contain branches of the umbilical arteries which break up into capillaries in the terminal ramifications. As direct communication between the fœtal and maternal circu-

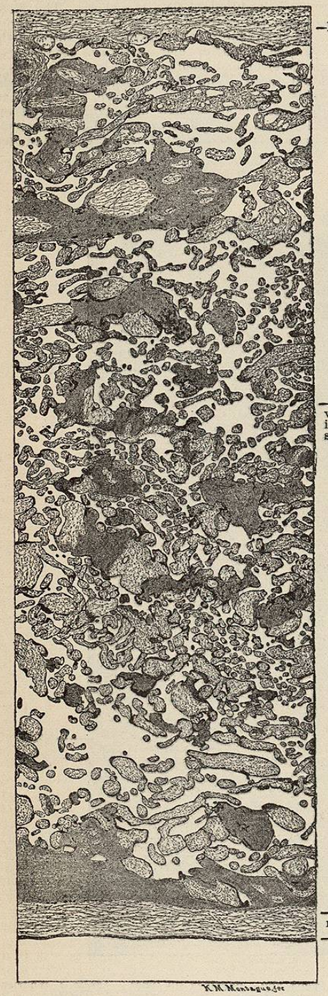

FIG. 3819.—Cross Section of Seven-Months Placenta Showing Beginning Infarct Formation. (From J. Whitridge Williams.)

lation has been disproven, it is evident that the fœtus is nourished by substances derived from the maternal blood, by osmosis, and by the selective power of the syncytium. These must traverse the layers of the chorionic villi which separate the two circulations. In the early and middle months of pregnancy there are four such layers—syncytium, Langhans' cell layer, the connective tissue of the villi, and the endothelium of the villous capillaries. Later, this number is reduced to three by the disappearance of the Langhans layer. These act as a barrier to the passage of formed substances. While the evidence concerning this question has been conflicting, it seems probable, in the light of recent investigations, that bacteria at least are not transmitted from the mother to the child unless the placenta presents definite lesions, which may constitute portals of entry.

The full-term placenta contains many infarcts, which if of moderate size cannot be regarded as a disease, but rather as a sign of senility of the placenta, analogous to the changes which are observed in the villi of the chorion læve at an earlier period of pregnancy. These begin as a rule in an obliterating endarteritis. At the same time changes may be seen in the portion of the villi which corresponds to the position occupied by Langhans' cell layer in the early months. This progresses and the tissue becomes converted by coagulation necrosis into canalized fibrin. If the process continues, numbers of villi become fused together and are eventually converted into a fibroid material, which in its final stages is indistinguishable from fibrin derived from the blood. Such structures are known as white infarcts, and are constantly present in varying size in every normal placenta, as has been shown by Ackermann, Eden, and Williams. The primary change in the production of infarcts occurs most frequently in the villi, although it may be initiated in the so-called decidual septa, which, as we have seen, are prone to degeneration, owing to the absence of blood-vessels. The frequency of infarcts has been emphasized by Williams, who found white surface infarcts of at least 1 cm. diameter in 243 of 500 placentæ, and marginal infarcts which extended throughout at least one-third of the placental periphery in 184 cases of the same series.

Anomalies in Form.—As already indicated, the placenta may present many varieties in size and form. We have seen that it becomes discoid in shape by atrophy of the villi of the chorion læve, and develops from the chorion frondosum, which is attached to the most highly vascularized portions of the decidua. Abnormalities in the blood supply of the decidua cause most of the anomalies of the placenta. If the vascularization, instead of being limited to the single area of the chorion frondosum, develops in several portions of the decidua, certain villi of the chorion læve, corresponding to the seat of vascularization, persist, and the resulting placenta may present one or more lobes, separated from each other by normal membranes. When it is incompletely divided into two lobes and the vessels extend from one to the other to form the umbilical cord, we term it *placenta dimidiata*, or *bipartita*. Ahlfeld noted this condition once in six hundred cases. If it consist of two separate lobes, the vessels of which are perfectly distinct, and do not unite until just before entering the cord, it is known as *placenta duplex*. The insertion of the cord in such cases is generally marginal, and at the periphery between the two lobes. Occasionally the organ may be made up of three distinct lobes—*placenta triplex*, while in very rare instances it may consist of a number of small lobes, Hyrtl having described as many as seven—*placenta septuplex*.

