

derm, which is divided by large cavities (abdominal and thoracic) into two main layers, one of which is closely associated with the epidermis and forms the body wall, the somatopleure of embryologists; the other joins with the entoderm to complete the walls of the splanchnic viscera, and constitute the splanchnopleure of embryologists. The mesoderm is permeated by two sets of cavities: (1) the heart and blood-vessels; (2) the lymphatic system. It is also differentiated into numerous tissues, muscle, tendon, bone, etc., and organs, urogenital system. The nervous system, although developed from the ectoderm, is found separated from its site of origin, and completely encased in mesoderm.

As we ascend the animal scale, we discover in all parts an increasing complexity; especially in the nervous system is this marked, but it is even more strikingly shown by the evolution of the mesoderm in relative size and differentiation. This important correspondence between the organization of the mesoderm and the degree of evolution of animals has not, to my knowledge, hitherto attracted express attention.

Charles Sedgwick Minot.

**GESTATION.**—The word is derived from the Latin verb *gestare* to carry, and therefore describes the function performed by the pregnant woman from the time of the fecundation of the ovum to that of delivery. Gestation and pregnancy are synonymous, but most authors do not apply either term to those pathologic conditions characterized by prolonged retention of a dead fetus or secundines.

The German synonym *Schwangerschaft* expresses this same idea of carrying something; the French *grossesse* refers to the increase in the size of the abdomen during pregnancy; the Italian *gravidanza*, like the English terms *gravid* and *gravidity*, imply an increase in the weight of the uterus (*gravo*, to weigh down).

When more than one fetus is present the gestation is designated as *multiple*, in distinction from a *single* or *simple* pregnancy. Normally the ovum should develop within the uterine cavity, and all other forms of gestation are known as *ectopic*, viz., out of place. In this article the subject of ectopic gestation will not be considered.

**MODIFICATIONS CAUSED BY GESTATION.**—The presence of the fecundated ovum at once stimulates the maternal organism, and a series of changes take place in order to

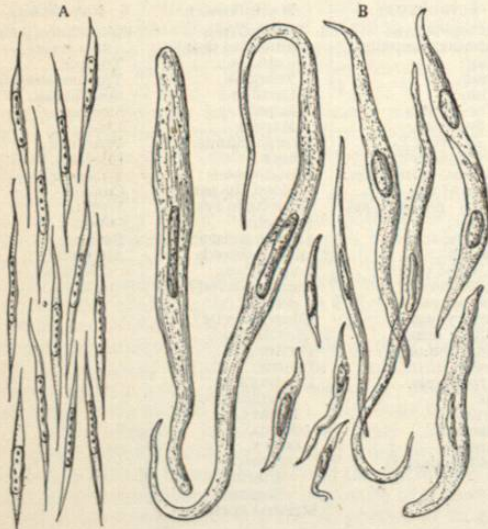


FIG. 2289.—A, Muscle-elements from Non-pregnant Uterus; B, cells from uterus shortly after delivery. (Sappey.)

meet the following requirements: 1. A place must be provided in which the fetus can develop and be protected. 2. There must be a physiologic hypertrophy of all organs

concerned in the processes of nutrition and excretion. 3. There must be preparations for labor and subsequent nourishment of the child. Under these heads will fall all the local and general changes induced by gestation, but as the genital system is the centre of physiologic disturbance it is there we expect to find the most striking modifications.

**Uterus—Modifications of its Body.**—Increase in the size of the womb in order to keep pace with the growing demands of the fetus constitutes one of the most prominent features of gestation. The volume of the uterus augments gradually, but not regularly, the growth during the later months being more rapid than at first. Of course the size of the uterus at term varies somewhat, depending upon the size of the fetus, the number of children in utero, and the amount of liquor amnii; but the following figures give a general idea of the extent of uterine enlargement:

Before impregnation the uterus weighs about an ounce, its capacity is about one cubic inch, and the length of the cavity is two and one-half inches. At term the uterus weighs two pounds, has a capacity of four hundred cubic inches, and its cavity measures fifteen by ten by nine inches.

The increase in size is due chiefly to hypertrophy of all the constituents of the organ, and occurs, although in a less degree, even when the ovum develops outside of the uterine cavity. During the latter part of pregnancy distention undoubtedly plays a rôle in producing the uterine tumor.

**Changes in the Form, Position, and Direction of the Uterine Body.**—At first the uterus preserves its pyriform shape, but the gradual increase in its antero-posterior diameter gives it a spherical outline during the third and fourth months. From the fifth month onward the expansion of the fundus and lower uterine segment alters the sphere into an ovoid with the larger end up. Herrgott ("Essais sur les différentes variétés de forme de matrice pendant la gestation et l'accouchement," Strasbourg, 1839) found that the fundus of the uterus rarely took on a symmetrical development, but that the right half usually contained the breech and was more elevated than the left. The anterior portion of the lower segment is more developed than the posterior so that the axis of the uterine body passes in front of the cervix.

