Obstetrics: The Science and the Art - Part II. The Physiology of Reproduction; Chapter VIII. Pregnancy

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CHAPTER VIII.

PREGNANCY.

Pregnancy.—The subject of pregnancy is one that is worthy of the most careful study by those who intend to devote themselves to the pursuits of Obstetricy, and, indeed, it merits the attention of all persons desirous to become acquainted with those miraculous powers and actions of the living body that result in forming and perfecting a human being, the crowning-work of the Deity in creation, who ordains man thus to come forth from the darkness of nonentity, in order that he may live to shine upon the stage of the world, and there act his part in the great drama of the living world.

There have appeared a great many speculations and theories upon the subject of Generation; yet, however ingenious or inventive their authors, or however eloquent or argumentative in urging the adoption of their peculiar views, there still remains a terra incognita of Embryogeny, which human sagacity, perseverance, and toil have never been able to explore; and which seems purposely set beyond the reach of the utmost ken of human wisdom or learning.

It must ever, we should think, remain impossible for man to comprehend the secret mysteries of those proximate causes, by the force of which a non-existent, or formless being is drawn forth of the dark sources of time, and launched out on the boundless ocean of eternity; made partaker of a prospective immortality; charged with the burden of responsibilities to God and his fellow-creatures; and bound by numerous relations to the physical world, of which he has also become a part by the very fact of his entrance into a moral state. Such a subject, nevertheless, cannot fail to prove interesting to the Medical Student, whether he approaches it in view of its physiological connections, or whether he wishes to investigate it as a psychological inquiry of the utmost importance in any system of moral philosophy. What subject, indeed, could be more replete with interest than one which pretends or seeks to explain all the changes that are experienced by the embryo, from its first discoverable estate as a drop of pellucid
PREGNANCY.

lymph, or as maculae germinativa, up to the time when it comes forth into the world endowed with all the powers that are appropriate to a healthy, full-grown foetus at term! Such a study involves a comparison of its organs with those of all other living creatures as well as those of the adult animal, and a complete history of their development and growth; and it ought also to comprise an account of the accidents and diseases to which it is liable, with a full detail of all the peculiarities of the ovum and its several parts, and a comparison of them with the several parts in various animals. The subject comprises, therefore, a vast field of physiology, which might be profitably explored by the curious Student; but the limits of this work are too confined to admit of it being treated of at length on this occasion.

If, as it has been eloquently said, the springing up of a blade of grass from the bosom of the earth is calculated to fill the mind with wonder and amazement, what far more vivid impressions of the miraculous power of God are likely to be made upon those who contemplate the unfolding of those organs and faculties, by means of which man learns not only to know and acknowledge his Maker, but to render himself, as it were, a still more fitting image of Him, by the education of the faculties that have justly given him the title of the lord of creation! In addition to the interest as a merely philosophical study with which our subject is clothed, it appears to me indispensable that the Medical Student should make himself acquainted with it, as taught in past times, as well as at the present era, and that he should aim to obtain a thorough knowledge of the subject, knowledge which can alone fit him for the conduct of cases in midwifery. But, let him consider whether in aiming at this so-called practical knowledge, he is not also called upon to make himself master of all those scholarly acquirements which can shed a light of revelation upon the dark and doubtful questions that in his practice he must not only solve, but instantly solve. To know that a pregnant woman has a child in the womb, and to learn by rote something of the presentations, positions, and manoeuvres relative to the midwifery operation, is but a vulgar knowledge, common to old women and to physicians who confine themselves to the study of text-books and the unrecorded and misunderstood experience of their own clinical operations. The Student ought to study the subject not merely as a midwifery qualification, but as an Obstetric Science, the possession of which places him in the forefront of his professional rank.

Pregnancy is the developing of an embryo or foetus in the womb.

An account of pregnancy comprises a relation of all the changes
that take place in the reproductive organs and in the whole economy
of the female, from conception, to the end of the puerperal state, as
well as a history of the development of the foetus. It is proper, how-
ever, for convenience sake, to separate the account of pregnancy and
embryogeny from that of parturition, which in itself presents a great
and imposing subject of study.

Inasmuch as there are, besides natural or healthful pregnancies,
cases to be met with of morbid or preternatural pregnancies, the latter
merit a proper share of consideration. Hence, we ought to inquire
not only into the physiological, but into the pathological conditions
that are brought about by pregnancy, and learn the seat, nature,
causes, signs, and cure of many troublesome disorders and dangerous
accidents that overtake the gravid woman.

**Fecundation.**—In order that a woman may become pregnant, it is
necessary that a germ, matured in one of the ovaries, should be ex-
pelled from its Graafian follicle, and then fecundated by the encounter
of it with the male sexual element, the sperm or seed. I have already
shown that the germ is contained within an ovum or egg; which the
woman, like all other reproductive animals, matures and spontane-
ously discharges at regular periods.

I shall by no means pretend to show what is the nature of the
mutual influences of the seed and the ovum, or which it is of the two
that in this generative encounter furnishes the nucleole of the new
entity about to start on the career of development. These are myste-
reries beyond human ken, and likely ever so to remain. It is in the
mean time unquestionable that the concurrence of two different sys-
tems of genital organs is indispensable; that one of them must be
female, ovaric, or germiferous, and the other male, yielding sperm-
zoons and a fluid with peculiar properties. Neither the female nor
male is endowed with the independent power of reproduction. It is
usually admitted that the female yields the germ, and the male a
material which, upon some combination or contact with the germ,
imparts to it the power to grow or augment at a certain rate, and
only in given and rigorously predetermined forms. The ovulum dis-
charged from the maternal ovary, though alive, is not generically
alive; it cannot evolve either form or substance beyond its present
stage; it is as yet unfecundated; fecundation renders it at once capable
of generical evolution. To fecundate is, therefore, to impart generic
force. Is this induction the act of the male alone, or of both male and
female? Perhaps it is better to regard the ovulum as a cell, and the
seed as the product of a cell; for the seed is originally a cell whose
rupture or disintegration sets at liberty the fascicles of spermzoons that are produced within them. In this view, both the female and the male furnish each a reproductive cell.

Without desiring to call in question this opinion as to the germiferous nature of the female, an opinion which I cannot but adopt, I may avail myself of the occasion to advert to the opinion set forth by M. Schleiden, that the developing matter of the embryo plant—its primordial solid—is contributed by the male organ of the vegetable. Mr. S. shows that the pollen tube is a series of cells propagated from the pollen grain; that the pollen tube shoots its terminal cell into the ovary of the plant; and that a pollen-cell, making use of the cytoblastema within the ovary, the medium in which it is now placed, begins the career of the new vegetable, plant, or tree.

In this view, the terminal cell of the pollen tube is the germ, and the anther which yields the pollen grain is a female, not a male organ; for that which produces the germ is female. But even if M. Schleiden is correct in his views, the dogma is not overthrown; naturalists have only mistaken the sexual characters of plants, calling those female that are male, and vice versa.

At the present day, it is not doubted that the woman produces the germ by the force of her ovarian stroma; yet it is not long since it was contended that a zoosperm, or spermatic animalcule conveyed to the surface of the ovary, and entering in at a pore, finds a nidus or matrix therein, for its early morphological operations, being thus the starting-point of the embryogenic processes.

No doubt exists as to the cell-nature of the ovulum of the mammals, and there is some reason to believe in the cell-nature even of the spermzoon. If they be equally cells, which hath the pre-eminence, or which is the true germ? and where is the philosopher that can, with absolute assurance, declare which of these cells is the primal solid in the generic or fecundative processes? I freely acknowledge my own ignorance of the essential nature of fecundation. Fecundation is not conception; a woman may have within her organs a fecundated ovulum, without having conceived.

Conception.—A fecundated ovulum entering into the womb through the Fallopian tube, and falling without delay into the vagina, may be destroyed or lost before conception can take place: it may be washed away in a torrent of blood, or carried off amidst a quantity of mucus. In such case, the woman has been fecundated, but she has failed to conceive.

An ovum may suffer the encounter with the male element even in
the infundibulum or fimbria of the tube, and falling out into the cavity of the pelvis or belly, be wholly lost, from not making its attachment to the serous surface on which it has fallen. It could not attach itself to a serous membrane, for its nature renders it indispensable that its basement should be a mucous membrane.

Conception is the fixation of a fecundated ovum upon the living surface of the mother; it is the formation of an attachment to or union with the womb, the tube, &c., of the mother. This is conception, viz. the fixation of a fecundated ovum. If conception take place in the womb, it is pregnancy; if out of the womb, it is extra-uterine pregnancy; in the Fallopian tube, tubal pregnancy; in the ovarium, ovaric pregnancy; if it occur in the substance of the wall of the womb, it is called interstitial pregnancy.