One or more accessory lobules are frequently noted in the membranes at some distance from the periphery of the main placenta. Ordinarily they are united to the latter by vascular connections and constitute the *placenta succenturiata*. When these are lacking and the accessory lobules are functionless, they constitute the *placenta spuria*.

Failure of the chorion læve to atrophy results in the formation of a thin placenta, which covers more or less of the entire inner surface of the uterus with functioning villi. This constitutes the *placenta membranacea*, which is frequently adherent, and may give rise to serious complications in the third stage of labor. Atrophy of the central primary villi of the chorion frondosum gives rise

to the so-called *placenta fenestrata* in which there is an aperture of varying size in the central portion of the placenta, covered only by normal membranes. Other anomalies may occur, and as reported by Taurin the human placenta may be a broad annular organ which encircles the uterine cavity like those of the carnivorous animals.

The outlines of the placentas in the case of twins varies accordingly as development occurs from the ova of two Graafian follicles (double-ovum twins), or from one ovum whose nucleus has undergone cell division (single-ovum twins). In the former instance there are two distinct placentas. In the latter, there is but one placenta, with a single chorion which contains two separate amnions, so that each child lies separated from the other by two amniotic walls. This septum may be ruptured by unusual pressure of the amniotic fluid or by excessive fœtal activity and atrophy of the partition may result.

The placenta in utero is generally attached either to the upper portion of the anterior or posterior wall, and extends for some distance upward and upon the fundus. If the insertion be low, it may cover the internal os of the cervix, which condition is known as *placenta prævia* and constitutes a most dangerous complication of pregnancy. Schroeder has drawn attention to the fact that the direction of the round ligaments may indicate whether the placenta is anteriorly or posteriorly placed. If the placenta develops upon the anterior uterine wall, the increased blood supply will cause a more rapid growth in this region and the resulting increased breadth of the uterus will cause the ligaments to run more or less parallel. If the placenta be posteriorly situated the reverse will be true, and the ligaments will be found to diverge in their course downward. The distance between the internal os and the edge of the placenta may be estimated by measuring the length of the membranes of the shed placenta from their point of rupture to the placental margin. As rupture occurs over the internal os, we can by this method frequently reconstruct the position of the placenta in utero, having first determined by palpation of the round ligaments as to whether the placenta was anteriorly or posteriorly placed.

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PLACENTA, PATHOLOGY OF.—The chief part of the pathology of the placenta has been discussed under the heads of *Chorion, Pathology of the*, and *Decidua, Pathology of the*. This article will treat only of the general pathological conditions of the organ considered as a whole; namely, anomalies of development, size, and location, general disturbances of circulation, inflammation, etc.

Anomalies of Development.—These are of not infrequent occurrence. Instead of the usual round or oval form, the placenta may exhibit the greatest diversity of shape, such as crescentic, horseshoe, elliptical, etc. (*Pl. biloba, triloba, multiloba, reniformis, fenestrata, panduæformis, etc.*). Besides the main organ there may be found completely separated cotyledons appearing as smaller accessory placentas (*Pl. succenturiatæ*). The smaller accessory placentas owe their origin to a localized failure of placental development in certain areas corresponding to an endometritic thickening of the decidua with fibrin formation, leading to an obliteration of the intervillous sinuses at the point of separation between the main mass and the accessory cotyledons. Following the obliteration of the intervillous spaces the villi of the intervening areas undergo atrophy or fibroid change. Not infrequently the accessory placentas may suffer a similar change from obliteration of the intervillous spaces and appear in the mature placenta as thickened, bloodless areas separated from the main organ (*placenta spuria*). If the placenta becomes divided in similar manner by atrophy or non-development of a portion of the chorion, into two portions of approximately equal size, the phenomenon of an apparently double placenta with one child is presented (*Pl. duplex, dimidiata, bipartita*). Smaller accessory placentas may also be associated with this condition. The cord may be inserted marginally upon one half, or there may be a velamentous insertion between the two halves. It is also possible that a double placenta may be formed by the changes that occur in the placenta following the original implantation of the ovum in one of the uterine horns. Under such conditions the placenta finds proper nourishment for its development upon the anterior and posterior walls of the uterus, but not in the horn itself where the decidua is developed but slightly. As the result of the non-development of the chorion over the poorly developed

decidua of the horn the portions of placenta developing on the anterior and posterior walls become separated from each other and appear as a double organ. According to some writers a double placenta may be formed through a secondary implantation of a placenta reflexa upon the opposite uterine wall; but by the majority of authorities this is considered doubtful. The peculiarities in development of the placenta mentioned above have been regarded as examples of an atavistic reversion to the placental type of some of the lower animals; but it is very likely that they represent the sequelæ of inflammatory conditions of the endometrium, or are secondary to a localized obliteration of the intervillous spaces and atrophy of the chorion analogous to infarct formation. Such atrophy may be due to the fact that the affected portions of the chorion do not find a favorable location for development. The various anomalies of development may have a practical importance, in that portions of the placenta may be retained after delivery; this is particularly likely to occur in the case of double placenta or when accessory placentas are present.

