfactory for both mother and child; and the exclusion of heavy meat, and the limiting of the quantity taken, can often be accomplished. If the mother is hungry at night, a glass of milk with a

biscuit taken before retiring will cause her to sleep better and appease her appetite.

Women have long believed that the free use of fruits will prevent the development of an unusually heavy and hard fetal head and so lessen the suffering of labor. There is enough truth in this to justify its use in the management of pregnant patients, and they should be encouraged to use fruit as freely as possible. Occasionally a pregnant patient will break over all limitations, and insist upon taking food which ordinarily should be avoided: terrapin, lobster, ham, sausage, mushrooms or pâté de foie gras. If she does not add sweet champagne to these, her physician may be thankful. There seems to be a Providence who is said to watch over drunken men, sailors and children and, it may be added, pregnant women, and these patients will sometimes avoid the just results of such an orgy.

The effects of alcohol upon the fetus, if taken freely by the mother, are disastrous. Maternal drunkenness may produce an epileptic child, or at best a child with a miserable, unstable nervous system and often dwarfed in development. The habitual use of light wines and beer, by women accustomed to them and leading an active life, has no harmful effect upon the child. The excessive use of coffee, tea and tobacco by pregnant women cannot fail to harm the child, and unfortunately these substances are very often considered harmless. But patients should be cautioned regarding them. The Greeks believed that, not only the diet and hygiene of the pregnant woman, but also her mental hygiene was of the greatest importance in influencing the development of her child. Pregnant women of wealth were accustomed to follow a strict hygiene during gestation; bathing and massage were practiced regularly, with the aid of slaves; inunctions were given to keep the body in the best possible condition. Calisthenic exercises were followed and the patient carefully avoided excitement, danger, and violence of every sort. She was accustomed to surround herself with objects of beauty and art, and often to include music and poetry in the refining influence of her life. Whether the proverbial beauty of the Greeks, at their period of highest development, resulted from this care, may be a question, but certainly it could not have been without its influence.

Maternal Impressions.—An interesting question has arisen whether an extraordinary and unfortunate mental impression made upon a pregnant woman can influence her child. In estimating this, one must avoid the familiar error of ascribing a causal relation to a coincidence; furthermore, congenital defects in the development of the skeleton from causes not clearly known may be ascribed to maternal impressions when the causal relationship cannot be established. With all due allowance for other factors, there are a sufficient number of cases on record to establish the fact that a sudden and severe fright in a pregnant woman may result in a serious manifestation in the child.

Possibly one of the most interesting cases is that of the man who was known in London as the "elephant man." During his mother's preg-

nancy, she visited, with the other children of the family, the Zoölogical Garden and, while standing near the elephants, one of these animals quietly placed his trunk near her face, begging as usual for food; the woman turned suddenly, her face came in contact with the trunk of the elephant, she suddenly saw the large head and mouth and bulk of the animal, and experienced a severe fright. She went practically to term, and gave birth to a male fetus whose head and face so resembled in contour that of an elephant that the individual attracted undue attention, and could not mingle with his fellow men without great inconvenience and discomfort. So unfortunate was his life that he finally took refuge in a medical college, where he made a bare living in some capacity and was often exhibited to illustrate the theory of maternal impression.

In the experience of the writer, two instances have come to his notice which are of some interest. A pregnant woman, a multipara living in a small town, was called from her house to the street by the passage of a procession. The street was crowded and, in the excitement and confusion, a large hog escaped from its pen and pushed violently against the woman, knocking her down but not seriously injuring her. Pregnancy continued to its termination, but the head of the fetus resembled considerably that of the animal which frightened the mother; through some complication the fetus perished during labor, and a former student of the writer obtained the specimen and sent it to him for examination. The malformation and resemblance were undoubted.

The writer has had under his observation for a number of years a woman, now past middle life, who has upon the right parietal bone, near the vertex, an area which is sensitive to pressure and upon which hair has never grown. The history states that, during her mother's pregnancy, she was greatly perturbed on one occasion by the news brought to her suddenly that a friend whom she highly valued had been thrown from a horse and killed by fracturing the skull. The injury was received upon the identical portion of the cranium of the injured person that, in the offspring, has remained sensitive and devoid of hair.

Whether these and similar cases are coincident only or cause and effect, we do not positively know, but they are not without interest and suggestion. The practical fact remains that, if pregnant women wish to continue in good health and produce healthy children, they should avoid mental and psychic shock and also whatever injures the nervous system in the form of stimulants, narcotics, or poison.

Acute Infections Attacking the Mother and Their Influence upon the Fetus.—In dealing with infectious disorders of pregnancy, we have stated that very high temperatures will probably prove fatal to the fetus. That the fetus shares in the acute maternal infection, there can be no doubt; children have been born with the full eruption of variola or other infectious diseases. That the child can be protected by specific antitoxins is also true. On one occasion, a nurse at the Maternity Department of the Jefferson Hospital was discovered to have an active and virulent pharyngeal diphtheria. She was immediately removed to the Municipal

Hospital where, under prompt treatment by antitoxin, she recovered. Upon the advice of the Board of Health, every individual in the Maternity Department was immediately fully immunized with antitoxin in proportion to the body weight and development. Pregnant patients were included and, as a result of this prompt action, no further infection developed. It is scarcely possible that, in a large Maternity Hospital, all should have escaped had this not been done. The nurse in question had been on duty in the wards attending pregnant women up to the very moment of the discovery of her condition.

There need be no hesitation in vaccinating pregnant women against variola, and a physician would be justified in considering the unborn child of such a mother as practically vaccinated, certainly for several years. If vaccination is performed upon these infants, they frequently show no reaction. So the fetus would be protected if the mother were given inoculations against typhoid, tetanus and other infections for which a reliable antitoxin has been discovered.

If the fetus can be protected by protecting the mother, so the treatment of the mother during an infectious disease will also serve the interest of the child; hence, from the standpoint of the fetus, the clinical need to disregard the pregnancy and to treat the mother for the disease which threatens her life and health is obvious.

The local infections which attack a mother may pass directly to the fetus. Of these, gonorrhea is a striking example, for children have been born with gonorrheal ulcerations in the mouth, proved by bacteriological culture. In the case of syphilis, the infection may have arisen at impregnation in the ovum, and the mother may escape the active disease. An infant is rarely born with tuberculosis, for as a rule the placenta resists direct transmission, although tubercle bacilli have been found in the placenta.

That vegetable extracts and mineral substances can pass through the placenta or at least to its appendages is shown in the case of pregnant women working in tobacco factories. In these, the amniotic liquid is often greatly discolored and the fetus itself may show some of the same change. In various arts, pregnant women working where they may become poisoned by lead, phosphorus, arsenic, irritant fumes or other poisons, will show the transmission of the poison to the unborn child.

Psychic Effect upon the Mother Transmitted to the Offspring.—So far as literature is concerned, there are narrations of striking phases in the life of a pregnant woman at which the child is said to have leaped in the womb of the mother. Just what the method of transmission in these cases has been, we do not know. That sudden and overwhelming fear and terror may result in fetal death has been demonstrated, but the mechanism of the loss of fetal life is not clear. Whether an overwhelming toxemia is suddenly produced or violent uterine contractions separate the placenta is not known. One or both of these may have been present.

That malaria may be transmitted to the fetus is abundantly proved, and that the fetus will have chills when the mother has them has fre-

quently been observed; although quinin is supposed to excite uterine contractions, when given for malaria it prevents premature labor. It is probably true that other parasitic diseases of the blood, occurring principally in the tropics, may pass the barrier of the placenta and affect the fetus; for the general rule prevails that placental resistance may be overcome and the fetus share a mother's infection.

The prevention of fetal death from maternal infection is the guarding of the mother's life and health. In the interest of the fetus, the treatment is that appropriate for the mother; and in the body of the fetus, the pathology of this condition is essentially that seen in the mother.

Mechanical Violence Sustained by the Mother and Its Effect upon the Child.—We have already considered this to some extent, and in this connection have drawn attention to the fact that, when the fetus is not directly injured, as by a penetrating wound of the uterus, mechanical violence suffered by the mother injures the fetus through separation of the placenta; hence, when examining a pregnant woman who has sustained violence and accident, when the examination of the mother is complete, the obstetrician should listen for fetal heart sounds and palpate the abdomen to detect the presence or absence of fetal movements. In all these cases he must be on his guard to detect separation of the placenta, for this may greatly complicate the mother's serious condition.

The essential causes, however, of fetal complications occurring during pregnancy are toxemia in the mother and degenerative processes in the placenta. These placental changes are of several varieties. In toxemia of the nephritic type, characterized by high blood-pressure, with abundant serum albumen and globulin and casts in the urine, it is usual to find, in the placenta, areas of infarction whereby the placental substance has been replaced by a firm grayish-white substance which has completely destroyed the vascular tissues of the placenta. These placental infarcts, when they have involved a considerable area of the placenta, may cause fetal death through asphyxia. In the clinical course of the toxemia, their development seems to mark an improvement in the condition of the mother at the expense of the child. One may infer their formation when, in such a case, the mother's condition improves, fetal movements grow gradually weaker, fetal heart sounds diminish in strength and signs of fetal life gradually disappear.

In other forms of toxemia, the placenta shows multiple emboli and hemorrhages, gradually separating the placenta from the wall of the uterus and thus destroying fetal life by asphyxia. A syphilitic placenta often shows no abnormal conditions on visual inspection, but on microscopic study the phenomenon of multiple hemorrhage is present.

The particular significance of these placental changes and their influence upon the fetus lies in the clinical rule that, in treating such conditions in the mother, no undue risk should be taken of her life in the hope of saving the child. So extensively does the fetus share in the disease of the mother that it cannot be considered in good condition, and the chances are greatly against its survival. The conservative processes

of nature are often illustrated by the destruction of the fetus, apparently in the interests of the mother. Obviously, whatever treatment will save the mother will aid in saving the life of the child.

Blighted Ovum.—When the degenerative changes described occur in early pregnancy, the result may be the death of the ovum through the processes to which allusion has been made. Such an ovum may be retained and is then spoken of as a blighted ovum, and its retention is termed missed abortion. This condition may result in a confusion in the diagnosis, for a uterus pregnant three or four months and containing a blighted ovum may be mistaken for a fibroid uterus. In these cases the embryo may become adherent and be indefinitely retained. In one recorded instance, an autopsy disclosed an ovum which must have been retained in the uterus for fifty-two years. In another instance the retention was undoubtedly at least twenty-eight years. Such blighted ovum is firmly adherent, shriveled in appearance, and seems to exert little or no influence upon the health of the possessor.

Immediately after the death of such an ovum, it may completely disappear by absorption if its life is terminated within ten or twelve weeks of gestation. Such an occurrence cannot always be accepted unless the patient is in a hospital, but there are at present a sufficient number of carefully observed and recorded cases to prove the possibility of the occurrence. While the indefinite retention of blighted ova is not common, nor the entire absorption of an embryo a frequent occurrence, between seven and eight hundred accurately studied cases of missed abortion have recently been collected which prove the possibility and comparative frequency of the occurrence.

After the skeleton is formed, the embryo cannot be completely absorbed, fetal bones may remain and, as foreign bodies, may make their way out of the uterus through the vagina; or, should local infection and inflammation occur, they may be retained in an abscess cavity and ultimately, like the skeleton of an ectopic fetus, gain access to some adjacent viscus or escape through ulceration of the external surface of the body.

When an ovum becomes blighted near the time for the development of the placenta, the villi of the chorion and the decidua may continue to grow and the placenta may become partially formed and retained. Such a placenta is usually adherent and may be carried indefinitely in the uterus of the mother.

At the time of embryonal death, the mother passes through a condition of toxemia which may escape her notice, and not cause her to seek medical advice. She feels less well than usual, her appetite is impaired, there may be an unpleasant taste in the mouth, sometimes sweating is easily excited, the pulse is somewhat rapid and there may be either diarrhea or constipation. If she comes under medical observation and the history of probable embryonal death and missed abortion is obtained, the obstetrician, on examination, will find the uterus somewhat enlarged and may make at least a provisional diagnosis. Infection in these cases does not often develop and hence, in dealing with them, the obstetrician

has a greater responsibility than usual lest his treatment may complicate the patient's condition by the development of sepsis.

When a diagnosis of missed abortion is made, the uterus should be explored in a hospital and under surgical precautions. If the patient is near her menopause, or if she has a number of children and is not in vigorous health, the obstetrician may decide to perform supravaginal hysterectomy without opening the uterus. He will thus avoid the danger of infecting the abdomen, and efficiently deal with whatever intra-uterine condition may be present. In younger women, under better circumstances, if examination indicates that there are intra-abdominal complications, the obstetrician may select abdominal section: the uterus may be opened, the blighted ovum or its appendages removed, the uterine cavity disinfected, the cervix partly dilated for drainage and the uterus closed. Pathological conditions in the tubes and ovaries may be dealt with and an infected appendix, if present, may be removed.

If, however, there are no indications of abnormal conditions outside the uterus, the patient may be treated by dilatation and curettage of the uterus, followed by disinfection of the uterine cavity and packing. It must be remembered that the uterine wall may be greatly thinned at the site of the attachment of the embryo and hence unusual caution is necessary to avoid puncture. For this reason, some prefer under anesthesia to dilate the cervix moderately and to introduce a small bougie or catheter. The cervix is then packed with gauze, and a moderate packing of sterile gauze is placed in the vagina about the cervix. After a variable time, the uterus will usually expel its contents. Unfortunately, if the embryo has been firmly adherent, a missed abortion may become an incomplete abortion, and ultimately the obstetrician may be obliged to practice curettage or hysterectomy. Special care is necessary, in operating on these patients, to avoid perforating the uterus.

Hydatid Mole.—Vesicular degeneration of the villi of the chorion produces what is often known as hydatid mole. In this the embryo resembles a mass of grayish white grapes, each grape being a vesicle of degenerated chorion. This pathological change may be brief in its course and the uterus increase more rapidly in size than if normal pregnancy were present; portions of the diseased chorion may be discharged, and there may be intermittent and considerable hemorrhage. In extreme cases the altered chorion may penetrate the wall of the uterus and infection of the pelvic or abdominal tissues may result.

Obviously, there is nothing to be done for these cases except the thorough emptying of the uterus. If this is accomplished by dilating the cervix and emptying the uterus through the vagina, the risk of perforation, hemorrhage and infection must be kept in mind. Should this accident occur, the obstetrician should be prepared to open the abdomen. Supravaginal hysterectomy is then indicated. In the majority of cases, however, it is possible to empty the uterus, apply iodin to its inner surface and insert a firm packing of sterile or iodoform gauze. The pathologic appearance of the tissues is sufficiently characteristic to establish

the diagnosis, but, should this not be the case, microscopic examination will decide the question.

The predisposing and exciting cause of this degenerative process is unknown and no theory, up to the present time, has been advanced which satisfactorily accounts for the abnormality.

Polyhydramnios.—Dropsy of the amnion is not an infrequent complication of pregnancy. It has its importance in the life and health of the mother and, to a greater extent, in the survival of the fetus.

The writer on several occasions has had minute microscopic examinations made of the body of the fetus, the placenta, cord and membranes in cases of polyhydramnios. No satisfactory explanation of the condition has thus been found. In the decidua and placental tissue, there is an unusual proliferation of connective tissue and the walls of small vessels are somewhat thickened. The term "endarteritis" may fairly explain the condition present. There is no extensive degeneration of the placenta, nor is the placenta greatly increased in size, although it is a familiar fact that, where the placenta increases greatly in size, the life of the fetus is usually terminated. We are not clear as to the origin of the amniotic liquid, and hence it is not strange that, in the present state of our knowledge, we cannot adequately explain the occurrence of polyhydramnios. That twin pregnancy is present in these cases is often seen, but the important clinical fact is the striking influence which rapid amniotic dropsy has upon the development and life of the child.

Unless the accumulation of amniotic fluid is promptly checked when it becomes excessive, the fetus will show malformation and often die. This accident of pregnancy is often seen in multiparous women who have passed the most successful period of childbearing. In some of them there has been a lack of nourishment and the burden of poverty and hard work. In those who have abundance, there is unquestionably a general process of degeneration.

Diagnosis.—The diagnosis of polyhydramnios, for one not accustomed to examine pregnant women, may not be an easy matter. In the knowledge of the writer, an abdominal surgeon of experience opened the abdomen of a woman to remove an ovarian cyst, only to find an enlarged uterus containing fluid and, on opening this, polyhydramnios and blighted twin pregnancy. At the stage of fetal development, very often polyhydramnios may be mistaken for ascites as well as ovarian cyst. In making a differential diagnosis, the physician may be confused by the fact that he cannot recognize fetal heart sounds, nor can he be sure of fetal movements. Under these circumstances, the old test of pregnancy known as ballottement is useful. If the physician can pass one or two fingers through the cervix or if the cervix is so thin that he can readily feel the pressure of the uterine contents, if pregnancy is present and the patient is put in the erect or semi-erect position, one extremity of the fetus will usually gravitate to the internal os and come in contact, through the wall of the uterus, with the examining finger or fingers; if the physician can feel the presenting part, he should then push it away and wait

for a short time when it will again gravitate to the bottom of the uterus, and he can again recognize it by touch. If this sign can be clearly made out, it demonstrates the existence of pregnancy.

Treatment.—So far as is known, nothing can be done to prevent polyhydramnios except the enforcement of the hygiene of pregnancy. Where the condition is suspected, the obstetrician must examine his patient frequently to determine whether fluid is rapidly increasing. If the child is viable, and rapid increase of the fluid can be detected, the pregnancy should be terminated as soon as possible in the hope of saving the child. Sometimes the effort is made to continue the pregnancy by removing a portion of the fluid. This is accomplished by introducing a trocar and cannula as high in the uterus as possible, and withdrawing a portion of the fluid. The obstetrician must not be disappointed if this procedure does no good, but, if the patient is very desirous of continuing the pregnancy, the effort should be made.

When it is decided to empty the uterus, care must be taken to remove the fluid gradually, if possible. If a trocar and cannula are used, a large size should not be selected; if the membranes are ruptured, the obstetrician should take care to avoid the sudden shock which will follow the removal of great pressure in the abdomen. When this occurs, the abdominal vessels suddenly dilate, the vasomotor tone of the abdominal viscera is greatly lessened, and cerebral anemia develops and may be fatal. These may be obviated if pressure is continued upon the abdomen by a many-tailed bandage tightly applied and tightened as the fluid escapes. In extreme cases, light anesthesia will permit the administration of intravenous transfusion, using glucose and sodium bicarbonate. Strychnin, digitalis and atropin, given hypodermatically, are also of use.

When the quantity of fluid is not large, these precautions may not be necessary, but the possibility of shock after the uterus is emptied must not be forgotten.

An overdistended uterus contracts badly if suddenly emptied; hence, when the fluid is allowed to escape, the expulsion of the child may be left to the gradual action of the uterus. A tonic dose of strychnin should be given hypodermatically and, if necessary, a small dose of ergot or pituitrin added. When the uterus is empty, it should be thoroughly irrigated with 1 per cent lysol and firmly packed with 10 per cent iodoform gauze. Tonic doses of strychnin should be continued.

In these cases, the fetus will show malformations, and, not infrequently, imperfect development of various parts of the body.

When the obstetrician is convinced that amniotic dropsy is developing, he should inform the husband of the patient or some other responsible person. Warning should be given so that the birth of a malformed or dead child need not come to all concerned as a painful surprise; for the inference might be drawn that the physician might have done something to prevent the accident, but had been negligent.

Oligohydramnios.—As the amniotic liquid is sometimes excessive in quantity, so in other cases it may be deficient. As no cause is positively

ascertained for the excess of amniotic liquid, so there is no demonstrable cause for a deficient quantity of this fluid. The condition may be inferred when the uterus is unusually small for the period of gestation, and when fetal movements are felt by the mother with unusual vigor and appreciated by palpation to a great extent. The quantity of amniotic liquid varies greatly without necessarily producing complications in pregnancy or labor, but decided deficiency frequently results in some fetal deformity or in premature labor. There is reason to believe that so-called club-foot or talipes may result from a deficient amniotic liquid. Under these circumstances, the child in its motions strikes against the uterine wall and in the formative stage of the skeleton it is not difficult to comprehend the formation of the deformity mentioned.

Nothing can be done in the present stage of our knowledge to remedy this condition during pregnancy. The propriety of inducing labor might arise for discussion, but nature usually solves this dilemma by bringing on premature labor. In this event, the first stage of labor may be unusually painful, the fluid contained in the lowest portion of the membranes, which ordinarily serves as a dilator, may be deficient or absent. When the membranes rupture, the lack of amniotic fluid often produces severe uterine contractions attended with unusual pain; dilatation may be deficient and the patient may be subjected to the greater risk of lacerations of the cervix. For the child, the condition is dangerous because of increased birth pressure and, as a result of this, the child may suffer from hemorrhage, usually cerebral, which causes a permanent lesion.

Multiple Pregnancy.—As the usual pregnancy is with one fetus, so the presence of more must be considered a complication. Twin pregnancy is recognized as the result of simultaneous impregnation of two ova, or from impregnation of two ova, not simultaneously, but with an interval of time between the impregnations. Twins are also recognized as those resulting from the impregnation of one ovum or impregnation of two ova. Similarity or difference in sex may result in accordance with the different varieties of impregnation. The placenta may be one large, fused placenta, with one sac of membranes, or there may be two placentae and two sacs of membranes, and occasionally there is one sac divided by a partition. Size and weight of twin children depend upon the stature and vigor of the parents, and also the comparative age of the mother; for a very young primipara may not have as large children as a woman of twenty-five or thirty. The position and presentation of twins depends somewhat upon the condition of the uterine muscle. When this is firm, one child usually presents with the head and the other with the breech lowermost; thus the two children fit most compactly in the uterus. When, however, the uterine muscle is elastic and not firm in tone, it readily stretches as the fetuses grow, and both children may present with the head instead of the breech. Polyhydramnios, as has been said, is not rare with twin pregnancy.

The positive diagnosis of twin pregnancy may be difficult or impos-

sible; especially is this true if polyhydramnios is present. Under normal conditions, the hearing of two heart sounds, if plainly made out in different localities, may arouse a very strong suspicion of twin pregnancy. When two heads can be recognized by palpation and where separate motions may be made out, the diagnosis can be established. It is but natural to expect that the mother's abdomen will be larger in size than if there be but one fetus, but other causes may produce abdominal enlargement, so this is not a positive sign.

The presence of twins may complicate pregnancy by increased abdominal pressure producing dilatation of the veins in various portions of the body, making respiration more difficult and interfering with peristalsis of the intestines. The discharge of urine from the kidneys may be retarded, and thus the conditions may be favorable for the development of pyelitis. The added burden which the mother sustains will interfere with her exercise and her general health.

In vigorous women, the appetite is stimulated in accordance with the unusual demand, and the patient's excretion must keep pace with the increased quantity of food consumed. In others, so great is the general disturbance and malaise that the patient's nutrition suffers. If there is a tendency to prolapse of the abdominal contents, it will be exaggerated by twin pregnancy. Gestation may end before it is expected, and the premature termination of pregnancy may find the mother unprepared.

The management of twin pregnancy consists in excluding polyhydramnios and other conditions which are distinctly abnormal. It is well to avoid a positive diagnosis of twin pregnancy unless the condition is clear, for the demonstration at labor of a mistake on the part of the physician does not redound to his credit. Moderation is the essential element in the life of the patient pregnant with twins; exercise must not be abandoned, but excessive fatigue must be avoided. While nourishment should be abundant, digestion must not be overtaxed. If there is discomfort and uneasiness from excess weight, a change of residence, especially to a better atmosphere, is often useful. The mother will hear from others of the dangers of twin pregnancy, and her fears should be allayed by her physician who can remind her that, as a general rule, twins are smaller than the average child, so their delivery should not be unusually difficult.

The suspicion of twins should lead to early preparation for labor and all arrangements should be made so that, if gestation ends a few weeks before the expected time, the mother may not suffer. In depleted and anemic multiparae with relaxed tissues, gestation may be unduly prolonged, and it may often become the duty of the physician to interrupt the pregnancy in the interest of the mother.

Triplets, Quadruplets and Sextuplets.—The greatest number of children borne by a human mother at one parturition is six. Very recently a naval surgeon of the British Service, hearing of such a case in an Italian village, sought the mother as soon as possible to confirm the report.

The circumstances left no doubt of the occurrence. At the time of his visit, two of the children had died and he did not see the bodies, but there was every reason to believe that the statement was correct. The average weight of the children was a little more than two pounds.

Curiously enough there are few if any recorded authentic cases of the birth of quintuplets or of quadruplets. Triplets are not so very infrequent, and may grow to adult age and develop normally; they are, however, usually somewhat less in stature than the average individual. In the acquaintance of the writer, a man and two women are living in middle life who are triplets. Each of them has enjoyed average health, and has developed to a degree somewhat above the normal average.

These cases are often mistaken in pregnancy for dropsy, ovarian tumor, or some unusual abdominal condition. Under these circumstances a diagnosis is usually made at labor. While the management of these cases in labor is not within our province, attention must be called to the fact that termination of pregnancy may occasion considerable confusion. Thus, in twin pregnancy, an interval of ten to twenty-four hours may elapse between the birth of the children. When the number is greater than two, delay may be still longer. In some cases the third or sixth fetus has been overlooked at the time the others were born. The mother, fortunately, is in bed; feeling a sense o futerine contraction and supposing that she is having after-pains, the birth of the remaining child or children has occurred.

The tendency to multiple pregnancy is undoubtedly hereditary; this tendency may be transmitted by either parent, and it is well in obtaining the history of pregnant women to ascertain the occurrence of multiple pregnancy in families of the wife or husband.

The premature birth of twins and other multiple children by no means indicates that the children may not develop normally and vigorously. Their after-health seems to depend upon the vigor of the parents, and especially upon the physical condition of the mother. In the observation of the writer a primipara, aged about twenty-five years, had just recovered from an attack of bronchopneumonia of considerable severity. The presence of twins had not been clearly made out. A few days after her convalescence was apparently complete, she came into premature labor and gave birth to a girl weighing two and three-quarter pounds and a boy weighing three and a half pounds. Both children were perfectly formed, were in proportion as to their weight and length, and were vigorous. These children were kept in an incubator for six weeks, which was undoubtedly of the greatest possible advantage, for it prevented their admiring friends and relatives from handling and infecting them. The mother could not nurse them and they were artificially fed. The girl was dressed in doll's clothes, since no infant's clothes that were small enough could be procured. Both children were of unusual beauty. They are now between twenty-five and thirty years of age, and have been remarkable for their physical and mental development.

The Induction of Labor.—In discussing the complications of preg-

nancy, we have repeatedly observed that conditions may arise in which the pregnancy should be interrupted. In accordance with the usual rule of obstetric practice, the first and paramount indication should be the interest of the mother. But, under some circumstances and without undue risk to the mother, the life of the child may call for protection by interference.

As the name indicates, the induction of labor is a process of bringing about contraction of the uterus and a spontaneous delivery, as nearly normal as possible. In this it differs radically from the procedure, fortunately now abandoned, of forced or violent labor, by which the uterus was forcibly dilated and the child immediately delivered. Nothing more dangerous could have been practiced, but, unfortunately, some time was required to learn this lesson.

The writer was asked to see in consultation, by her family physician, a multiparous woman who had once had labor induced by the use of dilating bags; so painful had this process been that she refused its repetition. She thought herself going over term, was very impatient at the delay and anticipated grave complications. She had already borne several children with more or less difficulty, but without radical operation. She was of the opinion that her family physician should summon assistance, have her anesthetized by ether and, after dilating the cervix, deliver the child by forceps. This to her mind would be an ideal procedure, for it would terminate pregnancy, prevent the pain of natural or artificial labor and be completely accomplished in a short time. On examining the patient, the writer could find no reason for interference. The pelvis was of average size and well proportioned; the fetus was not excessively large; the position and presentation had not fully declared themselves; but there was every reason to believe that the head would descend and rotate when labor began. The patient was a little beyond the time of greatest reproductive activity, but her social duties, she felt, demanded more time than she could give to continuing the pregnancy.

The patient was informed that her proposition was not feasible nor safe, and that she had her choice of two things: first, to wait under the best possible conditions and allow labor to declare itself naturally; second, if she and her husband were fully determined that there should be no further pregnancy and were willing to take the surgical risk, she might be delivered by elective section with sterilization. As might have been expected, she demurred from a surgical procedure and had not the patience to wait, so the family physician was induced to try her original procedure. Under complete anesthesia by ether, he proceeded to dilate the cervix sufficiently to apply the forceps to the head, when, on making traction, shock developed to an alarming degree. The forceps were at once removed and help summoned and, in the absence of the writer, an obstetrician was called who succeeded in making a difficult vaginal delivery, followed by the death of the child by birth pressure. The mother was lacerated and made a tedious recovery.

Methods.—Time and space need not be taken to enumerate the methods of inducing labor which have been discarded by the majority of obstetricians. At present, two are most considered.

The first is the administration of drugs by the combined castor oil, quinin-pituitrin method which has been described. This is not in common use, but reliable observers who have employed it have obtained good results. The second is the induction of labor by introducing some foreign substance within the uterus. If time is no object, and the process must be as gradual as possible, the packing of the cervix uteri with sterile or antiseptic gauze will ultimately bring on labor. The process may be indefinitely prolonged and there is the risk of repeated interference and its discomfort for the patient. It is also true that, if a small quantity of amniotic liquid is taken from the uterus, labor will usually result, but this action is uncertain and the process is tedious.

Where a more sure and comparatively prompt action is required, at present there is the choice of two methods. One consists in the introduction of dilating bags. These are distended with sterile fluid, successive-sized bags being employed, until the last bag introduced, when completely distended, is nearly or quite as large in circumference as a fetal head. The patient expels the bag and this is followed by the rupture of the membranes and the expulsion of the child. This procedure is probably somewhat shorter than the use of bougies, but patients complain bitterly of the pain caused by the pressure of the bag. The bag may displace the presenting part to some extent and produce an abnormal mechanism. The bag does not soften the cervix nor induce prompt dilation and retraction as do bougies. If for any reason the bag is removed before the head is well in the cervix, the cervix may contract, but little permanent dilatation having resulted. The bag may burst and, while the entrance of sterile fluid into the uterus might be a trifling matter, if the fluid is less than perfectly sterile, infection may arise from this source. Those who habitually use bags are convinced of their value and are loud in their praise, and in skillful hands they often give fairly good results.

A sterile, smooth, elastic, solid bougie, introduced under light anesthesia, preceded by the dilatation of the cervix by the fingers or dilators, and separation of the membranes from the wall of the uterus as much as possible, produces phenomena more closely resembling spontaneous parturition than any other manipulation. If the conditions are favorable and in accordance with the firmness of the cervix, the obstetrician may introduce several bougies. An effort should be made to pass them above the pelvic brim, at one or both sides of the promontory of the sacrum, where there is the greatest room for their passage. If they are well lubricated and introduced very slowly and gently, with a rotary motion, they will not often rupture the membranes; should they do so, some at least of the amniotic liquid will escape, and labor may develop more promptly. Bougies are kept in place by vaginal gauze packing. They do not interfere with the mechanism of labor. They produce gradual

softening, dilatation and retraction of the cervix, and ultimately excite good labor pains. No one can tell definitely how soon active labor will begin. The writer has seen the uterus empty itself in a few hours after the introduction of bougies; he has also seen labor delayed from thirty-six to forty-eight hours.

There is some risk that bougies, introduced into the uterus, may pierce the substance of the placenta or possibly completely separate it. In the Maternity Department of the Jefferson Hospital, a patient came into vigorous spontaneous labor after the introduction of bougies; the head was forced down, passed the bougie, and the child born before the bougies were expelled; when the placenta came away, one bougie had transfixed it, but there had been no hemorrhage and the occurrence would not have been known but for the abnormal position of the bougie.

The writer has several times seen hemorrhage follow the introduction of bougies. In one case, when the uterus contracted, the placenta began to separate and the patient was promptly delivered by section. The bougies were not near the placenta nor had they touched it. In another case, a hemorrhage was caused by a chorio-epithelioma which became evident when the patient, failing to come into spontaneous labor, was delivered by hysterectomy and the specimen examined. In other cases, the hemorrhage has occurred at the moment of inserting the bougie and has ceased without further complication. The only explanation which occurs to the writer is that the decidua has been wounded by the passage of the bougie and temporary bleeding has resulted.

Catheters should not be used instead of solid bougies, nor is the introduction of irritating liquids, like glycerin, to excite uterine contractions, a safe proceeding.

Mortality and Morbidity.—In properly selected cases, and in skillful hands, the induction of labor has in itself no maternal mortality, namely, its morbidity is so light as scarcely to be estimated. It must be remembered that pregnancy is ended in these cases for a pathological condition, and it may take the patient some time to recover from this after-labor, but that is not the fault of the induction of labor. For the fetus, there is increased risk the earlier in pregnancy the interruption occurs; on the other hand, the interruption of pregnancy may save fetal life in a woman who has lost children previously by overdevelopment of the fetus and disproportion. Labor induced before the child has grown excessively may save the life of the child.

It is sometimes interesting to observe that insane women do not respond to the induction of labor and, in these cases, labor may be induced without sign or symptom from the patients; hence, in dealing with such persons, the induction of labor is impracticable.

Chorio-epithelioma.—General pathology teaches us that various processes may arise in the body in which fetal tissues may develop to an excessive degree and by which adult tissues may assume the fetal type. Oftentimes, from the diseased tissue, a correct idea cannot be obtained of its significance in relation to the life of the patient. Thus, at times,

the surgeon is perplexed by the statement of the pathologist that the tissue which he examined is sarcomatous or at least is of the type from which sarcoma is apt to develop. In these cases there is an entire lack of clinical evidence of disease other than possibly a subacute inflammation. If the tissue removed is really malignant, then the surgeon must proceed to an important operation, frequently that of amputation. If it is not malignant, the removal of the diseased tissue and its adjacent lymphatics may result in cure. In these cases the clinical observations and judgment of the surgeon, while accepting as technically correct the findings of the pathologist, must decide the treatment of the patient.

It has long been recognized that villi of the chorion develop during pregnancy in great abundance. Examinations of the organs of women who have died from various causes, during pregnancy, have shown the villi in various parts of the body; apparently their transportation has been by the blood current and they were apparently doing no harm. The fetal tissues, known as syncytium, may proceed to develop in adults of either sex; thus this tissue has been found in men as well as in women. That, under some conditions, the syncytium and chorionic villi may proliferate beyond the capacity of the immunizing qualities in the mother's blood to limit their growth has been well established. The typical cases which first drew attention to this matter were those in which, after abortion, often with blighted ova, and sometimes following their retention, the uterus steadily and rapidly enlarged; there was a foul and bloody discharge, the patients showed signs of cachexia, and, on dilatation and curettage, a mass of bloody tissue, sometimes foul in odor, was removed. This, when subjected to microscopic examination, showed chorionic and syncytial tissues in a stage of very active proliferation and degeneration.

These cases were considered malignant and the extirpation of the uterus usually followed. If the operation was done promptly, there was a considerable percentage of recovery; if the operation was done too late, the patient died. The autopsy showed metastasis of these fetal and chorionic tissues in those organs of the body which are most rich in blood, notably the lungs, liver, spleen and brain. In other cases, the excessive growth of fetal and chorionic tissue began in the early weeks of gestation, and manifested itself in toxemia with pernicious nausea. If the uterus is promptly emptied and thoroughly cleared of its contents, these patients often recover. In other cases, although apparently the uterus has been emptied, the patient manifests obscure symptoms. There is a thickening of the tissues at the base of the lungs, with evidence of consolidation and fever; evidence of a constitutional infection; and sometimes obstinate pain in the head, with active delirium. Such cases rapidly prove fatal.

The writer was called in consultation, to a multiparous woman, aged between thirty and forty, not in good circumstances but not destitute. She had borne a number of children successfully; the present pregnancy was of about three months' duration; she was profoundly depressed from pernicious nausea. She was immediately transferred to the hospital,

where every effort was made to help her resist the invasion of fetal and chorionic elements. Nothing succeeded, and the uterus was emptied by dilatation and curettage. There was an undue quantity of decidua; chorion was very freely developed; but there was nothing absolutely convincing in the microscopic examination of the contents of the uterus. The patient, however, rapidly failed; the predominating symptoms were intense headache and increasing delirium, rapid and difficult breathing, exhaustion, high fever, coma; death followed. At autopsy, metastases were abundantly present in the liver, the spleen, the lungs and the brain. A diagnosis of a rapidly proliferating chorio-epithelioma was made provisionally by the examination of the contents of the uterus, and confirmed by the clinical course of the disease.