The enlargement of the uterus necessitates a change of position, especially as the organ soon becomes too large for the pelvic cavity. Many books describe a descent during the early weeks of gestation, but Tarnier and Pinard never have noted this downward movement except as a part of that pathologic condition known as prolapse. During the first months of gestation the gravid state of the uterus tends to exaggerate the normal ante-flexion, and after the fourth month, when the fundus emerges from the pelvis, the degree of ante-flexion is regulated by the position of the woman and the tonicities of the abdominal walls.

It usually is stated that by the fifth month the fundus has reached half-way to the umbilicus; by the sixth that it is on the level of the umbilicus, and that by the eighth, or eight and a half, the fundus lies under the ensiform cartilage. Pinard, however, says that the fundus usually is much higher than is described by most authors, and that he never found a uterus whose fundus was not above the umbilicus at the fifth month of gestation. On the other hand, Ribemont-Dessaignes mentions a case in which, at the sixth month, he found the fundus below the level of the umbilicus, the child weighing over seven pounds at birth. A possible explanation of these discrepancies may lie in the fact that the umbilicus is not a fixed point. At some time during the last two weeks of gestation the presenting part slips into the brim of the pelvis and the fundus sinks. In multiparæ this readjustment may be quite sudden and give rise to a sensation of "lightening," but it is much more gradual in primiparæ owing to greater rigidity of the abdominal walls.

The fundus of the uterus seldom lies in the median line of the abdomen. On examining 100 women at the ninth

month of pregnancy P. Dubois and Pajot found a right lateral deviation in 76, a left in 4; in the remaining 20 the fundus lay in the median line. Not only does the fundus tend to fall to the right, but the body of the uterus rotates

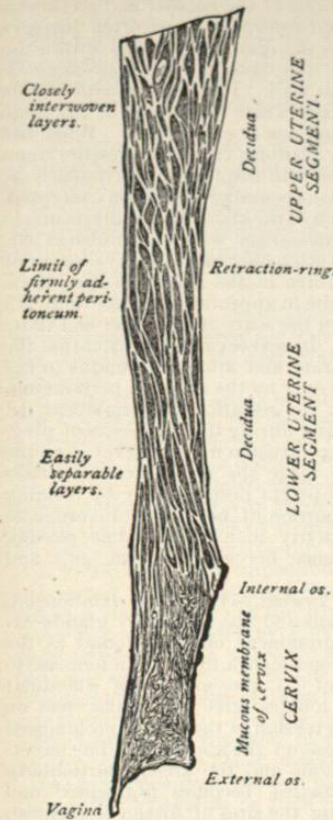


FIG. 2290.—Section of Wall of Pregnant Uterus. (Hofmeier.)

so that the left side is turned to the front. Probably both the deviation and the torsion proceed from the same cause; the distended sigmoid and rectum prevent the uterus from balancing upon the prominent vertebral column and push the organ toward the right; as the uterus rolls into the concavity at the right of the spine the right face becomes posterior. Unless this physiologic torsion of the uterus is remembered at the time of performing the operation of Cæsarian section, the surgeon is in danger of making his incision into the left border of the uterus and severing some of the large vascular trunks lying in that region.

**Changes in the Structure of the Uterus.**—All the constituents of the uterus are involved in the process of development. There is marked hyperplasia of the serous coat, allowing the peritoneum to cover the uterus at the different stages of enlargement. The muscular fibres in the walls are greatly increased in size, but it is not proved that a true hyperplasia occurs. In the pregnant womb three layers of muscular fibres can be demonstrated. The superficial layer is made up of longitudinal and transverse fibres, which are continuous with those upon the surfaces of the tubes and round ligaments. The median layer forms the bulk of the uterine walls and contains interlacing fibres running in all directions. This layer is traversed by numerous vascular trunks around which the muscular fibres take an arciform direction. In the case of the veins, the external and middle coats of the vessels disappear so that the blood is conveyed in muscular channels lined by endothelial cells and known as sinuses. By the constricting action of these arciform fibres, which Pinard calls *ligatures vivantes*, hemorrhage is prevented after labor. The internal muscular layer is very thin and best marked by circular fibres at the orifices of the tubes, although a set of longitudinal and transverse fibres may be found just beneath the mucous membrane. In the lower uterine segment there is a predominance of longitudinal muscular fibres.

The advent of pregnancy stimulates the mucous membrane of the uterus so that it becomes congested, thickened, and thrown up into folds. The hypertrophy is the result of an increase in the interglandular tissue and a growth of the cellular layer in which may be found the large decidual cells of Friedländer. The superficial, or *compact layer*, of the decidua vera is in contact with the ovular decidua by the third month and then rapidly atrophies; it is through the deeper, or *spongy*,

layer that the line of separation runs when the decidua is cast off.