Placenta marginata. This term is applied to the placenta when the chorion læve is given off, not from the edge of the placenta, but from its surface, so that there is produced beyond the attachment of the fœtal membranes an edge or margin which does not stand in direct connection with the main mass of the chorion. From this margin the membranes are easily stripped; its surface is covered with a thick, firm, yellowish fibrin layer which is elevated 1–2 cm. above the general surface of the chorion. On microscopical examination the fibrin ring or margin is found to consist of atrophic and necrotic villi with obliterated blood spaces. Its structure is therefore the same as that of the placental infarct. If, on the inner side of the fibrin ring, there is developed a ring-formed elevation of the chorion, the variety known as the *placenta circumvallata* is produced. Both of these anomalies develop as the result of an abnormal proliferation of the *reflexa* with a subsequent infarction of the same and of the enclosed villi. In this way there is formed on the surface of the placenta a stiff and inelastic ring of fibrin at a time when the placenta has not yet attained its full size. The fibrin ring hinders the peripheral growth of the villi, but these are able to penetrate the decidua outside of the ring, where they give rise to masses of villi lying outside of the firm attachment of the membranes to the placenta. As the result of the formation of the placenta marginata, portions of the membranes are likely to be retained after delivery; and in those cases in which the condition develops very early the growth of the placenta may be so limited that the fœtus will probably be insufficiently nourished and abortion may occur.

The *placenta membranacea* is a rare form in which the organ is thin and flat, and extends over a large surface, either the whole or a large part of the chorion bearing permanent villi. It has been variously explained, but the most plausible theory is that the persistence of the villi over such a large part of the chorion is due to the fact that the villi penetrating the original serotina did not obtain sufficient nourishment. The *placenta membranacea* may give rise to clinical symptoms of *placenta prævia*, hemorrhages, retention, etc. Separation in the case of this form of placenta is much more serious than that of the normal form of organ.

Abnormalities of Site.—The *placenta prævia* is the most important form of abnormal location of the placenta. The placenta may completely cover the os (placenta prævia centralis), or extend into the lower uterine segment without reaching the inner os (placenta prævia lateralis). The etiology of the condition is obscure; and many theories have been offered in explanation. As a result of previous endometritis the cavity of the uterus may become so enlarged that its walls are no longer in contact with each other; so that when the ovum enters the uterus it drops downward and becomes attached to the lower portion of the uterus. In some cases the placenta prævia may be a normally situated placenta, which is so large that it extends into the lower uterine segment. It is also probable that the placenta prævia may owe its origin to a development of a portion of the chorionic villi in the decidua reflexa, instead of those implanted in the serotina. The clinical importance of placenta prævia lies in the fact that in the later months of pregnancy the enlargement of the lower pole of the uterus gives rise to detachment of the placenta with consequent hemorrhage.

Anomalies in the insertion of the cord are not infrequent; the usual attachment is the centre of the organ; not rarely it is eccentric, or even at the margin (*battledore placenta*). When the cord is inserted into the membranes some distance outside of the placental margin the condition is known as *velamentous insertion*. The vessels bifurcate at the point of insertion, their divisions running between the amnion and chorion to the placenta.

Circulatory Changes.—Œdema of the placenta occurs rarely. It is usually associated with general œdema of the fœtus; more rarely with maternal dropsy. Disturbances of fœtal circulation, thrombosis of umbilical or hypogastric arteries, antenatal closure of the foramen ovale, etc., have been regarded as the exciting causes. The placenta of acardiac monsters is usually œdematous. The number of leucocytes in the blood of the fœtus may show a great increase in these cases. The œdematous placenta is larger and heavier than normal, pale, friable, and soft. Microscopically the villi are found to be greatly enlarged and closely packed together; the intervillous spaces are reduced in size and contain but little blood. The stroma of the villi is separated by fluid, the cells being pushed far apart. The fœtus usually dies in utero as the result of the conditions causing the œdema.

