

the uterus can be ascertained by the uterine sound, and its cavity will measure more than the normal two and a half inches for at least a month after delivery. It should not be forgotten that the uterine parietes are now undergoing fatty degeneration, and that they are more than usually soft and friable, so that the sound should be used with great caution, and only when a positive opinion is essential. The state of the cervix and of the vagina may afford useful information. Immediately after delivery the cervix hangs loose and patulous in the vagina, but it rapidly contracts, and the internal os is generally entirely closed after the eighth or tenth day. The remainder of the cervix is longer in returning to its normal shape and consistency. It is generally permanently altered after delivery, the external os remaining fissured and transverse, instead of circular with smooth margins, as in virgins. The vagina is at first lax, swollen, and dilated, but these signs rapidly disappear, and cannot be satisfactorily made out after the first few days. The absence of the fourchette may be recognized, and is a persistent sign.

The presence of the lochia affords a valuable sign of recent delivery. For the first few days they are sanguineous, and contain numerous blood corpuscles, epithelial scales, and the débris of the decidua. After the fifth day they generally change in color, and become pale and greenish, and from the eighth or ninth day till about a month after delivery they have the appearance of thick opalescent mucus. They have, however, a peculiar, heavy, sickening odor, which should prevent their being mistaken for either menstruation or leucorrhœal discharge.

The appearance of the breasts will also aid the decision, for it is impossible for the patient to conceal the turgid, swollen condition of the mammae, with the darkened areolæ, and, above all, the presence of milk. If, on microscopic examination, the milk is found to contain colostrum corpuscles, the fact of very recent delivery is certain. In women who do not nurse it should be remembered that the secretion of milk often rapidly disappears, so that its absence cannot be taken as a sign that delivery has not taken place. On the whole, there should be no difficulty in deciding that a woman has been delivered, as some of the signs are persistent for the rest of her life; but it is not so easy, unless we see the case within the first eight or ten days, to say how long it is since labor took place.

CHAPTER VI.

ABNORMAL PREGNANCY, INCLUDING MULTIPLE PREGNANCY, SUPERFETATION, EXTRA-UTERINE FŒTATION, AND MISSED LABOR.

THE occurrence of more than one foetus *in utero* is far from uncommon, but there are circumstances connected with it which justify the conclusion that plural births must not be classified as natural forms of pregnancy. The reasons for this statement have been well collected by Dr. Arthur Mitchell,¹ who conclusively shows that not only is there a direct increase of risk to the mother and her offspring, but that many abnormalities, such as idiocy, imbecility, and bodily deformity, occur with much greater frequency in twins than in single-born children. He concludes that "the whole history of twin births is exceptional, indicates imperfect development and feeble organization in the product, and leads us to regard twinning in the human species as a departure from the physiological rule, and therefore injurious to all concerned."

The frequency of multiple births varies considerably under different circumstances. Taking the average of a large number of cases collected by authors in various countries, we find that twin pregnancies occur about once in 87 labors; triplets once in 7679. A certain number of quadruple pregnancies, and some cases of early abortion in which there were five fetuses, are recorded, so that there can be no doubt of the possibility of such occurrences; but they are so extremely uncommon that they may be looked upon as rare exceptions, the relative frequency of which can hardly be determined.

The frequency of multiple pregnancy varies remarkably in different races and countries. The following table² will show this at a glance:

RELATIVE FREQUENCY OF MULTIPLE PREGNANCIES IN EUROPE.

Countries.	Proportion of twin to single births.	Proportion of triplets.	Proportion of quadruplets.
England	1 : 116	1 : 6,720	
Austria	1 : 94		
Grand Duchy of Baden	1 : 89	1 : 6,575	
Scotland	1 : 95		
France	1 : 99	1 : 8,256	1 : 2,074,306
Ireland	1 : 84	1 : 4,995	1 : 167,226
Mecklenburg-Schwerin	1 : 88.9	1 : 6,430	1 : 183,236
Norway	1 : 81.62	1 : 5,442	
Prussia	1 : 89	1 : 7,829	1 : 394,690
Russia	1 : 59.05	1 : 4,051	
Saxony	1 : 79	1 : 1,000	1 : 400,000
Switzerland	1 : 102		
Württemberg	1 : 862	1 : 6,404	1 : 110,391

¹ Med. Times and Gaz., Nov. 1862.² Pucch: Des Naissances Multiples.

It will be seen that the largest proportion of multiple births occurs in Russia, and that the number of triple births is greatest where twin pregnancies are most frequent. Puech concludes that the number of multiple pregnancies is in direct proportion to the general fecundity of the inhabitants.

Dr. Duncan has deduced some interesting laws, with regard to the production of twins, from a large number of statistical observations;¹ especially that the tendency to the production of twins increases as the age of the woman advances, and is greater in each succeeding pregnancy, exception being made for the first pregnancy, in which it is greater than in any other. Newly married women appear more likely to have twins the older they are. There can be no doubt that there is often a strong hereditary tendency in individual families to multiple births. A remarkable instance of this kind is recorded by Mr. Curgenven,² in which a woman had four twin pregnancies, her mother and aunt each one, and her grandmother two. Simpson mentions a case of quadruplets, consisting of three males and one female, who all survived, the female subsequently giving birth to triplets.³

Sex of Children.—In the largest number of cases of twins the children are of opposite sexes, next most frequently there are two females, and twin males are the most uncommon. Thus, out of 59,178 labors, Simpson calculates that twin male and female occurred once in 199 labors, twin females once in 226, and twin males once in 258. The proportion of male to female births is also notably less in twin than in single pregnancies.

Size of Fœtuses.—Twins, and *à fortiori* triplets, are almost always smaller and less perfectly developed than single children. Hence the chances of their survival are much less, and Clarke calculates the mortality amongst twin children as one out of thirteen. Of triplets, indeed, it is comparatively rare that all survive; while in quadruplets, premature labor and the death of fœtuses are almost certain. It is a common observation that twins are often unequally developed at birth. By some this difference is attributed to one of them being of a different age to the other. It is probable, however, that in most of these cases, the full development of one fœtus has been interfered with by pressure of the other. This is far from uncommonly carried to the extent of destroying one of the twins, which is expelled at term, mummified and flattened between the living child and the uterine wall. In other cases, when one fœtus dies it may be expelled without terminating the pregnancy, the other being retained *in utero* and born at term; and those who disbelieve in the possibility of superfœtation explain in this way the cases in which it is believed to have occurred.

Multiple pregnancies depend on various causes. The most common is probably the simultaneous, or nearly simultaneous, maturation and rupture of two Graafian follicles, the ovules becoming impregnated at or about the same time. It by no means necessarily follows, even if more than one follicle should rupture at once, that both ovules should

¹ On Fecundity, Fertility, and Sterility, p. 29.
² Obst. Trans., 1870, vol. xi. p. 106.
³ Obst. Works, p. 890.

be impregnated. This is proved by the occurrence of cases in which there are two corpora lutea with only one fœtus. There are numerous facts to prove that ovules thrown off within a short time of each other may become separately impregnated, as in cases in which negro women have given birth to twins, one of which was pure negro, the other half-caste.

It may happen, however, that a single Graafian follicle contains more than one ovule, as has actually been observed before its rupture; or, as is not uncommon in the egg of the fowl, an ovule may contain a double germ, each of which may give rise to a separate fœtus.

Arrangement of the Fœtal Membranes and Placentæ.—The various modes in which twins may originate explain satisfactorily the variations which are met with in the arrangement of the fœtal membranes, and in the form and connections of the placentæ. In a large proportion of cases there are two distinct bags of membranes, the septum between them being composed of four layers, viz., the chorion and amnion of each ovum. The placentæ are also entirely separate. Here it is obvious that each twin is developed from a distinct ovum, having its own chorion and amnion. On arriving in the uterus it is probable that each ovum becomes fixed independently in the mucous membrane, and is surrounded by its own decidua reflexa. As growth advances the decidua reflexa generally atrophies from pressure, as it is not usual to find more than four layers of membrane in the septum separating the ova. In other cases there is only one chorion, within which are two distinct amnions, the septum then consisting of two layers only. Then the placentæ are generally in close apposition, and become fused into a single mass; the cords, separately attached to each fœtus, not infrequently uniting shortly before reaching the placental mass, their vessels anastomosing freely. In other more rare instances both fœtuses are contained in a common amniotic sac; but as the amnion is a purely fetal membrane, it is probable that, when this arrangement is met with, the originally existing septum between the amniotic sacs has been destroyed. In both these latter cases the twins must have been developed from a single ovule containing a double germ, and Schroeder states that they are then always of the same sex, and have a striking similarity to each other. Dr. Brunton¹ has started a precisely opposite theory, and has tried to prove that twins of the same sex are contained in separate bags of membrane, while twins of opposite sexes have a common sac. He says that, out of twenty-five cases coming under his observation, in fifteen the children contained in different sacs were of the same sex, but in the remaining ten, in which there was only one sac, they were of opposite sexes. It is difficult to believe that there is not an error in these observations, since twins contained in a single amniotic sac do not occur nearly as often as ten times out of twenty-five cases, and no distinction is made between a common chorion with two amnions and a single chorion and amnion. The facts of double monstrosity also disprove this view, since conjoined twins must of necessity arise from a single

¹ Obst. Trans., 1870, vol. xi. p. 67.

ovule with a double germ, and there is no instance on record in which they were of opposite sexes.

In triplets the membranes and placenta may be all separate, or, as is commonly the case, there is one complete bag of membranes, and a second having a common chorion, with a double amnion. It is probable, therefore, that triplets are generally developed from two ovules, one of which contains a double germ.

Diagnosis of Multiple Pregnancy.—It is comparatively seldom that twin pregnancy can be diagnosed before the birth of the first child, and, even when suspicion has arisen, its indications are very defective. There is generally an unusual size and an irregularity of shape of the uterus, sometimes even a distinct depression or sulcus between the two fetuses. When such a sulcus exists it may be possible to make out parts of each fetus by palpation on either side of the uterus. The only sign, however, on which the least reliance can be placed is the detection of two fetal hearts. If two distinct pulsations are heard at different parts of the uterus; if, on carrying the stethoscope from one point to another, there is an interspace where pulsations are no longer audible, or when they become feeble, and again increase in clearness as the second point is reached; and, above all, if we are able to make out a difference in frequency between them, the diagnosis is tolerably safe. It must be remembered, however, that the sounds of a single heart may be heard over a larger space than usual, and hence a possible source of error. Twin pregnancy, moreover, may readily exist without the most careful auscultation enabling us to detect a double pulsation, especially if one child lie in the dorso-posterior position, when the body of the other may prevent the transmission of its heart's beat. The so-called placental souffle is generally too diffuse and irregular to be of any use in diagnosis, even when it is distinctly heard at separate parts of the uterus.