All the blood-vessels of the uterus become much enlarged, and at the placental site the arteries empty directly into the lacunæ, the blood spaces penetrated by the villi. The veins form the uterine sinuses as described above and constitute an extensive plexus. The lymphatics are increased both in size and in number, communicating freely with those of the peritoneum and adnexa, an arrangement which readily explains the seriousness of puerperal infection and the ease with which it occurs. Nerve cells and trunks take part in the general hypertrophy. Keiffer (*Gaz. hebdom. de Méd. et de Chir.*, June 7th, 1900) claims that the uterus has a set of independent nerve cells which are found along the vessels and can be detected by Golgi's method of staining. These local ganglia have sensory, motor, secretory, and glandular functions, giving to the uterus an independence similar to that of the heart.

During the first part of gestation the general hypertrophy of the tissues gives the uterine walls a thickness of five-eighths of an inch, but later distention reduces this measurement to one-quarter of an inch. Instead of being firm and unyielding, as are the walls of the virgin uterus, the tissues of the gravid womb are elastic and permit the foetal movements, or a change in the woman's position, to alter the outline of the organ.

**Modifications of the Cervix.**—The hypertrophy of the cervix is much less marked than is that of the body of the uterus and is mostly completed by the fifth month of gestation. The mucous membrane of the cervix takes no part in the formation of the decidua, but the glands secrete a quantity of mucus which securely plugs the canal from the beginning of gestation. In primiparæ the form of the cervix is that of a cone with its apex down; in mul-

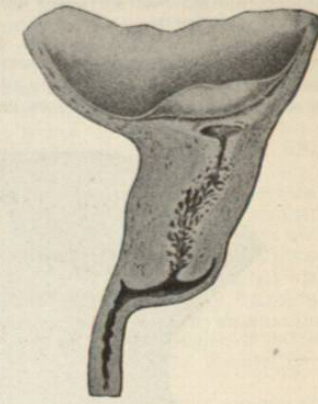


FIG. 2291.—Cervix in the Fifth Month of Pregnancy. (Leopold.)

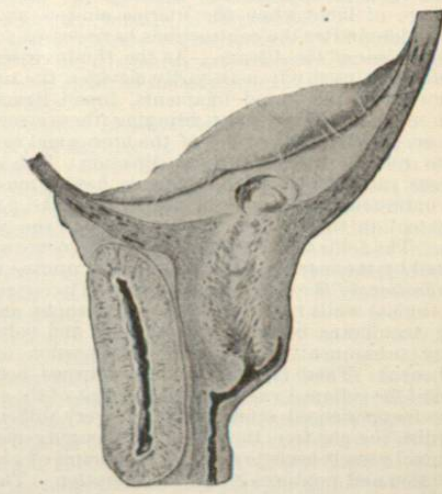


FIG. 2292.—Cervix in the Seventh Month. (Leopold.)

tiparæ the cone has its base down. In primiparæ, during the latter months of gestation when the presenting part lies low down and against the anterior wall of the

lower uterine segment, the external os may be carried so high into the hollow of the sacrum that students find it difficult to reach the cervical opening. The increased vascularity leads to a progressive softening of the cervix beginning at its most dependent portion; the softening is more marked and develops more rapidly in multiparæ than in primiparæ.

**Physiologic Modification of the Uterus.**—Associated with these anatomic changes certain physiologic properties appear. The irritability of the uterus increases, so that contractions are more easily evoked; this prop-

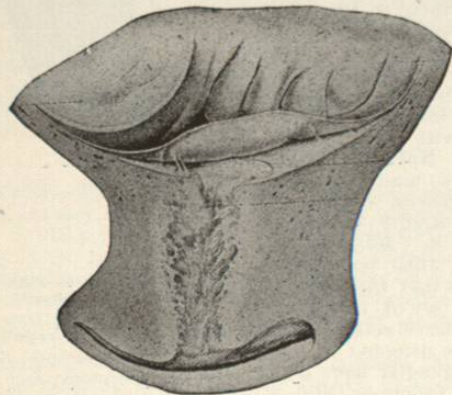


FIG. 2253.—Cervix in Ninth Month. (Leopold.)

erty is particularly marked at the menstrual epochs, so that at these times the danger of abortion is much increased. As the musculature of the uterus increases contractions become evident; during the latter months of gestation these contractions take place every twenty or thirty minutes; they are involuntary, slow and intermittent, differing from the contractions of labor in that they cause the woman no suffering nor have any effect upon the cervix. This systematic exercise of the uterine muscle serves to keep the organ in training for the exertions of labor. **Retractility** is a property more conspicuous during labor than during gestation; it enables the muscular fibre to hold a small portion of its contraction and remain permanently shortened. Retraction is thus dependent upon contraction and is seen at its best in the third stage of labor when the uterine sinuses are held securely closed after the contractions have ceased.