Hemorrhage.—True apoplexies of the placenta are rare. They may occur either in the maternal or in the fœtal portion, and are usually the result of inflammatory changes. In the fœtal portion the mass of blood becomes encapsulated by a dense layer of fibrin. The neighboring villi are compressed and become atrophic or necrotic. The nutrition of the fœtus may be impaired and abortion result. Very rarely the hemorrhage may occur upon the surface beneath the amnion, or the blood may burst through the serotina and escape externally. In such cases the fœtus is usually born dead. In some of the reported cases the hemorrhage was regarded as due to a rupture of a branch of the umbilical vein or artery following thrombosis, twisting, or laceration. The causes of these hemorrhages are unknown and their pathology is doubtful. It is probable that some of the cases described were not true placental apoplexies. The small dark red areas frequently seen throughout the placenta, and regarded by many as interstitial hemorrhages, are not true hemorrhages, but represent local congestions of the intervillous spaces. Inasmuch as the blood is contained within the normal blood spaces the condition cannot be considered to be hemorrhage.

Hemorrhage into or from the placenta as the result of trauma or of attempts at abortion are of frequent occurrence. Hemorrhage from partial separation of the organ occurs in placenta prævia. In inflammatory conditions of the maternal portion of the placenta, degenerative changes in the serotina, etc., partial separations of the fœtal placenta may occur. Such hemorrhages are of frequent occurrence in the acute infections, syphilis, nephritis, Basedow's disease, chronic endometritis of gonorrhœal origin, etc. In all these cases the hemorrhage is from the maternal vessels and not from the fœtal. They represent decidual changes rather than placental. The escaped blood fills up the cavity caused by the separation of the chorion or outer layer of the decidua, or may break through the fœtal membranes or escape externally. The serotina may be completely destroyed and a large cavity formed between the muscle of the uterine wall and the placenta. The chorionic villi and fœtus may be compressed; the latter suffering from disturbances of nutrition may die, or may present abnormalities of development.

Retrograde Changes.—As has been mentioned in the articles treating of the pathology of the chorion and decidua, the retrograde changes which are constantly found

in the mature placenta must be regarded as the expression of a physiological decay of the organ. The great majority of the older observations on inflammation, fatty degeneration, amyloid change, etc., were most probably nothing more at foundation than the various appearances produced by the physiological processes of infarction found constantly in the ripe placenta.

Atrophy of the placenta may follow extensive hemorrhages, or inflammation, or atrophy of the decidua.

Necrosis.—Simple necrosis of the chorionic villi occurs in placental infarction. An abnormal degree of this change may be caused by nephritis of the mother, by syphilis, tuberculosis, etc.

Placental Infarction (see *Chorion, Pathology of*).

Fatty Degeneration.—The cases described in the literature by Barnes and others were undoubtedly placental infarcts. Fatty degeneration of the chorionic villi is extremely rare except as a sequela of other changes, retained placenta, placental infarction, etc. A small amount of fat is almost constantly present in the normal ripe placenta, and is to be regarded as physiological.

Calcification within certain limits is almost constantly found in the mature placenta, and is to be regarded as physiological. Only in marked degree is it of pathological significance. In the latter case it follows excessive infarction, fatty degeneration, etc., in nephritis, syphilis, acute infections, etc.

Amyloid has been described as occurring in the placenta; but the appearances taken for amyloid were probably those of infarcted areas.

Myxomatous degeneration of the stroma of the chorionic villi occurs in retained placentas and in hydatid moles.

Pigmentation.—Deposits of blood pigment may be found in both the normal and the diseased placenta, resulting from the disintegration of red blood cells contained in the clots found between the villi. Rarely this pigment may be taken up by the villi and be found deposited in the stroma of the latter.

Hyaline degeneration of the villi occurs to a certain extent in the ripe placenta as an evidence of physiological atrophy. When it occurs prematurely, or to a marked degree, it is to be regarded as of pathological significance. It may follow the changes produced in the villi by the acute infections and certain intoxications, but is most often due to syphilis.

Hypertrophy.—An enlargement of the placenta may be due to œdema or degenerative conditions of the villi. Fibrous hyperplasia occurs in syphilis, nephritis, etc. A true hypertrophy—that is, an enlargement of the organ with preservation of normal structure—is of rare occurrence in association with abnormal development of the fœtus.

Inflammation (see *Chorion, Pathology of*).