At times a septic condition of the uterus developing at abortion may simulate chorio-epithelioma. Where there is a blood streptococcic infection, high fever, sometimes disturbance of the brain, sometimes foul bloody discharge and subinvolution of the uterus, these may furnish a picture closely resembling that of chorio-epithelioma.

Recent investigations have shown that very often pregnant patients escape a considerable proliferation of syncytium and chorionic tissues. The more the uterus and its contents and the other organs of the body are studied in pregnant women, the more we realize the fact that these tissues are often present in various parts of the body. The mere recognition of their existence by no means proves that the patient has chorio-epithelioma; for, if all these cases were malignant, the mortality of pregnancy would assume most alarming proportions. This recent pathological knowledge has an important bearing upon the question of prevention of malignant disease and the treatment of suspicious cases.

In a large percentage of patients in whom malignant disease of this type develops, there is a history of blighted ovum. The examination of these ova fails to show any one particular element whereby it can safely be asserted that, from a given specimen, a patient will develop malignant disease. Overgrowth of syncytium and chorion are not uncommon; hemorrhage with multiple embolism is almost invariably present; and degenerative processes of varying intensity are usually observed. In view of these facts, shall all cases of abortion be treated at a suitable time by dilatation and curettage, or shall the mother be allowed, without interference, to deal with what is left after the abortion, if the clinical symptoms are favorable? The majority of opinion inclines to curetting, and this is the author's view.

An uncertain element which cannot be appreciated is the resisting power of a given individual. If we had a successful method of ascertaining this, we might know better on what grounds to interfere. One may say that a comparatively young vigorous woman with negative Wassermann reaction, without anemia or toxemia, having had no previous important hemorrhage or infection, without essential disease, lacerations, wounds or injuries, might invariably be trusted to dispose of such fetal and chorionic tissue. There is an opinion not new in medicine

that the best course lies in taking every possible precaution and interfering only when one is obliged to do so.

It is the conviction and experience of the writer that cases of abortion should be closely studied; that it is safer in every case of abortion at a suitable time to dilate and thoroughly curet the uterus and examine the material thus obtained. Undoubtedly such a procedure would cause some unnecessary operations to be done; but, on the other hand, in the present stage of our knowledge, we have no other way of trying to prevent the development of the disease in question. Furthermore, as has been shown in treating blighted ova, it is not the time during which the ovum is retained which constitutes the danger of its retention. If a patient can carry a blighted ovum in her uterus from twenty to fifty years without the development of malignant disease, it is not the ovum, but the excessive development of fetal and chorionic tissues in the syncytium and villi, which is the source of danger. When these become malignant, they do so with comparative rapidity and, hence, curetting should not be postponed too long after abortion and should not be omitted.

In the presence of the disease, dilatation and curettage should establish without doubt the character of the uterine content. The clinical history of hemorrhage, uterine enlargement, elevation of temperature and general depression should confirm the malignancy of the process.

Obstetricians are agreed that, where extirpation of the uterus for malignant chorio-epithelioma is indicated, its lymphatics, as far as possible, should be included in the removal.

The interesting results obtained by the use of radium, and the pathological discovery that syncytial and chorionic tissues may be spontaneously cared for by the body in considerable quantity, would suggest the use of radium in suspicious or pronounced cases. Unfortunately, radium, under some circumstances, has the property of greatly stimulating malignant growth and hence the remedy might prove as destructive as the disease. We are not aware that sufficient experience has accumulated to enable us to judge the value of radium for this purpose, nor have we evidence that the X-ray can efficiently check the growth and development of chorio-epithelioma, nor are there, to our knowledge, a sufficient number of suspected cases which have been treated by the X-ray to afford data of value from experience. The tendency of radium to cause rapid tissue growth in some cases should not be forgotten.

The syncytial and chorionic tissues have been found in male subjects and in tumors of various size developing in different portions of the body. The diagnosis of the nature of the tumor is rarely made before its removal.

It must also be remembered that, under some circumstances, overgrowth of the decidua, without malignant characteristics and without the undue development of fetal elements, may occur. These cases are commonly supposed to be subinvolution following abortion or labor. The uterus remains abnormally large, a more or less bloody discharge persists and the indications are plain for dilatation and curettage, fol-

lowed by the application of iodin. Microscopic study of the material removed will show its true character.

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CHAPTER XXII

SUPPLEMENT

Late Hegar's Sign.—Under this title attention has been called to the fact that Hegar's sign is present for some time after the uterus has been emptied in early pregnancy. If a vaginal examination be made at this time the lower segment is plainly evident, the cervix is soft but may have closed immediately after the expulsion of the embryo, so that practically it does not admit the examining finger. The shape, size and consistency of the uterus is that of early pregnancy. Under these circumstances it is impossible for a physician from one examination, to know whether the patient is at that time pregnant or whether an embryo has very recently escaped from the uterus. The patient must be put under accurate and continual observation for a number of weeks; during this time if the uterus grows smaller and gradually assumes its non-pregnant condition, it is fair to infer that it no longer contains, certainly, a living embryo. It is true that a blighted ovum may be retained in the uterus indefinitely, but a living embryo cannot be present without continual uterine growth.

Should a menstrual period develop, the diagnosis that the patient is not pregnant becomes clear.

Joachimovits (*Monatschr. f. Geburtsh. u. Gynäk.*, 1924, Band 67, Heft 5), in his examination of 50 cases of abortion where the uterus was entirely emptied, found Hegar's sign clearly demonstrable in 2 cases, and present to some extent in 11 cases, five days after the escape of the ovum. There was slight hemorrhage in these patients but not sufficient to be of service in the matter of diagnosis.

That a dead fetus may be retained in the uterine cavity has long been known. Karlin (*Monatschr. f. Geburtsh. u. Gynäk.*, 1924, Band 67, Heft 5) reports 3 cases in one of which a dead fetus was retained in a woman suffering from carcinoma of the cervix, for one and one-half months from its death. Another woman with mitral lesion of the heart and toxemia, retained a fetus for a month after its death, while in a third case, a month after the death of the child stenosis of the internal os developed which made the emptying of the uterus difficult.

Diagnosis of Pregnancy by X-Ray.—This means of diagnosis, so valuable in other branches of medicine, is of decided importance in pregnancy. Its success will depend, not only upon the ability and experience of the operator, but also upon the perfection of the instrument employed.

Under ordinary circumstances several months at least must have elapsed before an accurate picture showing fetal bones can be obtained. With the average X-ray, five months is often as early as one can obtain accurate results, although under exceptional circumstances an earlier shadow develops.

The use of the X-ray to diagnosticate complications in pregnancy increases in value as time goes on. In a recent case of twin pregnancy, a positive diagnosis of the twin pregnancy was not clear. It was thought that one large child might be in the uterus or twins. The X-ray showed twin pregnancy but further demonstrated the fact that the twins were in such a position that should labor develop, they would inevitably become locked. The significance of this is apparent.

If one large child had been present, cesarean section was indicated as the pelvis was less than the average in size and the head had not engaged. If twins were present it was to be expected that as each twin is rarely of average size, vaginal delivery would readily occur; the presence of locked twins, however, in a primipara between 30 and 40 years of age, made cesarean section still the proper method of delivery.

X-Ray Obstetric Diagnosis Is Always an Interesting and Practical Subject.—Portes and Blanche (*Gynéc. et obst.*, 1924, 5) publish a paper giving the results of considerable work in this subject with a large bibliography and three pages of illustrations.

They found this method valuable in diagnosticating pregnancy before signs of fetal life could be recognized, in the diagnosis of multiple pregnancy, pathological pregnancy, mechanical obstacles developing during pregnancy which might influence labor, especially in the diagnosis of disproportion between the head and pelvis. They quote statistics of others who claim to have recognized pregnancy by this method at three and one-half months and four months, some at five months and in a series of 24 cases, in one-third of them before the fifth month. The writers studied 10 patients with 9 negative results and one in which they obtained a positive shadow. In diagnosticating twin pregnancy, error can be avoided by the use of the best apparatus in the hands of experienced persons, and if these precautions are taken the method is successful and of great value. In diagnosticating triple pregnancy, there are several cases upon record. Hydrocephalus and monsters can be recognized when the fetus has grown to considerable size. Regarding the question of diagnosticating fetal death in the uterus, there are very few results of practical and proven value in these cases. It is claimed that the recognition of disproportion between the size of the cranium and the size of its contents is positive proof of fetal death. Where maceration occurs, decalcification of the skeleton becomes pronounced and that can be recognized by the X-ray. Tumors complicating pregnancy would suggest examination by this method. In the second half of gestation the X-ray would show the fetal skeleton which would be contrasted with the outline of the tumor.

In ectopic pregnancy the X-ray can render service only after the fetal skeleton is sufficiently advanced to be clearly recognized; so in mechanical complications of gestation, all would depend upon the degree of ossification present in the fetus. So much can be done by this method of diagnosis that it should be kept in mind in all important complications of gestation in which it offers a chance of success.

The mechanism of labor has been suggested as an etiological factor in puerperal infection, and to confirm this opinion, a study has been made of

the relation of the uterus to the pelvis and of the presenting part to the cervix, by the introduction of a clip into the anterior lip of the cervix and the exposure of X-ray films during the period of contraction, and again during the relaxation immediately following. These films show descent of the uterus within the pelvis and of the fetal presenting parts within the uterus during contractions, with ascent of the fetus within the pelvis and the ascent of the fetus within the uterus, during the period of relaxation immediately following. Bessesen and Bessesen (*Surg., Gynec & Obst.*, Aug., 1929, p. 266).

Beck (*Am. Journ. Obst. & Gynec.*, Aug., 1929, p. 257) states that, in a case of polyhydramnios, with the aid of the X-ray a definite decision to empty the uterus was reached. The same conclusion might have been reached at a later date, but with the aid of the X-ray the patient was spared considerable suffering. Early interference, before the appearance of maternal indications for interruption of pregnancy, greatly lessened the risk in polyhydramnios.

Clinical Significance of X-Ray Pelvimetry.—This is described by Thomas (*Am. Journ. Obst. & Gynec.*, 1926, 12:543). He succeeded with remarkable accuracy in measuring the dimensions of the superior strait. This method requires no elaborate apparatus and may be used at any period of pregnancy. He obtains lateral views of the pelvis, giving the contour of the sacrum and the relation of the presenting part to the superior strait. Obviously this is of especial value in the less severe grades of rickets.

Estimation of Fetal Development by X-Ray.—Jardin (*Gynéc. et obst.*, 1926, 14) has used the X-ray in studying the development of fetal bones, finding that the center of ossification for the lower epiphysis of the femur appears at the beginning of the ninth month and is always present at term. The center for the upper epiphysis of the tibia appears at eight and one-half months and is always to be recognized at term.

One may conclude that a newborn infant weighing 5½ pounds or more, in length 18 inches, with centers of ossification in the lower end of the femur and upper end of the tibia, is at full term.

The child weighing more than 5½ pounds and longer than 18½ inches and showing ossification in the lower epiphysis of the femur is a full-time child. An infant less than 5½ pounds, 17½ inches in length, with a center of ossification at the lower extremity of the femur is in the beginning of the ninth month; where there is no center of ossification either in the lower end of the femur or upper end of the tibia, the weight less than 4½ pounds and the length less than 16½ inches, the child has not reached the beginning of the ninth month of gestation.

Irradiation in Pregnancy.—Murphy (*Am. Journ. Obst. & Gynec.*, Aug., 1929, p. 179) states that irradiation before conception may be followed by the birth of an unhealthy or defective child. Irradiation of pregnant women is extremely likely to be followed by birth of seriously defective offspring—microcephaly is most common.

A diagnostic curettage should always precede pelvic radiotherapy in order to avoid irradiation of a growing embryo. A pregnant uterus should never be subjected to radiotherapeutic exposures. It is further deemed advisable

that, should a growing embryo be irradiated unwittingly, the pregnancy should be terminated at the earliest possible moment.

Goldstein and Murphy (*Am. Journ. Obst. & Gynec.*, Aug., 1929, p. 189) are of the opinion that no pregnancy should be allowed to continue to term when radium or Roentgen-ray therapy has been employed. Cerebral arrest here was due to fetal irradiation.

Toombs (*Am. Journ. Obst. & Gynec.*, April, 1929, p. 523) states that a diagnostic exposure is not harmful unless resorted to too frequently.

A therapeutic exposure causes abortion in the early months and various deformities of eyes, brain and cord during later months. The younger the embryo the greater the injury. Malignancy superimposed upon pregnancy demands measures sufficient to destroy the cancer, the life of the fetus, of course, being disregarded. In obscure cases of pregnancy coexisting with fibroids and in elderly women, the probability of pregnancy should always be kept in mind in order to avoid subjecting the supposedly absent fetus to an immediate death or something worse.

Serological Diagnosis of Pregnancy.—This still remains without satisfactory results. The Abderhalden test has long since been shown inaccurate. That disturbance of metabolism follows certain procedures in pregnancy which does not happen in the non-pregnant, is indirectly of some slight value, thus the injection of epinephrin in pregnant patients is followed by glycosuria. In pregnant patients the red blood-corpuscles are said to settle to the bottom of a container much more rapidly than those of non-pregnant, but these are conditions which give rise to inference only and are of little value for positive information.

The metabolism of pregnancy remains an unsolved problem in the very extensive and increasing literature. The fact that pregnant women lose in weight is of interest and various researches have been made upon this point. In a recent series of observations by Hirsch (*Monatschr. f. Geburtsh. u. Gynäk.*, 1924, Band 67, Heft 5) in 170 pregnant patients, 53.5 per cent were below the average weight. The patients under observation for some time in the hospital, showed that there was a slight gain in weight until the sixth day before labor, from this to the fourth day the weight remained unchanged, and then occurred a loss so that when labor began, the average weight was 0.4 kg. less than five days before labor. It is difficult to find an explanation of this fact, but it may be of interest to note that the X-ray applied to the hypophysis in some patients produces a loss of weight.

An observation of some interest in this connection is made by Hess and Weinstock (*Journ. Am. Med. Assoc.*, Nov. 15, 1924) concerning the influence exerted by the diet of a pregnant woman, upon rickets in her offspring. By experiment upon animals the writers found that giving cod-liver oil during pregnancy did not protect the fetus against rickets when after birth the young were placed under conditions favorable for the production of rickets. At the Sloane Hospital for Women a number of pregnant patients were given cod-liver oil during the last two months of pregnancy; 28 patients could be observed and of this number, 15 had infants which developed rickets according to clinical criteria and 8 of these were shown to have rickets by X-ray examination.

That the mother's nutrition has an influence in making the child susceptible to rickets is proved by the fact that premature infants are very susceptible to the development of the disease. Evidently the nutrition of the mother in pregnancy has little to do with the disease in the child and this is acquired after its birth.

Diagnosis of Early Pregnancy.—The diagnosis of early pregnancy by recognizing some alteration in the excretions of a pregnant patient has frequently been attempted. Bronnicoff (*Zentralbl. f. Gynäk.*, 1924, 44) reviews the literature of the subject as regards the diagnostic value of glycosuria produced by phlorizin in recognizing early pregnancy. His observations were made in 350 cases of various kinds and in all over 1000 tests were made in 300 women and 8 men. Phlorizin was given by intramuscular injection and in another series of 42 men by intravenous injection. By the intramuscular method 1 c.c. of a fresh solution (0.2:100.0) which was 2 mg., was given in the morning in the gluteal region. After the injection the patient was told to drink water freely and then the urine was examined for sugar, three times at intervals of half an hour, if necessary it was taken by catheter. Before the injection, a control test was made of the urine to demonstrate the absence of albumin and sugar. In none of these cases was albumin present and the two cases which showed sugar in the urine, were eliminated from the test. In 73.8 per cent of patients in the first two months of pregnancy, the test was positive; in 26.2 per cent the test was negative although the patient was pregnant. In 40 patients who had temporary amenorrhea, 29 gave positive reactions and 11 negative. In 122 patients known to be pregnant, 82 were healthy, 20 tuberculous, and 20 anemic. Among the healthy patients 61 gave positive tests and 21 negative tests; in the tuberculous 14 were positive and 6 negative. In the anemic 10 were positive and 10 negative.

Cases of incomplete abortion from six weeks to the third month, were also examined, 60 in all, of whom 40 gave a positive and 20 a negative test. In order to control the test 70 cases, 60 of these not pregnant and 10 patients who had passed the menopause, were given this test and with the exception of three, aged 45, 55, and 60, the results were negative. The three patients had prolapse of the uterus and they gave a positive reaction. Twenty-two patients were examined during the menstrual period and 13 gave a positive reaction.

When men were examined 72 per cent gave positive and 14 per cent a negative test. This percentage is the same as that obtained in the examination of women.

These experiments are an illustration of the difficulty in diagnosticating pregnancy because of disturbed metabolism. They should lead to caution in placing too much reliance upon technical results.

Contour Abdominal Measurements for Pregnancy.—Pendleton (*Am. Journ. Obst.*, 1926, 12: 390) has found that in some cases one can predict labor by measuring the contour of the abdomen; after the twenty-fourth week this is a fairly accurate method. When the menstrual history has been unusual and confused, this method should be employed with that of Nagel as a check, the position and attitude of the fetus determined, the accuracy of the method being

greatest where the vertex is on the left side; marked variations are observed when the vertex is posterior. This method does not enable one to decide upon the course of treatment in an unusual posterior position.

When the pregnancy is abnormal or labor is abnormal, the contour measurements are greater than in the average. When the fetus descends into the pelvis, the uterus contracts, or where the uterus has been suspended, the contour measurements are smaller than the average. The smaller measurements are more accurate than those above the average.

The Respiratory Function in Pregnancy.—This was studied by Bombani (*Ann. di ostet.*, 1923, 10: 528) in a nervous pregnant woman who had influenza in 1918 and at four months pregnancy had obstinate and severe dyspnea. The urine was negative, the blood normal and abdominal organs seemed healthy. There was some tendency to exophthalmos but the pupils reacted well. The blood showed over four million red cells and 7000 white cells and 75 per cent hemoglobin. Various drugs were given to the patient and the carbon dioxid content was studied. While some of the observations are interesting, they throw no definite light upon the problem.

Relation of Embryo and Mother.—New light is given to our study of the relation of the embryo and the mother, by Teacher (*Journ. Obst. & Gynæc. Brit. Emp.*, 1924, 31 : 2). This contains some exceedingly good and clear illustrations, showing the intimate relation between the villi of the chorion and the maternal blood, and also the relation of the maternal blood to the ovum before the intervillous spaces are formed. His study shows a remarkable connection between the blood of the mother and the embryo which must render the condition of the mother's blood a potent factor in influencing her offspring.

The effort has been made to show the "Relationship between the Area of Placental Attachment and the Birth Weight of the Child" by Lavake (*Am. Journ. Obst.*, July, 1924). He concludes from his study of the subject that the diet of the mother influences little or not at all the size of the child, it is therefore useless to limit the diet in the mother to lessen the fetal size or to push her nourishment excessively with the hope of stimulating the growth of the embryo.

Toxemia of Pregnancy.—The toxemia of pregnancy is always a subject fertile in literary production. Many obstetricians believe that the toxemia of pregnancy is essentially one process, differing in manifestation in different organs and under different circumstances. This view seems logical and is useful in presenting the matter to students for study.

Some, however, strongly dissent from this opinion, among them Cook (*Brit. Med. Journ.*, March, 1924, in the "Hunterian Lecture on the Toxemia of Pregnancy"). His contention is essentially that until toxemias are clearly recognized, demonstrated and analyzed, he declines to believe that they exist as decisive factors in what is termed by some the toxemia of pregnancy. He questions the variations from the normal which are alleged to exist in calcium content of the blood-serum in pregnancy, and he does not accept the findings of those who have detected in the blood-serum marked variations in the healthy pregnant patient and in those threatened with eclampsia, having albuminuria or who have eclampsia.

The acidosis factor he believes of little importance and in eclampsia the

inorganic constituents are very little changed. Biochemical investigations have given us no accurate knowledge. The average case of albuminuria he asserts shows no symptoms. He believes that mechanical pressure of the growing uterus interferes with the function of some of the excretory organs. The value of bleeding in toxemia is its effect upon blood-pressure. The pernicious nausea of gestation is caused by many factors, among which starvation is very important. The influence of the nervous system is paramount, and he would not withhold food from these patients.

The majority of evidence, however, does not support his contention that there are no essential alterations in the blood urea and in the metabolic processes of the mother who has toxemia. It has been thought that in many cases of toxemia of gestation, the death of the fetus *in utero* is favorable for the mother. Recent studies in this connection indicate that where the fetus dies in the uterus and the mother's toxemic condition immediately grows less, the woman has no definite lesion of the excretory organs, especially the kidneys; but if albuminuria and other signs of toxemia persist after the death of the fetus, structural changes have developed in the excretory organs.

Pathology.—In the *American Journal of Obstetrics,* 1926, 12:792, Bell gives the results of autopsies in 10 cases of the toxemia of pregnancy, where this condition became evident during the last four months of gestation. Of these patients, 5 had convulsions. The illness had been present for varying intervals and jaundice was found only once. In one patient the lower surface of the diaphragm was covered by subperitoneal hemorrhage. This is often seen in the infants of toxemic mothers, dying shortly after birth. Fluid was found in the abdomen in 3, and in half of the cases, in one pleural cavity. This fluid was purulent in one case, bloody in 2 and clear in 2. Pulmonary conditions were present in half the group and these lesions extended from simple congestion to the development of nodules. Microscopic study of the lungs showed congestion with edema, various forms of bronchitis and bronchopneumonia, hemorrhage and abscess. The size of the heart was not proportionate to the weight of the individual, a comparatively small woman having the largest heart.

There was fluid in the pericardium in all the cases, in one purulent, in two bloody. In a few the myocardium was considerably softened. The coronary arteries and aorta showed no lesions of importance. The color of the spleen varied from pinkish gray to dark brown and corpuscles could be discerned in 8 of the patients. None of these patients had had the appendix removed and none of them had acute appendicitis. Beyond the presence of bile-stained fluid in the stomach, the digestive tract seemed normal, so were the adrenals and the pancreas. The capsule of the kidney separated easily in these patients. The kidneys were pale and the cortex often swollen.

The condition of the liver varied greatly, in some there was obvious congestion, in others localized fatty infiltration, acute yellow atrophy, infarction, necrosis with hemorrhage and in others the portal spaces were filled with cells.

The Eye.—The condition of the eye in the pregnant toxemic patient is always interesting, and Cheyney (*Journ. Am. Med. Assoc.,* Nov., 1924) reports his experience in examining patients at the Boston Lying-In Hospital. He

found that retinitis complicating pregnancy is not more common in primiparæ than in multiparæ. When changes occur in the fundus they usually develop in the last three months of pregnancy but rarely recur. If the toxemia of pregnancy is acute, eye changes do not recur; but if the pregnant woman has chronic nephritis, eye changes persist and return often with increased severity, in subsequent pregnancy.

In 8400 patients in the clinic at Christiania were 680 whose eyes were examined and among these were 40 cases of retinitis; 82 per cent of patients with retinitis had chronic nephritis and 18 had an acute toxemia of pregnancy. The reports of different observers do not agree concerning the permanent damage to vision. In one series, but 65 per cent of patients having retinitis were able to read after the pregnancy had ended. In another series 28 per cent had normal vision, 58 per cent damaged vision, and 14 per cent were blind after pregnancy ended. The writer believes that if a toxemic patient shows retinitis the chances are 4 to 1 that she has developed kidney lesions and she should be carefully followed for over a year after the termination of pregnancy. Unless the urine and blood-pressure are absolutely normal during this time, repeated pregnancy must not occur. It is true that cases of chronic nephritis can be tided along for considerable periods, and with these patients retinitis processes as well; but this does not lessen the gravity of the situation.

So far as treatment is concerned, if retinitis is discovered at any time previous to the last two weeks of pregnancy, the pregnancy should be terminated. Patients having retinitis and going to term, show a mortality of 15 per cent, and 20 per cent blindness in the survivors. Where the pregnancy is interrupted, the mortality falls to 4 per cent and the percentage of blindness to 6 per cent. Retinitis may be caused by toxic blood or may be secondary to changes in the circulatory system such as increased blood-pressure, slowing of the circulation, and hemorrhage.

In studying pregnant patients the writer endeavored to ascertain whether by examination of the eyes he could distinguish an acute toxemic case from the nephritic. Where the condition was one of acute toxemia it should theoretically be easy to differentiate from chronic nephritis, but practically it is impossible to do so, for lesions in the retina may vary in character, extent, and development in both toxemic and nephritic patients.

That it is important to have the eyes of pregnant patients examined, there can be no doubt and in many cases a valuable indication of the toxemia of pregnancy may thus be found. In the writer's observation the spontaneous interruption of pregnancy in these cases is often a conservative process not only to save the life of the mother but frequently to preserve her vision.

The Liver.—That sudden death after labor is due to a degenerative condition of the liver and a severe toxemia is illustrated by the report by Schickele (*Gynéc. et obst.*, 1924, 1) in his clinic at Strassburg. His first patient was aged 35, second pregnancy, spontaneous labor followed by some hemorrhage and manual removal of the placenta. There had been very moderate anesthesia with ether. After delivery the patient became greatly cyanosed and died in an hour. At autopsy the liver was extensively disintegrated and necrotic. Kidney lesions were not important.

The second patient was a young woman in labor fifteen hours, delivered by low forceps application, the child was living and vigorous but the mother died four hours after labor. Autopsy revealed an extensive lesion of the liver with embolism, no lesions in the heart or other organs. The liver was extensively disintegrated. On examination the capillaries were dilated and there was multiple hemorrhage and various stages of cellular degeneration. The kidney lesions were very slight.

A third case was in her fourth pregnancy with rachitic pelvis. Cesarean section under spinal anesthesia was done. Just after the child was delivered, the patient became livid, respiration failed, and death ensued. The spinal anesthesia was considered as the cause of death. At autopsy the liver showed lesions of yellow atrophy.

Hepatic Lesions in Eclampsia.—Dieckmann (*Am. Journ. Obst. & Gynec.*, April, 1929, p. 454) states that tissue fibrinogen when injected into the portal vein accompanied by injections of the same substance in the peripleural circulation, produces marked portal thrombosis. If the dosage is kept within the limits for the individual dog, a marked peripleural necrosis with hemorrhage can be obtained, as three animals clearly demonstrated. These experiments show that there is some real background for the theory, and answers the question why preventive treatment in eclampsia, namely, limiting of protein diet in the last months of pregnancy and good intestinal elimination, has been so effective.

Dieckmann (*Am. Journ. Obst. & Gynec.*, Dec., 1929, p. 757) has evidence that negative lesions in eclampsia may result from a great concentration of substances in the portal vein, which can bring about thrombosis and they abnormally must have their origin in great part from the intestinal tract. He also is of the opinion that it is important to limit the meat protein intake and the insistence on good internal hygiene in the patients in the last months of pregnancy, thereby averting, at least, the fulminating types of eclampsia.

Cross (*Am. Journ. Obst. & Gynec.*, Dec., 1929, p. 800), in his study of various liver function tests in normal pregnancy, reports that they are invariably negative in normal cases and produce no ill effects. The van den Bergh's test is valuable only in occasional cases. The icteric index test is valuable in that positive results point to hepatic insufficiency. The levulose tolerance and Widal's hemoclastic crisis tests are not uniformly reliable. All tests, even those whose reliability has been established, should be interpreted with caution, because of the fact that no one test can demonstrate the functional ability or disability of an organ with manifold functions.

The toxemia of pregnancy with especial reference to liver function was studied by Berkeley and his associates, as reported in *The Journal of Obstetrics and Gynæcology of the British Empire*, 1924, 31, 1. He examined cases from a number of hospitals and completed his paper by tables and statistics. He was especially interested in two methods of research: One, the estimation of the blood urea and blood non-protein nitrogen; the other, the investigation of the urine. In another group of investigations which he found more important, were the tests of hepatic function. For this purpose he used Fouchet's test for bile pigment in the blood. This is based upon the circumstance that damage to

the liver cells causes them to lose the property of converting urobilin into bile pigments; urobilin then accumulates in the blood and is excreted in the urine and can be recognized. Fouchet's test consists in taking the serum of the patient examined, putting three drops on a white porcelain surface and adding three drops of the reagent employed. This reagent is 20 c.c. H_2O, 2 c.c. of 10 per cent ferric chlorid, 5 gm. trichloracetic acid. If the reaction is positive, a white coagulum is formed by precipitation of the serum proteids by the trichloracetic acid and the coagulum turns a greenish blue color, reaching a maximum in about twenty minutes. He employed other tests but Fouchet's he believed was of considerable importance.

This paper should be studied in detail by those especially interested in the toxemia of pregnancy.

The purpose of the study was to determine whether an indication could be found which would form a reliable guide for the interruption of pregnancy and it is believed that the best indication and perhaps the only safe one for inducing premature labor in cases of albuminuria of pregnancy, is the test of hepatic function described. Even if the blood urea and non-protein nitrogen tests are as reliable as they are considered, they are complicated, requiring expensive apparatus and high technical skill, while Fouchet's test is simple and can be readily applied.

Cholecystography as an Aid in Determining Gall-Bladder Stasis in Pregnancy.—Fagelson (*Am. Journ. Obst. & Gynec.*, May, 1929, p. 613) states that positive Graham-Cole gall-bladder tests in pregnancy (the failure to visualize) should be skeptically accepted as proof of gall-bladder pathology. Stasis in the gall-bladder of pregnancy was not seen in the gall-bladders visualized in this experiment. What stasis may be present is certainly controlled by the response of the gall-bladder of pregnancy to fat meals. Even when the gravid uterus rises above the lower gall-bladder border, it does not exert enough pressure to disturb the normal gall-bladder outline.

Observations on Sixty Cases of Hyperemesis Gravidarum.—Peckham (*Am. Journ. Obst. & Gynec.*, June, 1929, p. 776) reports of his study of 60 cases of hyperemesis gravidarum that vomiting of pregnancy severe enough to warrant admission to a hospital occurs once in 150 pregnancies; and severe cases occur once in 400 pregnancies. Women in upper walks of life are more prone to it, but Negroes are not immune. Age and parity are not predisposing factors. Severe vomiting usually starts before the eighth and occasionally before the fourth week. Time of onset, duration of the vomiting and loss of weight are not indications of the severity of the disease, nor a guide to the prognosis. Albumin, frequently found in the urine, is of slight prognostic value. Acetone bodies are frequently absent from the urine in severe cases.

High blood-pressure or low does not mean a mild case.

In mild vomiting the blood chemistry changes are an increase of uric acid and decrease of chlorids. In severe cases, an increase in non-protein nitrogen, uric acid and sugar is noted, the chlorids are lowered.

In most patients isolation and hospitalization are sufficient.

A considerable number of the patients will abort spontaneously, some time

after the cessation of the toxemia. Treat eclamptic convulsions with a hypertonic soda bicarbonate solution intravenously plus morphin.

Insulin in the Vomiting of Pregnancy.—In line with this investigation is the report of a case of pernicious nausea of pregnancy with acidosis, treated by insulin (Lequeux, *Bull. Soc. d'obst.*, 1924, 5). The patient was aged 29, good general health. Eight months after marriage she had some treatment for the pelvic organs and after that pregnancy developed. Pernicious nausea was present with very great tenderness over the abdomen. Apparently menstruation returned and an early abortion had probably taken place. The second pregnancy was followed by pernicious nausea with severe acidosis, the coefficient being 68 per cent and acetone abundantly present in the urine. Treatment by injections of adrenalin and suprarenal extract did little or no good. Glucose was given by rectum. This treatment seemed to be successful for some time when the patient again became worse and was again better with the treatment. She gave birth to a child deficient in weight but made a recovery. In the next pregnancy nausea was treated by ovarian extract successfully with the successful termination of pregnancy. In a following pregnancy pernicious nausea was again present and the patient was treated by the administration of glucose and the Lily preparation of 10 units of insulin. She grew better, then worse, but her physicians were able to carry her along in pregnancy until a uterine hemorrhage occurred. A dilating bag was then placed in the uterus and under anesthesia a living child delivered by version.

In a recent number of the *Journal of the American Medical Association,* Thalhimer reports his experience with glucose and insulin in the pernicious nausea of early pregnancy. He gives by intravenous injection 1000 c.c. of 10 per cent pure glucose and also 10 units of insulin are administered. This treatment was repeated in these proportions three times in severe cases with good results. His series of cases would aggregate a considerable number.

In a case of pernicious nausea and toxemia at about seven months pregnancy in a multipara who had had toxemia in each of five previous pregnancies, the writer employed the intravenous glucose and insulin treatment. The uterus expelled its contents in this case. The first administration of glucose and insulin was followed by improvement, the second was followed in a few hours by high fever, coma, and death. Autopsy showed degenerative changes in the liver and kidneys.

Thalhimer (*Surg., Gynec. & Obst.*, Aug., 1924) gives the results of some recent researches in the laboratory of the Columbia Hospital of Milwaukee in the insulin treatment of the toxemic vomiting of pregnancy. He quotes 3 successful cases under the care of physicians other than himself and all these showed marked ketonuria and one had acidosis with carbohydrate combining power of the blood-plasma of 35. Three hours after an intravenous infusion of glucose and insulin, the blood-plasma combining power was 48 and nineteen hours later 69. Insulin forces the body to oxidize to the utmost glucose and this results in consuming the products of incomplete fat metabolism; the ketonuria is thus lessened and reduced. The blood-plasma carbon dioxid combining power is raised, acidosis ceases, and the patient improves. A diet rich in carbohydrates is then given. That pregnancy causes an abnormality in

carbohydrate metabolism, the writer believes is clearly shown. The results of treatment are that the patient's urine is free of acetone in one or two hours and the alkali reserve rises about ten points. An excessive amount of acetone reappears in the urine in eighteen to twenty-four hours, but unless the patient becomes worse, it may be disregarded. Carbohydrate food should be administered but no fat and plenty of fluid. After vomiting has ceased for twenty-four hours, the patient may take any food desired except fat, and the carbohydrates should be in abundance. The blood should be examined at least twice.

One patient only had an insulin reaction and she responded immediately when 3 mm. of adrenalin were given hypodermically and two glasses of milk were administered by the mouth.

Thalhimer's method of preparing the glucose is described and the apparatus for administration is reproduced in an illustration in his article.

Sachs (*Med. Klin.*, April 15, 1927) uses small injections of 5 units twice a day, and progresses to twice daily doses of 20 units. He does not precede this by giving carbohydrates, and considers this a point of importance. Hypoglycemia never appeared. The patients immediately improved, ceased to vomit, were able to take food and gained weight.

The writer has no explanation for the action but believes the effect upon the mind produced by the injections is a considerable factor.

Toxemia of Pregnancy as a Cause of Mental Disease.—That the toxemia of pregnancy is the cause of mental disease is demonstrated by Bourne (*Journ. Obst. & Gynæc. Brit. Emp.*, 1924, 31 : 2). He was able to study with a fair degree of accuracy 61 cases of insanity. The two great causes of this condition are the toxemia of pregnancy and septic infection. It is interesting to note that patients having eclampsia usually recover more rapidly and often more completely, than those who had toxemia which did not end in eclampsia. This is also true as regards the mortality; the mortality of eclamptic patients is less than that of toxemic cases in which convulsions do not occur. Seventy-seven per cent of eclamptic patients had insanity for a short period after pregnancy terminated and then recovered their mental health. In cases, however, where the toxemia did not clear up, repeated pregnancy was accompanied by repeated attacks of insanity.

At the Bellevue Hospital, Gregory (*Am. Journ. Obst.*, Oct., 1924) studied 118 cases of mental disease complicating parturition. More than half were called manic depressive psychoses. This is stated to be a constitutional disorder with a definite history and usually terminated favorably.

Sepsis.—Latent sepsis as a factor in causing the toxemia of pregnancy was the subject of a paper by Ivens (*Brit. Med. Journ.*, June, 1927). Her patients were treated at the Liverpool Maternity Home and a number of cases are narrated.

Coliform organisms with pus and sometimes blood were found in the urine. In some a non-hemolytic streptococcus was present, in others *Staphylococcus albus*. One case of pernicious nausea of gestation was septic, another had jaundice, another accidental hemorrhage, and in each of these it was apparent that sepsis played a part in producing the final pathology.