Commencement of pregnancy.—Pregnancy ordinarily begins soon after a periodical menstruation.

Several days probably always elapse betwixt the act of fecundation and that of conception. The ovum, in the mean time, by means of endosmose, is augmenting in volume, and undergoing important changes in the arrangement and mixt of its constituent elements, changes that are requisite to fit it for the higher act of forming its attachment to the mother, which is conception.

It is not precisely known how many days ordinarily elapse between the end of the process of ovulation and fecundation and that of conception. M. Velpeau seems to entertain doubts as to the four ova he describes at page 25 of his Embryologie, and which were from eight to twelve days old. It is not known how long they had been in the womb before their expulsion. Probably, Sir Everard Home's specimen, described in the Lond. Phil. Trans., was an embryo of seven days.

The facts seem to concur in proving that shortly after the act of fecundation the conception takes place; but it is probable that the time is various.

As menstruation coincides with the periodical act of ovulation, and as the sexual embrace is attended with the orgasm whether gravidity follows it or not, there is great reason to suppose that the coitus of the sexes is frequently followed by fecundation of ova, that are subsequently lost by effluxion, and it is to the last degree improbable that every fecundated ovum shall be able to effect its mesenteric attachment or fixation.

Fecundation and conception can take place only after the dehiscence and discharge of the Graafian follicle, whose ovulum, but for the aphrodisiac orgasm, would necessarily be lost; for, unless the orgasm should
occur, the fimbria of the Fallopian tube cannot be placed upon the ovary; the tube lies flaccid in the pelvis except when erected by the orgasm.

Amidst the doubt and uncertainty that rest upon the subject, it must be regarded as scarcely possible to ascertain a fixed term. Hippocrates and Galen, and most medical men, as well as most women, since them, believe that the sooner the sexual congress follows after the menstruation, the more liable is the woman to conceive. It was, if this notion be true, a singular policy of the Jewish legislator, that pronounced such deadly reprobation upon all violators of the law of women's cleanliness; and it seems to me a subject of surprise that the daughters of Abraham should, to this day, obey a custom calculated to obviate the greatest possible productiveness of their nation. The number of the Jews, at the date of the expatriation under the reign of Vespasian and Titus, was about 5,000,000 souls. There is reason to think that it has remained nearly stationary since the overthrow of their city by Titus. If the curious law of cleanliness of women should be abrogated as to the Jewish wives, would the augmented chances of fecundation cause the sons of Abraham to become as the stars of the firmament, and the sands on the sea-shore for number? Is it the operation of this ancient law that has kept the population of the Jewish people down, through so many centuries, to one even tenor of about 5,000,000 souls?

I shall now present a curious document received from a gentleman here, who was so obliging as to keep for me a careful record of the menstrual periods, the coitus, and the dates of birth—as in the annexed table.—It throws some light upon this subject.

**June 6th, 1845.**—Menstrual discharge ceased.
**7th,** Married—æt. 20 years, 5 months.
**Mar. 11th, 1846.**—Daughter born = 277 days from June 7th to March 11th.

**June 1st, 1847.**—Abortion, at end of 1st month.
**Aug. 18th,** Menstrua appeared.
**23d,** " ceased.
**24th,** Coitus, coitus.
**Sept. 21st,** " "
**22d,** Appearance of menstrua—only a slight stain.

**May 30th, 1848.**—Daughter born = 268 days from August 23d to May 30th, child premature.

**Aug. 6th,** Menstrua.
**11th,** " ceased.
**29th,** Coitus—first.
Sept. 6th, Menstrua.
12th, " ceased.
25th, First coitus.

Feb. 14th, 1849.—Quickening.

July 26th, Son born = 282 days from September 12th to July 21st.

This record shows that one child was born in 277, another in 268, and the third in 282 days after the disappearance of the monthly discharge.

It is possible that ovulation may in some women shortly precede, while in the majority it absolutely coincides in point of time with, the first appearances of the hemorrhage, and no man has a right to say that the monthly hyperaemia may not sluggishly arise even one or more days after the escape has actually taken place, in some rare instances. As to the impression still entertained by some reputable authors, that the discharge of the ovule depends upon the aphrodisiac orgasm, it is too unreasonable an hypothesis; too unreasonable, I say, because, the dehiscence being the effect of absorptive power, and not of a lacerative or vulnerative force, it is idle to attribute to a momentary orgasm, which perhaps has no positive influence on the circulation within the ovaries, a result that requires for its effectuation many days of the slow action of the absorbents of the ovarium. The regularity of the ovulative paroxysm is as great in the virgin as in the married woman; and is equally regular, moreover, in the vegetable as in the animal kingdom. It is much to be desired that careful observations of the state of the ovaries in persons dying just before, pending, or soon after the close of the monthly flow, should be laid before the profession in order that more accurate notions may be had upon the subject, and those gentlemen who should happen to enjoy opportunities of the kind, would deserve the thanks of their brethren for every such item of information accurately presented through the medical press.

As to the precise place at which the encounter of the sexual elements takes place, we do know that it may, and sometimes does occur in the Fallopian tube; indeed, we have certain proofs of this in all the cases of tubal pregnancy, which are but too numerous in the records of Medicine.

The examples of ventral or abdominal pregnancy ought not to be taken as proof of an encounter of the male and female elements within the peritoneal sac.

As to ovarian pregnancies, I cannot deem them possible, except under the following circumstances. Both Bischoff and Martin Barry
have found the zoosperm upon the surface of the ovary in animals killed immediately post coitum; this is sufficient proof that the prolific semen had been transported by the tube or cornu to the fimbria, whose embrace of the ovarium had deposited the zoosperms upon the ovarian indusium. If we suppose this transfer to be effected at the moment of the appearance, in the opened hila, of a mature ovule, it is clear the generative encounter would here take place, and the act of fecundation become complete. Upon some change of posture of the woman the further escape of the fecundated ovule might be now prevented, the pore being stopped by the pressure of a fold of broad ligament, a loop of intestine, or other obstructing cause; and thus the fecundated germ, imprisoned within its cell, might there commence its career of development, making of the ancient follicle, which produced it, its matrix or succedaneous womb up to the time at which it must inevitably burst. I am compelled to adopt this hypothesis; for I can by no means conceive that fecundation of a germ contained within an unopened Graafian follicle can possibly take place, as I fully adopt and believe Mr. Pouchet's doctrine as to the spontaneous discharge of the ovulum previously to the fecundation. I cannot believe that the male seed could enter into the ovisac, through not the peritoneum only, but through the albuginea and the concentric coasts of the ovisac.

**Decidua.**—The womb is provided with a lining or coat, called the decidua or caduca. This caduca has been regarded as a membrane excreted by the uterus as a means of securing the product of the conception, by affording to it a nidus in which to imbibe the earliest elements or pabulum for its development.

For a long time past it has been generally supposed that the womb, coincidently with the fecundative act, throws out a viscid excretion from its inner walls, so as to line or plaster the whole surface with the viscid matter. The cut, Fig. 48, is designed to show the manner in which this is supposed to occur. The dark, thick outlines represent the womb, already somewhat expanded by the growing ovum. A is the canal of the neck of the womb. B is the orifice of the left Fallopian tube, whose fellow is seen at B the opposite angle. C is the decidua or caduca excreted by the inner surface of the womb, covering it as with a soft inditus. D is the vacant cavity of the uterus. E the
same decidua or caduca, pushed off from the surface by the globule of the ovum, which, as it increases in size, thrusts the decidua, or reflects it, as in the outlines, from E to E. It is this part to which the name of decidua reflexa, or caduca reflexa, has been given. F indicates the chorion or outer membrane of the ovum.

It often happens that women miscarry in the early stages of their pregnancy, and where the event occurs in the most favorable manner, the entire product of the gestation is thrust forth in an unbroken or perfect state. When this occurs, we find, upon examination, an ovoid or pyriform body, upon the upper segment of which is seen a mass of tufted chorion, while the remainder consists of a dense and rather solid fleshy material, which is the original or true decidua, called decidua vera. By careful manipulation, it is possible to extract from the upper part of this mass the complete and perfect ovum, consisting of the chorion, with its remaining tufts, inside of which chorion is the amnion, the water of the amnios, and the embryo.

A good notion of the appearance of the whole decidua after the extraction of the ovum, which has been taken out of the hole at the top of it, may be got by examining the pear-shaped Fig. 49 annexed. The pit or depression at the upper end, out of which the ovum was taken, is the reflected decidua, while the outer or pear-shaped object represents the decidua vera, which filled the whole womb, and was moulded by its cavity. It is clear that if the ovum should continue to grow, and to reflect the decidua, or carry it before it, the decidua reflexa would at last come in contact with the inside of the decidua vera, be pressed against it, and that they would weld or solder together, so as at length to make it impossible to separate, or even distinguish them from each other.