Tuberculosis of the placenta has been described but a few times (Lehmann, Schmorl, and Kockel, Auché and Chambrelente, Warthin). It is not improbable that the disease is of more frequent occurrence than the few published reports would indicate. Inasmuch as there are no gross changes in the placenta by which the condition can be recognized without microscopical examination, it is probable that cases escape diagnosis. In all cases of maternal tuberculosis of advanced degree, in miliary tuberculosis, and in all cases of maternal tuberculosis in which the tubercle bacilli gain entrance to the blood, the bacilli will undoubtedly be found in the blood contained within the intervillous spaces. The conditions would therefore favor the development of tubercles in this location. On the other hand, it may be argued that the syncytium and fœtal tissues possess a certain degree of immunity toward the tubercle bacillus. This view is supported by the fact that in placental tuberculosis large masses of fibrin containing great numbers of tubercle bacilli may be found resting upon an apparently normal syncytium; and in a case seen by the writer the syncytium had even grown around and enclosed such a fibrin mass containing tubercle bacilli.

Syphilis may affect either the fœtal or the maternal portion of the placenta. In both cases the changes are those of inflammation and premature degeneration. Gummatous proliferations have been observed in the serotina; but it is not improbable that some of the changes described as such were in reality fibrin masses and not gummata. The most characteristic and constant change in the placenta due to syphilis is that which occurs when the infection takes place at the time of conception or during the early stages of pregnancy. In such cases the chorionic villi not infrequently show a fibroblastic proliferation (interstitial placentitis) of the villus stroma with resulting obliteration of the chorionic vessels. If the fœtus survives, the affected villi undergo a fibroid change. In the great majority of cases, however, the condition results in abortion. Infection during the later months may produce little change in the placenta; or the physiological phenomena of obliteration of the chorionic vessels and infarction may be much more extensive than normally. The interstitial placentitis occurring in the early months of pregnancy is characteristic of syphilitic infection only in the involvement of large areas. A similar change is also found in the neighborhood of placental tubercles.

Gonorrhœal placentitis has been regarded clinically as a cause of abortion. Two cases have been reported in which the gonococcus was found; but neither the bacteriology nor the pathology was established beyond a doubt. The etiological rôle of the gonococcus has, however, been clearly shown in cases of interstitial decidual endometritis.

Placental adhesions with the uterine wall are of much more rare occurrence than is usually believed. In rare cases the serotina may fail of development and the chorionic villi penetrate directly into the uterine wall. In cases of decidual endometritis fibrous connective tissue may develop in the serotina and give rise to firm connections between uterus and placenta. As a result of such adhesions portions of the placenta may be retained, and this may lead to severe hemorrhages or to secondary infection. Putrefactive processes may take place in such retained placental tissue, as well as in that retained after abortion.

Detachments of the margin of the placenta of slight degree are relatively frequent, and possess no significance. Their occurrence is revealed by masses of fibrin or blood clot lying between the decidua vera and the reflexa. More extensive detachments may endanger the life of both mother and fœtus. Such detachments are usually associated with hemorrhage; the blood may collect in the space formed by separation of the placenta from the serotina or burrow between the layers of decidua and escape externally. In rare cases the blood may rupture into the amniotic cavity. Only exceptionally, when the detachment occurs in the central part of the placenta while the edges remain attached, is the hemorrhage unimportant. In such cases death of the fœtus occurs, however, as the result of disturbed nutrition. The detachment of the placenta during birth is of rare occurrence. Such premature loosening of the organ is due to sudden diminution in the volume of the uterus following the loss of large amounts of amniotic fluid. The weight of the placenta causes it to descend into the lower segment of the uterus, where it may present before the fœtus, and may be expelled first. In such cases the child is usually lost.

Changes in the Placenta after Intra-uterine Death of the Fœtus or Abortion.—After death of the fœtus in the early weeks of pregnancy the retained chorion may continue to grow. Hemorrhages occur repeatedly, forming thick layers of blood clot, which gradually loosen the placenta remains. These together with the blood clot are discharged as a *fibrin* or *fleshy mole*. A deposit of calcium salts in the fibrin mass gives rise to a *stone mole;* myxomatous or hydropic degeneration of the stroma of the villi to a *hydatid* or *grape mole* (see *Chorion, Pathology of*). Through continued growth of the villi with successive deposits of fibrin, polypoid tumors (*placental polyps*) may be formed. These may be discharged spontaneously or may become gangrenous or purulent as the result of in-

fection. A penetration of the uterine wall by proliferating villi gives rise to the condition known as *malignant* or *destructive placental polyp* (see *Syncytioma*).