**Modifications of the Adnexa.**—As the fundus rises into the abdominal cavity it necessarily elevates the uterine attachments of the round ligaments, broad ligaments, ovarian ligaments and tubes, bringing these structures into closer relation to the sides of the uterus and causing them to run in a more vertical direction. The round ligaments, tubes, and ovarian ligaments, having muscular fibres continuous with those of the uterus, take part to some extent in the general hypertrophy of the sexual organs. The folds of the broad ligaments become widely separated by the increased thickness of the uterine body.

**Modifications of the Vagina and Vulva.**—The congestion of the vaginal walls results in their hypertrophy and the mucous membrane becomes reduplicated and softened, favoring subsequent dilatation of this portion of the genital canal. There is often so little contrast between the feel of the softened vaginal wall and that of the cervix that the inexperienced student finds it very difficult to distinguish the one from the other. The engorgement of the vaginal vessels leads to an unusual amount of glandular secretion and produces a bluish coloration. There is relaxation and gaping of the vulva together with dilatation of the veins and increased secretion from the glands.

**Modifications of the Pelvic Joints.**—During pregnancy the interarticular cartilages of the pelvis become vascular and softened and allow a limited amount of motion in the joints, thus slightly facilitating the passage of the head

during labor. The sacrococcygeal and symphysis pubis are the joints having the greatest degree of motility.

**Modifications Produced Mechanically by the Enlarged Uterus.**—The pressure of the growing uterus is apt to interfere with the functions of the bladder and rectum so that vesical irritation and constipation are often features of gestation. Owing to the diminished space within the abdomen a full bladder will cause a decided prominence of the anterior abdominal wall. Interference with venous return may produce or aggravate varicosities of the veins of the rectum, vulva, and lower extremities. When the fundus has reached the ensiform cartilage pressure upon the diaphragm interferes with respiration, particularly at times of exertion; as a compensation the thorax increases in width. The distention of the abdominal walls results in the formation of *stria gravidarum*, which are bluish or reddish lines caused by the stretching and atrophy of some of the connective-tissue fibres in the skin. In time these striae become pearly white in appearance so that there is a marked contrast between the scars of an earlier and those of a recent pregnancy. In severe cases of distention the recti muscles may separate and allow the fundus to fall forward and be covered only by the skin and peritoneum. By the seventh month of gestation the umbilical depression is obliterated, and during the last weeks of pregnancy there may be a protrusion of the navel. As the uterine tumor becomes large the woman can maintain her equilibrium in the upright position only by bending backward the upper portion of her trunk in order to bring the centre of gravity in a vertical line passing through the pelvis; hence her characteristic gait and posture.

**Modifications of the Breasts.**—The close relationship between the pelvic organs and the mammary glands explains the early and prominent changes found in the breasts: even in the second month there is an increase in size from the deposit of fat and growth of glandular tissue. The enlarged lobules give a nodular feel on palpation, and when the tension of the skin is pronounced striae form similar to those on the abdomen. The superficial veins are conspicuous and the areola, particularly in primiparæ and brunettes, becomes pigmented and shows elevations marking the sites of fifteen or eighteen sebaceous glands, known as Montgomery's follicles. By the fifth month the breast changes are at their height and a secondary areola may form having the appearance of a network of pigment containing numerous lighter spots. The nipple is hypertrophied, more sensitive and erectile; after the third month stroking the breast from the periphery inward may express a few drops of colostrum.

**Modifications of the Circulatory System.**—In order to carry out the new requirements laid upon the organism the quantity of blood is augmented during pregnancy and the increase is more marked in the watery constituents of the blood so that the red corpuscles are relatively diminished. The white corpuscles are said to be both relatively and actually increased in number. Many observers report an hypertrophy of the left side of the heart, accounted for by the increased labor of driving a greater amount of blood over a more extensive area, but recently this cardiac alteration has been questioned and deemed the exception rather than the rule. According to the studies of P. Longe the pulse during gestation has more tension and on the average shows a rate of 86 beats per minute.

**Modifications of the Digestive System.**—Nausea and vomiting are not uncommon during the first three months of gestation and the appetite may become capricious; later both the appetite and power of digestion are increased with the result that by the end of gestation the pregnant woman makes a gain equal, on the average, to one-third of her body weight. There is an increase of the amount of adipose tissue causing the figure to become fuller and rounder and serving as a reserve store of potential energy. This activity in metabolism entails greater activity in the excretory functions of the liver, lungs, skin, kidneys, and bowels.

Pigmentation of the skin is a common occurrence in

pregnancy; besides the darkening of the areola there may be irregular spots upon the face and almost invariably there is a pigmented line extending from the symphysis pubis to the navel, known as the *linea nigra*.

Upon the inner surface of the skull are formed the "puerperal osteophytes," consisting of deposits of carbonate of calcium, phosphates, and organic matter.