The cavity of the decidua vera, which at first was a closed sac, was, according to Breschet, filled originally with a fluid. Breschet gave to this liquor the denomination of hydro-perione; of course, such hydro-perione must be removed in the process of reflection and ultimate fusion of the decidua reflexa and decidua vera. We shall find, further on, other opinions on this subject.

Such are the Hunterian views of the decidua; videlicet, it is an excretion from the womb to answer a temporary purpose, after the effectuation of which it falls away, and is discharged. Other explanations
of this product have been lately presented, which are, perhaps, more
worthy of acceptance.

Many persons have heretofore disputed the existence of a mucous
lining in the interior of the womb, contending that the corpus muco-
sum terminates within the os tineæ, and that the inner wall of the
womb is peculiar, but not mucous. I presume no anatomist can be
found at the present day to deny the existence of a mucous body of
some sort as composing the tissue of the inner paries of the organ.

M. Coste's Atlas, already cited, contains several beautiful engravi-

gings, representing magnified views of this texture, and among them
one which exhibits the appearance of a piece cut from the substance
of the womb, on which is seen the inner lining membrane. I regret
that it was not possible for me to give copies of those drawings. Mr.
Gihon, however, has been very successful in copying the one annexed,
which represents a magnified piece cut from the uterus.

The right hand portion of the picture represents the fibrous struc-
ture of the substance of the womb, while the left and under sides show
the appearance, greatly
magnified, of the lining
membrane, which con-
sists of tubes perpen-
dicular to the surface.
The orifices of these
tubes, cut off by the
section, are seen at the
inferior margin of the
drawing.

I translate from page
208 of M. Coste's His-
toire Gén. et Part. du Dév. des Corps organ., the following portion of
an article, which cannot but prove interesting to the reader of this
work:—

"Upon examining the bodies of young girls dying suddenly, at the
approach of a first menstrual period, or those of adult women who have
perished by suicide while menstruating, I have found that among the
Graafian vesicles of the ovaries there is always one of them decidedly
more advanced than the rest. At the same time, the mucous body of
the womb, phlogosed and of a turgescent appearance, in obedience to
the laws of a pre-established harmony, is modified as it is in the
mammifers during the season of the rut, and prepared for the recep-
tion of the ovule, whose spontaneous maturation is about to occasion its fall.

"While, indeed, the ovarian capsule that is about to burst becomes the seat of this rapid evolution, the vascular apparatus of the womb is coincidently developed and injected in an extraordinary manner; that of the mucous membrane especially, forms at the surface of the membrane, beneath the delicate layer of epithelium with which it is invested, an elegant network with irregularly lozenge-shaped meshes, each of which incloses the orifice of one of the innumerable glandular tubes of which it almost wholly consists. This vascular reticulation is so decided and so rich that in certain subjects it communicates to the inner surface of the womb a more or less violet hue. In all probability, it is through these delicate ramuscules, of which the network consists, that the menstrual blood oozes. In cases where a pregnancy has become somewhat advanced, and the ovum, lodged upon the mucous surface, has affected the mucous tissue so as to cause it to assume all the characteristic features of the caduca, these ramuscules become so greatly developed that many of them attain the size of a quill-barrel. A definite opinion may now be obtained of their real nature, and we may feel convinced that the major portion of this substance belongs to the venous system, so that the mensual hemorrhage which they yield is evidently, in chief, derived from the reservoir of the black blood."

"These glandular tubes, one end of which is related to the muscular layer, while the other opens upon the free surface of the mucous membrane, are in number so considerable, that their orifices give to the surface the appearance of a strainer. Their presence in the tissue of the membrane increases its thickness to such a degree that, in many subjects, it forms plicae, or elevated convolutions, that are soft, compressed, and so jammed together, as to leave no void space in the cavity of the womb. These convolutions, when the ovum descends from the tube, seize it, and retain it by their contact or pressure. Upon inspecting the extraordinary thickness of this membrane, one might be led to suppose it the seat of a true pathological hypertrophy, or other alteration, were it not that repeated experience, corroborated by the examination of the parts, in women dying of accidents at the commencement of pregnancy, afford us the undeniable proofs of its being a normal condition of things."

M. Coste's engravings give very beautiful illustrations of the assertions of the above paragraph, and I have the pleasure to bear witness to the fidelity of at least one of his pictures, of which he presented me
with an engraved and colored copy, while I was in Paris, in 1845. Not only was that engraving a most faithful copy of the water-color drawing, but M. Coste had the kindness to show me the anatomical specimen from which the drawing was made. It is impossible for art to give a more perfect representation of an object. These views of the nature of the decidua seem to meet the concurrence of the author of an excellent work on midwifery, now in process of publication in Germany: I allude to *Die Geburtskunde, &c.*, by Franz A. Kiwisch Ritter von Rotterau: Erlangen, 1851. This author regards the *decidua vera* as a hypertrophy of the tubular tissue described by Good sir and others, with modifications affecting the epithelium of the womb. The drawing in Coste's Atlas gives a clear idea of his notion as to the manner in which the ovulum, once imbedded betwixt two folds of the hypertrophied membrane, clothes itself with a decidua reflexa.

I beg to remark that, however strongly I am led to adopt M. Coste's explanation, I feel some difficulty in accepting it, because I cannot readily comprehend how, after all this tubular structure is once thrown off as a decidua, it can ever be reproduced for the service of subsequent pregnancies. This tubular tissue must be regarded as an organ, complete in all its essential elements, and if it is in fact wholly deciduous and lost with each labor or abortion, then it presents an example of a complete organ, reproduced in the most elevated of the mammals; a thing which is, I believe, without analogy in the higher series of warm-blooded animals.

In the course of the researches that I made in the years 1847–8, upon the reproduction of the Opossum, I had occasion to examine the uteri of many of those animals, both in the gravid and non-gravid state. I present to the reader an outline drawing of the uro-genital apparatus of that singular animal, which is a monotreme. In figure 51, *a* is the urinary bladder; *b b*, the first wombs; *c c*, the secondary wombs; *d d*, the ovaria; *e*, the uro-genital sinus, along the surface of which (*e*) lies the rectum. The sinus uro-genitalis and the rectum unite in a cloaca, or monotrematous sac, which, as in the birds, gives outlet to the products of digestion, urination, and conception.

I examined this animal on the 3d of April, 1847, and found seven marsupial embryons in the pouch, which, from their size, I have reason to suppose must have come into the marsupium about the 10th of March, as they compare with my specimens of the 7th of March.

This figure represents the bladder, wombs, and sinus, inflated by the blowpipe. The wombs *b b*, when the animal is in rut, become twice or nearly thrice as large as they are in the figure; and the increased magnitude depends solely upon the development of the mucous tubuli,
of which M. Coste speaks in the above quotation. The cavity is very minute—bean-shaped, and filled with an apparently slimy matter as in Fig. 52.

In an opossum examined last winter, there being present Drs. J. Wallace and E. Wallace, the aorta was injected with size colored with vermilion. Much of the injection was found to be effused into the small bean-shaped cavity of the wombs $b\ b$; but there was a great multitude of tubuli standing vertically to the paries of the womb, that were filled with the red injection, presenting the appearance of waving, or straight red lines, that passed from the inner superficies of the substance of the womb down through the soft deciduous matter to the inner boundary of it. The Fig. 52, gives a pretty correct view of the appearances presented upon cutting
one of the wombs open in its longitudinal diameter. The lenticular-shaped cavity is seen in it as well as the converging tubuli. It gives also a good idea of the thickness of the membranous uterine walls, compared with the accidentally developed interior muco-tubular membrane. On the exterior of the womb is seen the ovary, with part of its Fallopian tube. I think no one who has examined M. Coste’s engraving of the gravid womb, opened, can fail to be struck with the immense comparative development of these uterine tubuli during the rut in the opossum. It was, probably, among the slimes of this tubular texture that the Rev. Dr. Bachman, of Charleston, S. C., found the young embryos moving—as expressed in his paper to the Philad. Acad. of Natural Sciences, 1848. I in vain searched for such free embryos in the various specimens of Didelphis in rut that I examined with the Drs. Wallace.

There is one circumstance that ought not to be overlooked by the Student while making up his settled opinion as to the decidua. It is this. In the solidungula, the pachydermata, and the cetacea, the entire exterior surface of the chorion becomes placenta; for the placental tufts are processes from the exterior surface of the chorion. In all these animals, while it is impossible to conceive of a decidua reflexa, it is equally difficult to admit of a Hunterian vera to which the whole exterior surface of the chorion could affix itself. Ought not the Student, then, to pause and consider whether this great and very general fact in embryogeny does not afford one of the strongest sanctions of M. Coste’s views of the original organic nature of the decidua? The means by which ends are produced, in nature, are always few; and as the uterine products in all the other mammals are formed without the intervention of a Hunterian decidua, it seems on that account probable it could not be indispensable in human embryogeny.