Placental Cysts.—Cystic formations have been frequently described as occurring in the placenta. The majority of these have undoubtedly been degeneration cysts, arising either from a myxomatous or hydropic degeneration of the stroma of portions of the chorion, or from the liquefaction of areas of infarction. Less frequently small cysts may arise in the placenta as the result of the liquefaction of small encapsulated hemorrhages. The cysts arising from the degeneration of infarcted areas may reach a very large size, and in rare cases may be mistaken for a second amniotic sac. They are found usually on the fœtal side, beneath the connective tissue of the chorion. Their walls are lined by large epithelioid cells, in part syncytial and in part decidual. Small cysts lined with epithelial cells (so-called dermoids) have been observed in the placenta. These have been interpreted as representing remains of the allantois.

Tumors.—New growths of the placenta belonging to the connective-tissue group are extremely rare. Alin collected twenty-three cases from the literature, and twenty additional cases have been reported up to 1902. The diagnoses given were myxofibroma, fibroma, angioma, fibromyoma, and sarcoma. The majority of these cases are very doubtful. The so-called myxoma fibrosum is the most common form; it is found usually on the fœtal surface, and is rarely embedded in the placental mass; and still more rarely it reaches the maternal side. These growths present a varied appearance, but are usually encapsulated, firm, and homogeneous on section. Microscopically they show an alveolar structure, the tissue resembling that of the umbilical cord, sometimes very rich in cells, at other times containing but few. It is very doubtful indeed if these formations are to be regarded as true neoplasms.

Of much more frequent occurrence are the growths arising from the syncytium, the *benign chorio-epithelioma* or *hydatid mole*, and the malignant chorio-epithelioma (*syncytioma malignum*). (See *Syncytioma*, and *Chorion, Pathology of the.*) Such growths arise from retained chorion after abortion or delivery, usually after the former during the early weeks of pregnancy. From the decidual cells a sarcoma may arise (*sarcoma deciduocellulare*). Confusion, however, exists with regard to this variety; in many cases syncytioma has undoubtedly been regarded as a sarcoma of decidual origin. (See also *Chorion, Pathology of*, and *Decidua, Pathology of*; and *Syncytioma.*) *Aldred Scott Warthin.*

PLACENTA PRÆVIA. (CLINICAL.)—When the placenta is attached in whole or in part to that portion of the uterus which is dilated during labor for the passage of the child, it is called "prævia."

Dr. Robert Barnes, in a paper read by him in 1892 before the International Congress of Diseases of Women and Obstetrics in Brussels, divided the uterus into three zones—the fundal or superior zone, the equatorial zone, and the inferior zone. The inferior zone is separated from the equatorial by Barnes' boundary line, which has also been called the "internal os of Braune," the "ring of Bandl," and "Schroeder's contraction ring." It is this inferior zone which is dilated during labor for the passage of the child.

Varieties of Placenta Prævia.—Some writers make four divisions of placenta prævia:

1. Lateral, in which the placenta is attached toward the upper part of the inferior zone.
2. Marginal, in which the placental edge comes down to, but does not cover, the internal os.
3. Partial, in which the internal os is partially covered by the edge of the placenta. And
4. Complete, in which the internal os is completely covered by the placenta.

The nomenclature of Schroeder, Budin, Parvin, and others, who make but two divisions, is more practical and less confusing. They condense the first three varieties under one head, lateral placenta prævia, which includes all cases not complete. Lateral placenta prævia occurs more frequently than complete, probably in the ratio of two or three to one.

Frequency.—Placenta prævia occurs about once in one thousand cases of labor, though the figures as to its relative frequency are widely divergent. Thus, Winckel gives 1 to 1,500; Kaltenbach, 1 to 1,500 or 1,600; Jewett, 1 to 1,009; while Townsend, at the Boston Lying-In Hospital, found 1 case in 239 labors, and White, at the New York Lying-In Hospital, reports a frequency of 1 to 322. These latter figures, however, are much higher than is usually found, as a great many abnormal cases are referred to lying-in hospitals by midwives and physicians.

Etiology.—The cause of the faulty attachment is still unknown. Predisposing causes are endometritis, relaxation of the uterine walls, anomalies of the uterus, as uterus bicornis and unicornis. Ingleby reported two cases in which there was a low opening of the oviducts. Webster says: "Three different sets of conditions explain the occurrence of placenta prævia: 1. Low implantation of the ovum 2. Development of chorionic villi on the decidua reflexa, forming a reflexal placenta. 3. Low implantation of the ovum with a reflexal placenta."