Anemia.—Attention is called to the severe anemia often accompanying the toxemic conditions in pregnancy by Schneider (*Monatschr. f. Geburtsh. u. Gynäk.*, Band 65, Heft 6, 1924). It has long been known that hemolysis may result in these cases and may be so severe as to become rapidly fatal.

Acetonemia.—That acetonemia may threaten death to a pregnant woman has been shown by numerous reports on the subject of the toxemia of gestation. Rowland (*Bull. Soc. d'obst.*, 4, 1924) reviews the literature of the subject and reports a case in detail in which the patient had a very severe toxemia resembling encephalitis lethargica in which acetone seemed to be the principal agent. The interruption of pregnancy was successful in this case in rescuing the mother.

Epistaxis.—At a meeting of the Section of Obstetrics, Royal Academy of Medicine of Ireland, February 4, 1927, Solomons, Master of the Rotunda Hospital, called attention to engorgement of the cavernous tissues of the nose as a symptom of pregnancy and the rarity of epistaxis. He reports the case of a primipara in the twenty-sixth week of pregnancy, admitted to the Rotunda in a toxic condition. The symptoms cleared to some extent and the patient was discharged but returned three weeks later with such severe epistaxis that he was obliged to tampon the entire posterior nares. Urine was highly albuminous, blood-pressure 240. Abdominal hysterectomy with spinal anesthesia was performed, morphin and scopolamin were given before operation and were so effective that stovain was not needed. The operation was performed without disturbance; on the following day the nasal tampons were removed. The patient was given water only, but on a holiday was unfortunately given an abundant meal which caused disturbance of vision and examination showed retrobulbar paralysis. On a very restricted milk and water diet the patient improved and was transferred to a general hospital.

Recurrent Toxemia of Pregnancy.—Young (*Brit. Med. Journ.*, Feb. 12, 1927), in a paper read before the Edinburgh Obstetrical Society, stated that eclamptic phenomena are caused by disturbance of the toxic elements rapidly elaborated in a mass of dying placenta. It has also been shown that extremely toxic materials such as histamin and tyramin might be produced by disintegrating tissue. If the placental lesions causing these poisons extend over a considerable area of the placenta, they might cause an immediate termination of pregnancy by abortion, premature labor, accidental bleeding without toxemia, but if the damage is less well-developed and less marked, the fetus might continue to live and there would be time for the development of the toxic elements which cause eclampsia. This view finds support in the fact that direct damage to the fetus does not occur from the eclamptic process of the mother; and that on the other hand a severe eclampsia may suddenly subside after the intrauterine death of the fetus and the consequent complete detachment of the placenta. In 220 successive cases of toxemia and accidental hemorrhage in parous women, these statements were illustrated by the study of the history in eclamptic cases. The recurrence of eclampsia or the toxemia was found in over 30 per cent, and this is evidently a low estimate. In 40 per cent there was a tendency to the recurrence, in successive pregnancies, of abortion, premature labor, accidental hemorrhage or stillbirth.

These morbid processes arising in the patient and damaging successive pregnancies, may be primary or acquired. In many of the damaged pregnancies, there is no toxemia. In many cases of accidental hemorrhage, toxemia is absent. It is present in from 40 to 50 per cent, and even in patients dying as the result of hemorrhage, there may be no evidence of toxemic changes in the liver or kidney.

Where the damaged placenta was retained within the uterus, the toxemia was intense. The same toxic sequence occurred in 32 per cent of the cases. Placental damage was the primary cause of toxemia and the interruption of pregnancy.

The recognition of the frequent occurrence of true eclampsia, toxemia, abortion and premature labor may necessitate revision of the views held regarding nephritic toxemia. It has been believed that there were two groups of late pregnancy toxemias, the eclamptic or non-recurrent, and the nephritic or recurrent, but this distinction does not prevail. The small number of cases of kidney disease acquired after pregnancy, as in scarlet fever, are to be readily separated from others. The kidney damage in the late pregnancy toxemias was secondary to the development of disease in the placenta.

In the *California and Western Medicine*, 1926, 25:333, Von Geldern studied the records at the Stanford Clinic of San Francisco of 27 women with toxemia of pregnancy who subsequently became pregnant. Of these one or more normal pregnancies followed the toxic one in 13; there was a return of the toxemia in 38 of 61 subsequent pregnancies. Among 135 patients, 25 had convulsions, of whom 21 were primiparæ. The maternal mortality in eclampsia was 16 per cent, the fetal 20 per cent. So far as diagnosis went in 14 cases of recurrent toxemia, 4 had or developed a chronic nephritis, while 10 had no kidney lesion; one of the 4 with chronic nephritis had four toxic pregnancies and died following a cesarean section in the nineteenth week, because of chronic nephritis. Another had three toxic pregnancies with deficient kidney function; two years after her last delivery there was much albumin in the urine and blood-pressure 230 systolic and 150 diastolic. In each pregnancy the symptoms became more severe and developed at an earlier period of the gestation. Where cases have chronic nephritis complicating pregnancy, the symptoms of toxemia appear earlier and with each succeeding pregnancy at an earlier period. The pathological changes in the kidneys frequently noted, completely disappear, marked hypertension continues and function of the kidney is deficient.

Where there is recurrent toxemia without permanent kidney damage, it is hard to give a prognosis. Out of 10 such cases, 7 were carried through their last toxemic pregnancy and labors satisfactorily. In 3 others where the outcome was unfavorable, it was impossible to tell whether pregnancy in such a case could be continued without risking the life of the patient.

The Effects of Pregnancy on Blood Circulation in Their Relation to So-called "Toxemia."—Becker (*Am. Journ. Obst. & Gynec.*, Sept., 1929, p. 368) states that the normal changes of general circulation during pregnancy, labor and puerperium are of great significance. Resistance of the blood flow through the normal wall of the pregnant uterus does affect the general circu-

lation in a definite manner. When this uterine resistance becomes abnormally large and especially in an individual whose circulatory system is incapable of compensating fully for even only the physiologic increase in resistance, the development of certain pathologic conditions, usually ascribed to a toxemia, becomes almost inevitable. In those patients, in the presence of marked hypertension, great changes arise when the circulatory system does not adjust itself promptly to the changes of conditions brought about by delivery.

The Removal of Blood-Plasma and the Reinfusion of Corpuscles in the Treatment of the Convulsive Toxemia of Pregnancy.—Irving and Taylor (*Am. Journ. Obst. & Gynec.*, June, 1929, p. 767) state that this form of treatment was used 16 times in 14 patients and in 5 eclamptics a prompt recovery followed. In 4 cases of preëclamptic toxemia, where the blood-pressure remained elevated following delivery, the use of this method reduced the hypertension and resulted in a disappearance of albumin from the urine. Chronic nephritic patients received only temporary benefit. The red blood-cells have shown little change in number following this method of treatment.

The Blood in Normal Pregnancy.—Denis, King and Briggs (*Am. Journ. Obst. & Gynec.*, March, 1929, pp. 386-391) observed in normal pregnancy that there was in a majority of cases a slight decrease in the concentration of non-protein nitrogen of the blood which is accompanied by a relatively large decrease in the urea nitrogen fraction. In pregnancy the ratio of urea nitrogen to the total non-protein nitrogen in the blood is lower than in non-pregnant individuals.

Fluctuations in Blood-Sugar during Eclampsia.—Lightbody (*Am. Journ. Obst. & Gynec.*, July, 1929, p. 36) states that the variations in the reported sugar mean for cell and plasma cannot be accounted for by alteration in cell volume, due to the use of varying amounts of salt anticoagulant, provided the cell existence as a suspended particle is maintained.

Diabetic Coma Complicating Pregnancy.—Merriam (*Am. Journ. Obst. & Gynec.*, May, 1929, p. 684) states that only 2 cases including the one reported, in which insulin was used, recovered. Young women, with diabetes, especially when aggravated during their menstrual periods, have worse prognoses. Even mild diabetes may suddenly go into coma during pregnancy.

Use of insulin results in marked improvement immediately after delivery. However, the death of the fetus before delivery makes the prognosis much more grave, because during fetal life, the fetal pancreas helps the mother in carbohydrate metabolism. Operative delivery during diabetic coma would seem to have as serious a prognosis as in eclampsia.

Bone-Marrow Stimulation in the Puerperal Woman by Injection of Pituitrin and Glucose Intravenously.—The data presented by Hofbones (*Am. Journ. Obst. & Gynec.*, June, 1929, p. 761) serve to establish the fact that by a combination of the intravenous administration of hypertonic glucose solution with a preliminary injection of pituitary extract, a vigorous, stimulating effect on the bone marrow of the puerperal woman can be evoked.

Venereal Disease in Pregnancy.—This was the subject of a paper by Browne (*Brit. Med. Journ.*, August 13, 1927).

As regards treatment, four main principles should be borne in mind. It

should commence as early in pregnancy as possible, or better still a full curative course of treatment for syphilis is to be completed before pregnancy. In every pregnancy such a patient should be treated by arsenical compounds, although she may seem to have been completely cured. It is safe to continue treatment up to the actual confinement. Arsenic and mercury or bismuth should not be combined because they tend to damage the kidneys. If there is no albuminuria, bismuth and mercury may be given in alternation. When albuminuria is present, it may be necessary to stop all treatment except potassium iodid.

He obtained the best results in syphilis by the use of novarsenobenzol intravenously, the dose varying from 0.3 to 0.75 gm. Injections once weekly are continued until six or eight are given, with a careful watch for albuminuria. During the following month 10 mm. of gray oil should be given, injected into the muscles of the buttock once weekly, with massage. As an alternative, twice weekly, bicreol of bismuth should be given. The condition of the teeth must be carefully watched and these courses of arsenic and mercury and bismuth may be given in alternation until pregnancy ends.

Eighteen months of treatment after delivery are required and it is safer to continue treatment for a year after all tests are negative. In each pregnancy antisyphilitic treatment should be repeated. Although salvarsan before and during pregnancy gives the best results for the child, there is no guaranty that the child will not be a congenital syphilitic.

As regards the treatment of gonorrhea complicating pregnancy, the difficulty is to bring the antiseptic into immediate contact with the gonococcus. Saline solution in cleansing the genital tract is as good as anything. Preparations of silver or 1 per cent picric acid are useful, a 1 per cent silver protein is also employed. Medicated urethral bougies have given good results. In some cases an astringent dusting powder is often useful. Local treatment is usually required twice weekly in clearing up the discharge.

Detoxicated vaccines, beginning with a dose of five thousand million repeating weekly and gradually increasing to fifty thousand million, may be continued until the end of pregnancy.

Douching is dangerous and should be avoided. The methods of treatment described usually result in curing gonorrhea before labor and avoiding complications during the puerperal period.

Gonorrhea.—Davis (*Urol. & Cutan. Rev.*, Dec., 1926) estimates the frequency of gonorrhea in pregnant women as 22 per cent and that of syphilis as 3 per cent. One cannot rely upon laboratory findings for the diagnosis because a chronic gonorrheal discharge is often mistaken for leukorrhea. The patient should be examined several times during pregnancy; a discharge not due to chronic gonorrhea will clear up, with proper douching, in a few days. If it is caused by gonorrhea, it will return if the treatment is neglected.

His best results were obtained by vaginal douches of bichlorid of mercury, 1 : 4000, at first twice daily, then once daily. After the discharge has ceased the douches are given every other day, then twice a week, but the patient should remain under observation until delivery.

Ophthalmia neonatorum is very rare with this treatment; 1 per cent silver

nitrate in the child's eyes was used. The entire body of the infant was then washed in a bath of 1 : 10,000 bichlorid of mercury and the child placed in a sterile blanket.

Syphilis.—The question of syphilis in pregnancy remains, as always, of great importance. In a paper in the *British Medical Journal,* November, 1923, Roberts states that in England and Wales 10 per cent of all marriages are complicated by syphilis and in these families three-quarters of the children are infected and one-third of the pregnancies end in fetal death. If syphilitic children are born alive, three-quarters die in the first year and the mortality later is very high.

Diagnosis.—In diagnosis the Wassermann reaction is of value but it is not absolutely conclusive. In seven-eighths of the cases a positive Wassermann in the mother means syphilis during pregnancy. So far as the period of pregnancy in which infection is most fatal for the child is concerned, if the mother becomes syphilitic before the end of the fifth month, the child does not escape; at the fifth or sixth month, there is 50 per cent chance for fetal mortality or fetal life, but if the mother contracts syphilis after the seventh month of pregnancy, the child escapes. The earlier in the pregnancy the mother is infected the more likely is the pregnancy to be interrupted. Multiparæ resist infection better than primiparæ.

Syphilitic pregnant women suffer considerably from headache, neuralgia, and insomnia, which are more or less relieved by appropriate treatment. During pregnancy, for primary and secondary signs, prompt treatment should be instituted. If a clinical diagnosis of syphilis can be made, no matter what the Wassermann reaction is, the mother should receive arsphenamin. If the disease is latent, neoarsphenamin should be given in weekly injections increasing to the twenty-eighth day, then ceasing for a week while other remedies are given. During this treatment the urine should be frequently examined to detect irritation of the kidneys. Pain should be avoided and the patient's teeth should be cared for. The dosage in this treatment is 0.03 grain in the beginning increased to 0.06 grain, the treatment stopping for a week every three or four weeks. During the entire time of treatment 1 grain of mercury in chalk should be taken three times daily, and from 7 to 10 grains of potassium iodid t.i.d. from the tenth to the twelfth and twenty-sixth to the twenty-eighth week.

The Wassermann reaction was studied at the Edinburgh Royal Maternity Hospital; Browne (*Journ. Obst. & Gynæc. Brit. Emp.*, 1923, 4) found that in old syphilis the only evidence obtainable during pregnancy was the Wassermann reaction in 75 per cent of cases. Primiparæ did not resist infection as well as multiparæ, which has been shown by other observers.

There was no definite evidence that the Wassermann reaction is changed to any great degree by pregnancy. In a suspicious case both parents should be under observation during pregnancy with repeated Wassermann tests in the mother.

Klaften (*Zentralbl. f. Gynäk.*, 1924, 35) reports the results of his studies in the diagnosis of syphilis in parturient women by examining retroplacental blood at the time of labor. This was found to be a more delicate and certain test than the Wassermann reaction in the blood taken from a vein. Extract

diluted 8 to 12 times was used; 0.4 c.c. of retroplacental blood-serum was mixed with 1 c.c. (1 to 11) with 2 per cent salt solution and the mixture was warmed. In from four to twenty-four hours the fluid became clotted and cloudy. This was produced by the increase in the colloids and the proteid bodies of the blood-serum. By this accurate chemical observation a considerable number of cases of latent syphilis were discovered which otherwise would not have been detected.

McCord (*Am. Journ. Obst.*, Feb., 1927) gives the results of his observations in 500 pregnant women. The Wassermann reaction was used, the first test made at the first visit, the second on admission to the hospital, and in most cases during the first stage of labor. In some the examination was made during the puerperal period.

In the 500 women the two reactions taken at the first visit and on admission to the hospital, agreed in 87 per cent of the cases. In 39 cases the reaction at the first visit was positive and that in labor was negative, and among these 31 had received treatment for syphilis; if these are deducted the reaction agreed in 93 per cent. The reaction at the first visit was negative and the one at labor positive in 26 cases. Treatment apparently failed in 35 cases in which the Wassermann remained positive. The maternal and cord Wassermann tests were positive in only 16 cases.

In cases of abortion in early pregnancy, about 10 per cent gave a positive serum reaction. It is important to note whether syphilis is present in a parturient woman before delivery, especially in recognizing accurately the cause of fetal death should the child perish during a difficult delivery. The operation may be blamed for the death, but if the mother was syphilitic during pregnancy, autopsy will frequently show that the child was syphilitic and that the real cause of infant death was syphilis in the mother; also the presence of syphilis may complicate her recovery from abdominal section.

Effect of Treatment on Congenital Syphilis.—The treatment of parturient patients by sera and such remedies as arsphenamin must not be employed without reference to the interests of the child. It is known that the treatment of syphilis in the mother may influence the child unfavorably in some cases. That vaccines may injure the child when given to the mother is shown by Fischer (*Zentralbl. f. Gynäk.*, 1924, 40), who gave a vaccine to a pregnant woman suffering from pyelitis. On the sixth day afterward she had a severe urticaria eruption on the thighs and buttocks, the throat and tonsils were red and swollen, the cervical glands enlarged, and the throat became so swollen that it was feared tracheotomy would be necessary. The eruption spread over the whole body, spontaneous labor developed, and abundant hemorrhages were found in the body of the dead child. There was no evidence of syphilis.

He cites other cases of pyelitis where the use of vaccines was followed by fetal death.

Belding (*Am. Journ. Obst.*, 1926, 12:839) gives the statistics of 190 women with positive Wassermann reactions, among whom were 40 treated for syphilis during pregnancy. Clinical studies showed that a large proportion of children born of untreated syphilitic women do not develop syphilis. The

question of transmission is influenced by the duration and type of the disease in the mother, and her power of resistance, and there seems to be, in some degree, a question of chance.

In active syphilis it is necessary to use treatment to prevent infection of the child. There is always the possibility of transmission in old syphilis, so every pregnant patient who is syphilitic should receive treatment. This should begin early and be continued so long as pregnancy exists. The children of syphilitic women who were not treated in pregnancy showed no evidence of early congenital syphilis in the majority of cases; 61.3 per cent had living, apparently healthy children. When the patient had no clinical signs of syphilis at the time of her pregnancy, and her syphilitic infection had occurred five years previously, the child was usually healthy.

The results in a group of women who were treated during pregnancy for syphilis are also given; 67.5 per cent of the children of these patients were born living and apparently well.

Pregnancy produces increased immunity to syphilis but it is not safe to rely absolutely upon this. If syphilis is diagnosticated in the pregnant woman, the mother should invariably receive treatment.

In the Negro.—McCord (*Am. Journ. Obst.*, March, 1927) has observed the results of pregnancy in 300 Negro women having a four-plus Wassermann; 19 per cent of the children were stillborn, 17 children in the 300 cases died in the hospital. Abortion occurred among 10 per cent of the mothers. There was a total of 34 per cent of pregnancies which ended disastrously. The greater number of women who had stillbirths had had no antisyphilitic treatment. Of the 29 who aborted, 27 had received no treatment. The mothers of 13 out of the 17 infants dying in the hospital had received no prenatal treatment. No severe reaction followed the treatment and the writer is confident that there need be no hesitation in employing it freely. He summarizes his 300 with 300 cases previously reported, making 600 in all. He finds that 35 per cent of the births were premature in these syphilitic women and 33 per cent were with fetal death. There was hypertension in 25 per cent of the mothers and the placenta was positive for syphilis in 43.5 per cent of 320 cases examined.

Histological study of the placenta shows the benefit of treatment.

Sixty-six of the babies who died were studied by the X-ray and in 52 per cent the characteristic lesions of syphilis were found. Section was taken from the liver and examined by the direct field method, in 68 cases. In 67 per cent of these the organism of syphilis was demonstrated. Among the mothers there were two deaths, one of puerperal septic peritonitis, the other of eclampsia and lobar pneumonia.

The Incidence of Syphilis among Pregnant Negro Women.—Wilson (*Am. Journ. Obst. & Gynec.*, Aug., 1929, p. 215) states that Negro parturient women are alleged to have a high incidence of syphilis. The value of the Wassermann during pregnancy is questionable. Out of 3631 cases there resulted an incidence of 7.18 per cent as compared with the higher percentages of others. In a large number of cases there is little difference between syphilitic and non-syphilitic women as to the final outcome of the pregnancy.

A Study of Two Hundred Autopsies Made on Syphilitic Fetuses.—McCord (*Am. Journ. Obst. & Gynec.*, Oct., 1929, p. 597) reports from a study of 200 autopsies that syphilis is only transmitted to the baby by way of the placenta. The lesions of long bones, as demonstrated by Roentgen rays, are pathognomonic of fetal syphilis. The organisms of syphilis fail to stain in about 12 to 15 per cent of cases.

A mature placenta, with the histology of syphilis, is rarely found without other positive evidences. Even moderate antisyphilitic treatment, during pregnancy, will save a majority of the babies. Mild arsenical and mercurial treatments have no injurious effect upon pregnant women.

Pyelitis.—Pyelitis still remains a not infrequent, annoying, and sometimes dangerous complication of pregnancy. Klaften (*Zentralbl. f. Gynäk.*, 1924, 32) divides his cases into three groups: (1) Those who recovered apparently perfectly; 50 per cent of his patients were in this class. (2) The patient recovered so far as symptoms of illness were concerned but the urine remained cloudy containing leukocytes and Bacillus coli communis in pure culture. This condition persisted indefinitely in some cases. (3) In the third group the patient passed through pregnancy and labor and seemed to improve very rapidly, but the urine persisted in an abnormal condition indefinitely, containing colon bacilli and other germs. These patients seemed to have latent pyelitis as part of their general condition. Such patients may be called "carriers," as the urine is distinctly infectious.

This disease occurs about equally in primiparæ and multiparæ and diagnosis is sometimes difficult because the signs and symptoms, when the pyelitis is in the right kidney, resemble those of appendicitis, and cases are cited in which pyelitis very closely simulated typhoid infection. In differential diagnosis it is useful to examine the vaginal secretions where the colon bacillus is found in great numbers and various forms. They are usually absent in the upper third of the vagina and under ordinary circumstances the colon bacillus is destroyed by the normal vaginal secretion in forty-eight hours. Where, however, the vaginal secretion becomes pathological, the colon bacilli survive ten days or longer. Vaginal douches of lactic acid are often useful in these cases.

So far as the cause of the condition is concerned constipation and obstruction of the ureters are the principal factors. It is rare to find cystitis and pyelitis combined in these patients. Mild cases of this sort yield readily to treatment but severe cases are difficult to manage and dangerous. Urotropin is useful, and fatal cases result from suppurating infarcts in the kidneys. It must also be remembered that some of these cases date their pyelitis to an attack of this condition in childhood, which was very probably not detected; after severe scarlatina or measles the child may be left with a chronic condition which, so long as the general health is good, escapes observation.

The majority of obstetricians have treated these cases conservatively: Rest in bed, careful diet, urotropin, whose action is increased, it is thought, by giving dilute hydrochloric acid at the same time, vaginal douches of lactic acid, and mild purgation were the remedies most employed. Irrigation of the pelvis of the kidney is valuable in severe cases, but without other treatment it will

not relieve the severe cases. Fifty per cent of these patients make a complete recovery with judicious treatment.

Prognosis.—Naujoks (*Zentralbl. f. Gynäk.*, 1924, 47) contributed a paper upon this subject from observations made in Winter's Clinic at Königsberg. His material comprised about 100 cases occurring during twenty years in the hospital of the clinic. In these patients 21 had been thoroughly examined after their recovery from the disease, functional tests had been made of the activity of the kidneys and every effort taken to secure accurate observation. Of the 21 there were 8 who were subjectively and objectively well. They felt well, examination of the urine showed no abnormality, and the urine taken from the bladder and from the ureters also was sterile. Four patients complained of pain in the back and in the sides and other vague sensations although the urine was free from bacteria, nor was there evidence of disease in the bladder or ureters. In three of the cases a pelvic condition was found to account for the pain and the fourth suffered from dysmenorrhea. There was no evidence that these patients had not recovered from the pyelitis and their complaints indicate how difficult it is to always arrive at a correct diagnosis in these cases.

Of the 21 then, 12 could be taken as in every way well. Of these 12, 10 had had the colon bacillus, one of the proteus, and in one the exact nature of the infecting germ was uncertain. There were 9 patients examined after recovery, of whom 8 had not made a good recovery. In 7 the colon bacillus was found in the pelvis of the kidney, in one, thirteen years after the original illness, there was a mixed infection of the pelvis of the kidney and symptoms of kidney stone. There was usually chronic cystitis in these cases. One patient, twelve years after she had passed through a pregnancy and pyelitis, had a spontaneous premature labor and in a subsequent pregnancy had pernicious nausea which required interruption of pregnancy at four months and was followed by extensive purulent inflammation which caused death. There were 37 cases where pyelitis had been observed from two to thirty years previously and of these one had had a return, 23 remained in good health, 8 had not recovered from the original attack and 5 could not be traced.

It is customary in this clinic to treat pyelitis during pregnancy in a very conservative manner. In these cases catheterization of the ureter was performed 14 times, in but one only was the pelvis of the kidney irrigated, and in only one case was therapeutic abortion practiced. Reliance was placed upon rest, hygiene, warm applications, and those substances, such as hexamethylenamin, which seemed to disinfect the urine and this, the author believes, is the safer form of treatment.

Eclampsia.—*Etiology.*—Carloni and Ferrari (*Ann. di ostet.*, Jan., 1927), from 134 cases of eclampsia, found it three times more common in primiparæ than in multiparæ. Age periods 15 to 20 and 35 to 45 show the greatest number of cases. Patients having a normal menstruation had eclampsia in 1 per cent, those with genital hypofunction, 1.5 per cent, and those with hyperfunction such as profuse menstruation about 0.4 per cent. The patients who have shown well-marked functional disturbance in early pregnancy are more apt to develop eclampsia; where this has been absent, and when eclampsia comes on, it is usually sudden without prodromal symptoms. One-

fifth of these cases were postpartum eclampsia. There were no cases of eclampsia before labor.

Capillary Circulation.—Heynemann (*Zentralbl. f. Gynäk.*, Feb. 26, 1927) in five years study has found that the capillary microscope is of value in eclampsia or preëclamptic states. The capillary circulation shows, quickly and rhythmically, alterations in flow and stasis, while repeated stases are observed which may last several minutes. The latter occur after serious operative intervention.

The writer is not at all positive regarding the diagnostic value of capillary microscopic observation in eclampsia, because many of the things seen in eclampsia are also found in healthy patients. The value of the method is chiefly prognostic and provides an index of the success or failure of treatment. If capillary circulation has temporarily improved after venesection and then fails, it may be necessary to terminate the pregnancy. Where there is alternating streaming and stasis after bleeding, narcotics are indicated, and where there is prolonged stasis, tonics and stimulants.

The writer does not believe capillary conditions are the cause of eclampsia.

Triplets, Cesarean Section and Recovery of Mother and Children.—Roberts (*Brit. Med. Journ.*, July 2, 1927) describes the case of a primipara with enormously distended abdomen, edema and unconsciousness. There was a very large percentage of albumin present, and when seen she had had several severe convulsions. The pulse was rapid, the tension very high. Temperature 102.8° F. Twins with hydramnion was the diagnosis. The fetal heart sounds were normal, the cervix closed and no indication of labor.

Section was done and anesthesia was not needed because the coma was so deep. There was considerable hydramnion and a large placenta was anterior. On opening the membranes, two good-sized female children were extracted, and a third, a male, was found in the lower uterine segment with its placenta.

The patient made a gradual recovery, regaining consciousness in about twelve to eighteen hours. There were no more convulsions. The infants did well and were nursed and partially bottle fed. Several years after delivery, mother and children were in good health.

Metabolism and Development of Eclampsia.—This is studied by Monahert (*Arch. f. Gynaek.*, 1923, 119: 407). His paper is devoted largely to the question of oxidation. Carbohydrates are less oxidized in the pregnant than in the non-pregnant, so are protein substances. While as regards the fetus the absorption of oxygen is increased and the passage of carbon dioxid is less in proportion to the quantity taken. Of the nitrogenous substances taken by the pregnant woman there is less oxidation than in the non-pregnant. As toxemia increases, so does carbon dioxid in direct ratio to the severity of the complication. Acid compounds are formed and if the kidneys become considerably affected the complication is more severe. The injection of adrenalin in pregnant patients increases metabolism but less than in the non-pregnant; there was a secondary increase followed by a decided drop in the non-pregnant. Less oxygen is absorbed and less carbon dioxid excreted after adrenalin is taken. There is some relation between blood-pressure and oxidation in the body of the pregnant woman; there seems to be retention in the venous blood in the preg-

nant woman of carbon dioxid resulting from some degree of acidosis. In toxemic patients the alkalescence of the blood is often materially lessened; while this process has to do with the growth of the fetus it often indicates an abnormal condition of the mother. In 57 per cent of patients suffering from derangement in function of the thyroid, this condition could be demonstrated by chemical studies in the metabolism.

Knaus (*Arch. f. Gynaek.*, 1923, 119:450) reviews the function of the thyroid in pregnancy by calling attention to hypothyroidism with lessened secretion, accumulation of partially formed substances, high content of globulin poor in iodin, with lessened quality of cellular thyroid globulin rich in iodin. In contrast to this is hyperthyroidism having increased secretion, an accumulation of imperfectly formed material diminished in globulin and its iodin, and increase of iodin which contains globulin showing a lack of colloid material. This lack of colloid substances is invariably present when the thyroid is deranged in its action in pregnancy; although pregnancy causes the colloid to increase in quantity, its content is poor in iodin and so its function of efficiency is lessened. During the last half of pregnancy the mother stores up nitrogen which has been estimated as four times the quantity absolutely necessary for the growth of the fetus. Undoubtedly the development of the breasts is concerned in this. When myxedema and cretinism develop in pregnancy, hypothyroidism becomes extreme. When pregnancy develops in women from whom the greater part of the thyroid has been removed, a condition analogous to tetany often develops.

Treatment.—The treatment of eclampsia is the source of unending discussion and gradually material of interest is acquired from the vast accounts which this serious complication of pregnancy produces. The Stroganoff treatment remains a subject of frequent discussion.

At a meeting of the Section of Obstetrics and Gynecology of the Royal Society of Medicine, London, Stroganoff presented a paper upon this subject (*Brit. Med. Journ.*, July 12, 1924). He alludes to the high mortality produced by eclampsia, then claims that a universal application of his method of treatment would reduce this at least one-half. His method was first employed in 1897 in 57 cases without a death. In 1918, 2208 cases treated by this method, collected from the literature, showed a maternal mortality of 9.8 per cent. In 1924, 3302 cases had been so treated with a mortality of 10.08 per cent. In his own observation and treatment, in ten years there had been 6 deaths, 2.4 per cent, and of these deaths three were from other causes. Not only was death made less common, but the patients were less severely ill and complications were greatly reduced. Psychic disturbances occurred in only 1.6 per cent; fetal mortality was reduced to 14.3 per cent.

He repeated the details of his treatment as follows: The removal of all sources of possible irritation, a darkened room, oxygen for asphyxia, careful protection during the convulsion, ⅙ grain morphin hypodermically injected, followed one hour later by 30 grains chloral hydrate by mouth or rectum. Two hours later the morphin is repeated, four hours after this the chloral, 20 grains of chloral are given thirteen and twenty-one hours after the beginning of the treatment. If the child is still undelivered at the end of twenty-four hours,

14 to 20 grains of chloral should be given three times a day. If, in spite of this, convulsions occur, 400 c.c. of blood should be taken from a vein. If labor comes on, delivery of the child should be aided. The functions of the body should be promoted as far as possible. Hot bottles should be placed about the patient and warm fluids should be taken freely. The patient is kept on her right side, the mouth is carefully cleansed and oxygen is given for asphyxia. If the pulse reaches 110 or more, digitalis is administered with camphor or caffein. Bleeding was practiced in 10 per cent of cases and then only if three or more fits occurred after the treatment was commenced. If it was thought that the patient could be delivered within two hours, bleeding was not practiced.

The treatment of eclampsia is always a subject of debate. Zweifel (*Ztschr. f. Geburtsh. u. Gynäk.*, 1923, 39: 1521) reviews the literature and summarizes his clinical experience, and like others he urges the earliest possible detection and treatment of conditions threatening eclampsia. He would first of all introduce fluid into the body of such patients, and if they are unconscious in toxemia, it is injected into the bowel or subcutaneously or with the help of the stomach-tube introduced into the stomach. He would wash out the stomach thoroughly and then leave in the stomach a considerable quantity of lemon juice or very dilute vinegar and water. Eight hours after this he would thoroughly irrigate the stomach with normal salt solution and he would also use normal salt solution subcutaneously if not retained in the stomach. He would never use very large quantities lest he might encourage the development of edema.

As regards interfering with pregnancy, expectancy is the better treatment. In observing 317 eclamptic cases, there were 27 who died, 4 of these had lesions in the lung which indicated that too much fluid had been given, 3 of these patients got pneumonia because the contents of the stomach entered the bronchial tubes. Of the fatal cases, 15 showed extensive blood disintegration, 4 died of cerebral apoplexy, and there was one patient who before admission to hospital gave indication of threatened collapse.

In the very beginning of the treatment he has seen excellent results from prompt bleeding; where cerebral apoplexy is threatened, he has obtained the best results by rapid cesarean section and bleeding. In estimating the mortality, if those cases are eliminated which were favorable for treatment in the early stages had they been brought to hospital, the mortality is reduced to 3 per cent; but it must be understood that such a low mortality is not possible unless cases are recognized early and treated efficiently. The difference between indiscriminate and rapid delivery and more conservative methods is shown by fetal mortality of 36 per cent following rapid delivery, and 18.8 per cent where more conservative methods were adopted. If delivery should be practiced, abdominal cesarean section is best. He has seen for some time no cases where decapsulation of the kidneys was indicated, although previously he had seen good results from this operation. He believes it to be important that the stomach and mouth contents, of unconscious patients, do not enter the bronchial tubes.

Stroganoff's method is always interesting in comparison with others. Dur-

ing a recent visit to Edinburgh he stated (*Journ. Obst. & Gynæc. Brit. Emp.*, 1923, 30: 1), going back to 1913 for statistics, that there were in Europe that year fourteen million confinements with a mortality in 10,000 varying from 3.5 per cent to 5.4 per cent. If the average of four mothers in each 10,000 is taken, 5600 mothers die in England every year of eclampsia and 8400 children. He estimates that 6000 children die yearly in the United States from that cause. In both countries 24,000 mothers and children are lost each year from the toxemia of gestation. New Zealand has apparently the highest mortality, 25 per cent. Stroganoff claims for his method of treatment a maternal mortality ranging from 4.7 to 23.3 per cent. He has several times reported series of cases with a mortality from 5 to 6.6 per cent. He is positive in believing that maternal mortality can be reduced to 1 or 2 per cent by his methods of treatment. He agrees with others that surgical interference is rarely indicated.

As is known, his method consists in removing all irritation, secluding the patient in a dark and quiet room, using chloral hydrate, morphin, and chloroform, and giving milk and salt solution. The patient's treatment is varied somewhat as eclampsia develops before labor, after labor, or during labor. Where the question of weakening the heart's action by chloral is discussed, he believes that from 1 to 1.5 gm. of chloral hydrate is less depressing to the heart and centers of respiration than the eclamptic convulsion. If patients pass through eclampsia without delivery, the treatment by narcotics is continued, to prevent, if it can readily be done, the appearance of labor; but should labor develop it is assisted in the least violent manner possible. He is often obliged to use stimulation such as digitalis. The mouth and nose must be cleansed frequently and carefully, oxygen administered, pure air, and every effort made to secure successful respiration. He applies heat by hot-water bottles around the patient. If three convulsions occur he performs bleeding, taking 400 c.c. of blood. He estimates the amount of blood lost in delivery in normal cases as 800 c.c. and in view of this fact he believes that caution should be exercised in bleeding in eclampsia. The patient is disturbed as little as possible, the stomach and intestines are not molested, the patient is turned from side to side in bed frequently, remaining longer on the right side. If bleeding is practiced, dry cupping is not necessary. He quotes the statistics of Russian hospitals: 78 cases without mortality in one, 152 with 4 deaths in another, 88 cases without a bad result in another, and taking all the favorable cases, he collected 166 without mortality. Where death did occur, extensive degeneration of the viscera was found. He claims 1.07 per cent maternal mortality with fetal mortality of 5 per cent. The number of convulsions was reduced to 1.3 per cent.

Williams (*Journ. Am. Med. Assoc.*, 1927, 88) found that his mortality in treatment of actual eclampsia by immediate delivery with anesthesia, bleeding, sweating, purgation and use of morphin and the profuse administration of fluids, was 24.89 per cent in 85 cases. He later employed a more conservative method which consisted in the use of morphia, glucose, chloral hydrates, with delivery by the least possible violence. The result was a considerable improve-

ment in statistics, mortality of 13.3 per cent falling as low as 1 per cent in mild cases, and rising to 21.3 in severe cases.

As regards diagnosis, with the exception of the nephritic type, neither pathological study nor chemical analysis of the blood and urine give any clew to the etiology of eclampsia. Some chemical substance from an unknown site is apparently the origin.