I leave it to the Student therefore to judge for himself, as to the nature of the deciduous coat of the womb; and to decide betwixt the Hunterian explanation of it already given, and the new doctrine, of which he has here the sufficient elements for the end of making up his opinion.

The ovum, after reaching the uterine cavity, grows rapidly. At first, it must be supposed to augment by endosmose, which conveys to its interior the cytotblastema found in mucous fluids amidst which it exists within the womb. Gradually developing its substance by means of changes by segmentation of the yolk, and also, probably, by means of the pabulum it finds in the mucus by which it is surrounded, it soon commences the acts of evolution of its parts. This process is effected by sending forth to all its parts, by means of the ventricles of
the heart, the sanguine materials which it first creates and then converts.

As the foundations of the tissues are being built up in these histological deposits, the nervous mass is everywhere deposited among them, and as in fact their most essential element. This nervous mass, in the form of nervous molecules, fibrils, and cords, is, like all the rest of the solids, derived from the blood; for nothing is truer than Oken's assertion, that "the blood is the fluid body, and the body the fixed and rigid blood"—so that the whole of the developments of the embryo and foetus come to be at last the results of organic deposits, derived from its blood alone.

The embryo requires an engine for the circulation of its own blood. Hence the features of the heart must be early disclosed—the path of the aorta is laid out by the blood itself; and the courses of the omphalo-mesenteric vessels are traced in order that the functions of the umbilical vesicle may not too soon fail.

The aorta, as it grows longer, divides into two branches, which are not two primitive iliacs, but two umbilical arteries, designed to send the blood of the embryo to circulate near the mother's blood, and to take from her the quantity of oxygen requisite for its aeration, and also a certain plasma which it brings back to the body of the embryo. These two umbilical arteries after some time give off branches which at length become sufficiently large to be easily demonstrated as external iliacs, femorals, popliteals, &c., the vessels of the limb, which are productions from the umbilicals, at last assuming their permanent character as iliacs, femorals, popliteals, &c. The blood of the embryo, by the extension of its umbilical vessels, comes at length to circulate among the cellular mass that is developed on the outer surface of the chorion, amidst which it receives its supplies of oxygen and also its alible elements. So that it is true to say, along with Professor Owen, that a placenta is a fleshy and vascular process from the exterior surface of the chorion.

When the embryo becomes at last developed within its amnion, chorion, decidua reflexa, and decidua uterina, it cannot be considered, of itself, to have any contact with the maternal surfaces—nor has it any other connection with the mother, save by its vessels and blood alone, which it sends forth far beyond the limits of its own body, into the distal tufts of the branches of its umbilical vessels, to spread it upon the living wall of its mother's tissues, there to receive its endowment of oxygen.

The only part of the child that really touches the mother is the blood of the child.
The embryonal blood, having traversed the capillary system of the placental tufts, returns by the channels of the umbilical veins. All the umbilical venules and capillaries have, probably, the power of taking up, by endosmose or absorption, some species of plasma or cytoblastema, from the maternal surfaces. They convey this, together with the aerated blood of the umbilical capillaries, into the single tube of the umbilical vein, which delivers it over to the child, by pouring it partly into the hepatic porta, and partly into the inferior cava by way of the ductus venosus, which is the continued tube of the umbilical vein. Professor Liebig's Researches on the Motion of the Juices in the Animal Body may be one's sufficient warrant to believe that the placenta can take up from the maternal tissues an amount of organic material adequate to the development of the uterine embryo and fetus by endosmose.

While the embryo is growing, the amnios continues to fill with larger and still larger quantities of water, the placenta increases in size, and the womb, which affords a nidus for the tender young, augments pari passu with the ovum and its contents.

The womb yields to the antagonistic force of the expanding ovum. It undergoes a compulsory hypertrophic development. The womb always resists this expanding power; it makes daily and perhaps hourly efforts to cast forth the burden from its cavity. It is not stretched, but compelled to grow.

The ovum commences its career of development not in the neck, but in the cavity of the womb, which is composed of the wall of the fundus and corpus uteri.

The long cylindrical cervix is not at first interested in the struggle or contest between the expanding ovum and the resisting cavity. It stands as the guardian of the fruit of the conception. The cervix uteri is the seat of what the ancients called the facultas retentrix, and it continues superior in force to the facultas expultrix until the close of pregnancy, when, being finally exhausted, the facultas expultrix acquires sole dominion, and labor commences. If at any time, during the course of a pregnancy, the retentive power of the cervix should fail, the expulsive power of the fundus and corpus uteri immediately begins to expel the ovum.

Many of the abortions that we meet with are caused by this weakness of the womb—that is to say, by weakness of the cervix uteri, which gradually yields to the antagonizing contraction of the body and fundus, and allows the ovum to come forth and be lost. The physician makes use of this principle in the treatment of cases in which the indication is plain to bring on premature labor. He dilates
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the canal of the cervix with his finger or with a sponge tent or a col-
peurynter, and he takes away the facultas retentrix, and the ovum
comes off.

It is curious to observe the care and providence with which the
retentive faculty is fortified in certain of the tribes of creatures. In
the cetacea, for example, there is a double cervix, a double os uteri,
one within the other, so that one of them being dilated may leave the
other still undilated and capable of resisting the antagonism of the
fundus until the last moment of uterine gestation is accomplished.
(See a paper on the Reproductive Organs of Delphinus nesarnak, in the
Transactions of the Acad. of Nat. Sciences of Philad., with engravings,
by Ch. D. Meigs.)

While the uterus is thus the reluctant servant of the forces of the
ovum, it gradually increases in weight and volume, as well as in the
cubic content of its cavity. After labor, it weighs a pound and a
half; in the non-gravid state, it weighs two ounces and a half. It
follows, therefore, that, in the course of a gestation, a vast increment
of its mass takes place, and that this whole sum consists in living
organic molecules, whether fluid or solid, that are deposited within its
limits and become constituents of them.

I shall not endeavor to give the rationale of the influence exercised
upon the womb by the growing ovum. Perhaps John Hunter would
ascribe it to the stimulus of distension. Suffice it for me to say, that
at any time in the course of the whole career, that career may, by the
physician, be instantly arrested and brought to a speedy close, by
destroying or withdrawing the ovum, or by overcoming the retentive
power of the cervix uteri. To discharge the waters of the amnios
by puncture, to dilate the canal of the cervix with a sponge-tent, or
to energize immoderately the facultas expultrix of the fundus and
 corpus uteri by means of ergot, is to arrest and bring to a close the
whole operations of the reproductive processes.

As the womb grows larger, its arteries and veins become elongated,
and their tubes become more considerable in size and weight. The
nerves are enlarged, or, at least, they are extended or produced. The
absorbents, in like manner, are augmented, and, more than all, the
great masses of muscular tissue existing in the virgin womb in potentia
rather than in reality, acquire a visible and palpable magnitude and
a great force.

As the womb expands, forced outwards in every dimension from its
centre, its walls do not diminish in thickness, although they become
softer and more succulent. Torrents of blood circulate in the tortuous
branches of the uterine arteries, and soak along in the immense
sinuses and veins, some of which are large enough freely to admit a finger within their cavities.

In the development of the superficial veins of the gravid womb, the fibrous coats of them do not appear to undergo much change or addition. It is the lining membrane, the endangium, that is to say, the vein that runs in the substance of the organ that is chiefly increased, so that, in examining the gravid womb, one sees rather great holes and channels lined with a smooth endangium, running among the tissue, than ordinary veins. In this respect there is nothing peculiar to the womb, since it has been long known that the veins within a viscus consist only of the endangium, as must indeed have been the case in the earliest stages of development, even of the aorta itself, for the blood makes its own channel. It makes, therefore, its endangium first, and the more tough, fibrous, and elastic parts of its tubes afterwards. (See Raciborski’s paper on the Veins, in the Transactions of the Roy. Acad. Medicine.)