Complications.—Faulty presentations are common, owing to the placenta filling the lower zone of the uterus which is usually occupied by the presenting part.

Anomalies of the placenta are frequently found in conjunction with the faulty attachment. It is usually thinner and spread out over a larger area than that occupied by the normally attached placenta; it is apt to be irregular in form, and "placenta succenturiata" is not uncommon. There are frequently abnormal adhesions between the placenta and the uterine wall.

Prognosis.—This is one of the gravest of the complications of pregnancy. The more nearly completely the internal os is covered and the earlier the hemorrhage the greater the danger to both mother and child. The prognosis is affected by the time at which the case is first seen and by the skill of the operator. The figures for maternal mortality range from five or ten per cent. (Winckel) to twenty-three per cent. From fifty to seventy per cent. of the children are lost. Lateral placenta prævia is less dangerous than complete.

Symptoms.—The cardinal symptom of placenta prævia is hemorrhage. This may occur at any time after the formation of the placenta, but is rare before the twenty-eighth week. In the complete variety it occurs earlier and is more profuse than in the lateral. Winckel states that the first hemorrhage in lateral placenta prævia occurs usually after the thirty-second week; in complete, between the twenty-eighth and the thirty-second. Hemorrhage occurring in the latter months of pregnancy without obvious cause is strong presumptive evidence of the presence of a prævial placenta. The diagnosis can be made certain only by feeling the placenta through the os with the examining finger. Before the os is sufficiently dilated to admit the passage of the finger, the failure to find the placenta by abdominal palpation, a faulty presentation of the fœtus, and on vaginal examination inability to recognize the presenting part through the vaginal vault and uterine wall, are suggestive symptoms.

The first hemorrhage, if it occurs before labor, comes on without warning. It may be profuse, or there may be only a slight flow which ceases spontaneously, to recur after a few hours or days. Rarely it is so profuse as to cause death. Sometimes there is constant oozing.

Treatment.—The treatment to be adopted depends on the period of pregnancy at which hemorrhage occurs, the extent of the bleeding, and the ability to control it by simple measures.

When the first hemorrhage occurs before the child is viable, when it is slight and controlled by rest in bed, if there are no contractions of the uterus, we are justified in temporizing, in the hope of getting a living child.

Such a course being determined upon, the patient should be kept in bed and as quiet as possible until labor comes on spontaneously or is induced with the expectation of delivering a living child. She should be meanwhile on a nutritious and non-stimulating diet, and should be watched with unremitting care for a recurrence of the bleeding.

Should, now, the hemorrhage be profuse, whether labor be present or not, there is no condition of pregnancy in which danger to life is more imminent or in which judicious interference is more essential. We have before us then the problem of how best (1) to check the hemorrhage, (2) to expedite labor. No single method of treatment can apply to all cases.

Should the hemorrhage occur first after the onset of labor, with lateral implantation of the placenta and a normal presentation, if the os is fully dilated or easily dilatable, simply rupturing the membranes and allowing the presenting part to engage will often stop the hemorrhage. Should this fail to check the bleeding, the head may be brought down with the forceps, or, if the breech present, a foot may be grasped and the os plugged with the thigh and buttocks. Should the presentation be a transverse one, podalic version is indicated.

When, on the other hand, we have a brisk hemorrhage coming on during pregnancy or labor, with a rigid os barely admitting one finger, rupture of the membranes would be a very doubtful procedure. In such a case most obstetricians advise the use of the tampon. To be of use, it must be applied with thoroughness and care, and, needless to say, with all aseptic precautions. The best material with which to tampon is gauze. It may be either sterile or medicated, and should be folded in strips about one inch wide and two or three yards long. A Sims speculum of large size facilitates its introduction. The patient should be placed on her side or in the lithotomy position. The cervix should first be plugged if possible, and then the vagina should be firmly packed throughout, the tighter the better. We accomplish two things by this procedure: check the hemorrhage and stimulate uterine contraction. The tampon may be left in place, provided there is no oozing through or alongside it, until the cervix is fully dilated or is easily dilatable. It should be remembered that the tampon is simply a preparatory measure. Its usefulness ceases with dilatation of the os. Some physicians allow it to remain until it is expelled by the advancing head. It is better not to allow it to remain for a longer time than ten or twelve hours, should no indication arise for its removal sooner. When it is removed, if the cervix is found to be dilated or nearly so, and the presenting part shows a tendency to engage, the membranes should be ruptured and the labor terminated by forceps or version. Should the cervix be partially dilated—two fingers or more—we have to choose between the use of some of the rubber dilators, such as Barnes' bags, the *ballon* of Champetier de Ribes, Braune's colpeurynter, etc., and version, either external, or the combined external and internal or bipolar version of Braxton Hicks.