Hochenbichler (*Zentralbl. f. Gynäk.*, Feb. 19, 1927) gives the results of treatment of eclampsia in 275 cases in the hospital in Vienna. Prior to the middle of 1922, the mortality was from 15 to 20 per cent. In July, 1922, the writer began the treatment of such patients with ultraviolet rays, using the quartz lamp; 62 women had been admitted since that time in eclampsia, of whom 37 have been treated with ultraviolet rays with a mortality of 25.4 per cent. In 10 cases without mortality, the light was the only treatment, but in the remaining 27 it was combined with morphia, luminal or chloral or with venesection and intravenous or subcutaneous injections of saline or Ringer's solution. Labor was induced, forceps applied or craniotomy performed, as indicated.

In using the light, ten-minute exposure of the whole body, five minutes on each side was made, the face, breasts and genital organs alone being protected by a gauze covering. The treatment was given as soon as possible after admission, under light ether narcosis and with the lamp 1 M. distance from the patient. Further exposure with the lamp 1½ M., was given five hours after the first. This was repeated the next day, not more than two exposures being given in twenty-four hours. It was interesting to observe that the blood-pressure instantly fell after the first exposure, sometimes from 200 to 59 mm. Hg, owing to the dilatation of the blood-vessels on the surface of the body. This greatly relieved the heart and lungs and also stimulated the general metabolism.

At a meeting of the Section of Obstetrics of the Royal Academy of Medicine in Ireland, Cassidy (*Brit. Med. Journ.*, April 2, 1927) reported 3 cases of pernicious vomiting of pregnancy. He called attention to the necessity for distinguishing this condition from those diseases of the gastro-intestinal tract which cause vomiting, from remote diseased conditions of the spinal cord or brain, meningitis, and infection of the pelvis of the kidney. He speaks of the preëclamptic state as different from the condition producing vomiting in early pregnancy. Under the title of "pernicious vomiting of gestation" he would include only those cases where vomiting and pregnancy are synchronous, and where no cause other than pregnancy could be found to account for the vomiting. He believes that this occurs usually between the eighth and sixteenth weeks, more often in primiparæ than in multiparæ, and it has been observed that where a male child is present vomiting was more apt to occur than if the child was female.

It is evident that mental causes have much to do with some cases, and yet dogs and cats in the pregnant condition sometimes suffer from pernicious vomiting. Some authors are inclined to find the cause of this condition in a disturbance of the endocrine system or deficiency in the corpus luteum. This body is supposed by some to counteract the effect of poisons produced by the

villi of the chorion. Pinard has shown that pernicious nausea of gestation happens in connection with vesicular mole as frequently as 19 in 27 cases. Others have demonstrated in these cases increase in bilirubin over the normal quantity in the blood.

Where disease or disturbance of the nervous system or excessive reflex causes the pernicious nausea of gestation, there is intense thirst, weakness and emaciation, but these conditions disappear as pregnancy advances; on the other hand, when toxemia was present, the pulse rate increased although the patient was at rest in bed. There was a dry and furred tongue; dryness of the skin; diminished quantity of urine, which contained albumin, casts and acetone; insomnia; coma, and delirium.

The 3 cases reported by the writer recovered, although each was treated in a somewhat different manner.

In discussion, Madill had tried thyroid extract in these cases without success. He had observed one case in which corpus luteum had no effect, but the patient improved when given some of her own blood by injection. Another patient had been benefited by potassium bromid. It is usually thought that if starvation through elimination and rectal enemata did not stop the vomiting, pregnancy should be ended, yet this rule is far from being a universal one.

In further discussion the importance of the mental and nervous elements was emphasized. The value of irrigation of the stomach when gently performed was reported, especially if purgatives were left in the stomach after the irrigation. Some urged that all suggestions of vomiting be removed and that the patient be given a full diet free from fat. There was considerable emphasis placed upon the opinion that most of these cases are neurotic in origin and that the results of very different treatment would indicate that this is the case. Good results have been reported by the use of insulin and glucose, indicating that acidosis had been the cause of the vomiting in these patients.

Eclampsia without Convulsions Treated by Insulin.—Thalhimer (*Am. Journ. Obst. & Gynec.*, 1926, 12:369) reports the case of a patient whose previous pregnancy and labor had been normal. In the pregnancy under consideration she rapidly developed coma, high blood-sugar, acidosis, retention of non-protein nitrogen in the blood, nephritis and death of the fetus in the uterus near term. The urine showed a large sugar reaction, acetone, diacetic acid, abundant albumin, hyaline and finely granular casts.

Five per cent glucose with insulin was given intravenously, 140 units of insulin in nine hours were given on one occasion. Induction of labor was practiced by packing the cervix with gauze and delivery occurred in seven and one-half hours. Examination of the fetus and placenta failed to reveal pathological changes. After the second day following delivery, insulin was given in 20 unit doses every six hours for eight days. The patient's coma disappeared rapidly on the third day. On the ninth day after delivery the insulin was stopped.

Magnesium Sulphate.—Lazard (*Am. Journ. Obst.*, June, 1927) found that in therapeutic doses, magnesium sulphate intravenously does no harm to the blood or to the liver, and in active eclampsia is of use, as it seems to have a dehydrating effect upon the brain. In prophylaxis it is often useful.

Parathyroid Extract in the Treatment of Eclampsia and Allied Conditions.—López (*Surg., Gynec & Obst.*, Nov., 1929, p. 689) states that a few units of parathyroid extract initiated diuresis, usually beginning at the second or third day after injection, which increased daily for four or five days until the disappearance of edema. In 2 cases there was a decrease of blood-pressure amounting to 40 mm. Hg. The subjective signs, dizziness, headaches, disturbance of vision and muscular cramps, disappeared in the same ratio as the edema.

In the cases of the patients who had convulsions and other evidences of tetany, the convulsions ceased shortly after the first injection.

In no case was labor started by the injections, and in one patient in labor, the pains did not return while the treatment lasted.

In patients with a live fetus, the fetal heart sounds suffered no change and continued in a normal way until labor started.

The calcium in the blood-serum did not show an appreciable increase after the use of parathyroid extract.

The dosage of parathyroid extract used was of a tentative nature. The maximum and minimum dosage will evidently be definitely determined by more extensive research.

After-History.—This subject of particular interest was studied by Nevermann (*Arch. f. Gynaek.*, Jan. 31, 1927). He investigated the histories of 60 patients who had suffered from eclampsia, from one to twenty-three years previously. While these patients were not disabled they had inconvenient conditions traceable to the eclampsia. Thirteen had severe headache, 12 poor memory.

The writer believes that these conditions resulted from the minute hemorrhages and thrombosis found in the brain during eclampsia. Four had visual defects, 5 had swelling of the legs, 8 had high blood-pressure, 140 to 170 mm. Hg; only 3 had albumin and cylindrical casts in the urine; of these 2 were cases of recurrent toxic eclampsia and one very slight albuminuria within one year after an eclamptic illness. In none of these patients could a transition to chronic nephritis be demonstrated.

If a patient suffering from eclampsia recovers and soon after dies of some other condition, at autopsy the kidneys will be found in an abnormal state, but this condition would have cleared up had the patient survived. In a total of 300 patients who had survived eclampsia, but 60 showed any after results.

The Relation of Maternal Pelvic Disease to Deformities in the Newborn.—Grerstein and Murphy (*Surg., Gynec. & Obst.*, Dec., 1929, p. 804) concluded from these studies that uterine or ovarian disease apparently has no relation to the production of deformities in the newborn child.

Inflammation of the Uterine Adnexa.—While comparatively rare, this is frequently a serious condition. Patients with chronic inflammation of the tubes and ovaries are usually sterile. In other cases, however, there has been partial recovery and then pregnancy supervenes. Some of these have tubal pregnancy, others have pregnancy with more or less active inflammation of the fallopian tubes, varying in severity. These cases usually result from gonorrhea. A hematogenic infection with the pregnancy is often located in

the corpus luteum and the primary focus is frequently in the tonsils or some other part of the organism abounding in bacteria. Appendicitis during pregnancy may cause infection of the adjacent fallopian tube and result in local peritonitis. From the anatomy of pregnancy, the ascending form of infection in the fallopian tube must be rare; it can develop only during the early months before the deciduous membranes have joined. These cases arise from gonorrhea and often end in abortion. Attempts at criminal abortion frequently result in a purulent salpingitis. In these cases an abscess may rupture during pregnancy and be followed by a rapidly fatal peritonitis and sepsis.

Foreign Bodies in the Pregnant Uterus.—There are abundant reports of cases in which foreign bodies have been introduced into the uterus to interrupt pregnancy and have perforated the uterus and been removed from the abdomen.

In the *British Medical Journal,* March 19, 1927, Lacey describes an interesting case of a patient aged 28 who had previously given birth to a child with instrumental assistance, and at the time when she was seen, had been without menstruation for two months.

Her story was that she felt a lump in the vagina and had attempted to push it back with a crochet hook which disappeared. During the night following she had pain in the lower abdomen.

When brought to the hospital two days later there was a slight discharge of blood from the vagina, temperature 100.6° F., pulse 96. The cervix was closed, the uterus enlarged to about four months pregnancy. An X-ray examination revealed a foreign body, probably in the uterus, and no fetal parts. On the following day, patient aborted, temperature 101.6° F., pulse 108. Following this there developed diffuse abdominal pain with tenderness and rigidity and slight distention. The abdomen was opened and a small quantity of odorless pus was found in the abdominal cavity, the hook was protruding through the posterior wall of the uterus, firmly embedded against the sacrum. It was readily removed, drainage was inserted and the patient made an uninterrupted recovery.

In the discussion a case was reported in which the operator had removed two crochet hooks from the abdomen, one from the region of the right kidney, the other from Douglas' pouch. In neither of these cases was pregnancy present, although it was suspected.

In the experience of the reviewer, a patient presented herself at the clinic stating that she had given birth to several children and believed herself then to be pregnant. She had attempted to pass a glass female catheter into the cervix, but the catheter had disappeared. She came to the clinic because she suffered from slight abdominal pain.

On examination a foreign body resembling a catheter could be felt high up in Douglas' pouch. On abdominal section the catheter was found among the intestines above the promontory of the sacrum; the intestine was not wounded and the catheter was readily removed. The patient's pregnancy went on to term with a successful termination. It seems probable that the catheter had passed through the posterior vaginal wall at its junction with the cervix.

When an infection or injury is not severe, pregnant patients may recover

without abortion. Very rarely the pregnancy causes a previous condition of inflammation in the pelvic organs to disappear. If adhesions are present in the pelvis, the result of pregnancy may be disastrous. Labor may rupture an abscess causing infection.

Schmid (*Arch. f. Gynaek.*, 1923, 120:31) reports 4 fatal cases complicating pregnancy where foci of infection in the pelvis ruptured.

Chorionepithelioma.—There are a number of reports showing the development of primary chorionepithelioma of the broad ligament complicating pregnancy. The disease may also attack the ovary and a diagnosis cannot be positively made until tissue can be removed at operation. All patients in whom, during or immediately after the pregnancy, suspicious symptoms arise, calling attention to the possibility of this condition, should be subjected to thorough study and operation for the examination of tissues. Realizing that the condition is hopeless if pronounced, no delay should be practiced in suspicious cases. It must be remembered that this condition develops only after or during pregnancy, and that it is one of the most dangerous results of pregnancy.

That chorionepithelioma of the ovary is rare, is shown by Dougal (*Journ. Obst. & Gynæc. Brit. Emp.*, 1924, 31:3) who, with his own, collected, in the literature, 11 cases.

An interesting case of primary chorionepithelioma of the ovary is reported by Dougal (*Journ. Obst. & Gynæc. Brit. Emp.*, 1924, 31). The patient was aged 29, in her third pregnancy, and had been in good health until she had a fainting attack and fell, injuring her head, and after being in bed she commenced to have a dark hemorrhagic discharge. For a number of years she had had pain at times in the left lower abdomen. The irregular vaginal bleeding continued about nine months, when menstruation ceased for five and one-half months. At times she had vomiting and the abdominal pain had grown worse. On entering the hospital she was thin, slightly jaundiced, normal temperature, pulse about 100. In the abdomen was a very tense tender tumor which felt like a pregnant uterus with concealed hemorrhage. On internal examination there was an elastic swelling in the pelvic cavity which pushed the uterus forward and was continuous with the abdominal tumor. At operation the uterus was extirpated and both appendages removed, and there was a large tumor in the lower abdomen pushing the uterus forward and to the right, with the omentum adhering to the upper surface of the uterus containing vessels of supply. The tumor had grown firmly into the pelvis in the left broad ligament and pushed the rectum over toward the right; the left fallopian tube and ovary could not be seen. The uterus was soft and with the right fallopian tube formed the anterior surface of the tumor. The ovary was large, cystic, and adherent. The tumor was shelled out very carefully and the uterus and tumor removed from before backward and a small dark red nodule was removed from the wall of the rectum. The patient made a good recovery, but returned a week after leaving the hospital with a recurrence of the growth as large as a small orange. This was near the rectum and high up in the pelvis on the left side. On examining the specimen removed, the tumor was a chorionepithelioma of the ovary. There were areas

of hemorrhage and masses of Langhans' cells and syncytium and some portions of the tumor showed necrosis and degeneration of the villi.

With his own, the writer collected 11 cases, and also 5 where the broad ligament was the site of primary chorionepithelioma. Most of these patients were less than 31 years of age, they had had pregnancy usually one or two years before coming under observation. The symptoms were irregular bleeding for a prolonged time and after this cessation of menstruation with constant pain in the abdomen.

Of the 10 cases besides the author's, 7 were fatal and 3 recovered.

Ileus.—In some respects resembling this is ileus, complicating pregnancy. These cases are seen in constipated pregnant patients, and a diagnosis is often most readily obtained by examination with the X-ray. This shows the intestines greatly distended and may indicate a point of occlusion. The diagnosis is made in the usual manner with operation promptly performed as the only efficient method of treating these cases.

Osteomalacia.—The question has often arisen as to whether osteomalacia is a disease congenital in the pregnant woman and only requiring pregnancy for its development, or whether it is acquired. In *Surgery, Gynecology and Obstetrics,* November, 1924, Stone reviews the literature of the subject, adding his own researches which go to show that the disease is acquired. The exact cause is at present unknown and there is no direct proof that endocrins are responsible for the disease. It is known that calcium is deficient in the blood of these patients and yet very little attention has been paid to the condition of the parathyroid in these cases. The two substances which seem to be lacking in the mother's nutrition are cod-liver oil and vitamin A.

Researches by Dragstedt call attention to the connection between the parathyroid and metabolism in pregnant animals.

Cancer of the stomach complicating pregnancy, while not a very frequent occurrence, is, like cancer at any time, exceedingly grave as a condition. Schmid (*Arch. f. Gynaek.*, 1924, Band 121, Heft 2) studied 44 cases, in 14 of which there was metastasis in the fallopian tubes. The children were lost in two-thirds of these cases and the writer could not trace a single permanent recovery in the mother. Obviously, if this condition can be recognized, immediate operation is imperative.

Experiments on animals seemed to indicate that the effort to inoculate pregnant animals with malignant growths is less successful than in the non-pregnant.

Cancer of Cervix.—*Radium Treatment.*—Cancer of the neck of the uterus, complicating pregnancy, would at present naturally suggest the use of radium or X-ray in treatment. Complete recovery is reported by Couvelier (*Gynéc. et obst.*, 1924, 2) in the seventh pregnancy of a woman aged 35. This patient came into labor, was delivered by section followed by supravaginal hysterectomy, and application of radium to the cancerous cervix by the abdominal route. The child was living when delivered. With the aid of a special trocar, four tubes of radium were placed in the cervix, one in front, one behind, one on the right and one on the left, each tube containing 10 mg. of radium element with a filter of 1 mm. of platinum. A bag was placed in Doug-

las' culdesac and also in the vesico-uterine pouch. Five days later the radium was removed from the abdomen and an application made in the vagina. The bags were gradually removed and the radium changed, its application being continued in all for eleven days and two-thirds of the radium being given by the abdominal route and one-third by the vaginal route. The patient made a complete recovery.

An interesting question arises as to childbearing after radium and X-ray treatment. If this treatment is employed, what are the chances of pregnancy afterward? Pemberton reviews the literature of the subject and reports cases from Graves' Clinic in Boston (*Surg., Gynec. & Obst.*, Aug., 1924). Observation shows that the action of radium and X-ray is essentially the same. The maturing graafian follicles are more susceptible to radiation than the primordial, and radiation causes degeneration and destruction of the ovum preventing the follicle from coming to maturity and leaving a small cyst. If the follicle is not advanced the ovum is destroyed and a single layer of granulosa cells remains. Such a dose of radium may be used that mature follicles are destroyed and the primordial follicles are not damaged. We have no information concerning the possibility of fertilization of the partially damaged ovum, whether this would result in the formation of a poorly developed child or a deformed child is not known. Women treated by irradiation have a larger percentage of abortions than those who are not treated. In cold-blooded animals radium and X-ray have produced malformations and lack of development. This has been observed in guinea-pigs and there are a few reports of similar cases in human beings.

In the Munich Clinic, Werner, in 1500 cases treated by radiation, traced 24 pregnancies with 13 well developed normal children, one premature, 9 abortions, and a hysterectomy for fibroids. Six of the pregnancies occurred in patients who had amenorrhea for several months after the treatment. All of these women showed diminished menstruation. There was one abortion to every two normal births. Others report normal children born whose mothers had been treated by radium. In one case where pregnancy was not recognized, radium was placed in the vagina for treatment and the child was small and backward in physical development when 3½ years old. A mother was X-rayed from the third to the sixth month of pregnancy on mistaken diagnosis of fibromyoma. The child was a microcephalic imbecile with atrophy and cloudiness of the lens of the eye. This same condition had been produced in animals by experiment.

Pemberton reports 4 cases of women who had been treated by radium and who afterward became pregnant. One had twins, one of whom died; the other survived and was well when 2½ years old. One had had no pregnancy before radiation but afterward gave birth to a normal child. One had eight children and after radium treatment became pregnant, with eclampsia and premature birth, the child living two days. Another was treated by radium for membranous dysmenorrhea. When pregnancy occurred she had an abortion at three months.

Reeb (*Gynécologie*, Jan., 1927) finds that further experience in the use of radium in treating cancer, should modify our views concerning the treatment

of cancer of the cervix in pregnant women. If the cancer is operable and the child not viable, radium should be applied to the cervix and after a few weeks, hysterectomy with careful dissection of cancerous tissue, should be performed. When the case is operable and the fetus is viable or near viability, radium should be used and four weeks afterward cesarean section and hysterectomy performed.

Where the cancer is so far advanced that operation cannot be done no matter what the stage of pregnancy may be, a sharp spoon should be used to remove the superficial portion of the cancer, followed by the application of radium. The patient should be kept in the best possible condition until as near term as possible, when cesarean section should be done followed by subtotal hysterectomy. Radium should be applied to the cervical remnant by the combined abdominal and vaginal route. If the results of this treatment are good and cancer grows less, the cervix may be removed.

When a physician does not see the cancerous patient until labor has developed, if the patient's condition justifies it, cesarean section should be performed and then the Wertheim operation. When the patient is very fat or in poor condition or it is doubtful whether the cancerous uterus can be removed, cesarean section should be done followed by supravaginal hysterectomy or the Porro operation. As soon as possible after this, radium should be applied by the abdomen and also the vagina, and if the tumor becomes smaller and more movable, a month later the cervix may be removed.

In Reeb's experience the Wertheim operation is more simple toward term than in the non-pregnant, for it is easier to isolate the large vessels and the ureters. It is more difficult to separate the bladder because the tissues are softer and more vascular; it is also difficult to appreciate the limits of the growth because of the general softening of the pelvic tissues.

Ramos (*Gynéc. et obst.*, Feb., 1927) has found that pregnancy makes carcinoma of the cervix more easily influenced by the gamma-rays of radium. He reports the case of a woman in her fourth pregnancy, found to have an early operable carcinoma of the cervix, at seven months. Two applications within the cervix of 0.1 cgm. radium bromid for twenty-four hours were made. The fetus died and six weeks later labor came on. The Wertheim operation was done, followed by X-ray treatment, and twelve months later the patient was well.

He reports also a second case of a multipara with operable cancer of the cervix, admitted to hospital three days after the membranes had ruptured, with fetid lochia. A living child was delivered by cesarean section followed by Wertheim's operation and X-ray applications. A Mikulicz's drain was used at the time of operation.

Colloidal Lead Treatment.—Blair Bell (*Brit. Med. Journ.*, April 30, 1927) showed specimen and sections of cancer of the cervix in pregnancy from a multipara twenty-two weeks pregnant when she came under observation. The uterus, tubes, ovaries and appendix were removed as completely as possible, followed by uneventful recovery. Subsequently patient received injections of lead colloid. Bell considers cancer of the cervix rare in pregnancy, occurring on an average of 1 in about 10,000 cases.

He also exhibited a primary adenocarcinoma of the fallopian tubes in a primipara aged 45. This patient had had a yellow inoffensive discharge for twelve months preceding the examination. There was frequency of micturition and the patient became very easily exhausted and the uterus was thought to be enlarged, irregular and fixed. A large swelling was felt through the anterior fornix, pressing on the bladder, and a hard mass was on either side of the uterus. The complete removal of the pelvic organs was difficult because of dense adhesions and bilateral ovarian cyst, which had burrowed deeply into the loose tissues of the pelvis. A small vesicovaginal fistula was found subsequently and easily repaired. This case was considered rare, as primary carcinoma of the fallopian tube appears less than 150 times in the literature.

He also showed 3 cases of Krukenberg tumor, one of which was associated with pregnancy. The pregnant patient was a multipara complaining of diarrhea for two years and a painless lump in the right iliac fossa, which had increased for four months before coming under observation. She had severe pain in the right side, vomiting and diarrhea and loss of weight. On examination there was a four months pregnancy and a solid tumor to the right of the uterus extending into the Douglas' pouch, but the uterus was movable. Supravaginal hysterectomy, with removal of both tubes and ovaries, was performed. The right ovary was the size of a fetal head and adherent to the rectum, the left ovary was apparently healthy. There was a cicatricial area at the pyloric end of the stomach, and subsequently an X-ray examination showed malignant disease at the pylorus. The patient was given injections of lead, but passed from observation and the final result is unknown.

At the same society meeting, Burns described a case of carcinoma of the cervix complicating a sixteen weeks pregnancy, for which he performed Wertheim's operation and later applied radium to a return in the vaginal vault, with satisfactory result.

Fertility of Jewish Women and Prevalence of Carcinoma among Them.—Horwitz of the Mayo Clinic (*Surg., Gynec. & Obst.*, Feb., 1927) has studied Jewish patients in the Mayo Clinic, finding carcinoma of the uterus much less frequent in Jewish women than in Gentiles. The number of Jewish patients studied was 11,700. Although an accurate comparison is impossible, there can be no question of the fact that the fertility and longevity of Jewish women are greater than those of Gentile women, and that carcinoma of the uterus is considerably less frequent. On the other hand, carcinoma of the breast is common among Jewish women, almost equaling the percentage of Gentile, and carcinoma of the digestive tract is twice as frequent in the Jewish as in the Gentile.

Transmission of Tuberculosis from Mother to Infant.—Couvelaire (*Gynécologie*, Dec., 1926) has studied 126 cases of parturition in tuberculous women. Where the disease is advancing slowly it affects very little the intrauterine development of the fetus. In rapidly advancing tuberculosis, one-third of the patients gave birth to stillborn children or those dying shortly after delivery. Six of these children were examined to detect tuberculous infection

and in 3 tubercle bacilli were present in the fetal lymphatic glands, although anatomically the glands did not appear to be tuberculous.

A similar result can be produced in guinea-pigs by experiment.

He concludes that there is a placental transmission of tuberculous virus with the presence of bacilli, which does not produce anatomical changes.

Tuberculous Infection of the Lung.—The interruption of pregnancy with sterilization is not infrequently practiced for severe tuberculous infection of the lung complicating pregnancy. It is not always possible, however, to obtain statistics as to the permanent results of the total removal of the uterus and adnexa in advanced tuberculosis. Misgeld reports from Bumm's Clinic (*Zentralbl. f. Gynäk.*, 1924, 20) 56 cases. The patients selected were those who had no cavities in the lungs, were not neurotic and pregnancy not beyond the fourth month, for after the sixth month interruption or total extirpation was not thought indicated; these patients had already given birth to living children.

The results were 16 deaths, 28.2 per cent; 32 improved, 57.1 per cent; 3 were worse, 5.36 per cent; and 2 were neither better nor worse, 3.57 per cent. The operation consisted in the entire removal of the uterus and its adnexa. These cases are compared with 45 cases in which pregnancy was terminated by dilatation and curetting only. The comparison is interesting.

After total extirpation the mortality was 28.2 per cent; after curetting only, the mortality was 37.7 per cent; 57.1 per cent were improved after radical operation and none were improved where pregnancy was terminated by curetting. In 2, 3.57 per cent, the tuberculous disease was brought to a temporary cessation after the radical operation; after curetting 1.7 per cent seemed to be better. Of those who grew rapidly worse after total extirpation, there were 3, or 3.36 per cent, and after curetting, 16, or 45.5 per cent, in a series of 34 patients operated upon. Four, or 25 per cent, of the last 20 patients operated upon had severe nervous symptoms, but these symptoms were not such as to forbid recovery.

Tuberculous Infection of the Kidney.—That tuberculous infection of the kidney can complicate pregnancy is illustrated by Stevens from the San Francisco Clinic (*Surg., Gynec. & Obst.*, Dec., 1924). He reports 2 cases, one aged 22, and five months pregnant, from whose neck glands had been removed when she was 10 years old. The urine showed pus-cells. The function of the right kidney was diminished; urine from the left kidney was negative. A guinea-pig inoculated with the urine from the right kidney gave a positive reaction to tuberculosis, while inoculation from the left kidney was negative. Consent to operate could not be obtained until after the confinement. The child was delivered by high forceps with a small infected wound on the left side of the neck from which tubercle bacilli were recovered. This wound healed in about three weeks, but later a gland of the same side of the neck suppurated; tubercle bacilli were abundantly present and the child died eight months later from tuberculous meningitis. The mother's kidney was removed and twenty months after the operation she was well.

The second case was aged 30, in the second month, and had a family history of tuberculosis. Tuberculous infection of the bladder was proved

by inoculation, and infection of the right kidney. The patient was operated upon followed by marked improvement and abortion two months after the operation. Four months after the operation the remaining kidney was found to be tuberculous.

Stevens reviews 35 reported cases of nephrectomy during pregnancy for conditions other than tuberculosis. The purpose of this review seems to be to determine the possibility of the continuation of pregnancy after this operation. In 26 cases the patient went to term, labor was induced in 2, abortion occurred in 6, mother and child died in one. In the 17 patients who went to term, the child was normal. In addition to the 2 reported cases, the writer found 16 cases of nephrectomy in pregnancy for tuberculosis of the kidney; 12 had nephrectomy with recovery of all the mothers; in 6 a normal child was born at term; abortion occurred in 3, and in one of them, two months after the operation; one patient had a dead child at seven months, four and a half months after operation; the death was not due to the operation. The operation was done in all of the months of pregnancy up to and including the sixth. In 5 pregnant patients having renal tuberculosis who were not operated upon, 3 became much worse; death occurred in the eighth month in one. In 4 cases who were not operated on there were two abortions, one child infected at birth subsequently dying, one normal child at term. Obviously all pregnant patients suffering from unilateral renal tuberculosis should be operated on as soon as the diagnosis can be made. The children born of tuberculous mothers have an average mortality of 58.8 per cent. Following the operation tuberculin should be given, the urine examined often, and the patient kept under observation. If after two or three years the remaining kidney is free from tuberculosis and the woman is in good general health, pregnancy is permissible.

In 261 cases of pregnancy occurring in women from whom one kidney had been removed, there were 250 normal and 15 complicated labors with but 2 deaths. Should bilateral involvement be present, tuberculin should be given with good hygienic treatment and little will be accomplished for the mother by sacrificing the child.

In the observation of the reviewer, a woman from whom one kidney had been removed for tuberculosis, passed successfully through eclampsia and although her child was stillborn she made a good recovery. She was treated by medicinal and obstetric measures only, without operation.

Treatment in General of Complications.—A review in general of the treatment of complications of pregnancy is contributed by Aschner (*Arch. f. Gynaek.*, 1923, Band 120, Heft 96). He calls attention to the frequent occurrence of interstitial hemorrhage in the nervous system, the ear, respiratory tract, the digestive tract, kidneys, heart, blood-vessels, bones, joints, and skin. He also states that during pregnancy septic inflammation, catarrhal inflammation, and exudate are observed. Patients frequently complain of the first symptoms of a developing inflammation such as congestion, disturbance of sensation of the hands and feet, heaviness in the limbs, aching pain about the head and teeth, neuralgia, catarrh, hyperacidity, and constipation. Many suppose that these occur inevitably in all pregnancies and pay no attention to

them. They are, however, important and are usually controlled by rest, carefully regulated diet, and the giving of alkalies.

The writer ascribes these symptoms to the influence of the fetus and decidua on maternal blood. Toxins are produced, some of which may be used in fetal growth but most of which are distinctly harmful. These symptoms are important as indicating the first stage of toxemia because at that stage patients yield readily to treatment.

There is also a tendency in all pregnant women to thrombosis, embolism, and their results, and to failure in the normal action of the heart with congestion in various organs, notably the kidneys, and in severe cases the development of eclampsia.

Unquestionably the ancient belief that pregnant patients would be benefited by losing blood, has some foundation in truth. Because of her plethoric condition the pregnant woman is more liable to infection, and when this occurs, it readily becomes severe. In the treatment of this condition elimination is of primary importance. Nothing compares in value with this method of treatment. That the condition is widespread and profound is shown by recent microscopic studies which demonstrate the fact that the capillaries are involved and that in blood-making organs this capillary involvement readily predisposes to disease.

In women of very dark complexion with a tendency to sluggish action of the liver, and abnormal condition of the blood, one sometimes observes the death of the child at a normal termination of pregnancy, although the mother may be free from syphilis. In some cases she is very syphilitic. When no other cause can be found the death of the child must be due to a disturbance or failure in internal secretion in either the mother or the child. A considerable number of these mothers show hyperthyroidism and the greater number of children are males. To prevent such loss the fetal heart sounds should be watched, especially during labor and if they show signs of failure the child must be promptly delivered.

While an effort has been made to demonstrate a distinct pathological relation between the blood of the mother and child, this effort has so far not been successful.

The study of the blood in pregnant women is interesting, and of 200 patients, in 44 primiparæ the average leukocyte count was 11,480; while in multiparæ it was 9,490. During the last months of pregnancy digestion influences the condition of the blood in a third of the cases. This was especially true where either proteid or carbohydrate foods were freely used, but these gave no evidence of insufficient action of the liver. In proportion as the patient had better care the blood-cells showed less variation and better development but if the pregnant patient was without proper conditions of living, degenerative forms were seen in the blood-cells.

The familiar fact that during pregnancy the excretion of urea is lessened and ammonia coefficient is increased, seems to indicate that the process of producing urea is carried on more extensively than in the non-pregnant. The test of liver function is made by giving the patient, by mouth, organic compounds of ammonia and afterward subjecting the urine to examination. In

patients whose livers are healthy, in twenty-four hours following this administration, the urinary salts are quantitatively increased when compared with the urea. If this experiment is to be accurate the diet of the patient must be regulated and the patient must be under observation and care for several days preceding the test. In the writer's experience from 20 to 40 grains of ammonia citrate were administered and the urine examined and in healthy patients there was no result observed. In others there was a trace of albumin and acid compounds in the urine. In the last months of gestation it was sometimes interesting to give a patient a very rich protein diet and restrict the carbohydrates. Under these circumstances the carbohydrate intake of 120 to 150 gm. daily, seemed to be sufficient to prevent disturbance in the patient's health.

The feces of the patients in these observations showed no excessive quantity of protein in the matter discharge. These and similar observations go to show that the use of protein food alone in pregnancy, is not a serious factor in producing toxemia.

Anemia in Pregnancy.—Moore (*Am. Journ. Obst. & Gynec.*, Sept., 1929, p. 424) states that no wide variation exists between multipara and primipara in either hemoglobin recordings or red blood-cell counts in this series. The toxemic group showed a substantial reduction in both hemoglobin and red blood-cells over the general average. Syphilitic patients showed a lower average in red blood-cells than the average red blood-cell count of the series, but with practically no changes in the hemoglobin average from that of the entire series. Fulloway (*Am. Journ. Obst. & Gynec.*, Jan., 1929, p. 84) states that the majority of women, when pregnant, have a lower hemoglobin and fewer erythrocytes per cubic millimeter. This anemic condition will, in the majority of cases, disappear within two weeks after delivery. The use of ultraviolet rays, together with intramuscular injections of iron, will help to prevent a severe anemia in pregnant women.

The Weight of the Parturient Patient during Pregnancy and Labor and the Puerperal State.—Kemper (*Arch. f. Gynaek.*, 1924, Band 121, Heft 2) finds that four factors influence the weight of parturient women: the initial weight of the woman, the number of pregnancies, age, and the intensity or average rate at which variation in weight develops. When cases are studied in groups and compared, it is found that there is less variation in weight in parturient women during pregnancy and the puerperal state than has been supposed. Even twin pregnancy produces surprisingly little variation.

Antenatal Care.—In discussing the care of pregnant women, the question of the success of so-called antenatal clinics, and the application of their methods to private practice, becomes of definite interest.

At a meeting of the British Medical Association at Bradford in 1924, a discussion occurred on this subject, Fairbairn presiding (*Brit. Med. Journ.*, Aug. 16, 1924). Willitt, of the City of London Maternity Hospital, stated that their antenatal work began in 1908. They have had no difficulty in examining all primigravidæ and all multiparous patients who had a history of previous complications. Patients are warned at once if any symptom develops, urine is examined each month and the breasts and nipples receive careful attention. When the vomiting of pregnancy is not severe, attention to diet, excre-

tion, and the free use of fruits and the assurance that the patient will improve and recover, are all that is required. Abortion is believed to occur in from 20 to 25 per cent of all pregnancies and there will be no improvement in this percentage until patients place themselves under medical care as soon as pregnancy is known, and also until hemorrhage from the vagina is regarded as a sign of great danger and a symptom to be reported at once.

It is usually possible to detect and treat syphilis in pregnancy satisfactorily. If gonorrhea is discovered the patient is referred for treatment to the department for venereal diseases in a general hospital. In tuberculous patients, the management depends upon the social status of the patient and her resources. Cardiac cases, if severe, must enter hospital. In 2145 patients, 204, about 10 per cent, required especial investigation or treatment; 57 had albuminuria but there was no eclampsia although it was feared that many of these cases had chronic nephritis. There was but one case of pyelitis in 104 patients, but wherever there was any symptom of irritation in the region of the kidneys the citrates were freely prescribed. One shoulder presentation and two face presentations were not recognized before labor; the mothers were multiparæ and had normal pelves. Most of these patients were first seen about the twenty-eighth week and breech presentation was not uncommon; in many of these cases the vertex subsequently presented by spontaneous version. It is hoped that the X-ray may give much assistance in recognizing these cases. Where breech presentation is detected, external version is practiced and to dislodge the presenting part, the foot of the patient's bed is raised. Disproportion between mother and child occurred in about 1 per cent; if the occiput was posterior and deeply engaged, there was no interference. If the head was high up with occiput posterior, manual rotation was tried and late in pregnancy pads and a binder were useful.

The writer's method of pelvimetry is simple and to many satisfactory. He applies the tip of one index finger on the anterior superior spine of the ilium and the tip of the other on the highest point of the crest, between these two points the distance should be not less than 2½ inches which can easily be measured by the eye. The skin is then stretched along the outward edge of the iliac crest and if the patient is lying on her back the normal curve has the convexity downward and backward; if the pelvis is abnormal these conditions are wanting. If there is a suspicion of abnormality the pelvimeter should be used in addition. If one has no pelvimeter the length of the hand from thumb to little finger outstretched, may be used. He finds it important to recognize the landmarks of the fetal head, especially the parietal eminences. If the situation of these landmarks indicates disproportion, if recognized early, they may be an indication for early cesarean section. He believes that the head will mold one-half inch without injury. To estimate this the most important guide is the anteroposterior thickness of the pubis. If the pubis is thick and the parietal bone overrides or overhangs the pubis the indication for delivery by section is positive. Examination is made as much as possible by the abdomen, but when difficulty is anticipated, vaginal palpation of the head while pressure is made from above, is of great value. Labor was induced in 24 of 204 patients, in 4 at full term, in 19 after thirty-six weeks. There

was no maternal mortality, one child was stillborn, and one was delivered by forceps. In 13 cesarean sections the mothers all recovered. In 16 cases going over term, labor was induced without maternal or fetal death. The histories were often obscure among these patients, but in estimating prolonged pregnancy, the rule was made to compute three hundred days after the last period. Other signs were also taken into consideration.