From the foregoing, it appears that the augmentation in weight, volume, and capacity of the gravid womb, is a compulsory process under an antagonistic force applied and sustained by the self-developing ovum. The ovum may be compared to a powerful acephalocyst that, attaching itself by means of its placental mass, that serves as a suctorlial organ, to the living wall of the womb, absorbs, and compels it to yield in every dimension for its growing wants of accommodation. I beg the Student to see, in this great change of the womb from its non-gravid weight of two ounces to its gravid weight at term of one pound, or even one pound and a half, the proof of what I said a little while ago, videlicet, that the uterus is subject to a physiological hypertrophic evolution, from which it recovers as soon as the cause is removed; for, when the womb becomes emptied by the act of parturition, it returns within thirty or forty days to its non-gravid weight and size. The Student, in this, will see an example of an enormous hypertrophy or evolution, produced in the course of two hundred and eighty days, and recovered from by involution in the course of one month after the termination of the pregnancy. Let him reflect, therefore, that, if this is the law of the womb, it ought not to surprise him to learn that irritations, displacements, and various other causes may excite in the vacant womb this same disposition to hypertrophy under which it grows rapidly larger and larger for a certain time, but ceases to grow and returns speedily to its normal size and weight very soon after the irritation, displacement, &c., are removed.

Though the womb increases in weight as pregnancy proceeds, the means of its suspension in the cavity of the pelvis are still the same
in the gravid as in the non-gravid state. It is to be expected, then, that, as the uterus becomes heavier, it shall sink somewhat lower down, and that the woman shall, if she be a susceptible creature, perceive some symptoms like those of a falling of the womb: although the womb is growing larger, the lower part of the abdomen does not, at first, become larger. On the contrary, the early sinking downwards of the womb causes the hypogastrium to be less protuberant than before the conception, and hence the French proverb: "A ventre plat, enfant il y a;" or, as an old English midwifery states it,

"In a belly that is flat
There's a child, be sure of that."

These signs of falling of the womb in women who are married, should be ever held as suspicious until there is full reason to believe that they are not results of an early pregnancy; and there is frequently no little embarrassment in coming to a positive conclusion; even the vaginal taxis cannot, in all instances, give an assured ground of opinion, since the engorgements of the uterus, so frequently coincident with prolapsions, are with difficulty to be distinguished from the augmented volume of the same organ arising from gravidity.

The reproductive organs have a direct connection with the cerebro-spinal, and the ganglionic system of innervations. There is, therefore, no part nor parcel of the economy, into relation with which it cannot, under certain states of health, be brought; they are among the most powerful disturbers of the complacency of the organisms. They constitute an imperium in imperio, whose behests are not to be disobeyed. These organs can disturb the brain—the respiration—the digestion—the circulation—the secretions—the nutrition.

When the womb has become the seat of an advancing gestation, and feels the impulse of development, the complacency of the other innervations is, generally, discomposed. The stomach is one of the organs earliest to be called into sympathetic distress. The sympathy of the stomach is, in general, independent of any marked change of the animal heat, and of the rate of the arterial pulse. It is expressed by anorexia, by nausea, and oftentimes by vomiting. Probably the salivation, which is also a common symptom in pregnancy, is one of the same category of disturbances, as is also the sore-mouth of pregnant and suckling women.

Multitudes of women suffer from nausea only in the morning hours; the sympathy being interrupted by the business, the preoccupation, and the fatigues of the day, to return again on the following morning and follow the same course. In some, the nausea is perpetual, and attended with the most obstinate vomiting.
In most of the cases the nausea is gone before the quickening takes place; yet a young woman, under my care, vomited very soon after the conception, and vomited every day, and many times daily, during the whole course of her pregnancy. When her labor came on, which was a hard one, her disposition to vomit was greatly aggravated with every renewal of the contractions. To such a height did this symptom rise, that I found it seriously to contravene the intent and purpose of the labor pains. It is not a good practice, in general, to rupture the membranes of a primipara; but in this instance I concluded that, if the ovum could be allowed to discharge the waters, the condensation of the womb, that would follow, might put an end to the vomiting. I thrust my index finger through the distended bag of waters at the next pain. From that moment the nine-month's vomiting ceased, and returned no more. The labor, no longer delayed and contravened by the troublesome vomiting, hastened to a favorable conclusion.

I attended a lady in Spruce Street, a few years since, who, during nearly three consecutive months, appeared to vomit up every particle of her ingesta. It was her own opinion, coincided in by her friends and attendants, that the total amount of all her food and drinks returned very soon after they were swallowed. Although she felt much weakened, I could not perceive that, under this process, she lost her flesh; and, in the end, she gave birth to a healthy daughter. It is apparent that she must have been nourished during this time; but the manner, and the quantity, have remained ever since a mystery that I cannot explain. I cite this as one case only out of a great number that have occurred in my practice.

Many of these troubles vanish while the woman takes exercise in her carriage or on foot; because, as before said, the powers of the constitution, when devoted to the purposes supposed in every case of active employment of them, are not liable to be checked and diverted by a morbid consent of the stomach with the womb. Hence such women should be advised to walk or ride, or to busy themselves with their affairs, and avoid a sedentary and slothful life.

The acidity and eructations, and the diarrhoea or costiveness of pregnancy, may be obviated by the use of alkalies, whether soda or potash, magnesia, lime, or ammonia. Some vigor may be communicated to the gastric innervations by means of champagne; or by brandy and water, rum and water, or by certain of the bitter spirituous tinctures, combined with aperients.

I readily cured a case of this sort, in the spring of 1848, in a person who had suffered great distress from vomiting, cardialgia, flatulency, and constipation. She had a mixture composed of sweet tincture of
rhubarb two ounces, and tincture of gentian one ounce. A dessert-
spoonful of this medicine, taken once a day, dissipated all the symp-
toms; and I assure the Student that, in many instances of severe dis-
tress from this vomiting, I have found the patients promptly relieved
by its use. Two drops of tincture of aconite, in a tablespoonful of
water, may be given for the dose, in certain of the cases, with marked
relief.

Many of those examples that consist of nausea and vomiting during
the early part of the day, but which cease after the meridian hour,
may be set aside by the following method:—

Let a cup of coffee, with a toast, be brought to the bedside at the
earliest morning hour. The patient should be called from her sleep
to take this preliminary breakfast, without rising from bed. As soon
as it is taken, let her lie down to sleep again, if possible. It appears
useless to offer a rationale of this method. I am very confident,
however, that, in a considerable number of persons, it will be found
to put a sudden stop to the vomiting, as well as to the nausea. Cer-
tainly, many of my patients have been speedily, as well as perma-
nently cured by it, and that in very distressing instances of the nau-
sea.

Inasmuch as pregnancy enables the womb to disturb the alimentary
organs in the manner above mentioned, it might reasonably be in-
ferred that the rest of the nervous mass is also liable to interruption
of its regular action, from similar causes. Considerable modifications
are sometimes observable even in the temper and disposition of the
woman. Those who are by nature amiable and gentle, sometimes
becomes peevish, and fretted by trifles—full of false alarms and idle
fears; while persons naturally ill-tempered become charitable, and
kind, and courageous. Strange desires, longings, wishes for extraor-
dinary, unprocurable, or disgusting kinds of aliment, are said to
arise in pregnant women; but in a long clinical practice I have never
met with any examples of the sort; which leads me to infer that
these longings are more frequent in the books than in the practice of
our art.

Quickening.—The embryo acquires a power of slight muscular
motion at an early stage of pregnancy; but, as it is inclosed within
the decidua and the membranes, and floats in an abundant liquor
amnii, the first feeble motions of its body or limbs cannot make them-
selves felt through so many coverings, by the living tissue of the
womb. In general, it attains the age of four months and a half before
it becomes sufficiently large and strong to make itself felt by the
mother when thrusting with its feet or hands, or when suddenly re-
dressing its body from the usually flexed position. When the child
hath first acquired this power to make its motion felt by the mother,
it is said to be quick with life, or to have quickened, and the event is
called the quickening. Quickening is the first perceived motion
of the child.

The lawyers have looked upon a child quick with life as worthy of
the protection of the laws; for it is felony, maliciously and with evil
intent, to kill a child that is quick with life in the womb, but not
felony to kill one that is not quick with life. It appears to me that
this is a distinction without a difference; for the child of six weeks,
or of two months, is as essentially quick with life as one of five or
seven, or even nine months. The only difference is, that the child at
four or four and a half months is strong enough to make itself felt,
while at two or two and a half months its movements are so feeble as
not to be perceptible by the mother. It is to be hoped that this bar-
barous and ignorant distinction, a remnant of early superstition, may
be done away with by our modern legislatures, and that the wretches
who for hire lend our art to the detestable baseness teneros avellere foetus
may be made liable to condign punishment for the crime, committed at
whatever stage of the gestation.

Form of the Belly in Pregnancy.—As the ovum grows larger
day by day, so doth the womb continue to expand, adding molecule
to molecule, weight to weight, and mass to mass. The lower belly
becomes a little protuberant, and the swelling is fashioned upon
the pear-shaped womb that lies beneath, and pushes the belly out-
wards. The Student should remember that other bodies besides
the womb may cause the abdomen to enlarge, but that no object save
the uterus itself can give to the hypogaster its peculiar gravid shape.
The form of the hypogastric tumor dependent on the state of gravidity
furnishes to the physician, therefore, a very useful means of diagnosis,
which ought not to be neglected in some of the difficult cases, cases
in which it is a matter of extreme consequence to individuals that no
mistake should be made as to the real nature of the symptoms.