Superfoetation and Superfecundation.—Closely connected with the subject of multiple pregnancies are the conditions known as *superfecundation* and *superfoetation*, regarding which there have been much controversy and difference of opinion.

By the former is meant the fecundation, at or near the same period of time, of two separate ovules before the decidua lining the uterus has been formed, which by many is supposed to form an insuperable obstacle to subsequent impregnation. The possibility of this occurrence has been incontestably proved by the class of cases already referred to, in which the same woman has given birth to twins bearing evident traces of being the offspring of fathers of different races.

By *superfoetation* is meant the impregnation of a second ovule when the uterus already contains an ovum which has arrived at a considerable degree of development. The cases which are supposed to prove the possibility of this occurrence are very numerous. They are those in which a woman is delivered simultaneously of fetuses of very different ages, one bearing all the marks of having arrived at term, the other of prematurity; or those in which a woman is delivered of an apparently mature child, and, after the lapse of a few months, of another equally mature. The possibility of superfoetation is strongly

denied by many practitioners of eminence, and explanations are given which doubtless seem to account satisfactorily for a large proportion of the supposed examples. In the former class of cases it is supposed, with much probability, that there is an ordinary twin pregnancy, the development of one fetus being retarded by the presence *in utero* of another. That this is not an uncommon occurrence is certain, and the fact has been already alluded to in treating of twin pregnancy. In cases of the latter kind it is possible that some of them may be due to separate impregnation in a bilobed uterus, the contents of one division being thrown off a considerable time before those of the other. Numerous authentic examples of this occurrence are recorded, but by far the most remarkable is that related by Dr. Ross, of Brighton, which has been already referred to (p. 68). In this case the patient had previously given birth to many children without any suspicion of her abnormal formation having arisen, and, had it not been detected by Dr. Ross, the case might fairly enough have been claimed as an indubitable example of superfoetation.

Making every allowance for these explanations, there remains a considerable number of cases which it is very difficult to account for, except on the supposition that the second child has been conceived a considerable time after the first. Those interested in the subject will find a large number of examples collected in a valuable paper by Dr. Bonnar, of Cupar.¹ He has adopted the ingenious plan of consulting the records of the British peerage, where the exact date of the birth of successive children of peers is given, without, of course, any reasonable possibility of error, and he has collected numerous examples of births rapidly succeeding each other which are apparently inexplicable on any other theory. In one case he cites, a child was born September 12, 1849, and the mother gave birth to another on January 24, 1850, after an interval of only 127 days. Subtracting from that 14 days, which Dr. Bonnar assumes to be the earliest possible period at which a fresh impregnation can occur after delivery, we reduce the gestation to 113 days—that is, to less than four calendar months. As both these children survived, the second child could not possibly have been the result of a fresh impregnation after the birth of the first; nor could the first child have been a twin prematurely delivered; for, if so, it must have only reached rather more than the fifth month, at which time its survival would have been impossible.

Besides the numerous examples of cases of this kind recorded in most obstetric works, there are one or two of miscarriage in the early months, in which, in addition to a fetus of four or five months' growth, a perfectly fresh ovum of not more than a month's development was thrown off. One such case was shown at the Obstetrical Society in 1862, which was reported on by Drs. Harley and Tanner, who stated that in their opinion it was an example of superfoetation. A still more conclusive case is recorded by Tyler Smith.² "A young married woman, pregnant for the first time, miscarried at the end of the fifth month, and some hours afterward a small clot was discharged, enclosing a

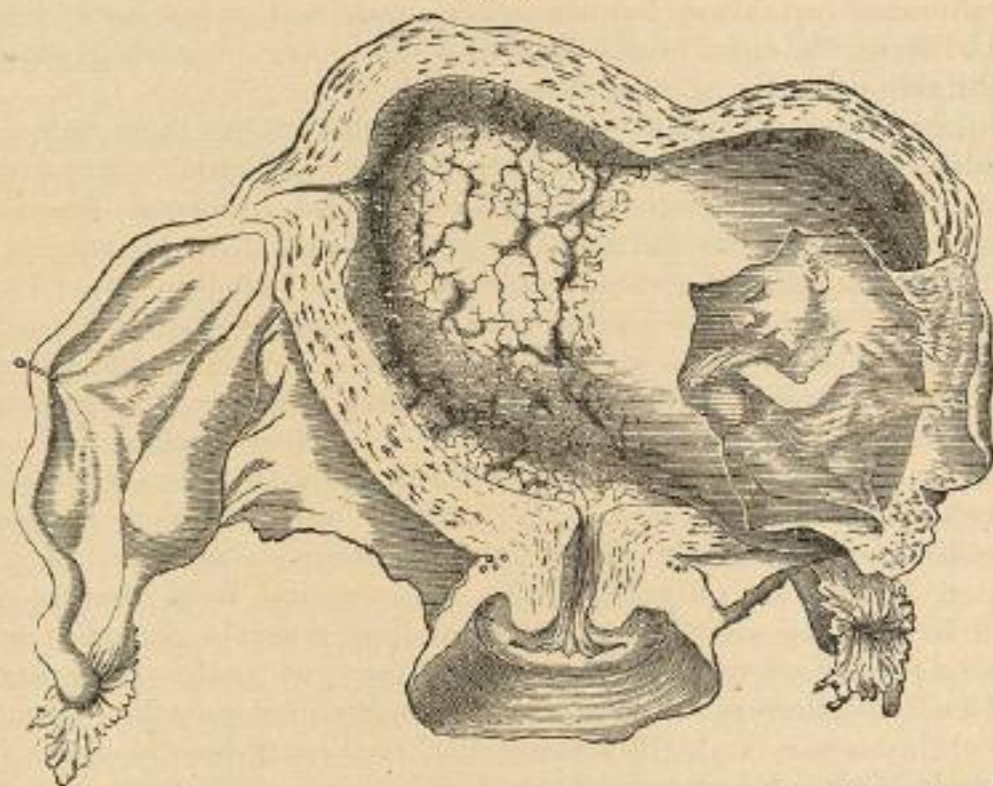
¹ Edin. Med. Journ., 1864-65.

² Manual of Obstetrics, p. 112.

perfectly healthy ovum of about one month. There were no signs of a double uterus in this case. The patient had menstruated regularly during the time she had been pregnant." This case is of special interest from the fact of the patient having menstruated during pregnancy—a circumstance only explicable on the same anatomical grounds which render superfetation possible. So far as I know, it is the only instance in which the coincidence of superfetation and menstruation during early pregnancy has been observed.

The objections to the possibility of superfetation are based on the assumptions that the decidua so completely fills up the uterine cavity that the passage of the spermatozoa is impossible; that their passage is prevented by the mucous plug which blocks up the cervix; and

FIG. 81.



Illustrating the cavity between the decidua vera and the decidua reflexa during the early months of pregnancy. (After COSTE.)

that when impregnation has taken place ovulation is suspended. It is, however, certain that none of these is an insuperable obstacle to a second impregnation. The first was originally based on the older and erroneous view which considered the decidua to be an exudation lining the entire uterine cavity, and sealing up the mouths of the Fallopian tubes and the aperture of the internal os uteri. The decidua reflexa, however, does not come into apposition with the decidua vera until about the eighth week of pregnancy, and, therefore, until that time there is a free space between the two membranes through which the spermatozoa might pass to the open mouth of the Fallopian tube, and in which a newly impregnated ovule might graft itself. A reference to the accompanying figure of a pregnancy in the third month, copied from Coste's work, will readily show that, as far as the decidua is con-

cerned, there is no mechanical obstacle to the descent and lodgment of another impregnated ovule (Fig. 81). Then, as regards the plug of mucus, it is pretty certain that this is in no way different from the mucus filling the cervix in the non-pregnant state, which offers no obstacle at all to the passage of the spermatozoa. Lastly, respecting the cessation of ovulation during pregnancy, this, no doubt, is the rule, and probably satisfactorily explains the rarity of superfetation. There are, however, a sufficient number of authenticated cases of menstruation during pregnancy, to prove that ovulation is not always absolutely in abeyance; and, as long as it occurs, there is unquestionably no positive mechanical obstruction, at least in the early months of pregnancy, in the way of the impregnation and lodgment of the ovules that are thrown off. The reasonable conclusion, therefore, seems to be that, although a large majority of the supposed cases are explicable in other ways, it cannot be admitted that superfetation is either physiologically or mechanically impossible.

Extra-uterine Pregnancy.—The most important of the abnormal varieties of pregnancy, if we consider the serious and very generally fatal results attending it, is the so-called *extra-uterine gestation*, or *ectopic pregnancy*, as some prefer to call it, which consists in the arrest and development of the ovum outside the cavity of the uterus. Of late years this subject has received much well-merited attention, which, it is to be hoped, may lead to the establishment of definite rules for the management of this most anxious and dangerous class of cases.

Extra-uterine gestation has hitherto been generally divided into three chief classes, tubal, abdominal, and ovarian, according to the position in which the fecundated ovum is developed. It is to be noted that Lawson Tait,¹ who has an unrivalled experience in this subject, considers all extra-uterine pregnancies to be primarily tubal, the other varieties being developments after rupture, as will be subsequently explained. This view is strongly upheld by Bland Sutton,² who maintains that "all forms of extra-uterine gestation pass their primary stage in the Fallopian tube." This opinion, although it is receiving an increasing number of supporters, cannot as yet be admitted as conclusively proved, and, therefore, it seems best to retain, provisionally at least, the ordinary classification.