The nervous system of the pregnant woman is extremely impressionable and often conditions of fretfulness or irritability develop. In rare instances the entire disposition changes and the patient shows unusual likes and dislikes.

**MULTIPLE FETATION.**—When the uterus contains two or more fecundated ova the pregnancy is designated as multiple or pluriparous.

Statistics as to the frequency of multiple gestation vary considerably among different writers. A fair statement would give the proportion about as follows: twins once in 120 pregnancies; triplets once in 7,900; quadruplets once in 370,000.

Among the factors predisposing to multiple pregnancy heredity and multiparity are important, but great stature, race, and the size of the ovaries also are mentioned among the causes.

Usually the fecundation of the ovules occurs as the result of a single coitus, but the instances on record in which a negress has given birth to one black and one white twin prove that the ovules discharged at the same menstrual epoch may be fecundated successively; to such cases the term superfecundation is applied. By superfecundation is meant the fecundation of ovules belonging to different periods and, theoretically, this form of superimpregnation would seem to be impossible both because ovulation is assumed to be suspended during pregnancy and because in the third month the ovular and uterine decidua come into contact, thereby preventing the access of the spermatozoon to the ovum. On the other hand, a few instances are reported in which women have given birth to apparently full-term children with a five-month interval separating the two. In the demonstrated absence of bifidity of the uterus such facts are difficult to explain on any other ground than superfecundation.

In twin conception the ova may have been discharged from different ovaries or both from the same ovary and even from the same ovisac. When twins develop from one ovum it must contain two germinating vesicles. In about sixty-six per cent, twins are of the same sex.

In all cases of multiple fetation there is at first a separate amnion for each child, although later the partition may become absorbed or rupture, so that the children are found in the same sac at the time of labor; there are as many chorions as ova. The placentæ are originally distinct, but later the contiguous borders may fuse and an anastomosis of vessels occur; if one foetal heart be much stronger than the other there is a disproportion in the amount of placental tissue at the disposal of the two children. The weaker foetus may die and be so pressed upon by the survivor that it is flattened out against the walls of the uterus and forms what is known as a "fetus papyraceus." The weight and size of twins usually are under the average and they are less likely to live than single children. Also the distention of the uterus makes premature labor more likely to occur in multiple pregnancies, and the distention is all the greater from the fact that hydramnios frequently is associated with twin pregnancy. According to Pinard's statistics out of 150 twin cases there were 108 premature deliveries.

**DIAGNOSIS OF PREGNANCY.**—The diagnosis of pregnancy rests upon maternal and foetal signs; these are obtained by questioning and by inspection, palpation, and auscultation.

**Subjective Signs.**—Absence of menstruation usually is the first symptom noticed by the woman herself, and this sign is particularly valuable in those patients who always have been regular and in whom there is no evidence of general disease. Of course, amenorrhœa has no significance before puberty, after the menopause and during lactation. It also must be remembered that the fear of

conception sometimes produces a "psychical amenorrhœa," and that in other instances the patient purposely has made false statements in the hope that an abortion will be accidentally induced. The amenorrhœa often associated with obesity has led the physician into embarrassing errors as the increase in the patient's size seems to confirm his diagnosis. Although Pinard says he never yet has observed a case of gestation in which menstruation persisted, a few instances have been reported in which a regular monthly flow occurred throughout a portion or the whole of pregnancy. Usually such periodic flowing does not have the features of normal menstruation, and is found to have its origin in cervical disease or ectopic pregnancy. It is not at all uncommon for a woman to have one period of diminished flow even after fecundation has taken place and the history of such a scanty discharge is almost as significant as amenorrhœa.

**Nausea and vomiting** on rising in the morning are mentioned as classic signs of early gestation, and certain multiparæ can make a positive diagnosis on these symptoms alone; salivation and heartburn may be associated with this gastric disturbance. Before allowing "morning sickness" to carry much weight the physician must eliminate all other reflex causes. The absence of gastric symptoms is of no value in excluding the possibility of pregnancy.

After the third month the patient notices a progressive increase in the size of her abdomen; the alleged preliminary flattening of the hypogastric region rests on no clinical basis. During the last two weeks multiparæ experience "lightening" or the feeling of relief produced by the marked sinking of the fundus.

**Quickening** is the term used to describe the sensations imparted to the mother by the foetal movements and appears at variable times according to the experience and acuteness of feeling on the part of the patient. In some women the foetal movements seem to be absent or unnoticed and in a few quickening occurs as early as the third month, but on the average the symptoms appear at the eighteenth or twentieth week. It is possible for even experienced matrons to be deluded and mistake muscular contractions or the passage of gas in the bowels for movements of the foetus. A woman who once starts with the assumption of pregnancy is quite apt to experience all the confirmatory subjective signs and may succeed in leading her physician to a wrong conclusion.