Pouting of the Navel.—The navel in the non-gravid woman is a
deep depression or dimple. This depression is caused by the contrac-
tion or shortening of the remainders of the two umbilical arteries and
veins, which, after birth, draw the skin inwards and downwards to
make the pit of the navel. In the gravid woman, when the six
months are past, the navel rises to the general level of the skin, and,
as the womb grows larger in its progress, the umbilicus protrudes, because the ligamentous remainders of the umbilical vessels, which are deployed with the mass of the abdomen, can no longer draw it inwards. A pouting of the navel is, therefore, one of the consequences and signs of a pregnancy of six and more than six months’ duration. Other tumors in the belly may make the navel to pout.

**Cramps from Pregnancy.**—Sometimes the gravid womb fills up by its bulk the cavity of the pelvis, so as to produce cramps in the legs by pressing too firmly upon and obstructing the sacral and obturator nerves. There is no remedy but patience and time.

**Costiveness in Pregnancy.**—When the womb has got fairly up into the cavity of the abdomen, it lies in front of the convolutions of the intestines; even the transverse colon lies rather behind the upper part of the fundus, so that when, in a gravid subject, the abdomen is laid open, nothing is to be seen but the uterus in front. The edge of the right lobe of the liver, or a segment of the greater curvature of the stomach, the omentum, and colon lie upon the top, and towards the reverse of the fundus uteri.

In this situation, it is impossible for the bowels to receive, in the same manner and degree, the stimulating and natural succussions of the abdominal muscles, as they receive them under ordinary circumstances. Those succussions are constant provocatives to a healthful activity of the peristaltic force, and are essential thereto. The failure of them tends to render the peristaltic motion languid or torpid, and therefore costiveness is a very ordinary state in advanced pregnancy. Let the Student reflect upon the evil effects of such torpor, in overloading the alimentary tube with the undischarged residuum of the digestions, by which the tension of the abdomen is increased, and the mesenteric and hepatic circulations and innervations brought into disorder, and which ought to be corrected by the proper remedies.

**Alternate Hardening and Relaxation of the Womb.**—As the womb approaches nearer to its term of gestation, the retentive faculty grows gradually less, from the deploying of the upper part of the cervix, which becomes a part of the general cavity for the accommodation of the ovum. The expulsive faculty makes frequent efforts to overcome the remaining antagonism of the cervix. These efforts, which doubtless lend a chief aid in the act of deploying the cervix uteri, are to be detected in the alternate hardening and softening of the globe of the uterus under one’s hand placed upon the abdomen. If
the hand be placed upon the abdomen of a pregnant woman, it may be that the impression will first be received of a great softness and pliability of the textures, but, upon keeping the palm in situ, the tumor begins to grow harder and harder, until a very condensed condition of the organ is produced by this tonic contraction of its muscular tissue.

These contractions are not productive of the least pain or any disagreeable sensation, save a feeling which women designate as a "drawing" sensation. One feels surprised, sometimes, upon observing the very positive force of these contractions, to hear the woman say that they produce no pain in the back or hypogastrium; particularly as the same degree of hardening or contraction of the organ in a labor is accompanied with very decided pain. The reason of the difference is this—viz., the pains of labor are pains of the yielding but still resisting os and cervix; while these contractions, above described, do not cause any positive stretching and pain of either of those parts.

How the Cylindrical Neck becomes Conical.—These contractions are repeated very often during many weeks, and, indeed, it may be said they are reiterated throughout the whole duration of the pregnancy. The effect of them is gradually to reduce the cylindrical neck of the womb to the shape of a cone—or rather to the form of the lesser pole of an egg, and to make the os tincæ acquire a circular instead of its usual oblong or oval form, and to convert it into a dimple or pit in the apex of the now oviform uterus. When this dimple has become completely developed by the resolution of the cylindrical into the conoidal cervix, labor is ready to begin, and the next repetition of the contraction might justly be accounted as the first pain of the labor, for the labor pain is nothing else than contraction of the organ, by which the expulsive faculty strives to overcome the retentive faculty, and thus free the uterus of its contents, by thrusting them forth into the vagina, and thence into the world.

Size of the Gravid Womb at Term.—The uterus, rising upwards in the cavity of the belly, finally attains the length of full twelve inches. I measured the gravid uterus at term, in an individual who died suddenly before the onset of labor, during the month of June, 1848. It was twelve inches long, and eight inches in transverse diameter. The broad ligaments rise, of course, as the womb rises; and the ligamenta rotunda, which extend from the internal abdominal rings to the angles of the uterus, ought not, in a normal state, to be more than two and a half to three inches in length; yet by
the mounting upwards of the uterus towards the scrobiculus cordis, they acquire a length of five or six inches at least, serving to stay or steady the womb as it goes up, and, on occasions, to render it oblique to the right or left, in proportion as the right or left ligamentum rotundum is the readiest or the most reluctant to yield as the rising womb compels it to accompany the ascent. I call the attention of the Student to this condition of these ligaments, now, in order that he may in this connection clearly understand that, if the round ligaments should not diminish their own longitude pari passu with the lessening of that of the womb after labor, and if they should continue elongated, or weak and relaxed, after the womb has returned nearly to its non-gravid dimensions, then the womb, having no support to prevent it from falling backwards, will be liable to dip its fundus below the promontorium, and be overset backwards, or retroverted. Whenever this accident happens, it is attributable to a fault of both the round and the utero-sacral ligaments; since, with round ligaments two and a half inches in length, the fundus could not possibly retreat far enough from the symphysis pubis to admit of the state of retroversion. Let the Student early learn that one of the common accidents of the lying-in state is this very accident, the non-contraction of the ligamenta uterina—and let him carefully estimate the effects, as to pelvic obstruction, pain, bearing down and general disturbance of the health, likely to arise from such an accident. While he is ignorant of these simple facts in pathology, he will permit his patients to suffer needlessly; but, well informed on this point, he will surely obviate by his precautions such sore distress. The accident is by no means an uncommon one after abortion at the third or fourth month. In such instances, and always, indeed, when the woman makes complaint of backache and pain within the pelvis, with tenesmus of the rectum or bladder, or both; and when she keeps her bed instead of getting up at the usual period and completely recovering as she might be expected to do a few days after the miscarriage, let the Student be careful to make a full exploration of the case. It is highly probable that all these complaints will be found to depend entirely on a retroverted state of the womb that has taken place because the ligaments could not contract soon enough and solidly enough to keep the organ in its proper position.

The Placenta.—A placenta is a vascular flesh excrescence from the exterior surface of the chorion, and is formed not before, but some time subsequently to the assumption by the embryo of its earliest form. Being produced solely by the chorion which belongs to the ovum, it has nothing to do with the womb except to attach itself to
it as a base on which it is to grow. At first it is probably a mere microscopic point situated upon a similar point in the uterus; it enlarges daily and exactly in the same ratio as the womb enlarges. It does not overgrow its base, nor does the base on which it rests overgrow—it—they must augment at an equal rate.

In the primary stages of connection betwixt the ovum and the womb, the tufts of the chorion, which are merely masses of cells attached together as clubs or cylinders, do probably sink into the orifices of the tubular glands of the uterine mucous membrane, and derive from the secretions by their endosmotic power some cyto-blastema that is appropriated to the earlier processes of development of the fecundated ovum. In the mean time, those curious acts called the segmentation of the yolk go on until the faint traces of the embryo come at last to be made manifest. The heart is a cylindrical tube that expands and contracts by turns, driving forwards into the soft and diffusulant materials a drop of blood, which flows back again in the diastole. Little by little the quantity of blood increases, and is jetted further and further from the fountain of the circulation, making the track it is to follow, which gradually acquires the characteristics of a bloodvessel. Each renewed jet drives the vessel further and further from the heart, and the omphalo-mesenteric vessels and the aorta are gradually formed. The aorta reaches the point of its bifurcation, and one branch becomes the right and the other one the left umbilical artery. These two vessels attached to the growing allantois extend with the expansion of that organ, and at length reach the inner wall of the chorion, through which they make their way, to be divided on the external wall of the same chorion into myriads of capillaries and venules and arterioles that convey the blood which is driven into their tubes by every systole of the embryonal heart. These bloodvessels on the outer surface of the chorion lie in contact with the inner lining wall of the womb, carry their blood close along on its surface, and when they by the reunion of many capillaries have acquired the nature of veins, they serve as channels of return through which the placental blood is conveyed back into the body of the embryo.