Hemorrhage developing during pregnancy was observed in but 3 cases and such patients must be treated in hospitals only.

These and other similar reports indicate that the principles of prenatal care may be transferred from clinics to private practice with great benefit.

The influence of work on the pregnant woman is of interest not only for general consideration concerning the success of pregnancy, but also with regard to the possible development of the toxemia of pregnancy. Carlinir (*Rev. franç. d'obst.*, 1923, 19) reviews extensively the literature upon the subject. There is no question that rest for the mother in the last weeks of pregnancy secures a better condition for her and the better development of the child. This rest does not exclude moderate and healthy exercise.

In contrast to this is the effect produced by painful and excessive work, especially if carried on under unfavorable hygienic conditions. Women working in shops, factories, and arsenals are naturally under more unfavorable conditions than those working in the country, their nutrition is worse and so is that of the offspring. Many pregnant women cannot work in tobacco factories without suffering. Painful and excessive work in a mother, especially if done in an uncomfortable and cramped posture, may shorten pregnancy, bringing the patient into premature labor. Unquestionably abortion is more common among women engaged in work than among those who are not, but this is not so much the result of the fact that these women work, as depending upon the circumstances that make them work under unfavorable conditions and injuriously.

Value of Antenatal Care.—Ganuneltoft (*Acta Obst. et Gynec. Scand.*, 1926) gives the statistics of the lying-in department of a Copenhagen hospital where 14,633 confinements occurred. There were 121 deaths, of whom 29 were due to intercurrent diseases. In 39 of the 121 fatal cases, treatment during pregnancy might have saved the patients.

In Denmark there are antenatal clinics and a Mothers' Help Society, partly supported by the state, which gives valuable care to pregnant women.

Antenatal Prevention of Difficult Labors.—Kynoch (*Brit. Med. Journ.*, June 4, 1927) states that the duty of the obstetrician in early pregnancy is to preserve the pregnancy and in the last three months to anticipate the complications of labor. Antenatal supervision must begin early. In malposition, a transverse position can be corrected by external version up to the very commencement of labor; in breech presentation in primiparæ, external version should be attempted, but not until the last week or two, for if done earlier, the fetus is apt to return to its old position. In occipitoposterior positions he advises the use of pads and binders. Pelvimetry in pregnancy is of great importance, and especially the failure of the head to enter the brim in the last weeks of pregnancy in primiparous patients is always a significant warning.

An X-ray examination is often of value to reveal abnormal position and multiple pregnancy; it also reveals some of the rare varieties of pelvic contraction.

The writer believes that the excessive indulgence in athletics by women, might favor the production of a male type of pelvis which would render labor difficult.

Significance of Low Arterial Pressure in Pregnancy.—Williams (*Am. Journ. Obst. & Gynec.*, Oct., 1929, p. 546) states a definite hypotension occurs in 5 per cent of pregnant women. Various methods of treatment failed to raise blood-pressure appreciatively. Their children suffer from prolonged labors, characterized by operative deliveries. Low arterial pressure in such patients may be but an expression of constitutional inferiority.

Gravid Uterus Bicornis Resulting in Streptococcic Peritonitis.—Epstein and Goldberg (*Am. Journ. Obst. & Gynec.*, Sept., 1929, p. 342) say to treat pregnancy in a double uterus as a non-ruptured ectopic, empty the uterus and correct the maldeveloped organ. If the condition was not discovered until the end of pregnancy, a course of watchful waiting must be assumed. Sometimes an uneventful delivery will take place. Be prepared for a severe postpartum hemorrhage, and be ready for a stormy puerperium.

Pregnancy after Tubo-uterine Implantation.—Cotte and Bertrand (*Gynéc. et obst.*, March, 1927) have investigated the results as to the occurrence of pregnancy after tubo-uterine implantation. The authors report 3 cases published in France. The permeability of the tubes and the anastomosis were shown by radiographic examination after the intra-uterine injection of lipiodol, five months after operation in one case and fifteen days in two others. In 12 other cases taken from the literature, permeability was demonstrated in 3 by Rubin's insufflation method. Of the 15 cases alluded to, 13 have been operated on within the last four years, 6 pregnancies have followed, 2 are known to have resulted in the birth of living children.

Treatment of Sterility in Women.—Polak (*Surg., Gynec. & Obst.*, April, 1927), after a review of the causes which may impair fertility and produce sterility, concludes that in each particular case, treatment must be individual and the procedure decided upon only by a careful and repeated study of the potential possibility of husband and wife. About 30 per cent of cases of sterility are due to disease of the male. When this is not present, the anatomical condition of the genital tract of the woman should be ascertained and such operation performed as may be necessary.

The condition of secretions in the cervix should receive attention. Endocervicitis, in his observation, has been directly or indirectly responsible for female sterility in 70 per cent of cases. While amputation of the cervix or posterior discission may be necessary if endocervicitis of any type or origin is present, the use of a stem-pessary is absolutely contra-indicated.

Repair of the pelvic floor may be helpful. Myomata of the uterus may be removed, angulation of the tubes corrected by plastic operations, and salpingostomy is successful in about 70 per cent of cases. Resection of the tube with implantation is more successful. Decapsulation of the ovary may be necessary. In bilateral hydrosalpinx or severe chronic salpingitis, there is prac-

tically no help from operation. Diet, exercise, sunlight and the hypodermic use of endocrins are especially successful in the hypothyroid type with low basal metabolism.

Birth-Control.—This subject, which excites continuous discussion from various sources, has been made the subject of a book entitled *Medical Views on Birth Control,* edited by Sir James Marchant, and published in London. It is a symposium or collection of essays upon the subject. It is in a conversational style and addressed to the public. The essays number ten. The compiler is secretary of the National Birth Rate Commission.

The contributors to the volume are obstetricians and students of sociology in England. Their arguments may be briefly summed up that in a considerable number of cases, well-defined medical indications exist for the prevention or control of conception, but that these cases should be dealt with on their merits in the consulting room of the doctor, with the assent of the patient. The essayists consider it extremely doubtful whether birth-control should be more generally practiced on any grounds. They found that most of the alleged reasons, if critically examined, are based on fallacies or imperfect knowledge of facts, and such reasons ignore the injurious effects which birth-control may produce. Without birth-control there are natural limitations to the increase of the population arising from the reduction in the birth rate and the natural limit to fertility. It is estimated that with a lower birth rate the population of the British Islands may become stationary and decrease within twenty years.

Real evidence does not exist of threatened overpopulation, nor where a considerable number of children exist in a family, that the children are unhealthy or ill developed. So far as the argument is concerned of unfitness, with the exception of a small proportion of mentally deficient persons, this cannot be determined. There are arguments in favor of a reasonably large family, nor is it found that the mother suffers from the production of a number of children. From the standpoint of morality and health of mind and body, the essayists believe that natural relations and processes should not be interfered with. It is furthermore observed that not one of the prescribed methods of birth-control is infallible.

Induction of Labor.—*Ovarian Extract.*—Addis (*Brit. Med. Journ.,* Feb. 26, 1927), in 22 cases varying from thirty-six weeks to a week beyond term, had induced labor by injecting 1 c.c. of ovarian extract into the pectoralis major muscle of the patient, where it formed the anterior border of the axilla. He did not use corpus luteum. The contractions of the uterus at the beginning of labor were painless, so that the case was studied by palpation. The first dose was usually effective for about three hours, when a second was required and in each 1 ounce of castor oil was given by the mouth. A partial failure occurred in the first case in which the method was tried, the others were completely successful.

It was interesting to note that the labor thus induced was practically painless through the first and beginning of the second stage. In most of these patients pain did not really develop until the presenting part came upon the perineum.

Quinin Causing Fetal Death.—This important question is considered by Gellhorn (*Am. Journ. Obst.*, June, 1927). He draws attention to the popularity at present of the induction of labor by castor oil and quinin and the belief that it is harmless. In his case the usual dose of quinin was followed by intrauterine death of the child, which was expelled in a macerated condition, seventeen days after castor oil and quinin had been given to induce labor. A thorough examination of the mother, child and placenta found no other cause for the fetal death.

The child died so promptly after the quinin was given that the conclusion is inevitable that there was a relationship between the two. The writer has collected two analogous cases.

His patient had been delivered by cesarean section for placenta prævia, and three years afterward had a normal pregnancy. The child was large and the induction of labor was advised to avoid strain upon the uterine scar. Accordingly the patient took four tablespoonsful of castor oil and three doses of 10 grains each of quinin, 30 grains in all. There were no uterine contractions but the patient felt some ringing in the ears. The child was a little more lively at first, but later all fetal movements ceased and at no time during the following two and a half weeks could the patient feel any motion, nor could heart sounds be heard. Fifteen days after the supposed death of the fetus there was a very dark discharge, with a few cramps. A small bag was inserted through the closed cervix when labor came on, and this was followed by the delivery of the child.

Overgrown Fetus.—Adler (*Zentralbl. f. Gynäk.*, April 23, 1927) states that a fetus is almost invariably lost in spontaneous labor, if pregnancy exceeds 302 days. As the weight of the infant increases, so does the necessity for operative delivery, and the mortality of the infants increases in like ratio.

So far as the induction of labor is concerned, the writer uses castor oil given by mouth and pituitary extract by injection. This method is entirely useless unless the patient is at term.

In 100 cases this method was successful in 61, uterine pains beginning in about two hours.

Castor Oil, Quinin and Pituitary Extract.—This subject, in which Watson has made valuable and prolonged study, is treated by Mathieu (*Am. Journ. Obst.*, Feb., 1927). His cases number 91; 52 primiparæ and 39 multiparæ. There were 3 failures, 3.3 per cent; in one the child was large and the head could not be fitted into the pelvis. Forty-eight hours after the treatment was stopped, a normal delivery occurred. In the second case a large head did not descend and a second attempt at induction was made, followed by successful delivery with low forceps. The third case was one of severe bilateral colon bacillus infection of the pelvis of the kidney. Induction was prohibited until the child was viable. The treatment prescribed failed twice and then the introduction of bags was successful. The patient was ill during her postpartum period.

In 4 cases the patient's temperature rose to 100.4° F. on two different days: One had chronic nephritis and severe toxemia, one pyelitis, one non-suppurative mastitis and one a contracted pelvis for which cesarean section was done

with considerable shock. The colon bacillus was found in the urine and the patient recovered under treatment. There was no morbidity among the children which could be traced to the induction or type of delivery, and there were no maternal or fetal deaths.

Sixty-two inductions were successful in the first trial, 20 in the second and 6 in the third. The dose of pituitary extract was 3 mm. and with this blood-pressure was not raised more than 5 points. In the hospital the patient is given castor oil, 2 ounces, and quinin sulphate 10 grains and hot soapsuds enema two hours afterward, at the end of which 3 mm. of pituitary extract are given by hypodermic injection. The pituitary dose is repeated in this way every thirty minutes until labor starts; it is then stopped. If eight hours pass without labor developing or if there is no sign of any effect, or the mother cannot endure the frequent hypodermics, the method is abandoned, the mother is given a sedative or hypnotic and twenty-four or forty-eight hours after another attempt is made. In only 8 cases were more than twelve hypodermic injections of pituitary extract given. In some cases labor started, but uterine contractions completely ceased; with these patients the injections of pituitary extract were again used in the routine manner.

The membranes ruptured early in 8 of these cases, but this seemed to have no bad effect. The longest labor was eight and one-half hours in a primipara, the shortest in a multipara, one hour. There were two cesarean sections in primiparæ, operation done after the test of labor. Labor was normal in 33, forceps in 51, version in 5, cesarean section in 2. There were 91 vertex presentations, one converted from the breech and one breech presentation.

It is interesting to note the frequency of forceps deliveries in this series.

Reis (*Am. Journ. Obst. & Gynec.*, March, 1929, pp. 392-400) states the most efficient method of medicinal induction of labor, at or near term, is with castor oil, quinin and pituitrin. The efficiency of all medicinal methods tested is materially enhanced by the stripping of the membranes. Induction methods, at or near term, are as efficient in primipara as in multipara. Induction of labor does not affect the character of the delivery. Morbidity without stripping was slightly greater than the morbidity in the obstetric department as a whole; the addition of stripping resulted in a further increase in morbidity. However, these figures are still approximately only one-third of those following bag induction in this series. Induction of labor is apparently not dangerous to the fetus.

Hemiplegia during Pregnancy.—Scott (*Am. Journ. Obst. & Gynec.*, March, 1929, pp. 401-403) reports a case of hemiplegia during pregnancy and gives a reference to the literature revealing 42 previously reported cases. It is reassuring to the obstetrician to know that this condition in no way complicated labor in any instance and that a large percentage of the patients recovered completely from the hemiplegia.

Interruption of Pregnancy.—A group of papers upon this subject by Eden (*Brit. Med. Journ.*, 1926, 2:237), McIlroy (*ibid.*, 240), Barris (*ibid.*, 241), Price (*ibid.*, 242) Cole (*ibid.* 244), and Evers (*ibid.*, 245) present different views upon this subject.

Eden states that no strict rule can be given for the interruption of preg-

nancy. Continual progress in the prevention and the treatment of disease would require constant change and revision in these rules.

At present pregnancy must be considered a definite risk to a tuberculous mother from the standpoint of the community; the birth of a child with the chance of tuberculosis seven times that of other children can scarcely be desirable. Chronic nephritis always renders pregnancy dangerous. In addition to local damage to the kidney, toxemia and accidental hemorrhage in the uterus are important. The fetal mortality rate is 40 per cent. A patient with chronic nephritis in her first pregnancy may try to go on under careful supervision. If the first pregnancy fails, succeeding pregnancies should be interrupted. In any patient with chronic nephritis, becoming pregnant, the presence of albumin and edema justify interruption. Infection of the urinary tract with the Bacillus coli communis rarely justifies the interruption of pregnancy. The use of insulin has greatly lessened the risk of diabetes. Glycosuria alone is not dangerous.

A young patient with good compensation, although having a valvular heart lesion, may pass through several pregnancies successfully, although the quick repetition of pregnancy results in cardiac damage and shortens the patient's life. Should the cardiac muscle give signs of failure, pregnancy must end.

If study by experts decides that the pregnant patient has had puerperal insanity or had a bad heredity or was a case of marked nervous and mental instability, interruption of pregnancy might be justifiable. In chorea, the development of high fever would indicate the termination of pregnancy.

Among London physicians the interruption of pregnancy for toxemic vomiting is said to be extremely rare. Where the presence of vesicular mole can be diagnosticated, abortion may be produced, but such diagnosis is often impossible until after considerable hemorrhage and partial or complete dilatation of the cervix. When the uterus grows smaller in size and fetal death is diagnosticated, administration of quinin and castor oil will usually cause the expulsion of the dead fetus.

So far as hemorrhage complicating pregnancy is concerned, it is more important to observe that the bleeding persists, than that the bleeding at any time is considerable.

McIlroy urges the importance of consultation in deciding upon the interruption of pregnancy. The slow method of dilatation by tents, or dilatation with Hegar's dilators followed by a packing of gauze saturated with glycerin, are favorite methods. Only in very early pregnancy can the uterus be rapidly emptied under anesthesia.

This is emphasized by Barris, who states that before the end of the third month the rapid method is readily applied. After the third month, the cervix having been dilated, he would practice section through the lower uterine segment, through the vagina, penetrating the membranes and removing the fetus by traction upon the leg. If the slower method is indicated after the third month, the dilating bag is especially good. Where vesicular mole is present, abdominal cesarean section gives success.

Price drew attention to the fact that in cardiac cases, the condition of the heart muscle is an important element. Where cardiac failure is slight, the

patient can probably go to full term without risk of life. If more severe during the first half of pregnancy, the chance of going to term is less. If this occurs in the second half of pregnancy, the patient can probably go to term, but in either case there must be absolute rest for a considerable time. Cases of severe heart failure in early pregnancy sometimes do surprisingly well with rest, so that when this occurs in the second half, every effort should be made to carry the patient to term. Should cardiac failure become extreme at any time in pregnancy, interruption is indicated.

Cole had found that insanity during pregnancy comprises less than 1 per cent of the total percentage of insanity in women; while mild disturbances are common, they rarely become severe. When insanity develops late in pregnancy, it continues after delivery. He had never seen a case where interference with pregnancy was justifiable, because of mental disturbance traceable to worry in pregnant unmarried women. Occasionally patients with marked obsessions and morbid fear of death may be so depressed that the interruption of pregnancy may be indicated. In his experience he has not seen cases where insanity had previously developed, or border-line cases with bad family history, where he felt justified in interrupting the pregnancy before the child was viable. When the patient has become pregnant by an insane man and is obsessed with the fear that the child may be defective, if the obsession cannot otherwise be relieved, pregnancy may be interrupted. Among pregnant women, dementia præcox and the depressive types are most common. If exhaustion be threatened in the early months of pregnancy, interruption would be of no benefit.

Evers urged against the interruption of pregnancy. He stated that the importance of embryonal and fetal life has greatly increased. The management of most of the conditions threatening mother and child has enormously improved. Careful analysis shows that many of the dangers which we consider inevitable in pregnancy rarely exist.

Interruption of Pregnancy in the Rat by Injection of Ovarian Follicular Extract.—Smith (*Johns Hopkins Hosp. Bull.*, 39:203), by experiment, has shown that it is possible to interrupt pregnancy in the rat in the first five days of pregnancy by injecting follicular ovarian extract; as the pregnancy advances the amount required increases.

From this observation he is inclined to believe that between the function of the follicular secretion of the ovaries and the corpus luteum, a considerable difference exists.

Interference with Pregnancy and Sterilization.—The effort to make public knowledge concerning birth-control is increasing interest in the question of sterilization by surgical means. Freund (*Zentralbl. f. Gynäk.*, 1923, 42) operates by severing the fallopian tube and burying one of the severed ends in the peritoneum and stitching the other end to the abdominal wall. A firm silk ligature is placed around the tube at its junction with the uterus. In 70 cases conception has not followed after the operation and very little shock or disturbance was caused by this procedure.

The effort to secure temporary sterilization is believed by the majority to be impracticable. If the fallopian tube is severed the epithelia degenerate

and the natural function of the tube cannot be accomplished. Very often these operations are accompanied by the shortening of the round ligament.

It is possible also to perform this operation, interrupting early pregnancy by the extraperitoneal vaginal cesarean section. Heinsius opens the anterior vaginal wall longitudinally above the cervix, pushes back the peritoneum and without opening it, incises the uterus at the internal os and through the lower segment. Should it be necessary, the peritoneal sac can be opened and, at the termination of the operation, closed by suture.

Sterilization is not effected by this procedure but early pregnancy can be interrupted with comparatively small disturbance to the patient.

Injury of Fetus by X-Ray.—Flaskamp (*Zentralbl. f. Gynäk.*, Jan. 1, 1927) has used the X-ray upon the ovaries to produce arrest of ovarian function, sometimes called temporary sterilization.

The dose given is strong enough to produce amenorrhea and sterility for some time. In a second method of treatment called weak ovarian reduction, there is no amenorrhea, the function of the ovary is not arrested, but ripe ova may be damaged by the X-ray, and as conception during this time is possible, the result may be the development of a damaged fetus. The writer very strongly advises against weak reduction, although it is often advised for inflammatory conditions and for sterility.

There is difference of opinion concerning temporary sterilization. The first conception which follows the amenorrhea often ends in abortion. This may be the result of the condition for which the X-ray was used, and abortion is especially likely to happen if conception follows almost immediately on the amenorrhea. Pregnancy subsequently is usually normal. After the temporary amenorrhea children then conceived and born, in 200 pregnancies, were healthy and not damaged by treatment. This indicates that the ovary completely regains its function after the amenorrhea.

The technic of temporary sterilization is difficult and only an expert should undertake it. It is successful in carefully selected cases of severe inflammation of the tubes and ovaries where recovery is retarded by menstruation, but it should not be used to prevent conception or as a general measure. In the period between radiation and the development of amenorrhea, conception should be avoided, and should it occur, the pregnancy should be terminated because the ovum is invariably damaged.

DeNobele and Lams (*Brit. Journ. Radiol.*, No. 31, 1926) report their study of the effect of the X-ray upon pregnant guinea-pigs and rats.

Where the ordinary erythema dose was given the embryo was usually killed. The earlier in pregnancy the more sure was the death of the embryo. If in the beginning of the irradiation the embryo was not killed, its later development was abnormal. There were no abortions but the evolution of the pregnancy was stopped and the embryo was absorbed.

In the later part of pregnancy, abortion would probably have been caused. In guinea-pigs the rays seemed to produce ovarian cysts. The embryos that were carried to term showed lesions of the nerves and sensory centers, such as hydrocephalus and microphthalmus.

Abortion.—Rock (*Boston M. & S. Journ.*, 1926, 195:843) believes that most spontaneous abortions are caused in man and the lower animals by disturbances in the fertilized ovum or maternal organism, and not by accidents from without which happen to the mother. He believes that the causes of sterility and of abortion are largely the same. The two conditions must be regarded as different degrees of diminished fertility. To arrive at a correct diagnosis, the causes of abortion should be studied in detail with a careful examination of the product of conception and also of both father and mother.

It is usually easy to make a diagnosis of abortion; it may be hard, however, to distinguish between a threatened and inevitable abortion. The treatment of threatened abortion should be to prevent it if possible; later if it is seen that the abortion is inevitable and incomplete, it must be made complete.

In 131 cases at the Boston Lying-In Hospital, the conservative treatment was followed where cases were doing well by themselves, interference was practiced as rarely as possible. In septic cases of abortion the uterus should not be invaded unless active and severe hemorrhage developed.

Management.—The management of abortion is always a subject of prolific discussion. In the *Journal of the American Medical Association* for March 29, 1924, Gordon states the results of his treatment of 1640 cases, of whom 961 were minutely studied. These were naturally divided into infected and non-infected, and those were called infected having a temperature above 101° F. by rectum or where there had been interference with the uterus. There were 1528 cases where the abortion was incomplete.

In treatment, on admission the patient was prepared as for labor without interference with the vagina, one vaginal examination only was made. The patient was put to rest in bed and given morphin to quiet suffering, and daily a low enema. Hemorrhage called for active treatment which consisted in removing the products of conception which were in the cervix and partly expelled, by the stick-sponge method. The vagina was thoroughly packed with antiseptic gauze and this manipulation was usually practiced through a speculum. Packing was necessary in 62 per cent of cases, of whom 53 were packed once and 10 per cent again. In 38 per cent no packing was required. If the symptoms indicated that abortion was inevitable, 0.5 c.c. of pituitrin was given by hypodermic every three hours for four or more doses. Whether the abortion is complete or not cannot be definitely ascertained without observation extending from five to seven days. The packing introduced is removed in eighteen to twenty-four hours and repeated in 10 per cent of the cases. Septic cases should never receive active treatment. If the patient's temperature is more than 101° F. by rectum, no intra-uterine manipulation is permissible. In most septic cases hemorrhage is rare. These patients were placed out of doors if possible in the Fowler position and feeding was forced, repeated transfusion of small quantities only of blood seemed to help some. Those who were syphilitic received arsphenamin and some had vaccines, sera, foreign protein, and neutroflavin. Careful observation could find no difference in the ultimate results or duration of the illness under any one type of treatment. Conservative treatment properly carried out will fail in less than 4 per cent of cases and mortality and morbidity are in direct ratio with the degree

and frequency of uterine invasion. The use of the curet makes septic many originally clean cases. In the 1640 cases, 18 died, 12 of sepsis in whom the curet had been used before admission, and 3 had had abortion induced. One hundred and ninety-three patients had sepsis, of whom 181 recovered. In the 1640 the curet was used 39 times.

That *fever complicating abortion* is of importance is shown by Winters (*Zentralbl. f. Gynäk.*, 1923, 38) by his bacteriological study in the first twelve hours after abortion; in streptococcus infection the mortality was 15.5 per cent, staphylococcus 8 per cent, Bacillus coli communis 3.1 per cent, hemolytic streptococci 20.8 per cent. In general septic infection the mortality was 100 per cent, where pyemia was present 60.6 per cent, diffuse peritonitis 64 per cent. Where there was pelvic peritonitis and pelvic abscess there was no direct mortality, nor was there mortality where the tubes and ovaries were involved or where there was exudate in the pelvis. Under hospital treatment these cases did well. In the attempt to remove the remnants of the ovum, much depended upon the character of the infection present. When hemolytic streptococci were found, the mortality was 30 per cent; where the streptococci were not hemolytic, 16.4 per cent, and 64.5 per cent of cases of abortion emptied the uterus spontaneously. Drugs had little effect in producing this result. In 792 cases without infection, the mortality was 1.1 per cent. The mortality of interference depends largely upon the local conditions present; in general sepsis, 100 per cent mortality results, this is also true in pyemia. When peritonitis is present the mortality following interference is 88 per cent, and where there is inflammation of the tubes and ovaries 25 per cent and there seems to be little difference in the use of the finger and blunt curet, the finger having 3 per cent mortality, the curet 2.6 per cent. Four or five days should pass with comparatively low fever before interference is practiced and bacteriological study should be made of all cases if possible.

In the *Journal of the Medical Association of South Africa*, January 22, 1927, Maxwell states that it is his habit, in cases of incomplete abortion, without fever, to evacuate the uterus as early as possible. He believes this to be a simpler and safe method, avoiding the risk of hemorrhage and infection. He has seen serious damage following the use of Hegar's dilator and so prefers the laminaria tent. If these are kept indefinitely in absolute alcohol, they are aseptic and ready for use, and their advantage is that they produce a uniform, constant and slow dilatation without danger of laceration. This method is most successful in cases at about the fourth month, and it is of great advantage to be able to explore the uterus with the finger. If a piece of placenta is so firmly adherent that the finger will not remove it, a curet must be employed. Where there is fever with sapremia or sepsis, the uterus should be emptied under an anesthetic, when rapid improvement usually follows. If in the abortion there has been injury to the wall of the uterus, the cervix, or the fornices of the vagina, and septic infection has developed, the writer advises dilatation and thorough exploration with the finger, removing septic material and giving very gently an intra-uterine douche. He believes that in these cases the curet is especially dangerous.

Indications.—A valuable book upon an important subject is that by Winters on "The Induction of Abortion, Its Indication, Methods and Legal Standing" (*Der Kuenstliche Abort. Indikationen, Methoden, Rechtspfleg für den Geburtshilflichen Praktiker,* Stuttgart, Ferdinand Enke, 1926).

The motto of the author is no unnecessary abortion and no omission of a single necessary one. Winters found in his clinics that the induction of abortion is justifiable in from 25 to 42 per cent only. The indications are the toxicosis of pregnancy, diseased conditions of the ovum, disease of the internal organs, the brain and its appendages and of the special senses. He also recognizes that there are eugenic and social reasons for abortion. In tuberculous cases he declines to induce abortion in all cases where the tuberculous process is latent, although he believes that the patient will grow worse without the interruption of pregnancy in 20 per cent of the cases. In active tuberculosis he would terminate the pregnancy. Hereditary diseases of importance justify interruption, including dementia præcox, idiocy, severe epilepsy, ataxias, spastic spinal paralysis and chorea, including retinitis pigmentosa. Where pregnancy has resulted from rape, he does not consider interference justifiable.

The laws upon the induction of abortion existing in Germany are reviewed.

Active Principles of Ergot.—Clark (*Brit. Med. Journ.,* April 23, 1927) drew attention to epidemics of ergotism during which abortion occurred frequently, and the observation of this fact led to the use of ergot in therapeutics.

Ergot given by the mouth increases the force and frequency of uterine contractions within twenty minutes, and this action is so powerful as to be dangerous if there is any obstruction to the birth of the child. The active principles of ergot are unstable. The chemistry of ergot was for a long time not made plain; the isolation of the hydrate of ergotinin produces a substance which has the effects of ergot. Other specific alkaloids have been prepared from ergot. In addition to alkaloids, ergot contains a mixture of decomposition products, tyramin and histamin, which produce increasing action when given hypodermically, but have very little action when given by the mouth. When ergot is given by the mouth these substances have little value in the result. The therapeutic action of ergot depends entirely on the specific alkaloids of which it contains 1.1 to 0.2 per cent. Many preparations of ergot are practically inert and the process of preparation usually employed results in the loss of 97 per cent of the active principles, with the exception of the ammoniated tincture, in which one-fourth of the active principle is retained.

He comments upon the fact that obstetricians have for so long used preparations of ergot known by chemists and pharmacists to be inert.

Cervical Attachment of the Placenta.—Recently the danger of the cervical attachment of the placenta has been brought to the attention of the profession by Freund, Humm and other continental obstetricians (*Ztschr. f. Geburtsh. u. Gynäk.,* 1923, Band 85, 581). In Freund's 25 cases, the maternal mortality was 80 per cent. His patients had violent hemorrhage usually following the first cervical and vaginal examination. The behavior of the case is characteristic of advanced cancer of the uterus, the tissues give a similar sensation to the finger, and the hemorrhage is profuse. It is almost impossible to recognize the cervix, so greatly is it altered. One of the principal causes of

bleeding is varicose vessels which develop in these cases. In one patient he could not detach the placenta as the cervix tore during the effort, and he was obliged to extirpate the uterus by abdominal section followed by fatal shock.

In one case Bumm exposed the cervix and ligated the most important vessels and checked the hemorrhage.

These cases were reported before the Berlin Obstetrical Society and the consensus of opinion was that cesarean section in one of the various forms is the only possible means of delivery in this very serious complication.

Placenta Accreta.—Under the title "Placenta Accreta," Polak and Phelan (*Surg., Gynec. & Obst.*, Feb., 1924) contribute an illustrated article giving their experience with this complication. They estimate the frequency at 1 in 6000 cases. This condition must be differentiated from simple adhesion of the placenta which is of little importance. Placenta accreta is a definite pathological condition. So completely is the placenta interwoven with the cervix that manual removal is impossible and can only result in hemorrhage, septic infection, or perforation of the uterus. Whenever the expulsion of the placenta is delayed, suspicion should be aroused, and if there is clinical evidence of separation Credé's method should not be tried. Where the placenta is retained without hemorrhage a thorough exploration should be made under anesthesia to decide the method of treatment. If gentle and careful manipulation fail to demonstrate a line of cleavage between the placenta and uterine tissues, hysterectomy or total extirpation of the uterus is indicated.

The writers during the past five years have had 8 manual removals of the placenta. Three were partially or completely adherent, but line of separation could be found and the placenta was finally delivered. Four were separate from the uterine wall but were retained by a retraction ring. There was one case in which no line of cleavage could be demonstrated, the placenta was removed piecemeal and not completely, accompanied by such severe hemorrhage that nothing could be done but firmly pack the uterus and give stimulation. While an effort was made to find a donor for transfusion, the patient died, nine hours after admission to hospital. In two other cases the attempt to remove the placenta by manual interference was followed by such hemorrhage that packing was used, but the patients died of septic infection. Both of these cases were multiparæ and previously had had the placenta removed by the introduction of the hand. In a third case narrated the woman was aged 26, married five years without pregnancy. She had had four curettings. When in labor the uterine tumor was very large and a small hard tumor was found just above the pubis in the left lower quadrant. A stillborn seven months' fetus was delivered after five hours of labor. The placenta was not expelled and there was no hemorrhage. The uterus contracted intermittently and Credé's method failed to express the placenta. Six hours after delivery, in hospital, under anesthesia and asepsis, the gloved hand found in the lower segment, just before the internal os, a submucous fibroid as large as a grapefruit attached to the anterior left uterine wall, the placenta was above the tumor and no line of separation could be made out. The abdomen was opened and the uterus incised at the right edge of the placenta. An attempt was made

to separate the placenta, but this attempt failed. Supravaginal hysterectomy was followed by an uneventful recovery.

In the *Journal of the Canadian Medical Association,* February, 1927, Foster reports a case of placenta accreta, the only one observed among 8000 deliveries in the Montreal Maternity Hospital during six years. The decidua was absent in this case at the placental site, the villi penetrated the uterine muscle and separation of the placenta was impossible. In other forms of adherent placenta there is always basal decidua.

If the cause of this condition is searched for, too vigorous curetting, chronic endometritis, submucous fibroid and previous manual removal of the placenta are found. In the writer's case the patient was aged 32 and had had previously three pregnancies; none were terminated artificially, but the second child was stillborn because the mother received a blow on her abdomen, and after the birth of this child the placenta was removed with instruments. With the third child the placenta was removed manually, hemorrhage was suffered and the patient was two months in bed. In her fourth pregnancy at term the blood-pressure was 132—82. There was a trace of albumin in the urine, some backache and bleeding from the vagina. At birth the fetus was dead in breech presentation and there was difficulty in delivering the after-coming head. Effort to remove the placenta brought away only two small cotyledons. Hysterectomy was done, when it was found that the placenta extended over the whole of the interior of the uterus; it varied in thickness and no normal line of cleavage could be found. Microscopic examination of the sections showed that decidua was absent.

Premature Separation of the Normally Implanted Placenta.—This remains one of the most formidable complications of pregnancy. Scott (*Surg., Gynec. & Obst.,* April, 1924) reports 9 cases in the Evanston Hospital, of this complication. He draws attention to the association of toxemia and its probable identification as the cause of the accident. Cases are cited illustrating this contention. One of the cases which he delivered was a primipara aged 30, pregnant seven months, blood-pressure over 200, albumin present in the urine and an increase in the uric acid of the blood. Acute abdominal pain and faintness developed during labor with partial cessation of the pains, which was treated by inserting a dilating bag. In six hours complete dilatation was present and a stillborn child was delivered. Three-quarters of the maternal surface of the placenta was occupied by a firm clot. Microscopic section of the placenta showed thickening of some of the walls of the arteries, although the chorionic villi were normal.

The second case was also a primipara with high blood-pressure and edema, delivered by low forceps of a living child. On examination of the placenta, infarcts and a clot were present.

Other illustrated cases are reported. Three cases are studied from the writer's clinic in which the separation came on suddenly and was accompanied by hemorrhage which escaped externally. These patients were treated by prompt delivery, one of them by section, and the recovery of the mothers followed. In two of the three a living child was secured.

From the literature he quotes 3 cases in which the placenta was delivered,

before the child; a stillborn child was spontaneously expelled some time after. In these patients the uterus resembled an ovarian cyst with twisted pedicle; blood had been effused extensively in the uterine wall or under the peritoneum, and one half of the uterus was apparently normal and the other greatly altered. The tendency of the hemorrhage is to separate and draw apart the muscular structure of the uterus forming cysts which are filled with blood. Where successive effusion of blood occurs, round-cell infiltration in the neighborhood of these foci has been observed. This process is more pronounced near the fundus and upper part of the uterus and is rarely found in the lower uterine segment. The placental site is most involved and the accident is usually more pronounced on the anteroposterior or lateral aspect of the uterus in accordance with the site of the placenta. The condition is most fully developed and destruction of tissue greatest just beneath the peritoneum; here the uterine wall is literally torn apart by the excessive bleeding. In nearly all cases the uterine muscle is considerably degenerated and this is most advanced where the bleeding is greatest. This degeneration is not caused by the hemorrhage but is produced by the toxemia which results in the bleeding. In some cases the individual muscle-fibers could not be recognized. In the decidua the walls of the vessels are degenerated and there is necrosis of the decidual cells, in the veins or walls of the vessels and where the veins are in direct connection with the effused blood. Thrombosis was present in some cases, infiltration about the vessels in others and there were multiple fissures in the peritoneum sometimes extending into the muscular tissues beneath. This peritoneal lesion was found in 15 per cent of cases. Usually the tear is transverse, sometimes longitudinal, occasionally irregular. These lesions are observed at the fundus on the anterior or posterior wall; as would be expected, they are often at the site of the placental attachment.

In one case, reported by White, among the very earliest, the woman aged 32, in her ninth pregnancy, after giving birth to a dead child, died in about an hour. At autopsy there were peritoneal lesions, extravasations into the broad ligament, and blood was also extravasated into the abdomen. Effusion into the peritoneum was found in 71 per cent. Sometimes this is clear serum and again bright blood.