Other less important signs which should not be passed over are: a sense of enlargement and tingling in the breasts, a feeling of heat in the pelvis with more or less leucorrhœal discharge, irritability of the bladder, and constipation, also nervous disturbances such as neuralgia, dizziness, and change of disposition.

**Objective Signs.**—Pigmentation of the face, enlargement of the abdomen, and the peculiar carriage or gait may be noticed by the physician in the first few moments of the interview.

**Abdominal Examination.**—After having obtained the history of the case it is best to proceed next to the examination of the abdomen; by adopting this order we can make the investigation of the breasts and pelvic organs less of a shock to susceptible patients. For the abdominal examination the woman should be in the dorsal position with the knees drawn up and the surface of the body exposed from the ensiform to the symphysis; corsets and all constricting bands must be loosened and the bladder and rectum empty.

**Inspection.**—On inspection there should be noticed the size and shape of the abdominal tumor which usually extends more to the right than the left of the median line; during a uterine contraction the tumor becomes more prominent. If the foetal movements are vigorous a series of irregular and temporary elevations are visible at times over the surface of the distended abdominal wall. During the latter half of gestation the umbilicus may be level with the surface or protruded. Pigmentation, in spots or along the median line, together with striae are the other signs noted on inspection.

**Palpation.**—For palpation the hands should be warmed

and laid flat upon the surface of the abdomen; the best results will be obtained by a series of circling motions punctuated by deeper pressure. Violent and sudden thrusts will cause a reflex contraction of the muscles and defeat the ends of the examination. The edge of the hand should be pressed down above the apparent site of the fundus and carried toward the symphysis in order to map out the upper limits of the uterus and obtain some idea of the period of gestation. The fundus is at the umbilicus at the sixth month; three fingers' breadth above at the seventh; half-way to the ensiform at the next month, and under the ensiform at the last month. If the fundus is slightly below the ensiform there may be several weeks of pregnancy remaining or "lightening" may have taken place and the labor be imminent. The peculiar doughy, semi-elastic feel of the uterus should be noted, and its increased firmness during a contraction constitutes *Braxton Hicks' sign*, which can be obtained as soon as the organ is large enough to grasp. By the sixth month the fetal parts can be palpated and the smooth back, as well as the irregular bosses forming the shoulders, knees, or elbows, located. By pressing the fingers deep down at the sides of the superior strait the head can often be grasped between the two hands, or it may be felt as a hard, globular body lying at the fundus to the right of the median line. The breech is softer, less movable, and bears no relation to the shoulders. In thin women a hand or a foot can be grasped. During the course of palpation the physician usually feels upon the palms of his hands several distinct taps which are caused by the movements of the fetal extremities; sometimes the entire body of the child will change its position under his hands.

*External ballottement* is obtained by placing a hand on either side of the abdomen and attempting to throw the fetus, as it were, from one side to the other; or, in a breech presentation, the head will rebound from one hand to the other. If the woman be turned upon her side so that the prominent abdomen projects over the edge of the table the fetus may be pushed up by a hand underneath and then fall again against the fingers. Ballottement depends upon the amount of fluid within the uterus and is best marked in cases of hydramnion, provided the fetus be large enough to detect. In normal circumstances it is a sign belonging to the fifth and sixth months as previous to these times the child is too small, and in the latter months of gestation the liquor amnii, relative to the bulk of the fetus, is not sufficient to allow of free motility.

*Auscultation*.—Percussion belongs under this head. Over the mass of the tumor there is dulness, while above and to the sides the coils of intestines give rise to tympanic resonance. Usually the fetal heart-sounds cannot be heard before the fifth month, except in favorable cases when experienced observers have detected them as early as the fourth. The rate of pulsation varies between 120 and 160, the sound being compared to that of a watch ticking under a pillow. The idea that a slow rate indicates a male and a rapid a female does not hold good in practice. In the most frequent presentations the head occupies the pelvis with occiput to the front, therefore the maximum intensity of the heart-sounds usually is found below the umbilicus and more often on the left side than the right; in posterior positions of the occiput the sounds are heard further round on the flank. When the head is at the fundus the focus of intensity is above and to one or the other side of the umbilicus.

In performing auscultation it is well to begin by applying the ear direct to the abdomen, using a thin towel for covering the skin, and examine systematically the four regions about the umbilicus. Many observers can do better by this immediate method of auscultation, besides which it is well to train the ear. The stethoscope should be used in those cases in which it is more convenient and pleasant or when the ear alone does not give satisfactory results. In order to hear distinctly the room must be very quiet, the physician's posture must be comfortable and not be such as to cause compression of the veins of his neck. A rapid maternal pulse may be mis-

leading until its rate is compared with that of the pulsation in the radial artery; in some cases the observer will become conscious of his own heart beats, which, of course, are much slower than those of the fetal heart.