Classification.—The following classes are generally admitted: 1st, and most common of all, *tubal gestation*, and as varieties of this, although by some made into distinct classes, (a) *interstitial*, (b) *tubo-ovarian gestation*, and (c) *sub-peritoneo-pelvic*, or *intra-ligamentous*. In the first of these subdivisions the ovum is arrested in the part of the Fallopian tube that is situated in the substance of the uterine parietes; in the second, at or near the fimbriated extremity of the tube—so that part of its cyst is formed by the tube and part by the ovary; in the third, an originally tubal pregnancy develops into the broad ligament, and continues this development beneath the peritoneum of the pelvic floor. 2d. *Abdominal gestation*, in which an impregnated ovum, instead of finding its way into the tube, falls into the peritoneal cavity,

¹ Lectures on Ectopic Pregnancy, 1888.

² Surgical Diseases of the Ovaries and Fallopian Tubes, 1891.

and there becomes attached and developed; this is the so-called "primary" abdominal pregnancy, the possibility of which is denied by many recent writers; or the so-called "secondary" abdominal gestation, in which an extra-uterine pregnancy, originally tubal, becomes ventral, through rupture of its cysts and escape of its contents into the abdominal cavity; or in which an intra-ligamentous pregnancy continues to develop until it lifts up the abdominal peritoneum, and forms a purely extra-peritoneal variety of abdominal gestation. This has been called by Hart and Carter sub-peritoneo-abdominal.¹ 3d. Ovarian gestation, the existence of which is denied by many writers of eminence, such as Velpeau and Arthur Farre, while it is maintained by others of equal celebrity, such as Kiwisch, Coste, and Hecker. It must be admitted that it is extremely difficult to understand how an ovarian pregnancy, in the strict sense of the word, can occur, for it implies that the ovule has become impregnated before the laceration of the Graafian follicle, through the coats of which the spermatozoa must have passed. Coste, indeed, believes that this frequently happens; but, while spermatozoa have been detected on the surface of the ovary, their penetration into the Graafian follicle has never been demonstrated. Farre has also clearly shown that in many cases of supposed ovarian pregnancy the surrounding structures were so altered that it was impossible to trace their exact origin and to say to a certainty that the fetus was really within the substance of the ovary. Kiwisch gives a reasonable explanation of these cases by supposing that sometimes the Graafian follicle may rupture, but that the ovule may remain within it without being discharged. Through the rent in the walls of the follicle the spermatozoa may reach and impregnate the ovule, which may develop in the situation in which it has been detained. The subject has been ably considered by Puech,² who admits two varieties of ovarian pregnancy, according as the fetus has developed in a vesicle which has remained open, or in one which has closed immediately after fecundation. He considers that most cases of so-called ovarian pregnancy are either dermoid cysts, ovario-tubal pregnancies, or abdominal pregnancies in which the placenta is attached to the ovary, and that even in the rare cases of true ovarian pregnancies the progress and results do not differ from those of abdominal pregnancy. While, therefore, it is impossible to deny the existence of ovarian pregnancy, it must be considered to be a very rare and exceptional variety, the existence of which has never been actually proved, which, as far as treatment and results are concerned, does not differ from tubular or abdominal gestation. 4th. There are two rare varieties in which an ovum is developed either in the supplementary horn of a *bi-lobed uterus*, or in a *hernial sac*.

For the sake of clearness, we may place these varieties of extra-uterine gestation in the following tabular form:

1. *Tubal*—
 - (a) Interstitial, (b) Tubo-ovarian, (c) Sub-peritoneo-pelvic.

¹ "Sectional Anatomy of Advanced Extra-uterine Gestation," Edin. Med. Journ., October, 1887.
² Annal. de Gynec., 1875, tom. x. p. 192.

2. *Abdominal*—
 - (a) Primary (?), (b) Secondary.
3. *Ovarian* (?).
4. In *bi-lobed uterus*, *hernial*, etc.

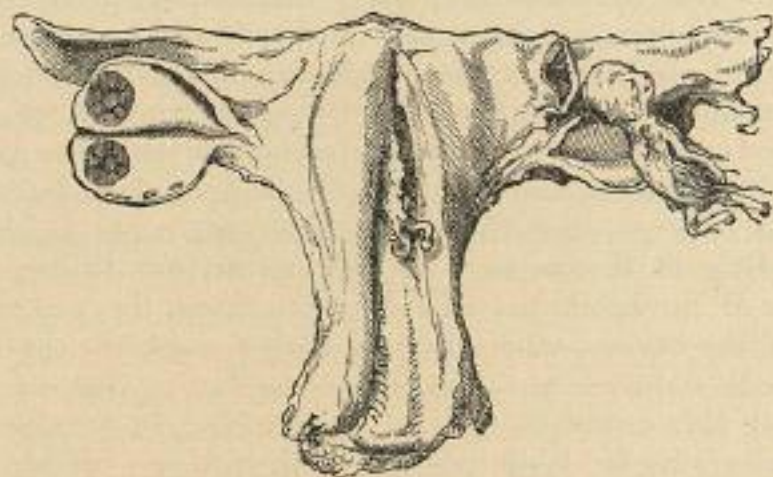
Causes.—The etiology of extra-uterine foetation in any individual case must necessarily be almost always obscure. Broadly speaking, it may be said that extra-uterine foetation may be produced by any condition which prevents or renders difficult the passage of the ovule to the uterus while it does not prevent the access of the spermatozoa to the ovule. Thus inflammatory thickening of the coats of the Fallopian tubes, by lessening their calibre, but not sufficiently so as to prevent the passage of the spermatozoa, may interfere with the movements of the tube which propel the ovum forward, and so cause its arrest. Various morbid conditions, such as inflammatory adhesions, from old-standing peritonitis, pressing on the tube; obstruction of its calibre by inspissated mucus or small polypoid growths; the pressure of uterine or other tumors, and the like, are supposed to have a similar effect. Tait¹ believes that the most important cause is chronic salpingitis, leading to destruction of the epithelium lining the tubes. The function of the epithelial cilia being to favor the progress of the ovum toward the uterus, when they no longer exist the mucous lining of the tubes is reduced to a condition similar to that of the endometrium, and the ovum is apt to be arrested *in transitu*. Bland Sutton² admits this to be a possible although as yet an unproved explanation. The fact that extra-uterine pregnancies occur most frequently in multiparæ, and comparatively rarely in women under thirty years of age, tends to show that these conditions, which are clearly more likely to be met with in such women than in young primiparæ, have considerable influence in their causation. A curiously large proportion of cases occur in women who have either been previously altogether sterile, or in whom a long interval of time has elapsed since their last pregnancy. The disturbing effects of fright, either during coition or a few days afterward, have been insisted on by many authors as a possible cause. Numerous cases of this kind are recorded; and, although the influence of emotion in the production of this condition is not susceptible of proof, it is not difficult to imagine that spasms of the Fallopian tubes might be produced in this way, which would either interfere with the passage of the ovum, or direct it into the abdominal cavity. The occurrence of abdominal pregnancy is probably less difficult to account for if we admit, with Coste, that the ovule may become impregnated on the surface of the ovary itself, for there must be very many conditions which prevent the proper adaptation of the fimbriated extremity of the tube to the surface of the ovary, and failing this the ovum must of necessity drop into the abdominal cavity. Kiwisch has pointed out that this is particularly apt to occur when the Graafian follicle develops on the posterior surface of the ovary; and, indeed, it is probable that it may be of common occurrence, and that the comparative rarity of abdominal pregnancy is due to the diffi-

¹ Op. cit., p. 4.

² Op. cit., p. 309.

culty with which the impregnated ovule engrafts itself on the surrounding viscera. Impregnation may actually occur in the abdominal cavity itself, of which Keller¹ relates a remarkable instance. In this case Koeberlé had removed the body of the uterus and part of the cervix, leaving the ovaries. In the portion of the cervix that remained there was a fistulous aperture opening into the abdominal cavity, through which semen passed and produced an abdominal gestation. Several curious cases are also recorded, which have given rise to a good deal of discussion, in which a tubal pregnancy existed while the corpus luteum was on the opposite side (Fig. 82). The most probable

FIG. 82.



Tubal pregnancy, with the corpus luteum in the ovary of the opposite side. The decidua is represented in the process of detachment from the uterine cavity.

explanation, however, is that the fimbriated extremity of the tube in which the ovum was found had twisted across the abdominal cavity and grasped the opposite ovary, in this way, perhaps, producing a flexion which impeded the progress of the ovum it had received into its canal. Tyler Smith suggested that such cases might be explained by supposing that the ovum, after reaching the uterus, failed to graft itself in the mucous membrane, but found its way into the opposite Fallopian tube. Kussmaul² thinks that such a passage of the ovum across the uterine cavity may be caused by muscular contraction of the uterus, occurring shortly after conception, squeezing the yet free ovum upward toward the opening of the opposite tube, and possibly into the tube itself.

The history and progress of cases of extra-uterine pregnancy are materially different according to their site, and it is, therefore, necessary to examine its varieties in detail.

Tubal Pregnancies.—When the ovum is arrested in any part of the Fallopian tube the chorion soon commences to develop villi, just as in ordinary pregnancy, which engraft themselves into the mucous lining of the tube, and fix the ovum in its new position. The mucous membrane becomes hypertrophied, much in the same way as that of the

¹ Des Grossesses extra-utérines, Paris, 1872.
² Mon. f. Geburt., 1862, Bd. xx. S. 295.

uterus under similar circumstances, so that it becomes developed into a sort of pseudo-decidua, the uterine extremity of which has been observed

to be open and in communication with the lining membrane of the uterus.¹ Inasmuch, however, as the mucous coat of the tubes is not furnished with tubular glands, a true decidua can scarcely be said to exist; nor is there any growth of membrane around the ovum analogous to the decidua reflexa. The ovum is, therefore, comparatively speaking, loosely attached to its abnormal situation, and hence hemorrhage from laceration of the chorion villi can very readily take place. This leads to extravasation of blood between

the villi, and it is often the determining cause of rupture, in consequence of the sudden increase in size of the tube contents. Should rupture not occur the ovum may be transformed into a fleshy mole, analogous to the uterine mole. And this is, doubtless, the origin of many cases of the so-called "hæmato-salpinx." The dependence of this on pregnancy may generally be proved by the tube contents showing chorionic villi on microscopical examination (Fig. 83).

Tubal Abortion.—In some such cases the mole may afterward escape by rupture into the folds of the broad ligament, producing a

FIG. 83.



Microscopical appearances of chorionic villi in transverse section from a tubal mole—low magnification. (After BLAND SUTTON.)