Thus it appears that when the embryonic heart contracts it propels the blood through the aorta, the umbilical arteries, the placental capillaries and small veins into the great umbilical vein, and so, back into the heart from whence it was driven by the systole. In this circulation it has not at all mixed with the blood circulating in the vessels of the womb, nor has it acquired any blood, as such, from the parent. Yet it has absorbed, as it passed along her living surface, a portion of her oxygen. It has also imbibed by endosmosis portions
of plasma, or liquor sanguinis, which it is transporting to the interior of the embryo, in order that the said plasma may be by the power of the embryo or foetus converted into fetal blood. This plasma, or liquor sanguinis, is water containing dissolved albumen and salts that are susceptible of passing, by exosmose, out of the mother's vascular tubes, and by endosmose into the interior of the foetal vessels. It contains the elements of blood, to be elaborated within the economy of the embryo or foetus.

The Student now perceives that I would inculcate the opinion that the placenta only sits on the womb as a basis to rest on and as a living surface out of which to take oxygen and liquor sanguinis—that there is no inosculation of maternal with foetal bloodvessels, and that the placenta is wholly and solely a product of the living ovum, with which the womb has no part nor lot, except to afford a point to rest on and a feeding ground from which to procure the alible materials of the ovum.

The nature of the connection thus formed is the subject of great differences of opinion, that have not been settled even by the authority of John Hunter, who first proposed a rational explanation of this difficult point, in his article on the placenta, which may be consulted in his volume of papers on the Animal Economy. According to Mr. Hunter, the placenta is a symmetrical organ, consisting of two parts, one derived from the womb and the other from the child.

Seiler, in his work *Die Gebärmutter, und das Ei des Menschen*, stoutly denies that the placenta belongs to the mother; and Velpeau, in his *Ovologie ou Embryologie humaine*, p. 65, says: "Et j'ose affirmer avec plus d'assurance que jamais que le placenta humain est entièrement foetal." I declare, with greater confidence than ever, that the human placenta is entirely foetal.

While the celebrated Velpeau thus resolutely rejects the Hunterian doctrine that there is a uterine portion of the placenta, other very eminent persons equally insist that an important portion of the mass is actually derived from the womb; and that, whenever it is extruded by the contractions of the organ, not only is the foetal portion expelled, but the whole of the uterine portion also, which is detached at the same time, comes off with the foetal half; from which, indeed, there is afterwards no possibility of separating it, nor even of distinguishing them, the one from the other.

Prof. Owen, of London, is one of the distinguished naturalists who contend that the placenta is constituted of materials, part of which belong to the mother and part to the ovum. Mr. Owen says, after having carefully compared the Hunterian preparations with the results
of his own examinations of the gravid uterus at full period: "I now believe they all fully bear out Mr. Hunter's general view, viz: that the maternal blood is diffused, by means of the tortuous arteries, into the spongy cellular substance of the placenta, where it bathes the capillaries of the foetal circulation, and is returned by the oblique decidual adventitious sinuses and channels into the orifices of the uterine veins." (Vide Note in *Hunter on the Animal Economy*, p. 102.)

M. Flourens, Professor of Comparative Physiology at the Jardin des Plantes, says, in his *Cours sur la Génération*, p. 130, that the umbilical vessels of the mammifers, which everywhere pierce the chorion, in order to come at the internal surface of the womb, are called placentas. The placenta is an inherent characteristic of viviparous production. It cannot, therefore, exist in the oviparae. Mr. F. divides the mammals into two great classes, one of which comprises man, the rodentia, and the carnivora; while in the other class are arranged the pachydermata, the solipedes, and the ruminantia. In the first class, he contends, there is a vascular inosculation of the mother's vessels with those of the ovum, whereas no trace of such vascular union can be detected in the second.

I have cited this distinguished physiologist in order to show his opinion; but I am far from advising the Student to adopt it upon his authority. His assertion that the placenta is a characteristic of viviparous production, is denied by high authority; and notwithstanding I am prompted to agree with him, I admit that the most careful research has never enabled me to discover the least trace of a placenta or cord in the early marsupial embryon, as I have stated in my paper on the Didelphis, in *Amer. Phil. Trans.*

Mr. Owen's assertion, in regard to these differences in the classes, is as follows: "Thus the placental intercommunication between the foetus and mother, in the human subject and quadruman, is carried on by the contact of the foetal capillaries with maternal extravasated blood; while in the ruminants, the mare and the sow, it takes place by the apposition of capillaries to capillaries, and the two parts of the placenta, viz: foetal and maternal, can be separated. In the ferrae and rodentia, there appears to be an intermediate structure." (Loc. cit.)

Let the Student, while pondering on these propositions of Masters in our science observe that, though the separation of the placenta in child-birth is essentially hemorrhagic, and never so in the parturition of quadrupeds, which might lead to inferences in favor of different plans of union, yet organs of such vital importance in the economy of the genera are not likely to be modelled upon plans absolutely different in creatures so nearly allied in their great types. In all the mammal-
fers, there is one type for the brain and nerves, one for the respiration, one for the circulation, one for the absorption, secretions, reproduction, &c., and there should, à fortiori, be but one for the great and indispensable branchio-absorptive apparatus of the fetus.

I have already said that being in Paris in the year 1845, I enjoyed an opportunity to examine some of Professor Coste's preparations of the gravid womb, as well as the water-color drawings, and engravings of them, and I now repeat that the engravings are most faithful representations of the facts exhibited to me.

Let us suppose Mr. Coste's views as to the real nature of what is called the decidua to be absolutely correct, and let us consider the annexed Fig. 53 as a representation of a gravid womb cut through transversely from top to bottom, and containing an early ovum imbedded in one of the plicae or sulci of the tubular membrane, then the ovulum, partly buried in one of the sulci of the plicated membrane, will sit on the basement tissue, which is the womb itself. If an ovulum should be thus caught, fixed and half buried between the rugae, it might form its mesenteric attachment at the bottom of the fold, and, daily increasing in size, it might cause its decidua reflexa to grow thinner, until it should, at last, wholly disappear, as in Fig. 54. The segment of the ovum that looks inwards to the cavity of the uterus, pierces through the thin coating of decidua, as in the figure annexed, and I have seen such an example.
As some of our brethren appear to take interest in the researches and opinions of Dr. Ernest Henry Weber, of the University of Leipsic, it is proper for me to show the grounds on which that author rests his theory. He directs that a gravid womb having been opened by an incision should be carefully washed, and then laid in alcohol to become somewhat hardened by the spirit. When sufficiently firm, an orifice of one of the veins opened in the uterine substance by the cut, should be sought, and the vessel inflated by means of a blowpipe. The inflated vein is then to be slit up with the scissors, and its track followed by successively inflating it and slitting it up. In this way the course of the vein is followed into the substance of the placenta, a certain portion of which is found to have been distended with the air of the blowpipe, which escapes from openings in accidentally broken vessels. The walls of these veins are so thin as to evidently consist only of the thinnest polished inner membrane. In this way, by dissecting and inflating, canals are discovered that are not really veins, but a sort of vacuoles and passages betwixt the spongioles of the foetal part of the placenta. Occasionally one finds a vein in which the spongioles or tufts are pressed against the side of the vein, so that the inner wall or tube of the vessel is roughened by the intrusion; but it is to be understood that the tuft does not enter into the vein itself through an aperture in its wall: it only drives the thin vein-wall before it, reflects it, and so, covers itself with a coating of this vein-wall.

Weber supposes that these umbilical tufts that thus thrust the vein-walls before them, are arches or loops of vessels which in this manner carry their flowing blood as it were into the very heart of the vein without mixing the fluids however; the current in the large vein being protected by its indented vessel, and that in the umbilical one being confined to its own tube, so that the poor, half oxygenated blood of the embryon flows onwards in its own channel, which is surrounded with the hot rich fluid of its mother.

Such is Dr. Weber’s idea; a very pretty and pleasing one—which, however, I cannot adopt, because I can never believe that the mother has any lot or part in the confectioning of the placenta, and which, moreover, is not called for by any absolute necessity of the case, seeing that vast whales, horses, oxen, and other great animals are as readily developed in gestation as man is, without any such complex apparatus. There is one law of gravitation, and I as fully believe, there is but one law of connection betwixt the embryon and its mammiferous parent.

In the human placenta, and in those of certain quadrupeds, all the placental tufts are united into a single disk, cake, or placenta, as in
the adjoining Fig. 55, which shows the uterine surface, where the lobules of the placenta are seen divided by the lines of the septa. These lobules are very numerous: and if, instead of being assembled in one disk, they were disseminated over various parts of the womb, the analogy to the ruminant organ would be complete. Fig. 56 exhi-

bits the foetal surface of the placenta. The umbilical cord, containing its two arteries and its vein, is seen reaching the placenta at its centre, and dividing its vessels into numerous branches, which radiate towards the circumference. In other animals, as the ruminants, the tufts are separated from each other and distributed to different parts of the whole chorion, so as to make a great number of placentas. In certain other genera, the tufts consist of zones, surrounding the oval ovum; or they are scattered everywhere, like a paste, over the entire super-

ficies of the ovum.