The *uterine souffle* is heard over the left border of the uterus, which has been brought to the front by the torsion of the organ. It is a blowing sound like that of an anemic murmur and is synchronous with the maternal pulse. The *uterine souffle* or *bruit* may be heard as early as the fourteenth week and is caused by the blood flowing through the enlarged uterine vessels; it is not peculiar to pregnancy and is often noted over large tumors.

The *funic souffle* is caused by some obstruction in the vessels of the umbilical cord, as from coiling about the neck. This sound is synchronous with the fetal heart; it is not present in the majority of cases and appears during the latter half of gestation.

Sometimes the movements of the fetus can be heard on auscultation as early as the fourth month of pregnancy as a succession of faint thuds or slight rubbing sounds. Gas in the bowel will closely simulate fetal shock.

*Examination of the Breasts*.—The clothing already being well loosened it is easy to pass next to the search for mammary signs. On *inspection* the presence of striae, enlarged veins, and pigmented areolae are noted. *Palpation* detects the knotty feel, and by a little manipulation a drop or two of colostrum may be pressed from the nipple.

*Examination of the External and Internal Genitals*.—For the vaginal examination the patient is drawn down to the edge of the table, her clothing well pulled up and replaced by a sheet. For internal examination an empty bladder and rectum are more essential conditions than for abdominal palpation. In obscure cases and when the patient is very nervous an anæsthetic is indispensable. Disinfection of the examining hand must be a preliminary step before its introduction, and with the other hand the vulva should be held apart so that no contamination can be carried up from below.

*Vaginal Touch*.—As the finger passes up the vagina the velvety feel and moisture of the walls are noted. Next, the shape of the cervix and the presence or absence of softening must be determined. Goodell says that if the tip of the cervix feels like the end of one's nose the patient probably is not pregnant; if it feels as soft as one's lips there probably is a fetus in utero. By bimanual examination the position, shape, size, and consistency of the uterus are discovered. During the fifth and sixth months *internal ballottement* can be obtained, especially in those cases in which the head presents. To develop this sign the internal finger is placed in front of the cervix and a quick push given to the fetus; the physician will be sensible of the upward movement and subsequent return of the presenting part. By conjoined manipulation the uterine contractions may be detected as early as the third month.

Besides the softening of the cervix there are two valuable signs belonging to the first part of gestation. One is the marked angle formed by the corpus and cervix and easily noted on internal examination; the other is known as Hegar's sign and consists in the compressibility of the lower uterine segment. To obtain this sign the outside and internal fingers should compress the uterus just above the cervix. In well-marked cases there will seem to be no tissue at this point and the fundus and cervix will give an impression of being two disconnected bodies. Another way of bringing out Hegar's sign is to introduce the forefinger into the rectum and the thumb of the same hand into the vagina; while the outside hand presses down the uterus the internal thumb and finger grasp the organ just above the cervix. R. von Braun-Fernwald (*Wien. klin. Wochenschrift*, March 9th, 1899) describes a sign which he has found to be valuable in the diagnosis of early pregnancy. It consists in an asymmetry of uterine development detected by the bimanual examination. The ovum very rarely lies exactly in the centre of the uterine cavity at first and consequently the antero-posterior diameter of one horn is

greater than that of the other; often a groove is perceptible between the two sides of the uterus.

*Inspection*.—As the finger is withdrawn from the vagina the parts are held open for a moment and the color of the vulva and lower vaginal wall is observed. A port-wine color of the mucous membrane may be noted, but is not a positive sign of pregnancy; the same color may be seen on the cervix if a speculum be introduced.

*Value of the Different Signs and Symptoms of Gestation*.—No one of the maternal signs or symptoms is positive, but the presence of a number of them forms a strong chain of circumstantial evidence. It is well known that all the breast signs may be present in a case of uterine disease and that uterine or abdominal enlargement may be due to the presence of a tumor. Before the sixth week a diagnosis of pregnancy is rarely positive, but strong opinion can be based upon the association of the following signs: amenorrhœa in a healthy married woman who has always been regular, an enlarged pyriform uterus of doughy consistency with a marked angle between corpus and cervix, softening of the cervix with compressibility of the lower segment. The pathognomonic signs of pregnancy come from the fetus and are fetal heart-sounds, ballottement, and fetal movements; provided fallacies be excluded any one of these signs establishes the diagnosis. The Röntgen rays are of no use for early diagnosis, although late in gestation they have given information concerning the presentation and the condition of the mother's pelvis.

*Differential Diagnosis*.—Early gestation must be differentiated from those conditions which cause uterine enlargement; advanced pregnancy from those producing abdominal distention. *Fibroid enlargement* usually fails to give the uterus the shape and consistency belonging to pregnancy; the rate of increase in size does not correspond with that shown by the gravid uterus; there is menorrhagia rather than amenorrhœa. *Chronic metritis* presents many of the same differential points. *Hæmatometra* is a rare condition caused by the retention of menstrual blood within the uterus. Symptoms denoting pain and disturbance appear at puberty and are repeated each month but are unattended by flowing; an examination often discloses an obstructed vagina. The abdominal enlargements with which pregnancy has been confounded are those produced by *fat, tympanites, ascites, ovarian and fibroid tumors*.