In 26 of the cases collected, the broad ligaments were involved, the tubes in 11, the ovaries in 4, the round ligament in one. Multiform bleeding was the lesion most often found. Extravasation of blood may extend over a very considerable area. The placenta does not seem to be pathological and the only condition found has been slight thickening in the stroma of the ovary. There are the records of 17 autopsies with subcapsular hemorrhage in the liver and acute parenchymatous degeneration. In one case there was hepatic cirrhosis and in one the extreme statement was made that there remained no normal liver tissue. The kidney showed parenchymatous degeneration and there was bleeding in the diaphragm, in two cases; in the pericardium in one, in the meninges one, in the stomach two, and in the adrenals one.

Autopsy on the fetus showed hemorrhage into the viscera. Whether this was caused by asphyxia from placental separation or by toxemia, it is difficult to state.

That placenta prævia and accidental separation can be combined, Scott believes, and supports this belief by the description of 2 cases in which the mother died and in which the conditions indicated placenta prævia and separation as well. These patients were not seen until the bleeding had become severe. He cites 3 cases treated obstetrically, as he terms it, in which the mother recovered with the birth of a dead child; delivery was spontaneous. In other patients interference was practiced, and if this was done sufficiently early, the results were favorable.

The writer believes that mild cases of premature separation of the normally implanted placenta are not infrequent. They are toxic and traumatic, the greater portion being toxic. Where the toxemia is mild, small areas of infarction with comparatively slight bleeding develop, which cause the mother but little disturbance, but end in the death of the child. The same toxemia which is seen in eclamptic patients is present in these. If the symptoms are not threatening, the author would use expectant treatment, but if symptoms indicate a condition of severity, delivery by cesarean section is indicated.

Bartholomew (*Am. Journ. Obst. & Gynec.*, Dec., 1929, p. 818) says premature separation of a normally implanted placenta is often accompanied by a degree of shock, which is out of all proportion to the amount of hemorrhage. Shock is more frequent in cases accompanied by toxemia and is aggravated or precipitated by trauma sustained during delivery. High pelvic morbidity, in this complication, practically eliminates the fetus from any consideration in the choice of treatment, unless delivery can be hastened without additional trauma and danger to the mother. Induction of labor, watchful expectancy, stimulative and supportive treatment, offer the best prognosis. Shock, if present, should be treated first and labor then induced if pains have not begun. Cesarean section, manual dilatation of the cervix, internal version and extraction or a difficult forceps delivery are associated with an increased maternal mortality, especially in the severe cases.

The period of several hours following delivery is one of great danger for the patient and requires watchful care to combat shock or hemorrhage.

Stimulation of the Uterus.—*The method by which the uterus is stimulated* has always been of interest to physiologists and especially to obstetricians. Whitehouse and Featherstone (*Journ. Obst. & Gynæc. Brit. Emp.*, 1923, 4: 565) utilized several abdominal cesarean sections and other operations as well as normal cases, to study the stimulation of the uterus. They added to this experiments upon rabbits and concluded that the nervous mechanism controlling the uterus is local, sympathetic, and lumbosacral and automatic. The local nervous stimulus produces rhythmical contractions of the uterus independently of the other sources of stimulation. This physiological fact is true of other involuntary muscles. The sympathetic nerves increase the action of the circular muscle-fibers and inhibit the action of the longitudinal bundles; the nerve-centers in the lumbar cord stimulate the longitudinal fibers and inhibit the action of the circular fibers. Centers in the medulla and possibly the cortex, control both automatic and sympathetic stimuli, but these centers can act independently. Reflexes are important factors in normal contractions

of the uterus, illustrated by reflexes from the breasts and reflexes set up by stretching or irritating the perineum. To have efficient uterine contractions both automatic and sympathetic nerve systems must be in a condition of health and there must be a balance between them; if there is disability there will be interference with normal labor.

Acting upon these observations the authors conclude that for classic cesarean section lumbar narcosis used alone or combined with general anesthesia, would be advantageous. If this method were employed they would limit the inhibitory stimuli from the lumbar portion of the cord and allow the sympathetic stimulation to produce firm contractions of the circular muscle. This should prevent bleeding. In one of their cases the fetus and five fibroids were removed at full term by operation, with very little hemorrhage. If one can get the circular fibers to contract strongly, the edges of the uterine incision are drawn up, which makes the closure of the muscle much easier and more efficient. If there is an indication to increase intra-uterine tension, the use of cocain in the lumbar region should do this and this treatment might be of advantage in premature separation of the normally implanted placenta. In placenta prævia the bleeding might be reduced temporarily by the contraction of the lower segment, but when the placenta was separated the bleeding would increase. In cases of exhaustion during labor, the uterus failing to act, spinal anesthesia should hasten delivery and lessen danger of bleeding. This also should reduce the quantity of blood lost from the placental site. When it is desired to empty the uterus through the vagina in early pregnancy, the writers prefer spinal to general anesthesia. Cases are sometimes seen where the cervix is rigid and a contraction ring develops which greatly retards labor; this is caused by excessive stimulation of the sympathetic system, and in the non-pregnant this may be an important factor in producing dysmenorrhea.

In normal labor spinal anesthesia is not indicated; it will retard the dilatation of the cervix and lessen the expulsive power of the uterine muscle and increase the necessity for the use of forceps.

Caudal Anesthesia in Obstetrics.—Kelso (*Am. Journ. Obst. & Gynec.*, Sept., 1929, p. 416) states that caudal anesthesia cannot be used in home delivery. It is hard to time; causes uterine inertia—operative delivery necessary; causes toxic effects in mother and fetal distress; does not relieve the pain from uterine contractions when an inertia does not develop; and is unsatisfactory for spontaneous deliveries.

Spinal Anesthesia in Obstetrics and Gynecology.—Pitkin (*Am. Journ. Obst. & Gynec.*, Aug., 1929, p. 165) mentioned spinal anesthesia only as simpler, quicker and more efficient than caudal anesthesia and as a method of relieving pain, suffering and misery in those unfortunate cases in which any form of inhalation anesthesia would be detrimental or fatal to mother, child or both.

Puerperal Morbidity without Disinfection of the Vagina.—Gordon (*Am. Journ. Obst. & Gynec.*, Aug., 1929, p. 245) cites 2016 average cases of labor with a morbidity of 3.6 per cent. Cases were delivered by internes, using the routine preparation of the outside field, with no attempt to disinfect the vagina. Best protection against puerperal infection is conservative obstetrics.

Vaginal antiseptics might give a false sense of security to those whose obstetric judgment is outdistanced by their desire for rapid delivery.

Bacterial Content of Uterus during Pregnancy.—This subject, which has occasioned much discussion, has been studied by Harris and Brown in the cases treated by cesarean section at the Johns Hopkins Hospital (*Am. Journ. Obst. & Gynec.*, Feb., 1927).

It is now commonly thought that up to the time that labor begins, the pregnant uterus is free from bacteria. Should, however, labor be prolonged and intra-uterine manipulations be practiced, infection is frequent. It is of particular importance to know when the bacterial invasion occurs, and what are the factors which control it. These are usually supposed to be examinations through the vagina, the time elapsing after the rupture of the membranes and also the duration of labor. It is usually believed that when bacteria invade the uterus, the temperature soon rises.

There can be no question but that vaginal examination made during labor increases the danger of infection. It is too soon yet to judge whether the practice of rectal examinations, instead of vaginal, will essentially lessen the danger of infection, but even when no vaginal examinations are made during labor, it does not necessarily prove that the uterus is free from bacteria.

In 50 cases studied by the writers, the lower uterine segment gave positive cultures in 22, and in 13 of these patients there had been made no vaginal examinations during labor. We must therefore conclude that the absence of vaginal examinations in labor does not make certain the absence of bacteria from the uterus.

The study made by the writers emphasizes the danger of bacterial invasion of the uterus when the membranes rupture prematurely, but this circumstance is not invariably present in cases of infection. Out of 22 patients having premature rupture of the membranes, from whom positive cultures developed, in 7 spontaneous rupture of the membranes had not occurred, and the membranes were ruptured artificially during the delivery of the child by cesarean section. Intact membranes are not a thoroughly reliable barrier to the entrance of bacteria to the lower uterine segment.

That prolonged infection in the uterus causes fever is certain, but there are exceptions to this rule, for in 22 patients with positive cultures, temperature was normal in 14. Of the remaining 8, 2 of them had temperature less than 100° F. Where, however, the uterus was sterile at the time of operation, the temperature was normal. These and similar observations show that the presence of a normal temperature is not a reliable indication that bacteria have not entered the uterus.

In the 50 cesarean sections, there were 19 that were elective, the operation being performed at a time chosen in the end of pregnancy and before the membranes had ruptured. In these cases the uterus was invariably sterile. This was also true of 6 cases of the classic section, where within four hours after the beginning of labor the operation was performed.

There were 5 cases of classic section where the operation was done six or more hours after labor began and in these patients bacteria could always be found in the lower uterine segment, and in 3 of the cases streptococci were

demonstrated. In 13 low cervical and 6 sections followed by hysterectomy, the only cases in which the uterine cavity was found sterile, were 3 in which the operation was done within a few hours after labor began.

These results demonstrate clearly that it is safe to perform a conservative cesarean section only in cases of election, before vaginal examinations have been practiced and the membranes have ruptured and before labor has developed. While vaginal examination and premature escape of the amniotic liquid make the invasion of the uterus by bacteria more probable, one cannot conclude positively that the uterus is sterile if these factors are not present, nor can a normal temperature be considered a positive proof that an ascending infection is not already present.

The process by which bacteria enter the uterine cavity is not yet clearly shown, whether by the passage upward of bacteria already in the vagina, or whether bacteria from the vulva may cause an ascending infection, and until a complete study of the germs normally found in the birth canal has been made, this question cannot be answered.

A Statistical Study of Puerperal Morbidity in Hospital Practice.—Tausinsin (*Am. Journ. Obst. & Gynec.*, July, 1929, p. 98) states that this country should have a good standard of morbidity. The use of mercurochrome, acetone and alcohol solutions for the preparation of the perineum resulted in a morbidity, due to infection in perineorrhaphy of only 1.56 per cent. Vaginal examination increases the risk of infection. Operative procedures increase morbidity; cesarean section showing highest incidence. Obstetric morbidity due to pyelitis is high. Morbidity due to phlebitis occurred in 1.13 per cent of febrile cases. There is a decrease of morbidity with each subsequent pregnancy. Lactation seems to be a factor in the cause of puerperal morbidity.

Transplacental Passage of Bacteria.—Laffont and Mele (*Bull. Soc. d'obst. et de gynéc. de Par.*, 1926, 15) report the case of a woman aged 24 admitted to hospital for nervous disturbance complicating pregnancy. Premature labor was threatened and opium was given. Facial paralysis and vomiting developed with a temperature of 103-104° F. There were signs of meningitis and the spinal fluid contained pus.

The laboratory report showed a Staphylococcus meningitis. A blood culture was positive. The patient became comatose and delivered herself of a female child that died one-half hour later. The mother died with bulbar paralysis.

After the death of the child its heart was punctured, the cardiac wall having been sterilized by the thermocautery; the blood extracted from the heart showed a growth of the staphylococcus.

The Incidence of Undulant Fever in Pregnancy and Abortion.—Cornell DeYoung (*Am. Journ. Obst. & Gynec.*, Dec., 1929, p. 840). The blood sera from 1015 pregnant women were tested by the agglutination reaction. Of this number none gave definitely positive reactions, 5 were weakly positive. The blood sera of 22 women, who aborted, gave negative results by the agglutination test. Of the 6 cases of undulant fever confirmed in the Health Department laboratory only one patient was a female. This patient had given birth to

a normal child at full term three months before becoming ill and gave no history of a previous abortion.

Relation of Hemolytic Streptococci to Pregnancy.—The old question of the relation of hemolytic streptococci to pregnancy and the puerperal period is discussed by Kanter and Pilot (*Surg., Gynec. & Obst.*, Jan., 1924). They quote the literature of the subject and studied 96 patients in the Presbyterian Hospital and Dispensary of Chicago. To obtain the secretion they inoculated swabs, one from the lateral wall of the vagina, the second from the posterior fornix, the third from the os and the cervix. The latter two cultures were taken with sterile speculum and care was taken to avoid the secretions present. They also made studies to determine the possible source of streptococcus infection in puerperal patients, and especially the nasopharynx of the patient and her attendant. They found that the normal vagina rarely contained virulent hemolytic streptococci, nor was there evidence that the presence alone of such streptococci produces puerperal sepsis. Any manipulation or disturbance of the vagina by examination or operation, increases the risk of sepsis. Puerperal hemolytic streptococci infection is considered by most to be exogenous. Drops of secretion from the nasopharynx of the attendant may infect patients and the use of gauze masks is indicated during delivery, and also the exclusion of all persons suffering from sore-throat from the delivery room and attendance upon puerperal patients.

Pregnancy Complicated by Amyotrophic Lateral Sclerosis.—Murphy (*Am. Journ. Obst. & Gynec.*, Dec., 1929, p. 845) states that women with this disease are capable of becoming pregnant. Delivery may be spontaneous, and child healthy as in normal women. Pregnancy should not be terminated, as the disease is incurable and is not influenced by pregnancy.

Formation of Abnormalities in the Placenta.—The formation of hydatid mole and abnormalities in the placenta have received the attention of Keller (*Gynéc. et obst.*, 1924, 1). He found in 7 cases of hydatid mole, degeneration of the villi caused by alteration in the circulation of the part. In moles the villi are almost completely absent and what are present are the lacunæ which were the original blood channels during the development of the embryo. The origin of these abnormalities in the circulation is at present unknown.

In 116 cases of marginal placentæ, Keller found that an important factor was a fibrous ring in different stages of development at the border of the internal os, where the edge of the placenta came to the edge of the os. In some cases there was necrosis of the villi; in others, of the decidua with hemorrhage. This fibrous ring is sometimes the result of the stagnation of blood in the intervillous spaces at the border of the placenta. This may develop at the sixth or seventh month by the unusual growth of the two placental surfaces. There is then a margin between the two placental surfaces which is outside the chorion. In a small number the placenta is inserted into the uterine cornu; here the chorion is situated at the border of the placental lip which covers the orifice of the tube; that is, fibrin is deposited and the superficial villi increased. The fibrous ring is thus formed outside the chorion. Occasionally one of these placentæ results from the fact that a portion of the decidua reflexa at the placental margin persists and is not absorbed. A

marginal placenta may produce bleeding in pregnancy; this would be followed by partial separation, very rarely by total separation, but often by premature labor. The placenta prematurely separates in these cases not infrequently. In others hemorrhage results because the placenta separates especially where a marginal placenta is at the tubal orifice. Unless the hemorrhage is severe, the condition is often not recognized positively until delivery. The membranes in 116 cases ruptured prematurely; in 17 there was atony of the uterus, which is five times more frequent in these than is usually the case. There is no evidence that this condition interferes with the growth or development of the fetus.

In the *American Journal of Obstetrics* for August, 1924, Bagg contributes an illustrated paper showing the result of experiments upon animals with X-ray and other agencies, in the production of malformation. Structural defects in the young are produced by arrested development from disturbances in the circulation. In some, impure blood enters the vascular endothelium producing malformation. If such extravasation occurs during the critical period in the development of an organ, it may interfere and lead to defect in structure. In experiments, the eyes of animals are readily affected by interference with the animal, because the blood-vessels of the head are often turgid and easily permit the extravasation of blood. In the extremities, club-feet and syndactylism are produced. Sometimes organs like the kidneys are interfered with and may be partially or wholly affected in development. In the unborn, birth injuries by instruments, or pressure by maternal pelvis or partial asphyxia, or increased blood-pressure in the infant during labor, may produce lesions in the head. Small hemorrhages have, however, been found in cases where the child was not subjected to pressure, as in those examined in the uterus during cesarean section. From congenital nevi we learn that such blood disturbances may occur before the birth of the child.

The study of the development of abnormal structure adds nothing to our knowledge regarding the cause of club-feet or paralysis and malformation of the lower extremities, but there is distinct evidence of interference in the development of the eyes.

Ectopic Pregnancy.—*Leukocytosis.*—That leukocytosis has a relationship to ectopic pregnancy is intimated by Gragert (*Zentralbl. f. Gynäk.*, 1923, 40:17). He finds a normal leukocyte count in ectopic pregnancy where there has been no hemorrhage or inflammation of surrounding tissues. In the absence of these a slightly increased leukocyte count gradually becomes normal. A tubal abortion is usually accompanied by slight hemorrhage which has little effect upon the leukocyte count. This differs very much in different patients, as some are greatly irritated by hemorrhage and others are not. After tubal abortion develops, there is a drop in hemoglobin percentage and the number of red cells, the rapidity of this process being in proportion to the severity of the bleeding. Where there is a recent rupture of the tube the blood is markedly altered, the leukocyte count remaining normal. Where the bleeding is gradual but continuous, the leukocyte count is altered. These facts may aid in making a differential diagnosis between inflammatory condition and ruptured ectopic pregnancy. From the leukocyte count and diminution in

hemoglobin and red cells, a differential diagnosis cannot be made between ectopic tubal pregnancy and rupture and ovarian tumor with twisted pedicle. If the patient shows normal leukocyte count but a rapid fall in hemoglobin and red cells, it will indicate rupture of the tube and not perforation peritonitis.

Anuria.—Horvat (*Zentralbl. f. Gynäk.*, 1923, 45: 1735) reports a case of ruptured tubal gestation with absolute anuria as the extraordinary symptom. After the removal of the ectopic tube, the secretion of urine became normal. The urine tests remained normal and although the patient's recovery was complicated by bronchitis she ultimately did well.

An interesting case of ectopic pregnancy was described by Mertens (*Zentralbl. f. Gynäk.*, 1923, 45) in an ovary which showed on removal two cavities filled with blood: In one a corpus luteum filled with blood, in the other placental villi and syncytial cells.

Broad Ligament.—An ectopic pregnancy in the broad ligament is reported by Pfeiffer (*Monatschr. f. Geburtsh. u. Gynäk.*, 1923, Band 65, 85) in a patient aged 28 who had had pain in the lower abdomen and yellowish discharge for one and a half years. Menstruation had been regular without much suffering. About a month after her period she came to the hospital complaining of pain which rendered work impossible. There was no vaginal hemorrhage, the tumor was as large as a fetal head in the abdomen near the uterus. The uterus was enlarged, pushed to the left; the tumor was very sensitive. There was some rise of temperature, and gonorrhea was found in the cervix and urethra. The patient was thought to have pelvic inflammation with pyosalpinx.

With rest in bed the pain became less and temperature normal and, after three weeks in hospital, the patient left, to return in eight days. The tumor had not become smaller and accordingly the abdomen was opened. There were abundant adhesions between the intestines, omentum, and abdominal wall, and it was necessary to resect a portion of the omentum. The uterus was separated from adhesions and found very little enlarged and the pelvic organs were affected. On the right side the tube seemed normal near the uterus, but then became very much shorter, and terminated apparently at the pelvic wall. The peritoneum on both layers of the broad ligament was intact. Tne ovary was intact and fairly movable and, upon opening the anterior layer of the broad ligament and ligating the vessels, the tumor seemed to be intraligamentary. It was firmly adherent to the internal surface of the ovary. After the tube was tied and separated there was no difficulty in removing the tumor. A corpus luteum could not be found. The left tube was closed as the result of inflammation.

On examining the mass removed, the tube, clot, and villi of the chorion were plainly evident.

Extra-uterine pregnancy at full term is reported by Catlin (*Journ. Am. Med. Assoc.*, Jan. 12, 1924) in a primipara. At the sixth week of gestation she had an attack of pain and faintness. She went almost to term when pain and faintness again occurred and were repeated on the following day, and after that pain and fever and she became so ill that food could not be retained and the bowels did not move for two weeks. She was taken to hospital and anes-

thetized and a pessary placed in the vagina to support the uterus; this was kept in position five weeks. She left the hospital and had another attack of nausea, after which she felt better. Fetal movements developed and fetal heart sounds were unusually plain. The child moved excessively on one occasion and then movements ceased entirely. When examined the breasts contained slight secretion, the cervix was soft and the body of the uterus could not be made out. On the left side of the abdomen a bruit could be heard but no fetal sounds. It was thought the uterus contained a dead fetus and it was decided to bring on labor by packing the vagina and cervix with gauze. Four days after this the patient was anesthetized and the cervix dilated and the uterus found to be empty. She was then removed to the hospital where X-ray showed the fetus in a sitting posture with the head at the margin of the ribs and the feet in the left iliac fossa, the back in front, and the shadow of the placenta seemed to be on the left abdominal wall. On section a thin amniotic sac was adherent to the transverse colon and small intestines. It was opened at the edge of the placenta and the fluid carefully removed and the child delivered. It was 55 cm. long and weighed 7½ pounds and had been dead several weeks. When an effort was made to remove the placenta hemorrhage was so great that it could not be continued. The sac was sewed to the peritoneum and the wound left open and packed with gauze which was changed daily. About thirty days after the operation the entire placenta was removed. The wound was kept packed with gauze and several ounces of 1 per cent dichloramin-T were poured into the cavity daily until it became sterile and the abdomen healed perfectly.

It is believed that the wide open drainage and antiseptic precautions saved the patient. Incision was made along the border of the right rectus muscle and this aided in the rapid closing. The blood-vessels at the placental site did not become obliterated until forty-three days after the death of the child.

Uteroplacental Hemorrhage.—The familiar complication of uteroplacental hemorrhage is reported by Rivière (*Bull. Soc. d'obst.*, 1923, 9: 543) in 2 cases. In one lumbar puncture of the child showed bloody cerebrospinal fluid. The child was delivered by forceps, cried feebly on extraction and the placenta was at the fundus and readily detached and delivered with a considerable quantity of blood. The mother recovered without complication, although she had shown some evidence of shock during the labor.

In the second case, a primipara in seventh month, the urine showed a small quantity of albumin and the patient would not permit examination. After a fatiguing day, she was taken with violent abdominal pain, hemorrhage, and diarrhea. She became greatly excited, delirious, and very pale, the pulse was regular at 60 and there was moderate external hemorrhage. The uterus was very hard, the cervix firm. No heart sounds could be heard and the lower segment was firmly closed upon the child. Upon admission to the hospital the urine contained a considerable quantity of albumin. At section a reddish fluid was found in the peritoneal cavity, the uterine wall was extremely thin, the placenta was in front and on the right, partly separated by a clot. On the posterior wall of the uterus there were two large ecchymoses, one on each side of the median line. As the uterus contracted and retracted

well as the sutures were inserted, it was not removed. The patient's pulse rose to 160 with extreme shock from which she gradually recovered.

Plastic Changes in Vagina.—Runge (*Arch. f. Gynaek.*, Band 122, Heft 3, 1924) has made an elaborate study of this subject to determine the chemical and anatomical changes which go on in the vagina as pregnancy develops. He paid especial attention to the so-called colloid chemistry of the tissue. He distinguishes two stages of the process, one of which develops as pregnancy advances, and the other is accomplished in a comparatively short time during parturition itself.

The first stage, which is gradual, consists in the distention of the elastic tissue with the formation of certain colloid materials which permit a very considerable alteration in the structure of the part. The second stage, which is more acute, the author describes as edema of the vagina developing at the beginning of labor.

Air Embolism Complicating Pregnancy and Parturition.—This question has long given rise to discussion. Experimentally it has been reported that air can be injected into the circulation without especial disturbance to the patient; in other cases immediate and the most serious results seem to follow. Hazelhorst (*Arch. f. Gynaek.*, 1924, Band 122, Heft 3) has studied this subject with the aid of the X-ray and illustrates his paper by skiagrams showing the condition of the heart when air has entered the circulation. His researches seem to show that air which enters the right side of the heart, passes with little disturbance to the circulation, into the pulmonary arteries and oftentimes causes no especial result. The air is in bubbles and the effect which it produces depends much upon the size of the bubbles, as the ultimate result is embolism of the larger or smaller terminals of the pulmonary artery. The size of these bubbles of air all depends upon the length of time during which the air remains in the heart and upon the strength of cardiac contractions. The longer the air remains in the chambers of the heart the smaller are the individual bubbles which develop. Where these bubbles of air are greater, the large vessels in the lungs are sooner obstructed and where they are smaller, the obstruction occurs in the vessels of ordinary or smaller size. When embolism in the vessels of the lungs develops there is a fall in pressure of the circulation at large and a corresponding rise in the pressure in the right heart and the pulmonary vessels. If the heart cannot overcome the disturbance to the circulation, there follows a very essential compression which extends to the left heart and which prevents the distribution of blood to the organs. The heart itself suffers in its nutrition and consequently in the performance of its function. The anemia in the central nervous system which results in this condition increases the general failure of the circulation, and death from venous air embolism results, primarily from emboli in the pulmonary vessels as a result of this insufficient heart action and sudden and intense anemia in the many organs of the body.

So far as practical deductions can be drawn, there seems to be no distinct separation between prophylaxis and therapy. The author warns against conducting obstetric operations with the pelvis of the patient raised. This posture, he believes, causes negative pressure in the veins of the pelvis and favors

the entrance of air into the uterus and vagina. Should air have entered, he believes that this position only increases the danger. Where the head of the patient is raised, if air has entered the right side of the heart, the tendency is to limit it to the pulmonary circulation and not to affect the entire system. He recommends for pelvic and obstetric operations, a horizontal position upon the back.

As far as drugs are to be considered, those substances which quickly stimulate the action of the ventricles are useful; such are camphor, caffein, strophanthus, and adrenalin. If possible, puncture of the ventricle should be made as soon as it is seen that air has entered the heart. While this is useful, to be successful from 10 to 20 c.c. of air mixed with blood must be removed to produce a definite result.

The author recognizes the hopelessness of many cases if once a considerable quantity of air has entered the circulation.

Pregnancy after Nephrectomy.—Borelius (*Monatschr. f. Geburtsh. u. Gynäk.*, 1924, Band 67, Heft 6) cites the cases of 6 patents who after nephrectomy had one or more pregnancies and were confined under observation in the hospital. Four of these patients had their surgical operations in the hospital, and the histories are available of 3 cases having six confinements in other hospitals and these were seen and examined by physicians shortly after labor had occurred. The nephrectomies were done for stone in the kidney, tuberculosis of the kidney, and pyelonephrosis. One patient after nephrectomy for stone in the kidney had three normal pregnancies and confinements. One who had a markedly tuberculous kidney removed, had two normal pregnancies and confinements and remained well on recovery from them. One patient had nephrectomy for pyelonephrosis threatening abortion but was finally delivered with forceps. During the puerperal period she had severe pyelitis caused by the colon bacillus. She finally made a good recovery but remained in a highly nervous state. Another patient had a kidney removed for tuberculosis and after that a normal birth complicated by colon bacillus infection, then the removal of an ovarian cyst and after that two normal births, remaining finally in good health. Nine patients had fifteen pregnancies after nephrectomy, none had abortion or premature labor, and the pregnancies and labors were normal. It is remarkable how, after nephrectomy, pregnancy proceeds without complications; very few cases had albumin in the urine, none had eclampsia, and all did well. A few of them had pyelitis from which they recovered. In all of these 12 patients, pregnancy occurred some time after the nephrectomy; in 3 cases nephrectomy was performed during pregnancy and in 2 of these there was no disturbance in the pregnancy; the third patient had a pyelonephrosis and was threatened with abortion which was checked by morphin and the patient went to term. One patient had symptoms indicating disease of the kidney for twelve years and during this time had two successful pregnancies. During the third pregnancy the condition became so much worse that nephrectomy was performed. A short time after the operation the urine became free from albumin and evidence of tuberculous infection disappeared and pregnancy went on without disturbance.

In treating these cases every care was taken to know that the other kidney was healthy, the X-ray was used and the ureters were catheterized to make sure of this important point. In one case nephrectomy was performed although the urine from the other kidney was cloudy with trace of albumin, leukocytes and a few tubercle bacilli; the result, however, was good.

The weight of the children born after nephrectomy varied from 2850 to 3740 gm. which is the usual weight. In most cases the right kidney was the one affected and removed.

The author quotes the literature of the subject which shows that the experience of other operators has been practically identical with his own. Where one kidney has been removed for tuberculosis and the second becomes involved, pregnancy usually causes so rapid and severe increase in the tuberculous process that fatal result soon develops. Most authorities believe that pregnancy influences tuberculosis of the kidney very unfavorably, tuberculosis of the bladder often develops and the ureters may become distended by retention of septic material and the tendency is for the disease to progress during pregnancy and the puerperal state. The question whether marriage should be forbidden in women in whom one kidney has been removed, may be answered in the negative provided the remaining kidney is healthy and the general health of the patient is good and from one to two years should have elapsed after the nephrectomy.

Changes in Ovaries Produced by Blighted Ovum.—Küstner (*Monatschr. f. Geburtsh. u. Gynäk.*, 1924, Band 67, Heft 6) cites the case of a woman aged 28 who had two spontaneous labors and no abortions and no severe illness. She believed herself to be pregnant and pregnancy was complicated by the spontaneous expulsion of a blighted ovum. Hemorrhage continued and became severe. The uterus was curetted and the diagnosis made of chorionepithelioma. When the patient was admitted to the hospital examination showed a tumor on the left side of the uterus about as large as a hen's egg which seemed to be connected with the uterus by a thin pedicle. The right ovary was somewhat large. There was a bloody secretion but no definite hemorrhage. Material removed for examination showed mucous membrane of the uterus with chorionic cells and characteristic appearance of malignant chorionepithelioma. The uterus and both tubes and ovaries were removed by abdominal section. Examination showed the characteristic lesions in the uterus and also in both ovaries. In the left side there was a small mass about as large as a cherry which proved to be malignant. On examination syncytial tissue was found distributed throughout all of the material removed.

The second case was that of a primipara aged 24 with a similar history and with similar pathological findings at operation. The interesting feature is that a very considerable time elapsed between the expulsion of the blighted ovum and the extirpation of the uterus by operation. The changes in the ovaries were characteristic and fairly well developed.

In the third case the changes in the ovaries did not show increase in lutein cells but otherwise the condition was the same.

In a fourth patient, aged 47, the operation consisted in removing the uterus

and left tube and ovary allowing the right to remain. The characteristic lesions were found on examination. In a fifth case the findings were essentially those of the first.

In all of these patients there had been a blighted ovum expelled; lutein cells and corpus luteum cysts were present in cases where a blighted ovum was expelled, and also where chorionepithelioma had developed. Apparently changes in the ovaries begin at the same time that the blighting of the ovum takes place. Ordinarily when a blighted ovum is removed, changes in the ovary gradually disappear but in the cases mentioned and undoubtedly in others, the process goes on to the formation of a malignant growth.

Puerperal Sepsis.—*Etiology.*—Giles (*Brit. Med. Journ.*, Feb. 19, 1927) states that infection from within as the cause of puerperal sepsis is relatively uncommon; occasionally a latent infection in the tube or appendix may produce sepsis, being set free by the anatomical alterations associated with delivery when confinement occurs. Without examination and interference, infection could scarcely develop except from a damaged and unrepaired perineum.

Labor therefore should be interfered with as little as possible. When interference is necessary the aseptic precautions adopted should be as complete as for surgical operation.

He urged an antenatal investigation of every case of pregnancy to detect possible innate foci of septic infection.

Notification.—This subject has for a long time occupied the attention of the British obstetrical profession (*Brit. Med. Journ.*, Nov. 5, 1924). A recent discussion was conducted by several societies and the question arose as to whether the regulation proposed could be carried out. This regulation provides that when there is a rigor or temperature of 102° F. or higher for twenty-four hours, during the first ten days after confinement or abortion, the case must be reported. The term puerperal fever is to be dropped and in its place puerperal sepsis is to be used.

In discussion it was shown that in some parts of the country the number of deaths from puerperal fever is larger than the number of cases actually reported. Some in discussion urge that septic cases be reported and thus that the patient be brought promptly under efficient treatment. It was thought by some that the term puerperal fever must be retained because it is understood by non-professional persons. A better supervision of obstetric practice is greatly desired. Eden believes that the notification of puerperal fever is not satisfactory. Fothergill estimated that not 4 per cent of the cases are reported; many of these undoubtedly occur after criminal abortion. The difficulties of the general practitioner were emphasized because frequently cases which he treats are found to be under practically the control of midwives who do not practice aseptic precautions.

On the whole it was thought that notification of the complications of pregnancy and labor and the puerperal state was greatly to be desired and, if possible, should be enforced.

Contracted Pelvis.—In the *British Medical Journal* for February 2, 9, and 16, 1924, are published three lectures by Fitzgibbon, Master of the Ro-

tunda Hospital, on this subject. He states that the obstetrician should consider a pelvis contracted when its size or contour interferes with spontaneous delivery. Lesser degrees of contraction are especially dangerous because they do not occur in deformed women and often do not attract attention. Apparently small women frequently have successful labors so that it is not the actual stature of the patient which is important.

He states that a normal pelvis has an anteroposterior diameter of 4⅕ inches or 10.5 cm. and a transverse diameter of 5¼ inches or 13 cm. at the brim. The cavity is practically circular, varying from 4¼ to 5 inches in diameter. When the outlet is dilated it is practically circular with the average diameter of 4½ inches. The average normal infant weighs from 7 to 7¼ pounds and both diameters which engage in the pelvis in spontaneous labor measure 3¾ inches. It is important to remember that the size of the fetal head can be reduced by pressure. When one studies the ratio of the fetal head to the pelvis it is found that spontaneous delivery is possible more often than has been supposed. No general classification can be made which is practical but each case must be studied and treated on its merits on careful observation. While the degree of contraction may greatly alter the prognosis it very often does not exclude delivery through the pelvis.

The author is accustomed to study cases during actual labor where there is no great pelvic contraction or disproportion and if this be done accurately and early, from 70 to 80 per cent of cases of contracted pelvis terminate with no more difficulty than normal cases. Those requiring obstetric surgery can be taken to hospital and receive proper treatment before complications develop. If a patient with contracted pelvis can deliver herself, labor does her no harm, and injuries arise from prolonged or ineffectual labor which develops gradually.

He divides contracted pelvis into (1) symmetrically contracted, (2) small round or transversely contracted, (3) generally contracted flat pelvis, and (4) small flat pelvis. He draws attention to contraction of the anteroposterior diameter as the most important element influencing the prognosis for delivery. The transverse diameters are rarely reduced to any extent. In one year the author met 190 cases of contraction of the pelvis. These did not include those having an external conjugate of more than 18 cm. except among the round pelves and 2 cases with marked difficulty in flat pelvis. The average external measurements of these 190 were 23.25 cm. between the spines, 25.85 cm. between the crests, external conjugate 17.78 cm. The average weight of the infants was 7 pounds 3 ounces. In 99 consecutive cases treated by cesarean section for contracted pelvis in another hospital, the measurements were 9.2 inches between the spines, 10 inches between the crests, external conjugate 7.2 inches, and the average weight of the children 6 pounds 14½ ounces.

Symmetrically contracted pelvis the author considers usually as hereditary. Among these patients the proportion of low forceps application was not greater than the average. In one case, because progress lingered, section was done when it was found that the head had passed the brim so completely that it was necessary to use forceps to bring it up again. Among these patients 14.4 per cent required interference.

Sixty-nine cases of transversely contracted or small round pelves were

seen; the anteroposterior diameter was from 20 to 17 cm. These were among the most dangerous cases so far as the transverse diameter was concerned and there was marked difficulty in delivery. In 14 vertex presentations among these cases there was marked difficulty at the brim where the head lodged. In 2 cases where the head passed the brim, the child was stillborn. Forceps were used more frequently than normally and the head was often excessively molded; 29 per cent of these cases were difficult.

There were 70 cases of generally contracted flat pelvis, the anteroposterior diameter not greater than 18 cm., and this produced no effect on delivery. One large child was delivered by low forceps followed by death from intracranial bleeding. Forceps delivery was not more frequent than the average. Two patients were delivered by section, one for a second time, although the children were about average size; one in her third labor had version. In a primipara the cord prolapsed with very slight dilatation of the cervix, the fetus died and the patient was delivered by craniotomy.

In 18 cases of small flat pelves the external conjugate was as low as 15.5 cm. There was difficulty in labor in 3 cases, 18.75 per cent, and forceps were used more often than the average. Thirty-three rachitic cases were studied in which the iliac crests were involved and gave evidence of the disease; rachitis, however, does not produce any one definite type of pelvic contraction, nor is it a very serious complication in labor and only 5 out of 33 patients had any difficulty.