Of the rubber dilators, the *ballon* of Champetier de Ribes is probably the best. Its conical form and moderate elasticity adapt it thoroughly to the purpose of a uterine dilator, and acting from within it closely simulates the action of the membranes in normal cases. It is urged against it that it sometimes fails to stop hemorrhage, that it adds to the danger of sepsis, and that it displaces the presenting part. It is applicable to the same class of cases as bipolar version, over which it has the advantages that it can be applied without anæsthesia and that it takes less time. But, like the tampon, its use is only a preparatory measure, and its expulsion or extraction must be followed in most cases by the use of the forceps or version.

External version is practicable only before the presenting part sinks into the pelvis and before rupture of the membranes occurs. As soon as it is accomplished the membranes should be ruptured, a foot brought down, and the os plugged with the thigh and buttocks. There is little danger of concealed hemorrhage, as the presenting breech makes firm pressure on the placental site.

The conditions necessary for the performance of bipolar version are: that the liquor amnii should be present, that the cervix should admit two fingers, and that the vagina should admit the rest of the hand if necessary. The operator should use, in the vagina, the hand corresponding to the position, *i.e.*, the left hand in left positions, and the right hand in right. Two fingers are slipped up through the cervix and push the head to that side upon which the dorsal plane lies, while with the other hand the breech is pushed to the opposite side. As soon as the head is pushed up out of the pelvis, the breech is crowded down with the outside hand upon the fingers inside the cervix, and a knee is grasped and brought down. The version is completed by drawing down the leg into the vagina, while the head goes up into the fundus, and the breech engages. The advantages of bipolar version over internal version are that it can be done earlier and that in bipolar version only two fingers enter the uterine cavity, thus causing less shock and less danger of sepsis.

Internal version, or ordinary podalic version, is one of the oldest and, when it is applicable, one of the best of the methods of treating placenta prævia. When there has been little blood lost in the earlier part of labor, when the os is fully dilated or is soft and sufficiently dilated to admit the hand, it is the most practical and direct method of effecting delivery. The hand and arm, during their introduction into the uterus, make pressure upon the bleeding surfaces, and thus check the hemorrhage, while, later on, the same office is performed by the thigh and breech of the child.

Whatever the method of version, after the foot is brought down and the os is plugged by the thigh, the further delivery may be left to the natural forces, provided there is no imperative indication for rapid extraction.

When the hemorrhage continues after the birth of the child, the placenta should be extracted manually at once, and the uterine cavity packed with sterile gauze, if necessary.

There is another class of cases in which the cervix is rigid and undilated, in which the tampon fails to stop the hemorrhage, or in which if the hemorrhage is checked the cervix fails to dilate and recurrence of the hemorrhage is imminent. In such a case, when the surroundings are not prohibitive, Cæsarean section would seem to offer much. With the improved technique of recent years, the mortality after this operation has steadily fallen, and as between it and "accouchement forcé"—by which is meant forcible manual dilatation of a rigid and oftentimes friable os, followed by internal version and delivery—Cæsarean section in competent hands should give a lesser mortality. *Richard Ewell Brown.*

PLAGUE, THE. See *Bubonic Plague.*

PLANTAIN—Codex Med. The flowering plant of *Plantago major* L., *P. media* L., and *P. lanceolata* L., three common European weeds, of which the first and last have made themselves pretty well at home in our fields and door-yards. They are very slightly acrid and bitter, somewhat astringent, and quite mucilaginous; containing a little of some sort of *tannin*, some *resin*, some "*bitter extractive*," and considerable *mucilage*, but no more active substances. They are almost obsolete as medicines, but were formerly esteemed as astringents, hæmostatics, and even antispasmodics, and were used locally in leucorrhœa, hemorrhoids, conjunctivitis, and scrofulous eruptions.

The order *Plantaginaceæ* is a large one, of several hundred species, but none having active properties. The seeds of one, *P. Psyllium* L., have an abundant mucilage, like that of flaxseed, and are employed in the arts for sizing cloths, etc., and occasionally in medicine as collyria or demulcent washes. *W. P. Bolles.*