FIG. 84.



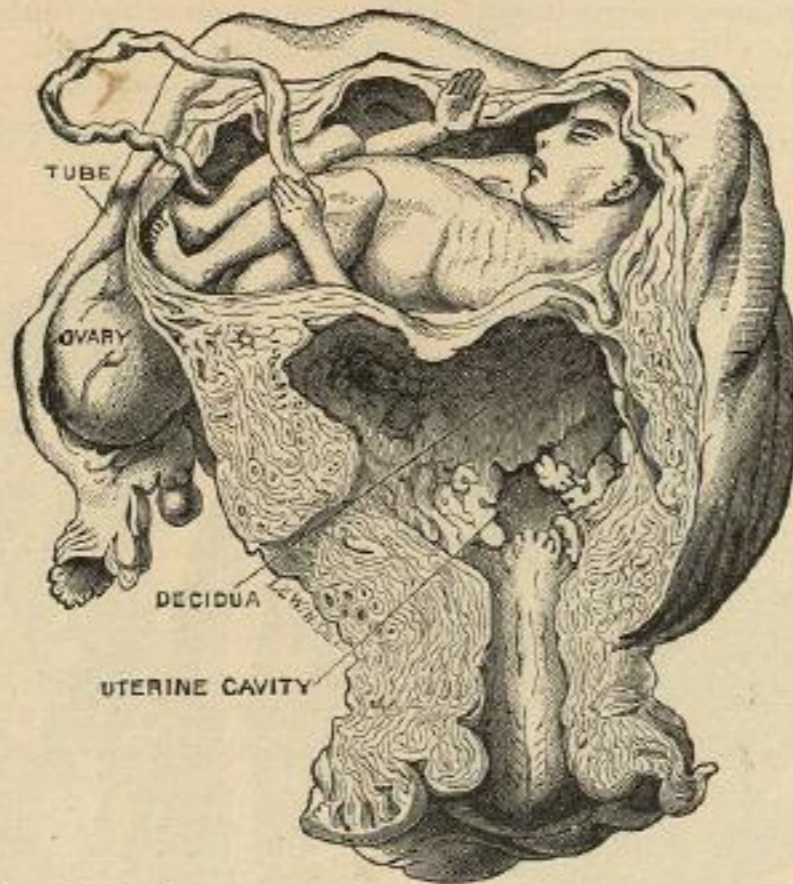
Tubal pregnancy. (From a specimen in the Museum of King's College.)

¹ I. Bandl: Billroth's Handbuch der Frauenkrankheiten.

hæmatocele, and these conditions have been described as "tubal abortion."

It is seldom that any development of the chorion villi into distinct placental structure is observed; this is probably owing to the fact that laceration and death generally occur before the period at which the placenta is normally formed. The muscular coat of the tube soon becomes hypertrophied, and as the size of the ovum increases the fibres are separated from each other, so that the ovum protrudes at certain points through them, and at these it is only covered by the stretched and attenuated mucous and peritoneal coats of the tube. At this time the tubal pregnancy forms a smooth oval tumor, which, as a rule, has not formed any adhesions to the surrounding structures (Fig. 84). The part of the tube unoccupied by the ovum may be found unaltered, and permeable in both directions; or, more frequently, it becomes so stretched and altered that its canal cannot be detected. Most frequently it is that part of the tube nearest the uterus which cannot be made out. Sutton states that by the eighth week the abdominal extremity of the tube becomes obliterated by the protrusion of a ring of peritoneum around it, which gradually becomes occluded, and so hermetically closes the opening.

FIG. 85.



Interstitial or tubo-uterine pregnancy. (Guy's Hospital Museum. After BLAND SUTTON.)

Condition of the Uterus.—The condition of the uterus in this, as in other forms of extra-uterine pregnancy, has been the subject of considerable discussion. It is now universally admitted that the uterus

undergoes a certain amount of sympathetic engorgement, the cervix becomes softened, as in natural pregnancy, and the mucous membrane develops into a true decidua. In many cases the decidua is found on post-mortem examination, in others it is not; and hence the doubts that some have expressed as to its existence. The most reasonable explanation of its absence is that given by Duguet,¹ who has shown that it is far from uncommon for the uterine decidua to be thrown off *en masse* during the hemorrhagic discharges which so frequently precede the fatal issue of extra-uterine gestation.

Interstitial and False Ovarian Pregnancy.—When the ovum is arrested in that portion of the tube passing through the uterus, in so-called interstitial pregnancy (Fig. 85) the muscular fibres of the uterus become stretched and distended, and form the outer covering of the ovum. In this case rupture is delayed to a later date than in tubal pregnancy, but, when it occurs, hemorrhage is greater, in consequence of the thickness of the gestation sac, and the fatal issue is more certain and rapid. When, on the other hand, the site of arrest is in the fimbriated extremity of the tube, the containing cyst is formed partly of the fimbriae of the tube, partly of ovarian tissue; hence it is much more distensible, and the pregnancy may continue without laceration to a more advanced period, or even to term, so that when the ovum is placed in this situation the case much more nearly resembles one of abdominal pregnancy.

Progress and Termination.—The termination of tubal pregnancy, in the immense majority of cases, is death, produced by laceration giving rise either to internal hemorrhage or to subsequent intense peritonitis. Rupture usually occurs at an early period of pregnancy, most generally from the fourth to the twelfth week, rarely later. However, a few instances are recorded in which it did not take place until the fourth or fifth month, and Saxtorph and Spiegelberg have recorded apparently authentic cases in which the pregnancy advanced to term without laceration; these were, however, probably examples of the sub-peritoneo-pelvic or abdominal varieties. It is generally effected by distention of the tube, which at last yields at the point which is most stretched; and sometimes it seems to be hastened or determined by accidental circumstances, such as a blow or fall, or the excitement of sexual intercourse.

Symptoms of Rupture.—The symptoms accompanying rupture are those of intense collapse, often associated with severe abdominal pain, produced by the laceration of the cyst. The patient will be found deadly pale, with a small, thready, and almost imperceptible pulse, perhaps vomiting, but with mental faculties clear. If the hemorrhage be considerable, she may die without any attempt at reaction. Sometimes, however—and this generally occurs in cases in which the tube tears, the ovum remaining intact—the hemorrhage may cease on account of the ovum protruding through the aperture and acting as a plug. The patient may then imperfectly rally, to be again prostrated by a second escape of blood, which proves fatal. If

¹ Annales de Gynécologie, 1874, tom. 1. p. 269.

the loss of blood is not of itself sufficient to cause death from shock and anæmia, the fatal issue is generally only postponed, for the effused blood soon sets up a violent general peritonitis, which rapidly carries off the patient. This is the general course of events in the most common class of cases, in which the rupture involves the peritoneal surface of the tube. The hemorrhage then takes place directly into the peritoneal cavity, and, unless coeliotomy is performed, is most usually fatal.

FIG. 86.



Extra-uterine pregnancy at term of the secondary abdominal variety. (After a case of Dr. A. SIBLEY CAMPBELL'S.)

In the minority of cases of rupture, the proportion being given by Sutton as 1 to 3, the laceration takes place in that part of the tube which is not covered with peritoneum, that is, the under surface of the middle third of the tube. The blood then escapes into the connective tissue of the broad ligament, and is consequently extra-peritoneal. The space into which the blood can pour is much more limited than in the former case, and the results are less uniformly disastrous. If the ovum and the patient both survive the immediate rupture, the former continues to grow, and the case is transformed into one of sub-peritoneo-pelvic gestation. The case is then subjected to the rules of treatment presently to be discussed when considering secondary abdominal pregnancy. (Fig. 86.)

Diagnosis.—The possibility of diagnosing tubal gestation before rupture occurs is a question of great and increasing interest, from the fact that, could its existence be ascertained, we might very fairly hope to avert the almost certainly fatal issue which is awaiting the patient. Unfortunately, the symptoms of tubal pregnancy are always obscure, and too often death occurs without the slightest suspicion as to the nature of the case having arisen. In the first place it is to be observed that all the usual sympathetic disturbances of pregnancy exist: the breasts enlarge, the areolæ darken, and morning sickness is present. There is also an arrest of menstruation; but, after the absence of one or more periods, there is often an irregular hemorrhagic discharge. This is an important symptom, the value of which in indicating the existence of tubal pregnancy has of late years been much dwelt upon by various authors, both in this country and abroad. It may probably be attributed to partial detachment of the chorion villi, produced by the ovum growing out of proportion to the tube in which it is contained. Whether this is the correct explanation or not, it is a fact that irregular hemorrhage very generally precedes the laceration for several days or more. Associated with the hemorrhage there may occasionally be found shreds of the decidua lining of the uterus, the presence of which would materially aid the diagnosis. Accompanying this hemorrhage there is almost always more or less abdominal pain, produced by the stretching of the tissues in which the ovum is placed, and this is sometimes described as being of very intense and crampy character. If, then, we meet with a case in which the symptoms of early pregnancy exist, in which there are irregular losses of blood, possibly discharge of membranous shreds, and abdominal pain, a careful examination should be insisted on, and then the true nature of the case may possibly be ascertained. Should extra-uterine foetation exist, we should expect to find the uterus somewhat enlarged, and the cervix softened, as in early pregnancy, but both these changes are doubtless generally less marked than in normal pregnancy. This fact of itself, however, is of little diagnostic value, for slight differences of this kind must always be too indefinite to justify a positive opinion.

The existence of a peri-uterine tumor, rounded or oval in outline, and producing more or less displacement of the uterus, in the direction opposite to that in which the tumor is situated, may point to the existence of tubular foetation. By bimanual examination, one hand depressing the abdominal wall, while the examining finger of the other acts in concert with it either through the vagina or rectum, the size and relations of the growth may be made out. There are various conditions which give rise to very similar physical signs, such as small ovarian or fibroid growths, or the effusion of blood around the uterus; and the differential diagnosis must always be very difficult and often impossible. A curious example of the difficulty of diagnosis is recorded by Joulin, in which Huguier and six or seven of the most skilled obstetricians of Paris agreed on the existence of extra-uterine pregnancy, and had, in consultation, sanctioned an operation, when the case terminated by abortion, and proved to be a natural pregnancy. The use of the uterine sound, which might aid in clearing up the case,

is necessarily contra-indicated unless uterine gestation is certainly disproved. Hence it must be admitted that positive diagnosis must always be very difficult. So that the most we can say is, that when the general signs of early pregnancy are present, associated with the other symptoms and signs alluded to, the suspicion of tubal pregnancy may be sufficiently strong to justify us in taking such action as may possibly spare the patient the necessarily fatal consequence of rupture.