In the whole series of 190 contracted pelves, 20 per cent had difficulty in labor. Cesarean section was performed 10 times, pubiotomy 8, forceps delivery 7, perforation after prolapse of the cord in one. Eight children were stillborn or died soon after delivery, of whom one was delivered by section, 4 by pubiotomy, 2 by version and one perforated; as the section was done early in labor, there was no evident cause for the death of the child. Forceps were used in 12.1 per cent and there was more molding of the head than normal in these cases. In all cases in the hospital during this time the forceps were used in 7.3 per cent and in primiparæ in 16.66 per cent. This would indicate that forceps need not be used more often than the average in contracted pelves.

The writer places little importance upon contraction at the outlet of the pelvis. In his experience if the brim will allow the head to pass, there will be no greater difficulty at the outlet. He has never had difficulty in extracting the head after it has reached the outlet. He believes that cases reported of deformity of the outlet are really those of disproportion at the brim and that this is not noticed until the head lodges in the pelvis. The difficulty in delivery arises from disproportion during the passage of the head to the outlet and consequent interference with mechanism. He does not measure the outlet but in the reports of other hospitals in 261 cases, 65 were reported as contracted at the outlet, of whom 41 ended in spontaneous delivery, 19 were terminated with forceps, one by section, and 4 not accounted for. He does not believe that one can estimate accurately the size of the fetal head before the test of labor. Women with contracted pelves tend to produce small children but not always small enough to balance the contraction of the pelvis. The

principal indication of disproportion is the head high and movable above the pelvis; the soft tissues keep the head high more often than the pelvis does.

Fitzgibbon divides contracted pelves into minor, medium, and major groups. In the minor the true conjugate is larger than 9 cm. and the prognosis for pelvic delivery is good. In the medium the anteroposterior diameter is reduced to 9 cm. but not less than 8, and transverse not less than 10.75 cm. If the bitemporal diameter of the head can be substituted for the biparietal in these cases, spontaneous labor is possible and this depends upon the transverse diameter of the pelvis. He had 157 such cases and 14.6 per cent had very marked difficulty in labor. When the true conjugate is reduced to 8 cm., pelvic contraction becomes the major degree and a normal transverse diameter does not help. Of these he had 6 cases, of which 34.6 per cent had difficult labors.

Diagnosis should be made in prenatal clinics before labor, and the conjugate and two transverse measurements, he believes, are most important. If the conjugate is less than 19 cm. the cavity of the pelvis is lessened. He used Skutsch's pelvimeter for internal pelvimetry. Radiography he believes impracticable. The fetal head and the pregnant condition obstruct the pelvis and he thinks that during labor patients cannot be transported to hospitals to obtain an X-ray picture of the pelvis and an expert is not always available to read the plates after they have been obtained. In emergency one often cannot get an X-ray picture.

Contracted pelvis does not influence pregnancy until the thirty-sixth week when descent should occur. The end of the thirty-sixth week is the best time to examine a case of contracted pelvis; complete examination under anesthesia may be indicated and about 70 per cent of cases will show good proportion and can go on safely to term. Cases of contracted pelvis should come into hospital at a calculated date for observation and treatment. Palpation and internal measurements are most valuable in studying these cases. If the promontory of the sacrum can be reached by vaginal examination, the internal conjugate is not more than 9 cm. The lateral edges of the brim should also be palpated and the relation of the head to the pelvic brim is most important. Where the head lodges against the top of the pubis the condition may be a grave one. If the head enters the brim the pregnancy may go on ten to fourteen days longer, but if the head impinges against the thumb of the examiner the head usually will not enter the pelvis and the pregnancy should be terminated. If induction of labor is to be performed, it must be done promptly so soon as the disproportion is recognized.

In the first stage of labor contracted pelvis does not seriously interfere with the normal presentation; if the membranes rupture prematurely, then abnormality may develop. During the second stage of labor the influence of pelvic contraction is greatest, the cervix usually draws up leaving the head against the pelvic brim. In the second stage, molding is not excessive if the cervix continues to dilate. If this does not occur, the lower segment stretches and presses constantly upon the head and there is considerable molding. Well-marked molding is evidence of disproportion.

As to the mechanism of labor in contracted pelvis: Where the transverse

diameter of the brim is lessened the head may be forced through with the posterior fontanel last and with excessive flexion. In small flat pelves the head moves laterally and accommodates itself to the brim; there is not much flexion until after the brim is passed and the head is flattened transversely; impaction results when the proportions between the head and pelvic brim are such that the head can engage but cannot be reduced by pressure sufficiently to pass. Contracted pelvis often calls for unusual uterine force and this may be followed by inertia or overdistention with rupture.

In treatment Fitzgibbon recognizes three methods: (1) Spontaneous delivery which includes the use of forceps after the obstruction is passed if excessive molding is not present; (2) the induction of labor; and (3) cesarean section. During pregnancy the induction of labor is the only treatment to be considered. At term the choice lies between spontaneous labor, or delivery by section. In inducing labor any time four weeks before full term may be selected. It is rarely necessary to induce labor as early as the end of the thirty-sixth week; more cases are taken at the end of the thirty-eighth week and induction of labor is indicated in 25 per cent of all pelvic contractions. His method is to introduce a small rubber tube, under careful aseptic precautions. If there is marked obstruction, cesarean section is usually indicated, although he believes that over 70 per cent of cases of pelvic contraction will deliver themselves spontaneously, under good care and observation. If the membranes bulge in a large bag into the vagina with the cervix partly dilated, section is usually required. Examination under anesthesia is very valuable. If the head has not passed the brim and the membranes have ruptured, vaginal examination is made within a half hour. If the cervix is fully or nearly dilated, and the head engaged with slight overlapping, the head will come down in a reasonable time and may be delivered safely with forceps. Labor may still go on if the cervix is only partly dilated if the head has entered the brim as a vertex and the cervix is closely fitted around the head. If the membranes have ruptured and the cervix is not applied to the head but remains as a vaginal portion, section is indicated in not less than six hours. A second vaginal examination should be made in all cases not delivered within four hours after the rupture of the membranes. Where the anterior lip is thickened and greatly lengthened, the head is greatly molded, the occiput may be posterior and the parietal bone may be presenting, spontaneous labor cannot be expected and the use of forceps may cause the death of the fetus in 50 per cent of the cases. In proper cases pubiotomy may be performed but section is safest. These cases are serious because the forceps are often applied and failure of this attempt greatly militates against the success of operation.

Where a considerable portion of the vaginal part of the cervix has reformed, with partial closure of the internal os, the head high above the pelvic brim, section is indicated. The writer believes that cases are no less suitable for section four hours after rupture of the membranes than at the beginning of labor.

High forceps in contracted pelvis do more harm than good; in some cases pubiotomy makes the use of forceps successful. These cases should never be allowed to go to the point of great distress for the mother and forceps

should be used on maternal indications. The forceps should complete delivery where the natural forces have failed to do so but have overcome the obstruction, and before the vitality of the patient is reduced by the useless prolongation of labor. Version, he believes, has no place in the treatment of contracted pelvis. Pubiotomy is easy to perform, safe for the mother, and saves the child. In the last four years the author has performed the operation 18 times, with the delivery of 13 living infants. Two mothers, previously infected, died; the child of one of these survived. He would never, however, with considerable disproportion and difficulty, allow labor to go on with the definite decision to perform pubiotomy; in all doubtful cases he would perform section. Craniotomy is usually proof of failure in treatment.

In a year the writer had 110 spontaneous normal deliveries with the death of 3 infants; one low forceps with the death of 2 infants, 5 low forceps with marked molding, and no mortality; 2 high forceps with no mortality; 4 pubiotomies with no mortality; 15 cesarean sections with 2 infant mortalities; 8 induced labors with death of one child; 5 induced labors terminated by low forceps, no mortality; 2 craniotomies; 2 prolapse of the cord terminated by forceps; 3 easy breech labors without accident; 2 face presentations converted into vertex; 4 twin cases without mortality; 8 premature children of whom 5 died; and 2 cases of macerated children; 184 deliveries with fetal mortality of 19.

Pelvic measurements averaged 7.2 inches for the external conjugate, the maximum being 7.6 and the minimum 6.6. The distance between the crests averaged 10.2, the maximum being 11.6 inches, the minimum 8.2.

Acute Abdominal Emergencies.—In the *British Medical Journal*, March 12, 1927, Fairbairn contributes a paper upon this subject. It seems a reasonable supposition that pregnant women should be more liable than others to acute mechanical disturbances of the bowel and to the spread of inflammation in the peritoneum, and this increased liability results from the displacement of the abdominal contents, with increased pressure, and the rapid change in these conditions following emptying of the uterus.

Pregnancy may greatly complicate a diagnosis, for vomiting, abdominal pain, distention and jaundice may exist in pregnancy without other abdominal conditions to produce them. After the third month of pregnancy the uterus becomes an abdominal tumor and in later pregnancy abdominal physical signs are complicated and altered by its presence. The toxemia of pregnancy or the mechanical effects of abnormalities in the reproductive tract may produce abdominal symptoms.

Severe vomiting must not be considered as usual or normal in pregnancy. When the surgeon is summoned to a case presenting this symptom, he must exercise great caution before ascribing it at once to pregnancy. The vomiting of pregnancy usually begins about the time of the first missed menstruation and continues or may be worse, for two or three months. It is more severe in primigravidæ and tends to return in subsequent pregnancies in lessened degree; food recently taken is the vomited material, but later bile-stained fluid is present. Only in definite toxemias is coffee-ground material observed. There is constipation but the bowels may usually be moved by enema. The

abdomen is sunken and not distended. When in pregnant patients vomiting begins after the fifth month, without evidence of toxemia, it should suggest an organic cause, especially if the vomiting rapidly becomes fecal.

Cases where vomiting arises late in pregnancy, where vomiting has not occurred in previous pregnancy, and where there is no evidence of impairment of renal or hepatic functions, require especial attention. Where the cause is not clear, the patient should be away from home under the care of competent nurses, so long as her condition so justifies and until a diagnosis can be made. If there is no definite evidence of renal or hepatic insufficiency, and treatment causes no improvement, the pregnancy should be ended. The writer narrates a case transferred to him by a surgeon, where there was pregnancy and continued vomiting; there was no albumin or jaundice and treatment was without avail, and the pregnancy was terminated at seven and one-half months. Shortly after, an emergency operation was performed for obstruction of the bowel from carcinoma of the colon, which had not been detected before the emptying of the uterus.

Pregnant patients showing symptoms of gall-stones or cholecystitis may present difficulty in diagnosis. Where there is toxemia, vomiting is pronounced, albuminuria is usually present and vomiting may become coffee-ground, jaundice is usually present. Cases are reported where the toxemia of pregnancy produces acute hemorrhagic hepatitis with jaundice and severe pain.

Maybury reported the case of a young woman, two months in her second pregnancy. She had had jaundice of a few days' duration about five years previously, with pain in the left scapula, which soon disappeared followed by epigastric pain and slight jaundice, the whole being ascribed to gall-stones. When she was first seen in her pregnancy, the symptoms were like those of obstruction of the bile-ducts, the stools were clay-colored, the liver enlarged and a little tender, but the gall-bladder could not be felt. Medical treatment produced no improvement. On exploring the gall-bladder, it was found to be empty, nor was there a trace of bile in the common duct. From the right and left hepatic ducts a little dark material was removed. A tube was inserted into the common bile-duct and a drain to the transverse fissure, and on the following day through both channels, bile was discharged. A fragment of liver tissue was examined showing undilated bile-ducts, no fat and slight degeneration of the liver cells. There was albuminuria with casts. The blood urea was above normal, and tests indicated a catarrhal jaundice. Spontaneous abortion developed, after which the patient died, apparently profoundly toxic.

The writer also quotes a case of a patient with severe vomiting once or twice daily, of a large quantity of brown and offensive fluid; apparently acute dilatation of the stomach was present. There was albuminuria and a high blood-urea content; coma developed but after the uterus was emptied the patient recovered.

The writer alludes to the causes of abdominal pain more or less directly connected with pregnancy, such as intra-uterine bleeding with a retention of blood. In concealed accidental hemorrhage, its sudden onset and collapse may

produce a striking condition; this does not usually occur until the later months of pregnancy, when the uterus will be found fixed and tender, without signs of fetal life or fetal parts.

When a vesicular mole is present these symptoms may develop in early pregnancy and suggest an ectopic pregnancy with intraperitoneal hemorrhage.

Severe abdominal pain, collapse and signs of internal hemorrhage follow spontaneous rupture through the scar of a previous cesarean section. When blood leaks from a tubal gestation by rupture or gradual discharge, a marked abdominal crisis results. This usually happens so early in pregnancy that the diagnosis of pregnancy must first be made, and for this the history is all-important. The most common and least dangerous termination of a tubal gestation is the formation of a tubal mole which rarely gives rise to severe symptoms. This, however, causes pain, sudden in onset, and may be accompanied by faintness, vomiting and shock, and suggest a more serious abdominal cause. There is tenderness in the hypochondriac region, with a history of uterine bleeding, making the diagnosis remain between that of intra-uterine abortion or tubal abortion or mole. Later, when a swelling is recognized bimanually in the lower abdomen, the diagnosis may rest between tubal gestation or appendicitis. When a tube ruptures in early pregnancy, followed by profuse intraperitoneal bleeding, the symptoms are pronounced and the necessity for abdominal section is evident.

Acute necrobiosis, in a uterine fibromyoma, may produce severe abdominal pain; on examination a nodular enlargement of the uterus, tender on palpation, is found.

When a pregnant patient has an ovarian cyst, it is peculiarly liable to strangulation by torsion of the pedicle. The symptoms are often subacute but occasionally develop spontaneously and so severely as to stimulate strangulation of the bowel, and in hospital practice such cases are sometimes admitted and operated under a diagnosis of acute intestinal obstruction. Torsion is more common in small than in large ovarian tumors, and those in the abdomen rather than in the pelvis. An ovarian cyst which before pregnancy was in the pelvis may be drawn up into the abdomen with the uterus and not be recognized until torsion of its pedicle develops. It may not be detected until pain, vomiting and distention occur. After torsion, hemorrhage into the cyst wall with increased tension develops, rendering the cyst more easily found by palpation, and when the cyst can be recognized, apart from the uterus, diagnosis is usually plain. There are a few cases on record of torsion of the pedicle of a pedunculated subperitoneal fibroid or presence of a fibroid uterus at the cervix, complicating pregnancy.

It is rare to find peritonitis, local or general, arising from infected tubes or ovaries during pregnancy. Infection of tubes and ovaries usually produces sterility. Those cases are sometimes seen where an inflammation has occurred at the same time as the pregnancy, and in others where infection has developed from the appendix or some other septic focus; pregnancy does not, in these cases, exclude the possibility of an acute spread of infection from the uterine appendages.

The pyelitis or pyelonephritis of pregnancy may simulate an acute abdomi-

nal emergency and has frequently caused the removal of a normal appendix. It is more common on the right side than on both, and least common on the left. The symptoms of appendicitis are often present. It is more common in primigravidæ and may be associated with cystitis. The diagnosis is made by the study of the urine and the detection of the Bacillus coli communis in the urine and the tenderness in the line of the costovertebral angle.

Pregnant women often complain of constipation and flatulence, especially in early pregnancy, but tympanites or constipation sufficiently severe to give rise to severe symptoms, is very unusual. There are a number of cases on record of ileus in pregnancy, including instances of intestinal obstruction due to mechanical causes, and of paresis of the bowel ascribed to the pregnancy as a mechanical effect of toxemic manifestations. If the cases reported are examined it is found that many of the cases of intestinal obstruction during pregnancy have been previously operated upon for some abdominal condition. Evidently the changes in abdominal contents associated with pregnancy and labor, may be especially liable to produce intestinal obstruction in patients having adhesions, hernia after operation or other such conditions. The fact that advanced ectopic gestation may give no symptom of its presence, explains some of the alleged cases of ileus. Mechanical interference with the intestines is most likely to arise when the uterus has become an abdominal organ, and labor with its marked change in the intra-abdominal pressure and contents, is the time when disturbance is to be expected.

Regarding appendicitis, it is thought that pregnancy has no tendency to increase its development. In late pregnancy, appendicitis is a serious complication because infection of the upper abdomen may develop and the descent of pus toward the pelvis may be prevented; abortion and labor spread the infection. Very often the pain of appendicitis complicating labor is falsely ascribed to some condition of the genital organs. When fetal movements cause pain in the abdomen, it is significant that the temperature is found unusually low and the pulse rate high.

So far as treatment is concerned it is safer to operate in infection of the appendix and gall-bladder during pregnancy, than to allow the case to go on to its later development. Interference with pregnancy is rarely indicated; occasionally, as in carcinoma of the bowel causing obstruction, the pregnancy should first be terminated and then the carcinoma removed.

In some cases it may be necessary to empty the uterus by cesarean section as a first step in the main operation. In infected cases hysterectomy may be chosen.

In general the writer urges that the least operative procedure which will meet the needs of the case, and the one that can be performed in the shortest time, should be selected. The uterus should be disturbed as little as possible. The occurrence of abortion or premature labor after an operation for an acute abdominal condition, greatly complicates the situation because of the development or spread of infection.

As regards the case narrated by the writer where hepatic complications developed during pregnancy, followed by a fatal termination, and where operation found no gall-stones but bile flowed after the operation, the reviewer

had a somewhat similar experience. A young Italian primigravida was in advanced pregnancy with increasing toxemia. Medical treatment failed to relieve or control the condition. There was no dilatation of the cervix and there was vague tenderness over the right abdomen suggesting cholecystitis or appendicitis or both. Jaundice was present, and after weighing the possible results of induced labor and other procedures, the patient was delivered by abdominal cesarean section with the birth of a living child, and after the uterus had been closed and replaced, the appendix, which was acutely inflamed, was removed and the gall-bladder drained. There was some accumulated material in the gall-bladder and a beginning cholecystitis. On the following day the discharge of bile through the drainage tube became free, the patient's toxemic symptoms subsided, and mother and child made a good recovery.

Purpura Hæmorrhagica.—This rare condition in pregnancy is described by Hottenstein and Klingman in the March, 1927, number of the *American Journal of Obstetrics.*

Examination of the literature shows that idiopathic purpura hæmorrhagica is rare, as Rushmore found but some 40 cases in a review of the literature. The patient was an American aged 30 with no history of abnormal condition of the blood. Three years before an abortion was followed by peritonitis, a previous pregnancy terminated normally. At her first labor, eighteen months previously, there was profuse postpartum hemorrhage but no purpura. During the pregnancy in which she came under observation, she had some temperature with patches of petechia and hemorrhages into the mouth. The blood disturbance increased steadily after delivery. There was a septic temperature with profuse lochia, and splenectomy was performed but was unsuccessful. An autopsy could not be obtained.

The purpura appeared during the fourth month of the pregnancy, the spots increasing in number and size as the pregnancy proceeded. At this time the blood showed 1,936,000 reds, 2350 whites, 25,000 platelets. Hemoglobin 36 per cent. The clotting time was four minutes and the blood calcium 9.6 mg. per 100 c.c. The Wassermann reaction was negative. The urine normal. The patient was admitted to hospital and given a transfusion of 600 c.c. of unmodified blood. This was followed by improvement, but the patient declined to remain in the hospital for further treatment. When she next came to the dispensary four weeks later, she was very weak and the purpura had become general. She finally entered the hospital six weeks later because her gums were bleeding profusely. The purpura was over the entire body, transfusion was again performed. When labor came on she was easily delivered by forceps and the third stage presented no more bleeding than normal. Urine taken by catheter showed a trace of albumin, red blood-cells, and granular casts. The child was a normal male requiring no resuscitation, and although it was artificially fed, has developed normally. The mother's lochia was profuse and she developed a septic temperature and complained at times of blindness. During the week following her delivery she lost considerable weight, she was very anemic and had high temperature. There were retinal hemorrhages and transfusions were again given. On splenectomy the spleen was found not to be enlarged, cultures made from it showed a short chain strep-

tococcus. A blood-culture taken just before the operation was negative. Transfusion was done just before the operation but the patient died on the second day, with great restlessness and difficult breathing.

Autopsy showed generalized subcutaneous hemorrhages. There was edema with congestion of the brain. In the lungs congestion and edema with multiple hemorrhage were present. There were petechial hemorrhages in various organs of the body and an acute parenchymatous degeneration of the kidney, with hemorrhage.

That the case reported was undoubtedly septic, there can be scarcely a doubt. Those who have seen many cases of puerperal septic infection will recall some in which petechial hemorrhages were a very prominent symptom.

In one case the reviewer examined a case supposed to be cerebrospinal meningitis which proved, however, to be septic infection and no evidence of meningitis was found. In another case a diagnosis of hemorrhagic smallpox had been made, but on close examination of the patient, this also proved to be puerperal sepsis. In this instance the case was complicated by an acute syphilis.

Concealed Accidental Hemorrhage.—In the *Edinburgh Medical Journal*, 1926, Proceedings of the Edinburgh Obstetrical Society, Hewitt describes the condition of the uterine wall in concealed accidental hemorrhage complicating pregnancy. He believes that the retention of fluid in the uterus is caused and maintained by painful tetanic contractions of the uterus. The difficulty experienced in making out the fetal parts by abdominal palpation is not due to the presence of blood-clots and placenta between the examining fingers and fetus, but to the tonic condition of the uterus. Examination shows that the membranes are very tense. Sustained spasm of the uterus causes the pain and the cramplike uterine contractions prevent labor from developing.

Cameron (*ibid.*) has found that in concealed accidental hemorrhage many patients die from shock. He questions whether death ever results from bleeding only. He does not use rupture of the membranes, abdominal binder and packing of the vagina to stop hemorrhage. He demonstrates the fact that no pressure from below, however great, can stop bleeding because the uterine and ovarian arteries anastomose so freely. He relies upon morphin given in doses sufficient to keep the patient in a drowsy condition. When she rallies from shock, 0.5 c.c. pituitrin is given every half hour until labor begins. Should there be any suspicion of uterine rupture, cesarean section and, if necessary, hysterectomy, should be immediately performed.

Rupture of Uterus.—Morvay (*Med. Klin.*, Feb., 1927) in studying this subject finds that rupture of the uterus, whether spontaneous or following trauma during pregnancy or labor, is usually due to some damage to the uterine wall in previous pregnancy, or a previous cesarean section, especially if the uterine incision was high up on the fundus, or if the patient's recovery was complicated by sepsis. Recent curetting sometimes injures the uterine wall and if pregnancy follows soon after, the uterus may rupture at that point. In most cases of spontaneous rupture, the lesions occur in the fundus under an abnormally high placenta. Stretching of the uterine wall over an ovum implanted in the interstitial end of a fallopian tube has also been followed by

rupture. In the records of these cases many remain unexplained because it is impossible to get an accurate history of the patient or a histological study of the condition. He cites a case of concealed hemorrhage at the sixth month, in a multipara, where rupture followed very slight trauma, abdominal section was performed two days after symptoms began and a macerated fetus was found in the abdomen, the placenta was adherent to the uterine wall, with old and recent hemorrhage. The uterine tear involved the placental site and was of considerable length. On microscopic study it was found that the fetal trophoblast had penetrated the uterine muscle.

Sudden Death Caused by Manipulation of Pregnant Uterus.—Spilsbury (*Brit. Med. Journ.*, May 14, 1927) states that in most of these cases death occurred during pregnancy and circumstances pointed to attempt to procure abortion. In the majority the method used was the injection of fluid into the uterus, partly separating the membranes. In 2 cases the introduction of instruments into the cervical canal proved immediately fatal; in the third case the instrument had been passed into the body of the uterus. One patient died when a rubber tube, which had been inserted into the cervical canal on the previous day, was removed. In none of these cases was a serious disease found which could account for death, and even microscopical examination failed to reveal cause for the fatal issue.

The writer believes that the emotional state of the patient at the time of the attempt and shock caused by the manipulations produced a reflex vasomotor paralysis resulting in rapid fall in blood-pressure.

Uterine Scar after Cesarean Section.—In a paper by Murray before the Edinburgh Obstetrical Society (*Brit. Med. Journ.*, March 12, 1927), he suggests the terms intraperitoneal and extraperitoneal, for rupture of the uterus. He believes that the chances of rupture of an old cesarean section scar have been greatly exaggerated. Still, this possibility cannot be ignored and should be kept in mind in pregnancy following cesarean section.

In 50 repeated sections he had found none giving evidence of imminent rupture. In these patients the scar area was thinner than the surrounding tissue, but in all cases tough and firm.

Oligohydramnios.—Schiller and Toll (*Am. Journ. Obst.*, June, 1927) believe that oligohydramnios is produced before pregnancy by endometritis which is not acute enough to prevent the imbedding of the ovum in the decidua. Through inflammatory hyperemia, one side is nourished more than the other, resulting in unequal development of the fetus, with a long kidney on one side and lack of kidney on the other. An extension of the decidual inflammation to the placenta, chorion and amnion occurs and leads to decrease in the secretion of the amniotic fluid. At early pregnancy malformations such as clubfeet are produced.

The inflammation of the placenta accounts for the premature delivery.

The amniotic liquid is probably produced by the epithelium of the amnion and also from the fetal urine.

Basal Metabolism in Pregnancy.—Ramos and Schteingart (*Gynéc. et obst.*, May, 1927) find that the thyroid gland influences both mother and child during pregnancy and that conception cannot occur without thyroid activity.

If hypothyroidism does not prevent conception, the consequent edema of the uterine mucosa prevents pregnancy. Thyroid hypertrophy and hypothyroidism are common in pregnancy. In 61 per cent of the cases studied, basal metabolism was increased with augmented heat production, especially during the latter stage of pregnancy. Where women show a slight hypothyroidism, under normal conditions, the other endocrine glands may compensate for this by increased activity. This would account for a normal metabolic index seen in some cases during the latter part of pregnancy. The fact that these patients had a lessened quantity of protein has something to do with it. An increased heat output is necessary for the development of the child.

Significance of Enlargement of the Thyroid.—This subject has been studied by Hinton (*Am. Journ. Obst.*, Feb., 1927) who uses the classification of Plummer in dividing the goiters found among his patients. The most frequent sort of goiter in pregnancy is the colloid. This results from the fact that the thyroid gland cannot meet the excessive demand which pregnancy makes upon it and colloid is secreted in the acini; this is retained, producing distention and a soft and uniform enlargement throughout the whole gland. The patient's pulse is not affected and hyperthyroidism is never present. This condition can be successfully treated by giving thyroid extract ½ grain three times daily for three weeks out of each month. Should this dose not be sufficient, it may be increased to from 6 to 9 grains daily, but the treatment should be intermittent and not continued indefinitely.

In patients who have had several children, adenomata of the thyroid are seen and especially if the pregnancies have occurred in rapid succession. There is usually a definite mass confined to one lobe, occasionally to the isthmus, which gives the neck an enlarged appearance upon one side. On palpation the growth is readily made out. It is important to distinguish between an adenoma and colloid goiter. Treatment of the former with iodin or thyroid extract may lessen the swelling of the neck, but the condition cannot be cured, and the danger is that hyperthyroidism may result. If the patient's basal metabolism is normal, no medication should be given; where hyperthyroidism is developing with the existing adenoma, 3 grains of ovarian substance and 2 grains of pancreatic may be given three times daily.

Exophthalmic goiter is not common in pregnancy. In considering the treatment of the case the severity of the disease and the duration of the pregnancy must be considered. Where the disease is severe and the patient in the early months of pregnancy, a therapeutic abortion should be produced. If the patient has reached the fifth or sixth month, with little disturbance, she can usually go safely to term. If she is in the later months of pregnancy and very ill, the superior thyroid arteries may be tied and medical treatment given. It is occasionally necessary to perform a thyroidectomy.

In the cases of colloid goiter, iodin or thyroid extract should be used and with judicious management, the prognosis of such a case is good. Apparently the adenomata have their origin during embryonal life, probably from the lack of iodin in the mother. The proper treatment of the mother should prevent fetal adenoma. If adenomata can be prevented, malignant disease of the thyroid will be greatly lessened, for most of these tumors began in adenomata.

Iodin and thyroid extract are contra-indicated where the goiter is caused by adenoma. In exophthalmic goiter, iodin should not be used unless as a preoperative measure to reduce the toxicity of the patient.

In the *Journal of the American Medical Association,* 1926, 87: 1004, C. H. Davis reports his examination of 520 women during early pregnancy, finding 41 per cent with visible enlargement of the thyroid. Within fourteen months after delivery, 8 of these returned with the characteristic symptoms of toxic goiter. During pregnancy several doses of iodin were given, after delivery none. Hyperthyroidism developed in no case earlier than four months after delivery. The usual cause is overwork, worry and nervous strain which produces enlargement of the thyroid in pregnant women.

Women who live in goiter districts should have iodin during pregnancy as a prophylactic measure, unless they have an adenoma of the thyroid. Hyperthyroidism may be developed, but has not yet been observed. The average metabolic rate in 9 women with normal thyroid at term was + 2.4 per cent; after delivery their average was — 1.3 per cent. Seven patients with simple hyperthyroidism had + 22.1 per cent before term with a drop later on to + 3.1 per cent. In the hyperthyroidism group, 9 women had + 32.2 per cent before delivery and eleven days afterward + 8.9 per cent, excepting two. In this last group small doses of iodin were given to these women during the last months of pregnancy. Where patients have been operated upon for toxic goiter and become pregnant later, they are benefited by small doses of iodin; only one such patient could not tolerate the drug.

In one case of toxic adenoma of the thyroid, operation was demanded in the fourth month of pregnancy and later iodin was given. One patient having a toxic adenoma was apparently benefited by iodin during pregnancy, although her metabolic rate at term was + 86; twenty days after delivery she was successfully operated upon. She continued to nurse the child and additional feedings were stopped six days after the operation. Mother and child subsequently did well. One case of exophthalmic goiter suffered from prolonged nausea and vomiting; ten days before her delivery her metabolic rate was + 81 per cent. She was benefited by the use of iodin. As a rule, patients toxic in pregnancy had a low metabolic reading and some of them had lower readings than those with high blood-pressure, albumin and casts but no edema.

When a comparative study of the amount of calcium in the blood and the function of the thyroid was made, as indicated by the basal metabolism, no relation could be shown between the milligrams of calcium in each 100 c.c. of serum and the metabolic rate. The average metabolism for the patient with thyroid hypertrophy is slightly higher than for the women with normal thyroid, but the series is too small to justify conclusions.

After delivery, 3 patients with toxemia of pregnancy had a lower calcium content; normal patients usually show an increase within eleven days. The administration of cod-liver oil and ultraviolet radiation did not increase the blood calcium.

This preliminary study suggests that if a woman with a normal thyroid has sufficient iodin during the course of normal pregnancy, her basal metabolic

rate remains within normal limits, with a slight increase toward the end of pregnancy. Where the metabolic rate is considerably above normal, abnormal function of the thyroid, usually slight in degree, is present. When within eleven days after delivery there is return to normal this must be considered as the average, but it does not prove that increase of rate did not signify abnormality. Such patients require prolonged medical care after delivery. Many cases of confirmed nervous diseases frequently originated in a disturbance of thyroid function during pregnancy.

Basal Metabolism Studies in Normal Pregnant Women with Normal or Pathological Thyroid Glands.—Ploss and Yookam (*Am. Journ. Obst. & Gynec.*, Oct., 1929, p. 556) state that the basal metabolism rate during normal pregnancy shows an approximate increase of 15 per cent with a free to normal in the first few days following delivery. Of patients studied 20 per cent had a basal metabolism rate above + 20 per cent. Pathologic thyroid glands are less able to respond normally to the demands of gestation, but tend to function abnormally, producing symptoms of hyperthyroidism.

Iodin, given entirely during the pregnancy, is apparently unable uniformly to prevent gestational hypertrophy of the normal thyroid gland, but seems to be quite effective in preventing such a change in the glands which are pathologically altered when pregnancy begins, and may actually lead to a reduction in the size of certain colloid goiters. Iodin given to pregnant women acts very effectively to prevent the appearance of congenital goiter in the newborn.

Hyperthyroidism Complicating Pregnancy.—Falls (*Am. Journ. Obst. & Gynec.*, April, 1929, p. 536) states that mild hyperthyroidism is not an uncommon complication of pregnancy. No special treatment is necessary. Many nervous symptoms arising during pregnancy are probably due to an abnormal activity of the thyroid gland induced by the pregnant state. The symptoms of exophthalmic goiter may manifest themselves first during pregnancy and if present before conception are usually aggravated but can be ameliorated. Vomiting and toxic symptoms of exophthalmic goiter in pregnancy may be wrongly diagnosed as hyperemesis gravidarum. Conservative treatment is the best—rest in bed, Lugol's solution—and as long as improvement occurs, surgical intervention should be withheld. If medical management fails, do surgery after waiting until the thirty-fifth week. Toxic adenoma can be best handled conservatively, unless the pressure or toxic symptoms are too severe, when lobectomy is indicated.

Labor is well supported by these patients, but to spare them as much as possible, one should shorten the second stage by operative intervention when conditions are favorable. Seriously intoxicated patients first seen late in pregnancy, who do not respond to medical management, may best be delivered by vaginal or abdominal cesarean section. Babies born of mothers who manifested all grades of hyperthyroidism, mild, exophthalmic and toxic adenoma, show no clinical evidence of goiter.

Carbohydrate Metabolism in Pregnancy Toxemia.—Titus (*Am. Journ. Obst. & Gynec.*, April, 1929, p. 553) maintains that merely to class toxemias of pregnancy as being associated with a depletion of the body stores of glycogen

and a secondary hypoglycemia, explains more fully and consistently the vagaries of these complex states than has been done heretofore.

Graves' Disease.—Fabre (*Bull. Soc. d'obst. et de gynéc. de Par.*, Nov. 1926) describes Graves' disease, presenting continued tachycardia with violent exacerbations, tremors, exophthalmos and a small goiter. Treatment by radium was refused by the patient and accordingly hemato-ethyroidin was given in progressive doses. The patient was better following this, but six months later a nervous disturbance caused a relapse. In the next month the patient became pregnant and all treatment was stopped. In spite of the pregnancy the symptoms did not return, the mental and physical condition of the patient remaining excellent; pregnancy followed a normal course and the patient was delivered of a healthy child and made a normal recovery, nursing her child.

With others, the writer is inclined to believe that in some cases of Graves' and Basedow's disease, pregnancy is actually beneficial.

Pregnancy Following Inversion of the Uterus.—Miller (*Am. Journ. Obst.*, March, 1927) has studied 55 cases from the literature of this subject and, although a careful search was made, no more reported cases could be found, from which it is inferred that the accident must be often attended with slight results and therefore escape report.

His case was that of a woman aged 23, who stated that her child had been born about seven months previously, that there was difficulty in delivering the placenta followed by complete inversion of the uterus. There was profuse hemorrhage and the patient's condition was serious for several days. She gradually improved but there was a continuous bloody discharge, occasionally profuse, a dragging sensation in the pelvis and frequent headaches. On examination the fundus could not be felt in its normal location but was protruding from the cervical rim. The patient was successfully operated upon and made a good convalescence.

During the next year she was examined at times and came to the hospital for her next confinement. The labor was carefully watched and was perfectly normal, lasting five and one-half hours, with the birth of a normal male child weighing a little over 6 pounds. Examination of the cervix and uterus following the confinement showed no evidence of the former operation. The anterior uterine wall and cervix were normal and no thin area in the uterus could be found. This examination was repeated two weeks later with the same result, the patient making a complete recovery. The operation performed was what the writer called a slightly modified Spinelli operation.

The youngest recorded case found by the writer was age 18, the inversion was cured by operation after existing for six weeks, and the patient had two normal pregnancies afterward. The oldest patient whose history was found was 37 and inversion in that case was cured by operation after eleven months standing. This patient had one normal confinement subsequently. There were slightly more multiparæ than primiparæ in the histories found, and the average duration of the inversion before operation was thirty-three days. The longest interval elapsing between inversion and its cure was twelve months. This was corrected manually. There were some cases of spontaneous correction,

the average existence of the condition being thirty-two months. In several of these cases the spontaneous replacement happened after other methods had been tried. Twenty-two of these patients were operated, on an average of nine months after the occurrence of the inversion, the time varying from five years to four days.