*Fat*.—The amenorrhœa of obesity must be remembered. The thickness of the abdominal wall may be estimated by lifting a fold of tissue and also by observing the general fat-deposit of the patient. There are no uterine signs of pregnancy. As an adipose condition greatly interferes with bimanual examination it may be necessary to administer an anæsthetic in order to detect intra-abdominal conditions.

*Tympanites*.—Thorough cleansing of the bowels will diminish the size of the tumor which is resonant instead of dull.

*Ascites*.—When the patient lies in the dorsal position the tumor has a characteristic shape, namely, flattened on top and bulging at the sides. Fluctuation is marked and the change of position on the part of the patient changes the physical relations of flatness and resonance.

*Ovarian Cyst*.—An ovarian tumor may cause symmetrical enlargement of the abdomen but usually is unaccompanied by amenorrhœa; Braxton Hicks' sign is absent and fluctuation may be obtained. Of course no fetal signs are present and the uterus usually is found to be displaced and not enlarged.

*Fibroid Tumor of the Uterus*.—A large fibroid usually is very irregular in outline and has a history of longer duration than that of pregnancy; menorrhagia usually is a prominent symptom.

It is important to remember that although various pathologic conditions may be present pregnancy is not necessarily excluded. There are many instances in which an operator has found gravidity associated with a fibroid or ovarian tumor.

*Pseudocyesis*.—Spurious pregnancy, or phantom tumor,

is a condition met with in some women who are very desirous of having children as well as in those who dread maternity. There are instances in which women after the menopause have deluded themselves with the idea of pregnancy and made all the preparations for confinement. In these cases the physician can obtain an almost complete subjective history in which he may place undue reliance if the patient already has had experience in bearing children. Abdominal distention usually is present but due to the accumulation of gas or fat. It is said that often under an anæsthetic the tumor of pseudocyesis will disappear and the test should be made in doubtful cases. Under no circumstances should a physician make a diagnosis of pregnancy on the statements of the patient, nor must he allow them to give his mind a bias; in fact he should never give a positive opinion until signs from the fetus are clearly manifest, although, before this time, he may feel justified in advancing a probable diagnosis.

*DIAGNOSIS OF MULTIPLE PREGNANCY*.—Having established the existence of pregnancy the presence of more than one fetus in utero is indicated by the following signs: the uterus is larger than it should be for the estimated period of gestation; it is broader in proportion to its length than is the case in a single pregnancy; a multiplicity of fetal parts is present; two hearts are heard, having different rates of pulsation and foci of intensity.

*DIAGNOSIS OF DEATH OF THE FŒTUS*.—When the death of the fetus occurs in utero usually the contractions of the organ expel its contents, but there are cases in which the dead products of conception are retained and undergo saponification, mummification, putrefaction, or even become totally absorbed. The diagnosis of fetal death may be very difficult and the signs vary according to the period of gestation at which it occurs. Lactation may be present for a few days and the subjective symptoms of gestation usually disappear. Except when there are profound disturbances following putrefaction there are no general symptoms distinctive of fetal death and the diagnosis rests upon the results of physical examination. During the first half of gestation palpation, performed at intervals, reveals no increase in the size of the uterus and often a diminution; the softening of the cervix disappears. While comparisons are valuable, if the case is not seen until some time after the death of the fetus, there may be great difficulty in making a diagnosis of pregnancy. During the second half of gestation the absence of certain fetal signs, especially if they have been present, is most valuable. The patient no longer feels the movements of the child, nor can the physician detect the fetal heart-sound; the absorption of the liquor amnii leads to diminution in the size of the uterus. If the head of the fetus can be palpated, either in the lower uterine segment or at the fundus, crepitus may be obtained owing to the motility of the loosened bones of the skull. It is claimed that in all cases the urine of the woman contains acetone.

Care must be taken not to make an error in concluding that the fetus is dead, for the fetal movements may be absent because the intra-uterine space has become so limited and the heart-sounds may appear to be wanting merely because the physician is unable to find them. Usually considerable study of the case is required before any positive opinion can be formed. In a case of multiple pregnancy the diagnosis of the death of one child alone usually is impossible.

*Duration of Gestation*.—Even when the date of the fruitful coitus is known the duration of the pregnancy is found to vary from two hundred and sixty to two hundred and ninety-four days; in the majority of cases, however, confinement takes place at the end of two hundred and seventy-one days. For practical purposes it is found convenient to estimate the duration of pregnancy as two hundred and eighty days and count from the beginning of the last menstrual flow. This method is fairly reliable except when the conception occurred just previous to the first missed menstrual period. Labor is apt to take place on or near the tenth menstrual epoch, and to estimate this date we count back three months from