Treatment.—If the diagnosis were quite certain, the removal of the entire Fallopian tube and its contents by abdominal section would be quite justifiable, and would neither be more difficult nor more dangerous than ovariectomy; for, at this stage of extra-uterine foetation, there are no adhesions to complicate the operation. This operation has been performed in many cases with a most happy result, and there can be no doubt that in the hands of an operator sufficiently expert in abdominal surgery, it is the proper course to adopt, whenever the symptoms are sufficiently well marked to indicate its necessity.

It is to be observed, however, that the uncertainty in the diagnosis in cases of this kind is very great, and it requires a good deal of experience and self-reliance to enable the practitioner to adopt so radical a procedure. It is not surprising, therefore, that many expedients have been suggested and tried for arresting the growth of the ovum, and thus leaving it quiescent in the tube. Many cases have been recorded in which the issue has been supposed to be satisfactory. Whether they were so in fact, or whether the diagnosis was erroneous, as the opponents of such procedures are so apt to suggest, cannot, of course, be proved in the nature of things. Such procedures are characterized by Tait as "mere nonsense,"¹ and by Sutton as so unsatisfactory as not to merit discussion. It must be fully admitted that coeliotomy in competent hands is infinitely more satisfactory, and it may be confidently recommended in every case in which the diagnosis is sufficiently plain. There will always, however, be a certain number of cases in which, either from the surroundings, the want of assistance or instruments, or of sufficient surgical aptitude on the part of the medical attendant, such radical measures cannot be adopted, and, therefore, the methods referred to seem worthy of consideration.

Dr. Thomas, of New York,² has recorded a most instructive case, in which he saved the life of the patient by a bold operation. The nature of the case was rendered pretty evident by the signs above described, and Thomas opened the cyst from the vagina by a platinum knife, rendered incandescent by a galvanic battery, by which means he hoped to prevent hemorrhage. Through the opening thus made he removed the foetus. In subsequently attempting to remove the placenta very violent hemorrhage took place, which was only arrested by injecting the cyst with a solution of persulphate of iron. The remains of the placenta subsequently came away piecemeal, after an attack of septicaemia, which was kept within bounds by freely washing out the cyst with antiseptic lotion, the patient eventually recovering. Should this

¹ Op. cit., p. 53.

² New York Med. Journ., 1875, vol. xxi. p. 561.

operation be resorted to, it would be better not to remove the placenta, but to plug the gestation sac with antiseptic gauze, frequently changed, and trust to antiseptic injections and thorough drainage to prevent septic mischief. This procedure has not, so far as I know, been again adopted; the operation seems as severe and difficult as coeliotomy, which would be, in every way, preferable.

Means of Destroying the Vitality of the Foetus.—Another mode of managing these cases is to destroy the foetus, so as to check its further growth, in the hope that it may remain inert and passive within its sac. Various operations have been suggested and practised for this purpose. Thus needles have been introduced into the tumor, through which currents of electricity have been passed, either the continuous current, or, as has been suggested by Duchenne, a spark of franklinic electricity. Hicks and others have endeavored to destroy the foetus by passing an electro-magnetic current through it by means of a needle. Of late years a large number of carefully recorded cases have been published, chiefly in America, in which the faradic current has been used, apparently with perfect success, one pole being passed through the rectum or vagina to the side of the ovum, the other being placed on a point in the abdominal wall two or three inches above Poupart's ligament; or Apostoli's vaginal electrode, in which both poles are combined, might be used. The number of cases is so considerable¹ that it is quite futile to talk of this plan as "mere nonsense," or unworthy of consideration. On the contrary, under the conditions already mentioned, when coeliotomy is not feasible, it appears to offer a very hopeful resource. The current should be passed daily for at least ten minutes, and continued for a week or two until the shrinking of the tumor gives satisfactory evidence of the death of the foetus. This practice is perfectly safe, and there can be no rational objection to its being tried. Aveling makes the reasonable suggestion that the current acts by producing "tetanic contractions of the fetal heart due to the repeatedly broken current of an induction machine."² Simple puncture of the cyst has been successfully practised on several occasions, either with a small trocar and cannula, or with a simple needle. A very interesting case, in which the development of a two months' tubal gestation was arrested in this way, is recorded by Greenhalgh,³ and another by Martin, of Berlin.⁴ Joulin suggested that not only should the cyst be punctured, but that a solution of morphine should be injected into it, which, by its toxic influence, would insure the destruction of the foetus; and this is probably one of the best means at our disposal for destroying the foetus. Friedreich and others have reported successful cases, one-fifth of a grain of morphine being injected into the sac every second day, until it had obviously begun to shrink.

Other means proposed for effecting the same object, such as pressure, or the administration of toxic remedies by the mouth, are far too uncertain to be relied on. The simplest and most effectual plan would

¹ See various papers in the Trans. of the Amer. Gyn. Soc.; also Lusk's Midwifery, 1892.

² "The Diagnosis and Electrical Treatment of Early Extra-uterine Gestation," Brit. Gyn. Journ., 1888-89, vol. iv. p. 24.

³ Lancet, 1867.

⁴ Monat. f. Geburt., 1868, Bd. xxxii. S. 140.

be to introduce the needle of an aspirator, by which the liquor amnii would be drawn off, and the further growth of the foetus effectually prevented. Parry,¹ indeed, is opposed to this practice, and has collected several cases in which the puncture of the cyst was followed by fatal results, either from hemorrhage or septicæmia. In these, however, an ordinary trocar and canula were probably employed, which would necessarily admit air into the sac. It is difficult to imagine that a fine hair-like aspirating needle, rendered perfectly aseptic by carbolic acid, could have any injurious results; and it could do no harm, even if an error of diagnosis had been made, and the suspected extra-uterine foetation turned out to be some other sort of growth. If the aspirator proves that an extra-uterine foetation exists, then, if the cyst be of any considerable size, and the pregnancy advanced beyond the second month, we might, if deemed advisable, resort to a more radical operation.

Treatment when Rupture has Occurred.—When the chance of arresting the growth of a tubular foetation has never arisen, and we first recognize its existence after laceration has occurred, and the patient is collapsed from hemorrhage, what course are we to pursue? Hitherto all that has generally been done is to attempt to rally the patient by stimulants, and, in the unlikely event of her surviving the immediate effects of laceration, endeavoring to control the subsequent peritonitis, in the hope that the effused blood may become absorbed, as in pelvic hæmatocele. This is, indeed, a frail reed to rest upon, and when laceration of a tubal gestation, advanced beyond a month, has occurred, death has been the almost certain result. It is now universally admitted that in such cases practically the only hope for the patient lies in the immediate performance of celiotomy, the rapid clearing away of the effused blood, and the search for, and ligature of, the ruptured tube. Mr. Lawson Tait's brilliant record of 42 cases, 39 of which recovered, would alone prove this to be, beyond any question, the proper, and indeed the only possible, practice, and happily many others are now able to record similar results. In these cases, in which rupture is never delayed beyond the twelfth or thirteenth week of gestation, there are rarely any adhesions, and the operation presents no particular difficulty. As a rule, death does not follow rupture for some hours, so that there would be usually time for the operation, and the extreme prostration might be, perhaps, temporarily counteracted by saline transfusion. Pressure on the abdominal aorta, resorted to when the patient is first seen, might possibly be employed with advantage to check further hemorrhage, until the question of operation is decided. We must remember that the alternative is death, and hence any operation which would afford the slightest hope of success would be perfectly justifiable.

In the second class of cases, in which the rupture is extra-peritoneal, the necessity for immediate operation is not so urgent. Cases of this kind are not so intense in their character, and they rally much more completely; if they do so, it will doubtless be best not to interfere until a later date.

¹ Parry on Extra-uterine Pregnancy, p. 204.

Abdominal Pregnancy.—In the second of the two classes into which, for practical convenience, we have divided extra-uterine gestation, the ovum is developed in the abdominal cavity. It is, as we have seen, very questionable if there is such a condition as primary abdominal pregnancy. Practically we may consider all the cases in which the foetus has developed in the abdominal cavity to have been primarily tubal or interstitial. Either the tube has burst into the peritoneum at a very early period of pregnancy, and the ovum has maintained its vitality, or, more commonly, there has been an extra-peritoneal rupture, and subsequently the gestation sac has again given way, and the foetus has found its way into the abdominal cavity.

FIG. 87.



Uterus and fetus in a case of abdominal pregnancy.

Formation of a Cyst around the Ovum.—In the large majority of cases the ovum produces considerable irritation, resulting in the exudation of plastic material, which is thrown around it, so as to form a secondary cyst or capsule, in which maternal vessels are largely developed, and which stretches, *pari passu*, with the growth of the ovum (Fig. 87). This may be partly composed of remnants of ruptured tube, and of the layers of the broad ligament, and to its external surface portions of intestine and omentum are frequently adherent. The placenta may be variously attached; sometimes above the foetus at the upper part of the sac, sometimes below it, or partially to some of the adjacent abdominal viscera. The density and strength of this cyst are found to be very different in different cases; sometimes it forms a complete and strong covering to the ovum, at others it is very thin and only partially developed, but it is rarely entirely absent. As there is ample space for the development of the ovum, and as the secondary cyst generally stretches and grows along with it, most cases of abdominal pregnancy progress without any very remarkable symptoms beyond occasional severe attacks of pain, until the full term of pregnancy has been reached. Sometimes, however, the cyst lacerates, and there is an escape of blood into the abdominal cavity, accompanied

by more or less prostration and collapse, which may prove fatal, but from which the patient more generally rallies. The fetus, now dead, will remain in the abdomen, and will undergo changes and produce results similar to those which we shall presently describe as occurring in cases progressing to the full period.