As regards the method of correcting the condition, in 25 the cure was made by manual correction, in 8 the cure was spontaneous and there were 22 operations. One of these patients, after the original inversion, had five pregnancies without a recurrence of the accident. Where the cure was spontaneous two patients had a return of the inversion with a subsequent pregnancy. In the manually corrected cases 44 per cent had a recurrence afterward. There was no recurrence in the cases treated by operation. In the 56 cases there were three abortions and in 38 per cent the placenta was adherent in the following confinement. The occurrence of adherence of the placenta was much more frequent where cases were treated manually than after operation. In 42 cases the final result of the condition was described and among these there were two cases of sepsis, one of whom died. This patient had been cured of her original inversion by operation three days previously. The other septic case recovered. There was no case of rupture of the uterus.

So far as the treatment, in labor, of these cases is concerned, while precaution should be taken to give prompt treatment by operation if necessary, the patient should be given the opportunity of spontaneous delivery. It would seem that cesarean section was indicated more in cases that had been treated by manual reduction than by operation.

Uterine Myoma.—Ferguson (*Brit. Med. Journ.*, March 12, 1927) reports 2 cases of this condition.

The first, a primipara, when first seen had a tender lump in the left side of the abdomen, the uterus pushed to the right. This apparent tumor was freely movable away from the uterus. The patient had pain and slight elevation of temperature. The attending physician thought that the tumor had increased in size within a week and that in the first weeks of pregnancy he had found no tumor. Although the history showed that the pregnancy could not be more than four and one-half months, the fundus of the uterus was above the umbilicus; neither fetal movements nor heart sounds could be detected.

At operation, a subserous fibroid was found on the left anterolateral surface of the uterus, attached by a broad base, and easily removed from its capsule. A very small fibroid was allowed to remain, the patient made an uninterrupted recovery and the pregnancy went on normally.

The second case was that of a Negro multipara at full term, brought to hospital with the history that following the escape of amniotic liquid, a fetal foot had come down. There was slight fever and a foul-smelling vaginal discharge; there were no uterine contractions and the examination resulted in the provisional diagnosis of twin pregnancy, although no fetal heart sounds could be heard. Two swellings resembling fetal heads could be made out. The cervix admitted three fingers and two macerated legs were brought down. It was impossible to empty the uterus, but two hours later a decapitated body of a fetus was spontaneously discharged. On the following day a foul and

macerated head was delivered. The placenta was manually removed with great difficulty, and a large fibroid found. The patient died from shock and septic infection.

At autopsy a large fibroid occupied the entire left wall of the uterus, the size of a full-term pregnancy. There was no history of such a tumor before the pregnancy and it must have grown very rapidly.

Evidently this patient's chance of recovery was lost when she was not in hospital at the beginning of labor.

Fibromyoma of the Uterus in Relation to Pregnancy.—Harris (*Surg., Gynec. & Obst.*, Sept., 1929, p. 330) states that there are manifold relations between fibromyoma of the uterus and pregnancy which concern surgeons and obstetricians. Statistics of sterility caused by fibromyoma of the uterus, if they are to be accurate, must consider such factors as the desire not to have children, widowhood, menopause and disease of the adnexa. Pregnancy and delivery may progress satisfactorily in the presence of a large uterine fibromyoma.

Uterine hemorrhages, breech and transverse positions of the fetus, high fetal mortality, stasis in the urinary and intestinal tracts, and sepsis, are among the important effects of fibromyomata complicating pregnancy, labor and puerperium. Diagnosis may involve great difficulty when an early pregnancy is present in a fibromyomatous uterus or when a large, soft fibromyoma simulates pregnancy.

Myomectomy is often followed by pregnancy in married women, less than 40 years of age, who are desirous of having children, but are sterile on account of fibroids. Patients for myomectomy should be carefully selected, and the right to do hysterectomy should be reserved by the surgeon, for radical operation may be necessitated by malignancy of tumors, disease of adnexa, or by an impossibility of leaving the uterus safe for pregnancy. Myomectomy during pregnancy may be required because of degeneration, torsion, impaction or the large size of the fibromyoma.

Hysterectomy during pregnancy is seldom necessary, and should be done only when myomectomy cannot save the patient from accidents due to the tumor, or when there is infection or malignancy of the tumor.

Whooping-Cough.—In the *Wiener klinische Wochenschrift*, February 17, 1927, Goldschmied states that in 187 cases of whooping-cough reported by Huebner, there were only three adult patients.

Whooping-cough in pregnancy is very rare; hemorrhage and abortion do not often occur, but occasionally the violence of coughing may rupture the membranes prematurely. In the puerperal period pneumonia is likely to arise.

The writer's case was aged 38 in her second pregnancy and contracted whooping-cough in the last month of pregnancy, giving birth to a healthy child one and one-half weeks before term. During labor there were violent paroxysms of coughing and the labor was somewhat precipitate. The child was kept away from the mother for five weeks, being fed upon breast milk taken with the breast-pump. It escaped the disease. Cases of whooping-cough in the newborn have, however, been reported.

Appendicitis in Pregnancy.—McDonald (*Am. Journ. Obst. & Gynec.*, July 1929, p. 110) states that pregnancy, as a complication of acute appendi-

citis, presents problems for a differential diagnosis but does not modify the indications for surgical treatment. Abortion or labor gives a relatively grave prognosis. Obstetric procedures are indicated only when the event is actually impending. Delivery should be completed by the most conservative method consistent with good practice.

Early Operation Indicated in Appendicitis.—Portes and Seguy (*Gynéc. et obst.*, Feb., 1927) do not believe that pregnant women are especially liable to acute appendicitis, but they are convinced that pregnancy very often causes a chronic appendicitis to become acute. Half of the cases of acute appendicitis during pregnancy are recurrences.

A woman having had appendicitis and contemplating marriage should have the appendix removed before marriage. When appendicitis complicates pregnancy, there does not seem to be more tendency to peritonitis than in the non-pregnant; but when a woman who has had appendicitis has a return which develops during labor, then peritonitis is frequent. The dangers during labor for these patients are so great that the appendix should be removed in pregnancy as soon as the diagnosis of appendicitis can be made.

Mental Disorders and Eugenics.—The Galton Lecture of the year 1927 was given by Tredgold on "Mental Disorders and Eugenics" (*Brit. Med. Journ.*, Feb. 26, 1927). The speaker said that evolution in the human subject had proceeded mainly in the sphere of mind and would probably continue in the same direction. Progressive evolution depended upon vitality and mental capacity, and hence the importance of mental diseases on the aspect of eugenics. One should carefully distinguish between mental diseases and eccentricity. Eccentric persons were not inefficient nor were they lacking in aptitude; many were pioneers of thought and most valuable members of society. Mental diseases might take the form of defect, disorder or decay, all of them due to the failure of the organism to adapt itself to its environment. These three forms were usually but different manifestations of one and the same cause, and a great majority resulted from inheritance. While inheritance might play a great part in insanity and mental breakdown, the main cause was constitutional; even in shell-shocked cases, there was a definite predisposition to mental breakdown.

Inheritance is not of the disease itself, but of the neuropathic diathesis which results from the devitalization of the germ-cell. As the individual results from the union of two germ-cells, the condition of one of these cells may have very different results upon the offspring. What is inherited is a tendency for development to proceed in certain directions, and due to a certain limit in deficient germ-cells and inheritance; the result was mental deficiency in some cases, in others dementia; in others the individual might go through life apparently normal, but with an impairment which might reveal itself in mental disease in a subsequent generation. The attempt to show that mental disease or defect is transmitted in accordance with mendelian law has failed. When one of the combining cells is healthy, the reduction in vitality is lessened; such an individual might show a normal mentality, but always be liable to mental breakdown under stress. Inherited impairment may be neutralized or even bred out if detected early in life.

Mental disease in a community is kept alive by carriers, those who are apparently normal but who break down on exposure to stress.

The writer found no evidence of close association between genius and insanity, the great majority of men of genius had seemed to him to have been remarkably sound. Mental disease is, however, closely associated with social inefficiency and retrogression.

Danger to the race lies in the contamination of sound and healthy stock by those predisposed to disease. What is urgently needed is the prevention of propagation by those persons suffering from disease due to inheritance. He believes segregation to be better than sterilization and an intensive educational campaign he thought might be of value.

Meningitis.—In the *British Medical Journal,* February 19, 1927, MacQueen describes 2 cases of meningitis complicating pregnancy. The first was a multipara aged 26, who for a week before coming to the hospital had severe headache, and just before admission a commencing left-side facial palsy. The patient was at full term but not in labor. The pupils were dilated, the reaction to light lost. There was slight but definite paresis of the left side of the face, and some loss of power in the left arm. The usual symptoms of meningitis were absent. The temperature was 102.6° F., respirations 44, pulse 124. A specimen of urine, obtained by catheter, measured 18 ounces, was acid, yellow, clear with a faint trace of albumin.

On lumbar puncture the cerebrospinal fluid was very cloudy with the pneumococcus in pure culture. Five hours after admission, quinin was given, the os dilated manually and a living child extracted by forceps. The death of the mother followed five hours later.

At autopsy the surface of the cerebrum was covered by thick greenish pus, the pleuræ were adherent to the chest wall at both apices and the lungs were congested but there was no consolidation or cavity. The child lived for several weeks and died of acute enteritis.

The second case was a multipara aged 36, admitted with the history of otorrhea for several years. She was seven months pregnant and had been well until five hours before admission, when she had two convulsions and became comatose and delirious. On examination the temperature was subnormal, the pulse 110 and irregular. The patient was restless and noisy. The pupils were unequal and reacted to light, reflexes exaggerated and marked retraction of the neck. Later on the urine was normal. From the right ear there was a discharge. On lumbar puncture the cerebrospinal fluid was purulent and so thick that it could only drop slowly from the needle. The patient died thirty-six hours after admission and cesarean section was performed three minutes after death was certain, and a living child weighing 4 pounds was removed.

At autopsy the surface of the cerebrum and medulla and pons and the surface of the temporosphenoidal lobe and insula were covered by a thick layer of greenish pus. The left middle ear was the source of infection. There was no sign of definite cerebral abscess. The organism present was the pneumococcus.

Medical Aspects of the Maternal Instinct.—In the *British Medical Journal*, April 2, 1927, Casson reports a study of instinctive behavior regarding the maternal instinct. In this she believes that there are three processes in every reaction occurring in the nervous system—stimulus, appreciation, and action or strong impulse to action. Emotion is the usual manifestation of appreciation. There is considerable difference in the stimulus and resulting action in various individuals, but emotion, for example, of fear is unmistakable. The specific emotion of the maternal instinct was a yearning to cherish. For this there is no one term, but when in a cinema attendance, a child suddenly appears on the screen, a considerable number of women in the audience give expression to an inarticulate sound. To a physician a patient with mental disorder is practically a child exciting the parental instinct, and this accounts for the resentment often felt by doctors at the slightest interference with the treatment ordered. Suggestions to parents regarding the training of their children are often greatly resented.

It would be interesting to note at what age maternal instinct appears, what is its physical basis, its abnormalities, its relation to infanticide, its absence in advanced states of dementia. Among patients suffering from mental disease, one of the first signs of recovery is often the return of affection or pity for other patients or for nurses. In treating cases of mental disease in a hospital it is not easy to secure suitable stimuli for the maternal instinct. There are few infants in such hospitals and, with the exception of other patients or nurses, no one to call forth such instinct. The best substitutes are dogs and cats and patients sometimes have great comfort in them. Other mental cases find relief in crafts and occupational therapy. This substituted maternal instinct may become abnormal, as in those who keep large numbers of animals or are violent in their opposition to vivisection. Sometimes a patient who has lost a child will transfer to herself the care and attention which the child had been receiving. Among mental cases one might find an old demented patient caring for and nursing a pillow, and occasionally these patients become quiet if given a doll for which they may care.

The writer urges the importance of studying the primitive instincts. In mothers mentally deranged, warning of their possible action in destroying the child might be obtained if derangement in their instincts of sleep and taking food were early apprehended. Where patients are discontented and depressed, it is often well to investigate the matter of repressed or absent maternal instinct; such patients are often benefited by doing charitable work, as during the War, but it was observed that when this stimulus was removed they often collapsed. The adoption of a child, teaching, nursing, infant-welfare work, or any occupation which excites all the energies of the patient, might be beneficial.

Hypertension in Pregnancy.—Stieglitz (*Arch. Int. Med.*, April, 1927) studied the relation of the calcium content of the blood with the hypertension of pregnancy. One group were relatively benign, occurring in early pregnancy with gradual rise of tension and little serious intoxication. He observed a later malignant type with sudden tension and intoxication, which may proceed to eclampsia. Another group of cases who had preëxisting vascular and renal

disease, showed hypertension in pregnancy. Others had definite complications such as toxic goiter, cardiac disease and acute infection.

From his observations he concludes that hypocalcemia is not an important factor in arterial hypertension in pregnancy. During the last month of pregnancy tension and calcium content rise gradually.

Blood-Pressure Readings in One Thousand Pregnant Women.—Cornell (*Am. Journ. Obst. & Gynec.*, July, 1929, p. 42) divided the patients into three groups: (1) Those with systolic pressure below 129; (2) those between 130 and 139, and (3) those above 140.

In group 1 blood-pressure throughout pregnancy is lower than in normal non-pregnant women. There is practically no change in the average readings from one examination to another. In group 2 appear the potentially toxic cases. They demand more attention, since a certain percentage will prove toxic. In group 3 toxic patients, but no cases of eclampsia.

Heart Disease.—Emanuel (*Brit. Med. Journ.*, March 26, 1927) draws attention to the great difference between the mortality rates of heart disease complicating pregnancy as stated by different observers. This varies from 3 to 60 per cent.

Most likely to affect the heart in the childbearing age is rheumatic disease of the heart, and mitral stenosis, with or without aortic disease, is the most common form. About 1 per cent of pregnant women suffer from rheumatic heart disease. The cardiac output in cubic centimeters per minute during pregnancy has been found in animals to be increased by one-third to one-half the output before pregnancy. The normal heart can meet this extra load, but a damaged heart is liable to fail. In normal pregnancy there is no evidence of a heart hypertrophy or that blood-pressure is increased. It is impossible to estimate mathematically the reserve power of the heart. In the pregnant patient, often an intercurrent infection, such as a common cold, influenza, endocarditis, auricular fibrillation, embolism, difficult labor, sepsis and the toxemias of pregnancy will ruin a previously damaged heart. In prognosis the study of the rhythm and the size of the heart are the most important guides. Auricular fibrillation should be a bar to pregnancy. When the heart is not enlarged, mitral disease produces but little additional risk, but the risk increases as the enlargement of the heart increases.

If one is asked to give an opinion regarding the safety of pregnancy in a woman with disease of the heart, it is exceedingly difficult accurately to do so. If the patient has ever had signs of cardiac failure, pregnancy must be avoided. Where signs of cardiac failure develop during pregnancy, the same methods of treatment as those employed in the non-pregnant are indicated; emptying the uterus does no good, for cardiac failure sometimes develops after labor. The physician should first overcome the cardiac failure before interference with pregnancy is considered. The period of gestation, the financial condition of the patient and her ability to obey instructions are important factors in such a decision. When cardiac failure occurs early in pregnancy, abortion is required, but in the later months, under strict supervision and treatment, a living child may be obtained by cesarean section followed by sterilization.

In discussion it was urged that with a defective cardiac condition in preg-

nancy, the simplest method of combining evacuation and sterilization lay in supravaginal hysterectomy with preservation of the ovaries.

The majority of those who took part in the discussion urged the induction of abortion in early pregnancy when heart-failure was threatened, and cesarean section and sterilization in later pregnancy.

In this connection, the reviewer calls attention to the value of local anesthesia in the performance of cesarean section in patients with diseased hearts. With the preliminary use of morphia with or without scopolamin, and infiltration of the tissues with novocain, little difficulty is experienced in performing cesarean section, followed by the complete removal of the fallopian tubes. This disturbs the patient as little as possible, leaving her in a favorable condition of general health. In comparison with other methods of treatment this is at present remarkably successful.

In the *Archives des maladies du cœur, des vaisseaux et du sang,* December, 1926, Doumer reported observing pulmonary edema, acute and dangerous in pregnant women, with mitral stenosis. Aside from pregnancy, this rarely happens, but he believes that these attacks are more common than ordinarily reported. His patient had a bad stenosis with a moderate auricular dilatation, and this would seem to show that the usual theory that hypertension is a dominant factor in causing pulmonary edema, is incorrect. Even with mitral stenosis, pulmonary edema may occur without stasis or hypertension. In nonpregnant patients, pulmonary edema, due to mitral stenosis, often results from a second infection, especially the lighting up of articular rheumatism. Among pregnant patients this is not observed, contrary to all ordinary expectations. In one of his pregnant patients a preëxisting acute pulmonary edema complicating mitral stenosis, disappeared during the pregnancy. This the writer believes results from the fact that the pregnancy completed the dilatation of the already dilated auricle, thus causing the edema to disappear. He does not believe it necessary to consider pregnancy the cause for pulmonary edema in order to explain some crisis or edema in mitral lesions; he considers pregnancy as only a factor in dilatation of the heart.

Hamilton and Kellogg (*Am. Journ. Obst.,* April, 1927) by studying the statistics of heart disease complicating pregnancy, found that in decompensated cases the maternal mortality was 45 per cent. The work of the prenatal clinics had so far helped little in lessening this mortality. The plan was then tried of grouping certain cases representing the more prominent obstetric problems in special service, and assigning each group to different doctors of the staff for intensive study during periods of the year. In one of these groups were cases complicated by heart disease. This resulted in the formation of practically cardiac clinics in connection with the usual prenatal clinics. In the last five years 882 patients have passed through this clinic or come to the hospital as emergencies; they all were observed by cardiologists, and they were supposed to have heart disease when sent to the hospital. Of the 882 cases, 218, about 25 per cent, had true cardiac disease, most of them rheumatic in origin.

In the whole pregnancy clinic 7.5 per cent of patients had something in the history or physical examination suggesting possible disease of the heart.

There was one group giving no true evidence of heart disease but having breathlessness, rapid heart, pain, fainting and giddiness, which were produced by cardiac neurosis. These patients usually do well without especial treatment other than encouragement and hygiene. Another group of patients had systolic murmurs, possible enlargement, third heart sounds or extrasystoles. It is impossible to say certainly that they have no cardiac disease. If these patients are treated symptomatically, they usually do well.

From 1 to 2 per cent of all pregnant cases have significant heart disease. A small number have cardiovascular syphilis, congenital heart lesions or disorders of the heart body. The greatest number of pregnant patients with genuine heart disease have rheumatic heart disease with mitral stenosis or aortic regurgitation or both. They contracted the disease in childhood and adolescence and have grown successfully to adult life. These patients require careful attention during pregnancy.

If a patient with a serious heart condition asks concerning the risk of pregnancy, she must be told that the death rate of such patients during pregnancy or the puerperal period is about 5 per cent. There is the risk of 10 per cent that the child will not be living at the end of her pregnancy. Whether she will recover in comfortable health cannot be foretold. To keep the risk as low as the figures stated she must follow explicitly the rules of rest through pregnancy, go to the hospital at once if failure develops, consent to the interruption of pregnancy on indications. Under some conditions she should be advised against pregnancy.

The patient who has had clear signs of congestive failure should have the pregnancy early interrupted. So should one who has nephritis, hypertension, auricular fibrillation or absolute disorder of the heart body. The same advice should be given to patients suffering from rheumatic fever or who have recently had rheumatism. The risk of such patients surviving the pregnancy is too great to be justifiable. Where such cases are seen in mid or late pregnancy, the patient should be given prolonged rest in hospital under medical treatment with the hope of securing a viable child. Unless under such treatment decompensation grows much less, the pregnancy must be interrupted. There can be no exception to the rule, but if the patient with heart disease develops decompensation during pregnancy, she must remain in hospital until the pregnancy is terminated.

The indications for sterilization following delivery are the same as those for interrupting pregnancy. If the patient knowing the risk of pregnancy requests sterilization, this should be done. The fact that such a patient has survived one or more pregnancies is no proof that the next may not end fatally. It is interesting to observe that many of the most alarming signs and symptoms complained of by these patients are not followed by serious consequences. Careful observation and medical care have lessened the necessity for the interruption of pregnancy. When a pregnant patient has previously been well and decompensation develops, it is usually the result of disobedience of rules of control of activity, or intercurrent disease which cannot be foreseen or prevented, and occasionally from a sudden cardiac infection such as auricular fibrillation, which cannot be predicted. Decompensation in these cases

often develops about the sixth month and may proceed in spite of rest and treatment, it may also continue after an uncomplicated delivery.

The writers have not found that cardiac pregnant patients have easy deliveries or that they miscarry if decompensation occurs.

As regards cesarean section in these cases, the writers believe ether, very carefully given by the open drop method, is the best anesthetic. They think that they have seen scopolamin do harm. Under ether anesthesia the length of time necessary for cesarean operation is greatly reduced; often scopolamin excites a cardiac case and it is necessary to resort to general anesthesia and cardiac failure and death may result. When multiparous cardiac patients can be delivered by forceps when dilatation is fully complete, sterilization may be done to advantage some months later. The cesarean operation should not be done for the sake of sterilization.

The writers believe that many primiparous cardiac patients who have gone to full term without decompensation can pass safely through the first stage of labor under the common analgesics and be delivered with full dilatation with forceps under ether, more safely than by section.

Dressler (*Wien. Arch. f. inn. Med.*, March 15, 1927) finds that auricular fibrilization is a grave complication of pregnancy, especially when associated with mitral stenosis. He describes two primiparæ having the symptoms of serious heart-block but passing through pregnancy and labor without accident. The first, aged 35, had frequent syncopal attacks; she had had symptoms of a heart-block for twenty years. The other had frequent attacks of syncope after influenza five years previously. Her confinement and puerperal period were normal, but when discharged from the hospital an electrocardiogram showed complete heart-block.

Another case collected from the literature is that of a woman with mitral regurgitation who had syncopal attacks and died in eclampsia. Autopsy showed old and serious heart lesions.

The writer believes that a pregnant patient showing even slight symptoms of the interruption of the bundle of His should be kept under most careful observation; if myocardial disease becomes extensive, parturition must be avoided and if possible pregnancy. Heart-block may not produce perceptible reduction in the function of the heart and partial heart-block does not therefore necessarily forbid pregnancy, if the patient is kept under observation.

The development of serious symptoms calls for the interruption of pregnancy.

At a meeting of the British Medical Association, Monroe Kerr (*Brit. Med. Journ.*, Aug. 13, 1927) contributed a paper upon cardiac disease complicating pregnancy. He draws attention to the fact that cardiac hypertrophy is normal during pregnancy and that it is associated with dilatation of the heart in about 60 per cent of the cases. Little information is to be gained by percussion except in gross cardiac enlargement. The heart is displaced during pregnancy, upward and backward, the apex beat being often felt in the fourth interspace with the left margin of dulness displaced.

In normal pregnancy there is no increase in blood-pressure, but in pathological conditions the pressure is greatly altered; in the latter weeks the pulse

rate is very easily disturbed. There is also increase in body weight, blood volume and cardiac output which affect the action of the heart.

Functional disturbances in pregnancy are not uncommon, and are often mechanical, while at other times they arise from disturbed innervation, alteration in metabolism or overaction of the thyroid gland. The condition of the heart muscle determines the seriousness of a heart condition complicating pregnancy.

In the Royal Maternity Hospital in Glasgow the mortality of pregnant women from heart disease is between 15 and 25 per cent. The methods of delivery were varied in these cases. Among these, 6 patients were delivered by cesarean section, all of whom recovered; a hysterectomy at the third month also recovered. Of the cases that died, 2 were spontaneously delivered, 2 had induction of labor, 3 died undelivered.

Evidences of approaching danger to these patients are: difficulty in breathing with evidence of pulmonary congestion, alterations in the urine and in blood-pressure. Aortic regurgitation is comparatively rare, occurring in 4.7 per cent; when decompensation occurs, the condition is very serious.

Mitral regurgitation is common with a mortality of 7.8 per cent in simple mitral regurgitation, contrasting with 24.5 per cent for mitral stenosis.

As regards treatment, the mistake is commonly made of delaying obstetric treatment too long. When a physician diagnosticates cardiac disease complicating pregnancy, the aid of the obstetrician should immediately be sought.

In some cases the artificial termination of pregnancy is the immediate cause of the patient's death. It has been too long delayed and a suitable method is not employed. In terminating pregnancy, great caution should be taken to avoid shock. In early pregnancy, rapid dilatation of the uterus may cause severe shock and hence a more gradual method should be employed. This is often dangerous, so that the writer believes that in early pregnancy, vaginal cesarean section should be chosen. In the later weeks rupture of the membranes or the introduction of bougies may be employed. Unfortunately, no one knows when labor will begin and a delay of one or two days, with nervous strain and nagging pains, is greatly to be avoided.

Statistics show a mortality of 44 per cent in one series and 50 per cent in another, from the gradual induction of labor. In contrast to this, cesarean section gives a mortality of 11 per cent, in some series frequently much lower. The operator may also sterilize the patient by excising a portion of the fallopian tubes if it is thought best. The writer believes that forcible dilatation of the cervix, manually or by instruments, must be avoided. In cases of serious cardiac disease, cesarean section, especially in primiparæ, is to be selected.

The writer has not seen danger from the skillful use of chloroform with these patients.

Fitzgibbon also contributes a paper giving the results of his observation at the Rotunda Hospital in Dublin. His mortality was 22.7 per cent and the frequency of these cases with modern methods of examination is 0.33 per cent. In prognosis he has found that when decompensation occurs in labor only, the prognosis is good. If decompensation occurs in pregnancy and is

treated promptly, the prognosis is good, but a neglected decompensation receiving no attention until labor begins, has a bad prognosis. Multiparæ often give a higher mortality rate than primiparæ, and the chance of recovery is better in women under 25 than those over 30.

Decompensation does not usually develop until the second half of pregnancy, but the greater the number of pregnancies, the earlier in the second half will it occur. Over 75 per cent of primigravidæ with compensated heart lesions go to term, but one-third of these develop failure as a result of labor, but they usually deliver themselves of living children and recover. If compensation fails in primigravidæ during pregnancy, it can usually be established and labor is usually successful. In multiparæ only about 50 per cent go to term and they are more apt to develop failure during labor. With them it is difficult to reëstablish compensation during pregnancy. The danger is that compensation will be lost.

As regards treatment, both primigravidæ and multiparæ who have had no failure in heart action during pregnancy may be allowed to go through pregnancy and labor, with especial care during the last eight and sixteen weeks respectively.

If decompensation occurs during pregnancy, the cardiac function must be reëstablished and the patient kept at rest until after delivery. Primigravidæ may be allowed to go through labor, but multiparæ will probably be delivered most safely by section at the thirty-sixth week, and should be sterilized.

In a multipara, if decompensation occurs before the thirtieth week, the cardiac state should be reëstablished and the pregnancy terminated, as there is very little chance of the fetus surviving. Labor must be shortened in cardiac cases, with the avoidance of shock.

A patient who has had decompensation during labor in a previous pregnancy, should be kept at rest from the twenty-fourth week of the next and this pregnancy should be terminated by section and sterilization.

Induction of labor has no place in the management of decompensation, and at other times it should be replaced by section and sterilization. In his experience there is little to choose between the various types of cardiac diseases, as regards the results for the patient.

In the *British Medical Journal,* April 16, 1927, Oliver contributed a paper upon the subject of heart disease in pregnancy. He quotes the statistics from a maternity hospital under his observation, where in one year 9 pregnant patients with heart disease were admitted. Three had mitral stenosis, 3 mitral incompetence, one aortic regurgitation and 2 myocardial weakness. All passed through labor successfully and made good recoveries.

In the following year, 16 cardiac cases were admitted, among whom were 3 deaths, one patient who had aortic regurgitation died undelivered, with angina; one was admitted moribund with mitral regurgitation, six and one-half months pregnant, and died undelivered; another also with a mitral regurgitation, died a few hours after admission.

Of 38 cardiac cases, 13 had mitral stenosis, 12 regurgitation, 6 aortic regurgitation; 4 of these, 10.6 per cent, died in hospital. He quotes the statis-

tics of a general hospital with a mortality of 11.1 per cent among heart cases. He calls attention to the fact that in mitral stenosis complicating pregnancy there is possible auricular fibrillation with heart-failure.

In attempting to collect statistics it is difficult to obtain statistics of large numbers of cases, for heart disease complicating pregnancy and attaining severity is comparatively rare. The statistics vary from 0.38 per cent of pregnant women as having heart disease to 1.06 per cent. In one series of 8000 pregnancies, 80 patients had heart disease, of whom 14 died. In a case under his observation where the second stage of labor was brief, the great change in blood-pressure following the emptying of the uterus, brought about a fatal cardiac failure.

So far as heart disease as a contra-indication to marriage is concerned, the condition of the heart, the presence or absence of dilatation, regularity and rapidity of heart beat, history of hemoptysis and dyspnea, as well as the social and economic position of the patient and her prospects, must all be considered. Irregularity of the heart's action is an important danger to pregnant women. He quotes Mackenzie's opinion that the condition of the myocardium in the pregnant woman is of more importance than particular valve lesion. Breathlessness and pain, in his opinion, were important symptoms.

During pregnancy, intracardiac conditions may arise which render a heart incapable of carrying the patient through labor and the puerperal period. All types of irregularity are not equally dangerous. The condition of the myocardium is of primary importance and the presence of pulmonary congestion with a diseased right heart is important.

As regards treatment, the pregnant woman requires attention during her pregnancy, parturition and puerperal period. Where there is good compensation and no difficulty in breathing the proper diet, regular exercise and competent excretion, with rest, will keep the patient in good condition. If the blood-pressure remains average, the chances are that the patient will do well; where, however, toward the end of pregnancy the pulse becomes rapid, feeble and irregular, the case is serious and the patient must be kept in bed and given digitalis in increasing doses if needed. During labor signs of fatigue must be recognized promptly. In the second stage labor must not be allowed to exhaust the patient, and the use of forceps is frequently indicated. For difficult breathing, oxygen, strophanthin, digitalin or strychnia, may be required. After the placenta has been expelled, pressure should be continued over the abdomen. During the puerperal period the patient should be watched to prevent her getting up too soon or from sudden exertion.

Patients with heart disease complicating pregnancy who have no private physicians, should report to antenatal clinics at regular intervals during pregnancy, and enter maternity hospital before term. Such should seek medical advice so soon as the condition of pregnancy is suspected.

Placenta Prævia and Its Management.—In *Surgery, Gynecology and Obstetrics,* January, 1927, Broadhead and Langrock give the result of their observations and treatment in 165 cases of placenta prævia. Their mortality was 18.

In view of the fact that digital examinations often cause hemorrhage, it

was their experience that when placenta prævia was suspected, should a digital examination be made, a firm tampon should be in readiness. If the examination is followed by hemorrhage, this tampon should be immediately and firmly applied.

Of the 18 fatal cases, there were 6 patients already much depleted through bleeding, the cervix admitting two or three fingers, and the writers are inclined to believe that these cases might have been saved by cesarean section. The value of this operation in placenta prævia lies in its rapidity, the avoidance of dilating a bleeding and soft cervix, and the dangers attending extraction following version. As a rule there is little bleeding in cesarean section.

Among these were 22 cases of central placenta prævia at six to eight months, 3 of which did well with cesarean section, while 19 had version with 4 deaths. After any method of delivery, the writers urge that the genital tract be tightly packed with iodoform gauze to prevent secondary hemorrhage.

Where it is possible, the blood of the patient should be typed before delivery and arrangements made for direct transfusion if required.

Common Cystic Structures of the Human Placenta.—Paddock and Greer (*Am. Journ. Obst.*, Feb., 1927) have studied cysts of the placenta in the Department of Obstetrics of the Washington University School of Medicine. They illustrate their paper by the reproduction of microscopic sections.

Their studies lead them to conclude that these cystic bodies have their origin in decidual tissue, and that they result from the action of trophoblastic cells on the tissues of the decidua. The islands of decidual tissue in the placenta are, in origin, maternal, and seem to be portions of decidual septa. Where these cysts are found, white infarction is also present to some degree, and the writers believe that in all probability these cystic structures are the cause of the white infarcts.

They could identify these bodies in 231 cases, both in the gross and microscopic study, and among these patients there were 8 premature deliveries, 11 stillbirths and 5 infant deaths. Where the microscopic structure alone could be demonstrated, in 51 cases, there were one abortion, 3 premature deliveries, 2 stillbirths and 2 infant deaths. These cysts developed in about 14.1 per cent of cases.

The material contained in the cyst is colloid, but its chemical and physiologic nature has not yet been determined. It is interesting to note the condition of the mothers in these cases. In 36 the thyroid was enlarged, and one of these patients had previously had thyroidectomy; there were 8 toxemias and 12 syphilitic cases. Other complications of pregnancy were present in much smaller number.

Causation of Stillbirth and Neonatal Death.—Thomson (*Journ. Obst. & Gynæc. Brit. Emp.*, 1926, 33 : 390) has analyzed 100 cases of stillbirths and neonatal deaths, regarding their causation. Syphilis accounted for over one-third of the deaths in the cases of macerated stillborn infants. Where maceration was absent, complications of labor, syphilis or fetal deformities and congenital defects were among the most important causes of fetal death. One-half of the deaths of this group were caused by complications of labor.

In the neonatal cases, 26 in number, lesions in the lung of the child, toxemia of pregnancy, syphilis and prematurity were important.

So far as preventive treatment goes, more may be hoped for from the treatment of toxemia and syphilis than anything else.

In *Surgery, Gynecology and Obstetrics,* April, 1927, Resnik describes a recto-abdominal maneuver for the determination of the engageability of the fetal head. He illustrates this by diagrams and pictures. He determines the position, presentation and posture of the infant and locates the anterior shoulder. The finger is then placed in the rectum to just above the level of the ischial spines. The palm of the other hand is placed flat on the abdomen on its most dependent portion; this is usually in the suprapubic region and as nearly over the anterior shoulder as possible. With this hand this portion of the abdomen is raised upward toward the mother's head, rather forcibly. As this is being done the hand slides slowly upward on the abdomen to a point just above the umbilicus where strong pressure is then exerted toward the mother's back. If the head is engageable it advances into the pelvic inlet, frequently as low as the ischial spines, and one can feel definitely certain that it will engage during the course of labor. The first maneuver releases the head from any impingement and brings the axis of the uterus into parallelism with that of the pelvic canal. The disappearance of asynclitism results in deflection and descent of the head, restoring its parallelism, and the sagittal suture approaches the middle of the pelvis. In the second maneuver the fetus is pushed dorsally toward the mother's back, which straightens its spinal column and causes further descent of the head into the pelvis. This is based on the principle that in the mechanism of labor, as the head descends, the back loses its convexity. In primiparæ with slightly contracted pelves preventing engageability, it is usually necessary to start the first part of this maneuver with the hand in the right or left lower quadrant, approaching the flanks, depending on the location of the dorsum. The hand is placed as near the anterior shoulder as possible, which is usually in the flank in these cases, and the maneuver is proceeded with as before.

This procedure is most valuable in a multipara with a border-line pelvis, a pendulous abdomen or a faultily inclined pelvis causing asynclitism which prevents engagement. It is also valuable in primiparæ with slightly contracted pelvis, occiput posterior position and delayed engagement. The principle of the method is the same as the abdominal binder, but it is believed that it is more efficient than the binder.

Hydatid Mole.—Lodge (*Brit. Med. Journ.,* March 12, 1927), in 37 cases of hydatid mole, found 70 per cent in the third decade of life and only 8 per cent after forty years. Primigravidæ comprised 30 per cent of the patients. In addition to the symptoms usually described, there was a brownish discharge in many of these patients. Severe vomiting and albuminuria were often seen. In all patients the Wassermann reaction was negative. Nineteen of the cases had been followed up and only one of them developed chorionepithelioma.

In studying the records of the various pathological laboratories in Edinburgh, Lodge had found that chorionepithelioma was very rare, but 6 cases having been reported in ten years. From this he infers that after the expulsion

of a mole, the uterus should not be immediately curetted, for the results were often bad; later such interference produced little disturbance.

The complications following hydatid mole were sepsis, hemorrhage and the development of malignant disease. Abdominal hysterectomy or vaginal hysterectomy at term were indicated.

The Human Sex Ratio.—Crew (*Brit. Med. Journ.*, April 23, 1927) states that the secondary sex ratio is near equality and constitutes one of the many disharmonies peculiar to the human species. One male in the matter of gamete formation, was the equivalent of many females. The habit of producing offspring has no relation to the social needs of mankind and the reproductive requirements of the present day do not correspond with the ordinary sex ratios.

At the time of conception the primary sex ratio is no less than 170 males to 100 females, but the increased mortality among males makes the disproportion much less.

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