In most cases, at the natural termination of pregnancy a strange series of phenomena occur; pseudo-labor comes on, there are more or less frequent and strong uterine contractions, possibly an escape of blood from the vagina, the discharge of the broken-down uterine decidua, and even the establishment of lactation. Sometimes the contractions of the abdominal muscles produced by this ineffective labor have been so strong as to cause the laceration of the adventitious cyst surrounding the fetus, and the escape of blood and liquor amnii into the abdominal cavity, with a rapidly fatal result. More frequently laceration does not occur, and the spurious labor-pains continue at intervals, until the fetus dies, possibly from pressure, but more often from effusion of blood into the tissue of the placenta, and consequent asphyxia. Occasionally the fetus has apparently lived a considerable time, in some cases even for several months, after the natural limit of pregnancy has been reached.

Changes after the Death of the Fœtus.—It is after the death of the fetus that the dangers of abdominal pregnancy generally commence, and they are numerous and various. The subsequent changes that occur are well worthy of study. Occasionally the fetus has been retained for a length of time, even until the end of a long life, without

producing any serious discomfort, and in many cases of this kind several normal pregnancies and deliveries have subsequently taken place. Even when the extra-uterine gestation appears to be tolerated, and has remained for long without producing any bad effects, serious symptoms may be suddenly developed; so that no woman, under such circumstances, can be considered safe. The condition of these retained fetuses varies much. Most commonly the liquor amnii is absorbed, the fetus shrinks and dies, all its soft structures are changed into adipocere, and the bones only remain unaltered. Sometimes this change occurs with great rapidity. I have elsewhere¹ recorded a case of extra-uterine foetation in which at the full term of pregnancy the fetus was alive, and the woman died in less than a year afterward. On post-mortem examination

Lithopædion. (From a preparation in the Museum of the College of Surgeons.)

the fetus was found entirely transformed into a greasy mass of adipocere, studded with fetal bones, in which not a trace of any of the

¹ Obst. Trans., 1865, vol. vii. p. 1.



FIG. 88.

soft parts could be detected. On the other hand, the fetus may remain unchanged; in the Museum of the College of Surgeons there is one which was retained in the abdomen for fifty-two years, and which was found to be as fresh and unaltered as a newborn child. In other cases the sac and its contents atrophy and shrink, and calcareous matter is deposited in them, so that the whole becomes converted into a solid mass known as *lithopædion* (Fig. 88). The cases, however, in which the retention of the fetus gives rise to no mischief are quite exceptional. Generally the fetus putrefies, and this may either immediately cause fatal peritonitis or septicæmia, or, as more commonly happens, secondary inflammation and suppuration of the sac. Under the influence of the latter the sac opens externally, either directly at some point of the abdominal walls, or indirectly through the vagina, the bowels, or even the bladder. Through the aperture or apertures thus formed (for there are often several fistulous openings), pus, and the bones and other parts of the broken-down fetus are discharged; and this may go on for months, and even years, until at last, if the patient's strength does not give way, the whole contents of the cyst are expelled, and recovery takes place. From various statistical observations it appears that the chances of recovery are best when the cyst opens through the abdominal walls, next through the vagina or bladder, and that the fetus is discharged with most difficulty and danger when the aperture is formed into the bowel. At the best, however, the process is long, tedious, and full of danger; and the patient too often sinks, during the attempt at expulsion, through the irritation and exhaustion produced by the abundant and long-continued discharge.

Diagnosis.—The diagnosis of abdominal gestation is by no means so easy as might be thought, and the most experienced practitioners have been mistaken with regard to it.

The most characteristic symptom, although this is not so common as in tubal gestation, is metrorrhagia combined with the general signs of pregnancy. Very severe and frequently repeated attacks of abdominal pain are rarely absent, and should at once cause suspicion, especially if associated with hemorrhage, and the discharge of a decidual membrane from the uterus. They are supposed by some to depend on intercurrent attacks of peritonitis, by which the foetal cyst is formed. Parry doubts this explanation, and attributes them partly to the distention of the cyst by the growing fetus, and partly to pressure on the surrounding structures. On palpation the form of the abdomen will be observed to differ from that of normal pregnancy, being generally more developed in the transverse direction, and the rounded outline of the gravid uterus cannot be detected. When development has advanced nearly to term, the extreme distinctness with which the fetal limbs can be felt will arouse suspicion. *Per vaginam* the os and cervix will be felt softened, as in ordinary pregnancy, but often displaced by the pressure of the cyst, and sometimes fixed by peri-metritic adhesions; either of these signs is of great diagnostic value.

By bimanual examination it may be possible to make out that the uterus is not greatly enlarged, and that it is distinctly separate from the bulk of the tumor; these facts, if recognized, would of themselves

disprove the existence of uterine gestation. The diagnosis, if the foetal limbs or heart-sounds could be detected, would be cleared up in any case by the uterine sound, which would show that the uterus was empty and only slightly elongated. But we must be careful not to resort to this test unless the existence of uterine gestation is positively disproved by other means. As, however, it places the diagnosis beyond a doubt, it should always be employed whenever operative procedure is in contemplation. Quite recently I have seen a remarkable case which illustrates the importance of this rule. The case had been diagnosed as abdominal pregnancy by no fewer than six experienced practitioners, and was actually on the operating-table for the performance of cœliotomy. As a precaution, having some doubts of the diagnosis, I suggested the passage of the sound, which entered into a gravid uterus, the case proving to be one of small ovarian tumor jammed down into Douglas' space, and displacing the cervix forward. Had it not been for this precaution its true nature would certainly not have been detected.

Treatment.—The treatment of abdominal gestation will always be a subject of anxious consideration, and there is much difference of opinion as to the proper course to pursue. It is becoming more generally recognized as good practice, that when the existence of an abdominal pregnancy is thoroughly established, no matter what the period of pregnancy, the sooner it is operated on the better. Puncturing the cyst, with the view of destroying the foetus and arresting its further growth, has been practised, but there are good grounds for rejecting it, for there is not the same imminent risk of death from rupture of the cyst as in tubal fetation; and, even if the destruction of the foetus could be brought about, there would still be formidable dangers from subsequent attempts at elimination, or from internal hemorrhage.

If we have to deal with a case which has advanced nearly to the full period, the child being still alive, as proved by auscultation, we have to consider whether it may not be advisable to perform cœliotomy before the foetus perishes, and so at least save the life of the child. There are few questions of greater importance and more difficult to settle. The tendency of medical opinion is decidedly in favor of immediate operation, which is recommended by Velpeau, Kiwisch, Koeberlé, Schroeder, Tait, and many other writers, whose opinion necessarily carries great weight. The arguments used in favor of immediate operation are that while it affords a probability of saving the child, the risks to the mother, great though they undoubtedly are, are not greater than those which may be anticipated by delay. If we put off interference the cyst may rupture during the ineffectual efforts at labor, and death at once ensue; or, if this does not take place, other risks, which can never be foreseen, are always in store for the patient. She may sink from peritonitis, or from exhaustion, consequent on the efforts at elimination, which in the majority of cases are sooner or later set up, so that, as Barnes properly says, "the patient's life may be said to be at the mercy of accidents of which we have no sufficient warning." On the other hand, if we delay, while we sacrifice all hope of saving the child, we at least give the mother the chance of the foetus

remaining quiescent for a length of time, as certainly not unfrequently occurs. Thus, Campbell collected 62 cases of ultimate recovery after abdominal gestation, in 21 of which the foetus was retained without injury for a number of years. Then there is the question of secondary cœliotomy, which consists in operating after the death of the foetus when urgent symptoms have arisen, a course which is advocated by Mr. Hutchinson. In favor of this procedure it is urged that by delay the inflammation taking place about the cyst will have greatly increased the chance of adhesions having formed between it and the abdominal parietes, so as to shut off its contents from the cavity of the peritoneum. The more effectually this has been accomplished, the greater are the chances of recovery. When the foetus has been dead for some time, the vascularity of the cyst will also be lessened, the placental circulation will have ceased, and that viscus will have become solid and tough, so that the danger of hemorrhage will be much diminished.

It will be seen, therefore, that there are arguments in favor of each of these views. The results of the primary operation are far less favorable than we should have, *à priori*, supposed. Since the first edition of this work appeared the subject has been carefully studied by Dr. Parry in his exhaustive treatise on *Extra-uterine Fœtation*. He has there shown that when the case is left until Nature has shown the channel through which elimination is to be effected, the mortality is 17.35 per cent. less than in the cases in which the primary operation was performed. His conclusion is that "the primary operation cannot be too forcibly condemned. It is not too much to say that this operation adds only another danger to a life already trembling in the balance, which the delusive hope of saving the uncertain life of a child does not warrant us in assuming." It is only just to remember, however, that in these days of advanced abdominal surgery a better result may be anticipated than when cœliotomy was performed in the haphazard way which was usual before we had gained experience from ovariectomy. No doubt, minute care in the performance of the operation, a due attention to its details, studiously avoiding, as much as possible, the passage of blood and the contents of the cyst into the peritoneal cavity, and a free use of antiseptics, will materially lessen its peril.

Mode of Performing the Operation.—The operation should be performed with all the precautions with which we surround ovariectomy. The incision, best made in the linea alba, should not be greater than is necessary to extract the foetus, and may be lengthened as occasion requires. If there are no adhesions, the walls of the cyst should be stitched to the margin of the incision, so as to shut it off as completely as possible from the peritoneal cavity. This has been specially insisted on by Braxton Hicks, and should never be omitted. The special risk is not so much the wounding of the peritoneum as the subsequent entrance of septic matter from the cyst into its cavity. It has been laid down as a rule that after incising the sac no attempt should be made to remove the placenta. Its attachments are generally so deep-seated and diffused that any endeavor to separate it is likely to be attended with profuse and uncontrollable hemorrhage, or with serious injury to the structures to which it is attached. Many of the

failures after operating can be traced to a neglect of this rule. The best subsequent course to pursue, after removing the fetus and arresting all hemorrhage, either by ligature or the actual cautery, is to sponge out the cyst as gently as possible, sprinkle the cavity with iodoform, or with equal parts of tannin and salicylic acid, as recommended by Freund,¹ and then to bring the upper part of the wound into apposition with sutures, leaving the lower open, so as to insure an outlet for the escape of the placenta as it slips down. The subsequent treatment must be specially directed to favor the escape of the discharge, and to prevent the risk of septicæmia. These objects may be much aided by injections of antiseptic fluids, such as solution of carbolic acid, or creolin and water; and it would probably be advisable to place a drainage-tube in the lower angle of the wound.

As long as the placenta is retained the danger is necessarily great, and it may be many days, or even weeks, before it is discharged. When once this is effected the sac may be expected to contract, and eventually to close entirely.

Excision of the Cyst.—The more advanced school of operators have of late years advised the complete excision of the sac and placenta, especially in the primary operation, a procedure which would probably be more feasible when gestation has not advanced to term. This has been the course adopted with considerable success by Martin, of Berlin, Breisky, of Vienna, and others. In this operation, after removing the fetus, the gestation sac and placenta has been ligatured, bit by bit, and removed, without any attempt at tearing or separating the placenta, and thus the uncontrollable hemorrhage, which has been so serious a danger when the placenta is interfered with, is avoided. It is needless to point out that such a procedure is only likely to succeed in the hands of operators thoroughly self-reliant and conversant with the details of abdominal surgery. Under such conditions, since it materially lessens the risk of septic infection, which must always be excessive when the cyst and placenta remain in the abdomen, it is clearly the most hopeful resource, and it is by some such operation as this that, in future, cases of primary operation will be dealt with.

Treatment.—When the fetus is dead, or when we have determined not to attempt primary cœliotomy, it is advisable to wait, very carefully watching the patient, until either the gravity of her general symptoms, or some positive indication of the channel through which Nature is about to attempt to eliminate the fetus, shows us that the time for action has arrived. If there be distinct bulging of the cyst in the vagina, or in the retro-uterine cul-de-sac, especially if an opening has formed there, we may properly content ourselves with aiding the passage of the fetus through the channel thus indicated, and removing the parts that present piecemeal as they come within reach, cautiously enlarging the aperture if necessary. If the sac have opened into the intestines, the expulsion of the fetus through this channel is so tedious and difficult, the exhaustion attending it so likely to prove fatal, and the danger from decomposition of the fetus

¹ Edin. Med. Journ., vol. 1883-84, p. 521.

through passage of intestinal gas so great, that it would probably be best to attempt to remove it by cœliotomy, especially if it is only recently dead, and the greater portion is still retained.

Mode of Performing Secondary Cœliotomy.—If an opening forms in the abdominal parietes, or if the symptoms determine us to resort to secondary cœliotomy before this occurs, the operation must be performed in the same way, and with the same precautions as primary cœliotomy. This operation is not only more simple, but much more successful than the primary. Bland Sutton¹ gives a list of seven cases operated on after the death of the fetus at or near term, in all of which the mothers recovered. This is doubtless due to changes in the placental circulation, which renders its connections much less vascular and facilitate its separation, and these are believed to be completed about ten weeks after fetal death, so that the operation should be postponed, if possible, until that time has elapsed after the supposed death of the child. The placenta should be left to exfoliate spontaneously, and the cavity of the sac treated as after the primary operation. Here, as before, the safety of the operation must greatly depend on the amount and firmness of the adhesions; for if the cyst be not completely shut off from the peritoneal cavity, the risks of the operation will be little less than those of primary cœliotomy. It would obviously materially influence our decision and prognosis if we could determine this point before operating. Unfortunately, it is impossible, as the experience of ovariologists proves, to ascertain the existence of adhesions with any certainty. If, however, we find that the abdominal parietes do not move freely over the cyst, and if the umbilicus be depressed and immovable, the presumption is that considerable adhesions exist. If they are found not to be present, the cyst walls should be stitched to the margin of the incision, in the manner already indicated, before the contents are removed.

If the fetus has been long dead, and its tissues greatly altered, its removal may be a matter of difficulty. In the case under my own care, already alluded to, the fetal structures formed a sticky mass of such a nature that I believe it would have been impossible to empty the cyst had an operation been attempted. This would be, to some extent, a further argument in favor of the primary operation.

Opening of Cyst by Caustics.—The importance of adhesions has led some practitioners to recommend the opening of the cyst by potassa fusa or some other caustic, in the hope that it would set up adhesive inflammation around the aperture thus formed. Several successful operations by this method are recorded, and it would be worth trying, should the extreme mobility of the cyst lead us to suspect that no adhesions existed. If we have to deal with a case in which fistulous openings leading to the cyst have already formed, it may, perhaps, be advisable to dilate the apertures already existing, rather than make a fresh incision; but, in determining this point, the surgeon will naturally be guided by the nature of the case, and the character and direction of the fistulous openings.

¹ Op. cit., p. 425.

General Treatment.—It is almost needless to say anything of general treatment in these trying cases; but the administration of opiates to allay the sufferings of the patient, and the endeavor to support the severely taxed vital energies by appropriate food and medication, will form a most important part of the management. Freund specially insists on the importance of careful regulation of the bowels, and on making milk the staple article of diet, as important points in the management of cases prior to operation.

Gestation in a Bi-lobed Uterus.—A few words may be said as to gestation in the rudimentary horn of a bi-lobed uterus, to which considerable attention has of late years been directed by the writings of Kussmaul and others. It appears certain that many cases of supposed tubal gestation are really to be referred to this category. Although such cases are of interest pathologically, they scarcely require much discussion from a practical point of view, inasmuch as their history is pretty nearly identical with that of tubal pregnancy. The rudimentary horn is distended by the enlarging ovum, and after a time, when further distention is impossible, laceration takes place. As a matter of fact, all the thirteen cases collected by Kussmaul terminated in this way; and even on post-mortem examination it is often extremely difficult to distinguish them from tubal pregnancies. The best way of doing so is probably by observing the relations of the round ligament to the tumor; for, if the gestation be tubal, it will be found attached to the uterus on the inner or uterine side of the cyst; whereas, if the pregnancy be in a rudimentary horn of the uterus, it will be pushed outward, and be external to the sac. In the latter case, moreover, the sac will be probably found to contain a true decidua, which is not the case in tubal pregnancy. The only point in which they differ is that in cornual pregnancy, rupture may be delayed to a somewhat later period than in tubal, on account of the greater distensibility of the supplementary horn.

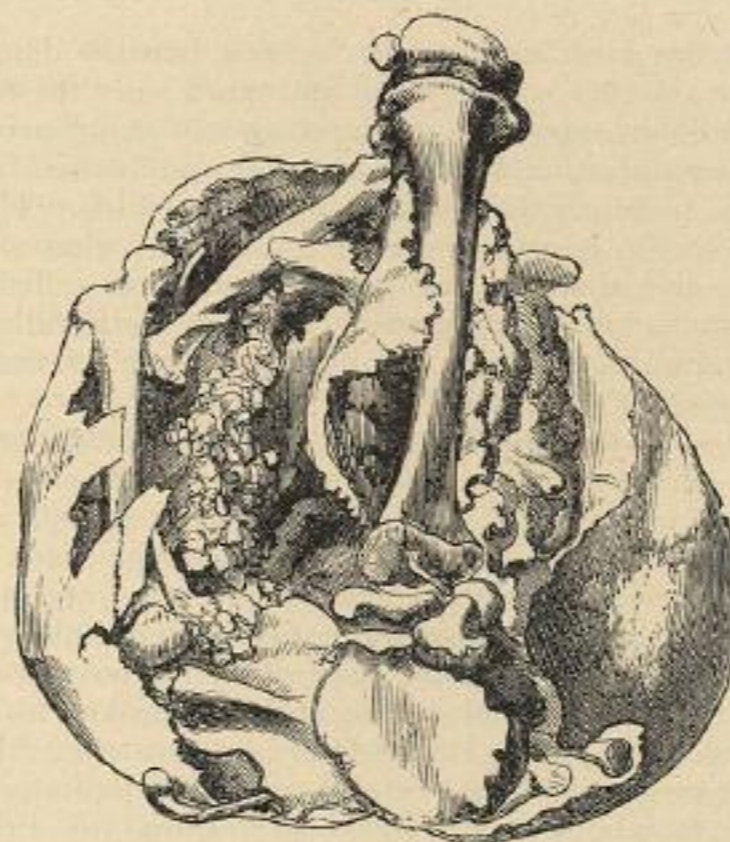
Missed Labor.—The term "*missed labor*" is applied to an exceedingly rare class of cases in which, at the full period of pregnancy, labor has either not come on at all, or, having commenced, the pains have subsequently passed off, and the fetus is retained *in utero* for a very considerable length of time. Under such circumstances it has usually happened that the membranes have ruptured at or about the proper term, and the access of air to the fetus *in utero* has been followed by decomposition. A putrid and offensive discharge has then commenced, and eventually portions of the disintegrating fetus have been expelled *per vaginam*. This discharge may go on until the entire fetus is gradually thrown off; or, more frequently the patient dies from septicæmia, or other secondary result of the presence of the decomposing mass *in utero*. Thus McClintock relates one case,¹ in which symptoms of labor came on in a woman, forty-five years of age, at the expected period of delivery, but passed off without the expulsion of the fetus. For a period of sixty-seven weeks a highly offensive discharge came away, with some few bones, and she eventually died with symptoms

¹ Dublin Quarterly Journal, Feb. and May, 1864.

of pyæmia. He also cites another case in which the patient died in the same way, after the fetus had been retained for eleven years.

Sometimes when the fetus has been retained for a length of time, a further source of danger has been added by ulceration or destruction of the uterine walls, probably in consequence of an ineffectual attempt at its elimination. This occurred in Dr. Oldham's case (Fig. 89), in which the contained mass is said to have nearly worn through the anterior wall of the uterus; and also in one reported by Sir James Simpson,¹ in which a patient died three months after term, the fetus having undergone fatty metamorphosis, an opening the size of half-a-crown having formed between the transverse colon and the uterine cavity. It is also stated that "the uterine walls were as thin as parchment."

FIG. 89.



Contents of the cyst in Dr. Oldham's case of missed labor.

In some few cases, however, probably when the entrance of air has been prevented, the fetus has been retained for a length of time without decomposing, and without giving rise to any troublesome symptoms. Such a case is reported by Dr. Cheston,² in which the fetus remained *in utero* for fifty-two years.

The causes of this strange occurrence are altogether unknown. Generally the fetus seems to have died some time before the proper term for labor, and this may have influenced the character of the pains. It is probably also most apt to occur in women of feeble and inert habit of body, possibly where there was some obstacle to the

¹ Edin. Med. Journal, 1865.

² Med.-Chir. Trans., 1814.

dilatation of the cervix, which the pains were unable to overcome. Barnes suggests¹ that some presumed examples of missed labor "were really cases of interstitial gestation, or gestation in one horn of a two-horned uterus;" and Macdonald² recently recorded a very interesting case in which he performed coeliotomy for what he believed to be a uterine fibroid, but which turned out to be one horn of a bifurcated uterus containing a fœtus which had been retained for more than a year. He believes that most, if not all, cases of "missed labor" are of this kind, delivery at term proving impossible because of the narrow connection between the impregnated horn and the cervix.

Müller, of Nancy, has attempted to prove, by a critical examination of published cases,³ that most examples of so-called "missed labor" were in reality cases of extra-uterine fœtation, in which an ineffectual attempt at parturition took place, the fœtus being subsequently retained.

From what has been said, it will be seen that the dangers arising from this state are very considerable, and when once the full term has passed beyond doubt, especially if the presence of an offensive discharge shows that decomposition of the fœtus has commenced, it would be proper practice to empty the uterus as soon as possible. The necessary precaution, however, is not to decide too quickly that the term has really passed; and, therefore, we must either allow sufficient time to elapse to make it quite certain that the case really falls under this category, or have unequivocal signs of the death of the fœtus, and injury to the mother's health.

Treatment.—If we had to deal with the case before any extensive decomposition of the fœtus had occurred, we probably should find little difficulty in its management, for the proper course then would be to dilate the cervix with fluid dilators, and remove the fœtus by turning; or, before doing so, we might endeavor to excite uterine action by pressure and ergot. If the case did not come under observation until disintegration of the fœtus had begun, it would be more difficult to deal with. If the fœtus had become so much broken up that it was being discharged in pieces, Dr. McClintock says that "in regard to treatment, our measures should consist mainly of palliatives, viz., rest and hip-baths, to subdue uterine irritation; vaginal injections, to secure cleanliness and prevent excoriation; occasional digital examination so as to detect any fragments of bone that might be presenting at the os, and to assist in removing them. These are plain rational measures, and beyond them we shall scarcely, perhaps, be justified in venturing. Nevertheless, under certain circumstances, I would not hesitate to dilate the cervical canal so as to permit of examining the interior of the womb, and of extracting any fragments of bone that may be easily accessible; but unless they could thus be easily reached and removed, the safer course would be to defer, for the present, interfering with them."⁴

It may be doubted, I think, whether, considering the serious results which are known to have followed so many cases, it would not, on the

¹ Diseases of Women, p. 445.

² Edin. Med. Journ., vol. 1884-85, p. 873.

³ De la Grossesse utérine prolongée indéfiniment, Paris, 1878.

⁴ Dublin Quart. Journ., vol. xxxvii, p. 314.

whole, be safer to make at least one decided effort, under chloroform, to remove as much as possible of the putrefying uterine contents, after the os has been fully dilated. Such a procedure would be less irritating than frequently repeated endeavors to pick away detached portions of the fœtus, as they present at the os uteri. When once the os is dilated, antiseptic intra-uterine injections might be safely and advantageously used. Unquestionably, it would be better practice to interfere and empty the uterus as soon as we are quite satisfied of the nature of the case, rather than to delay until the fœtus has been disintegrated. Macdonald thinks that abdominal section would be the best course to pursue, either removing the sac entire or resorting to Porro's operation. This advice is based on the assumption that "missed labor" is essentially the retention of a fœtus in one horn of a bi-lobed uterus, a theory which certainly cannot yet be taken as proved.

[Causes of "Missed Labor."—From several cases that have been reported in the United States we find that the failure of the uterus to expel its contents may be due to a variety of causes. If we are certain that the fœtus is actually *in utero*, that there is no pelvic or vaginal obstruction, and that the uterus is itself of normal form, then we must look for the cause of difficulty in the organ itself. By an examination of our reports of Cæsarean operations we find that there have been several cases in which the power of the uterine contractions was insufficient to overcome the resistance to expansion in the cervix. This may be due either to a want of contractile force in the muscular coat, to a change in the tissues of the cervix as the result of inflammation, or to both conditions combined. Where the muscular power of the uterus is in its integrity, the resistance in the cervix may be such that the os may remain unchanged after it is slightly opened, and the patient continue in labor until the contractile power of the uterus is exhausted, when all muscular contraction will cease. Efforts at expulsion may recur at intervals covering a period of many months, when they will cease finally. In two Cæsarean cases in the United States, the subjects being black, there was found a calcareous incrustation over and around the internal os uteri. The first operation was performed in Virginia in 1828 upon a multipara of twenty-five.¹ She was taken in labor at term, and had pains for two or three days together, at intervals, for about four weeks, after which pains returned occasionally during fifteen months. The cervix admitted the index finger, and in time the fœtus became putrid. When operated upon she had carried the fœtus two years. There was very little hemorrhage in the operation, although the uterus failed to contract, and for this reason was sutured. The woman died in the second week, of peritonitis, following an attack of indigestion, produced by a meal of animal food and cider. The second case, also a multipara, was operated upon in Georgia in 1877, after a labor of four days, by Dr. Theodore Starbuck, who describes the deposit as "ossific." The child was dead, and the woman died of internal hemorrhage very suddenly on the third day.²

[¹ Am. Journ. Med. Sci., vol. xviii, p. 257.]

[² Communicated by the operator, 1880.]

In a third case, also black, the cause of retention appears to have been a prevention of the descent of the fetus, from its arm and leg being secured within the uterus. The woman was thirty-three years old and the mother of one child, and was operated upon by Dr. J. C. Egan, of Shreveport, Louisiana, August 25, 1860.¹ On May 4, 1857, while at work in the field, she felt a sudden and violent pain in the left side; fainted, remained insensible so long as to be thought dead, but finally revived, and was pronounced four months pregnant. Labor began in November; the os dilated, head presented, but did not descend; pains continued at intervals for a month. In the fall of 1858 an abscess opened, leaving a fistula one and a quarter inches below the umbilicus. When operated upon nearly two years later, she was greatly emaciated and affected with hectic fever. The uterus being adherent, the peritoneal cavity was not opened. When the fetus was extracted, its left foot and hand were wanting, and, search being made, were found in a pouch on the left side of the uterus, enclosed by bands which were cut for their liberation. The uterus was examined bimanually to make sure that the cervix was sufficiently open for drainage. The decomposed fetus had been carried thirty-three months after maturity. Dr. Egan believes that a partial rupture of the uterus took place at the time of her attack in the field, and that the arm and leg were caught in its partial cicatrization. The woman made a good recovery.

Much light is thrown upon a possible way of accounting for some of the mysterious cases of missed labor, which have been claimed to be extra-uterine in order to account for them, by a case recently operated upon in Portland, Maine, by Dr. Stanley P. Warren, and kindly reported to me by letter. The woman was a native, of Scotch-Irish descent, aged thirty-two, and mother of a child of thirteen. She last menstruated in January, 1884. Supposed accidental abortion in May, as there was hemorrhage; the physician said he had removed the placenta, and there was a thick "molasses-like" discharge afterward. Dr. Warren was called in a week later; found metro-peritonitis and a tumor of about four inches in diameter in the right groin. The peritonitis became general, and Dr. W. was in attendance for fifteen days. On July 1st the tumor was in the median line, and foetal movements and heart-sounds distinct. Labor expected about October 28th; subsequent gestation normal. Was called October 26th, at 11 P.M.; found no true pains; pains apparently abdominal, rather than uterine, and continuous in the back and over the sides of the uterus. Fetus transverse, with head to right; pulse 152. No change for several days. Second week in November found child dead. Next four weeks slight occasional chills, and temperature 102° for two or three nights, but usually normal. Absolutely no expulsive pains. Cervix reached with difficulty, and finger passed through a long tubular neck, but fetus not reached. Cervix absolutely closed from December 21st to 29th; pulse 120, temperature 100° to 102°. Attempted to dilate with sponge tent, but could not pass it into the uterine cavity. December 30th

¹ N. O. Med. and Surg. Journ., July, 1877, p. 85; also communicated by operator, 1878.]

attempted to open cervix by digital dilatation, and succeeded finally in passing a cranioclast, but the parts closed as soon as the dilators were removed. Patient in a profound shock. After stimulating for an hour, performed Cæsarean section; hemorrhage slight; peritoneum adherent everywhere to uterus; uterine wall one-quarter inch thick; child presented by right arm and side; placenta thin and far advanced in fatty degeneration; no hemorrhage on its removal; uterus did not contract; sutured by continuous stitch with catgut. Child eight and a half pounds. Woman rallied slightly, but died of shock in twenty-eight hours. Drs. T. A. Foster and S. C. Gordon were associated with Dr. Warren in the management of the case.

It would appear in this instance of missed labor that the changes produced by metro-peritonitis prevented the natural dilatation of the cervix and the contractile action of the muscular coat of the uterus. Possibly, fatty degeneration of the muscular fibres had taken place, but this could not be ascertained, as there was no autopsy.

The Cæsarean case of Dr. Brodie S. Herndon, of Fredericksburg, Virginia, operated upon with success in 1845, bears a close resemblance in many of its features to that of Dr. Warren. The subject was a white multipara of thirty, whose pains of labor gave place to the continuous pain and other characteristic symptoms of peritonitis. This disease lasted a month, during which time the fluid contents of the uterus escaped and the vaginal discharge became very offensive. Five weeks after the peritonitis commenced the os uteri admitted two fingers, and attempts at dilatation were made, but failed. Under ergot an offensive placenta was expelled, but the fetus could not be removed. The woman being greatly wasted and her room filled with stench, the Cæsarean operation was performed on November 16th, forty-six days after the first signs of labor appeared. The uterus being adherent, the peritoneal cavity was not exposed; the uterus was sponged out, but did not contract; it was closed in the suturing of the abdomen. The patient made a good recovery. As in the Warren case, the uterus became unsuited for performing the functions of labor by reason of changes in its tissues effected by inflammatory action.—ED.]

CHAPTER VII.

DISEASES OF PREGNANCY.

THE diseases of pregnancy form a subject so extensive that they might well of themselves furnish ample material for a separate treatise. The pregnant woman is, of course, liable to the same diseases as the non-pregnant; but it is only necessary to allude to those whose course