To possess a gravid womb at term, and enjoy an opportunity to examine it leisurely, is to be what Noortwyck calls rarissimum hocce spolium mactus. Even in London, Professor Owen appears to have waited long before obtaining such a privilege; and Dr. William Hunter says, that “opportunities of depicting the human pregnant uterus at leisure, very rarely occur. Indeed, to most anatomists, if they have happened at all, it has been but once or twice in their whole lives.” (Anat. ut. Hum. Grav.)

I have enjoyed but few such opportunities during a long course of business in a great city. Those I have had were as carefully improved as my means would admit; and as I must confide in my own, rather than in other men’s senses, I find it impossible, under my own observa-

tions, to adopt the views of the Hunters, and I prefer the opinions of Seiler and of Velpeau. One ought not lightly to dissent from great authorities, nor is it without a sentiment of profound respect for the
Hunters, that I claim the privilege to see with my own eyes, in a matter so authoritatively determined by those great benefactors of Medicine. In what is called Deliverance, the whole placenta comes off from the womb. Kiwisch doubts that this is the case, supposing that a portion only of the maternal part comes off with the fetal portion.

As a general rule, the placenta is separated from its place on the vault of the fundus, by the same pain that chases the buttock of the child into the vagina, and is completely extruded from the genital fissure in about ten minutes: sometimes it is expelled within twenty minutes after the commencement of a labor.

I have removed a great number of placentas without staining the hand with blood, or perceiving a drop upon the mass itself.

The placenta comes off with equal readiness at the third, fifth, or the ninth month, showing that no other action of the womb is required for its expulsion than shrinking of its muscular tissue, and that all times and stages are indifferent as to the facility.

I find in dissecting the gravid womb at full term, that the slightest traction suffices to remove the placenta from the surface where it had ever before enjoyed an undisturbed attachment; and that, too, very soon after death. I am convinced that the connection may be broken up even by puffs of air from the blowpipe; and that it is not more adherent than is the peel of a perfectly ripe orange to the fruit. Can it be that the womb may exfoliate its half of the placenta with such amazing facility, and that, too, in all the stages of pregnancy? Do these facts consist with the idea that arteries pass from the womb into the placenta? Are other arteries broken so easily? Has the womb its half of a placenta?

I shall subsequently mention the case of a lady who died here in June, 1848. In the post-mortem examination in presence of Dr. Yardley and Dr. Wallace, I detached the whole of the placenta from the womb, after the careful injection of the aorta made by Dr. Wallace, an expert anatomist, who had secured the external iliacs before throwing the injection into the trunk. Neither I, nor those gentlemen, upon the most minute and careful search, aided by good lenses, could verify the existence of even a single vessel passing from the womb to the placenta. Much of the injection was effused into the cellular meshes of the placenta. It was an infiltration of the material and not an injection, in the anatomical sense of the term. We arose from the dissection, equally and unanimously convinced that we had not seen a single vessel broken off or pulled out, in the slow, gentle, and most careful divulsion of the two surfaces, uterine and placental.
This examination was made within less than twenty-four hours after
the demise of the lady.

During the epidemic of cholera here, in 1832, I examined a gravid
womb at term within a very few hours after the death of the woman,
in company with the late Dr. J. Hopkinson, then prosector at the
University of Pennsylvania. He, though a practical anatomist, was
unable, as I was, to detect anything broken, save mucous tractus,
though the light and the glasses were good, and the most scrupulous
care was used, without precipitation or rudeness in the operation.

A similar opportunity was enjoyed, a few years since, at the Penn-
sylvania Hospital, in a womb gravid with twins. Here, also, I detected
nothing but mucous tractus. Another very fine specimen, at the
seventh month, was afforded to me by Professor Pancoast at the Jeffer-
son College. In this case, many medical students observed the di-
vulsion of the surfaces without detecting any vessels. I have had
other similar opportunities, and obtained the same results.

On Friday, Dec. 15th, 1855, I examined the dead body of Mrs. —,
late a patient of Dr. Weevil, in presence of that gentleman, Dr. Condie,
and Dr. E. Wilson. She died of phthisis near her term. In the act
of detaching the placenta from the womb-surface, we all with entire
unanimity declared that we could not perceive that any vascular tract
was broken asunder by the gentle, very slow, and most carefully
observed process of disruption or separation of the two surfaces,
uterine or placental.

I had a similar opportunity lately at the Blockley Hospital, when
many physicians agreed with me in declaring that no vessel was seen
in separating the placenta from the womb.

These are the opinions I adopt; but when so many explanations
abound, who is he that can feel perfectly assured of the soundness of
his own? There is one argument against these opinions which I con-
ceive it a duty to state; for that which I desire is, the truth. The
argument may be presented as follows:—

It is admitted that bloodvessels, whether arteries or veins, or capil-
laries, when deeply inserted within the tissue of an organ or viscus,
always leave their additional coats and go within the intimate tissue
solely as membrana vasorum communis. Professor Burdach calls this
lining membrane ENDANGIUM, a word more easily pronounced than
the common Latin term, or the long English compound word lining-
membrane of bloodvessels. I greatly prefer, therefore, to employ the
word Endangium, after the illustrious German teacher. Raciborski, also,
in his elegant treatise on the veins, published in the Transactions of the
Royal Academy of Sciences, clearly shows that the true bloodvessel is
in fact this very membrane, and that the other textures found in larger arteries and veins are merely the protectors of the real vessel in its transit from the heart to the distal point in which its essential offices are to be performed. On various occasions I have been struck with this appearance in the large sinuses of the womb, some of which are so capacious as to admit the introduction of a finger into them. Here, the lining membrane, endangium, or true bloodvessel rests upon the very substance of the womb, having no fibrous or other coating interposed between it and its proper basement texture, the uterus itself. The strong fibrous coats of bloodvessels are never formed until after the essential endangium has for some length of time conveyed the moving blood along its channels. No one will deny this who has observed, with a microscope, the circulation of the embryo chick on the second day of incubation. Strong additional coats are gradually formed, and only in proportion as they may be requisite to resist the injection force of the heart.

It should be remembered that the womb is subject to great changes of condition. In the virgin, it is 2½ inches in length, and weighs about two ounces. At term, it is 12 inches long, and weighs as much as two pounds. After delivery, it makes haste, by involution, to return to its pristine weight of two ounces, which it would be impossible for it to do provided its great bloodvessels should have been strengthened with fibrous or elastic coverings instead of consisting, as they do, solely of the endangium.

As the womb grows, in pregnancy, many of its venous trunks become extremely large, and as they run in every direction in the womb-structure, some of them come so near the inner surface as to leave small spaces where the outer aspect of the endangium is destitute of any uterine basement. These thin or vacant spaces are chiefly seen on the part of the womb that is covered by the placenta, and are described by Dr. Lee as a sort of valvular apertures, representations of which he has given in an excellent plate in his Midwifery. The blood of the uterine veins would here press so strongly on the unsustained membrana communis as to rupture it were it not supported by the placenta, which acts as a cover or stopper, for the foramen, the removal of which would be sure to be followed by a rush of the blood.

During the process of its development, the placenta, which at first is a half-diffusent, softish mass on the exterior of the chorion, becomes continually of a firmer consistence. While it is in this half-plastic state, the blood driven along in the uterine veins moves with a force sufficient to cause the delicate endangium across the above-named vacant spaces to yield in form of a pouch or cul-de-sac, that impresses,
indentations, and sinks more or less deep into the softish mass of the placenta. These pouches or culs-de-sac are not properly vessels, but rather they are a sort of varicose state of the endangium, which contain the blood of the mother, yet keep it from all direct contact or mingling with that of the fetus.

It is my belief that these culs-de-sac or varices of the womb-veins are the vessels which Mr. Hunter describes as curling arteries of the womb. In many and patient searches for them, I could never discover one single tube that could be called a curling artery, as Hunter denominates them, and I cannot believe they do exist as a normal condition of pregnancy. As to the idea of Hunter, strongly advocated still by eminent English writers, that the blood of the mother is poured into what they call the cells of the placenta, I am unable to comprehend how it is that very learned people do still adopt it, for if there are cells or vacuoles in the placenta, which I deny, any blood that might fill them can be none other than extravasated blood, and yet the gentlemen insist that this extravasated blood can and does return again into the sanguine circulation of the mother! It is as easy to suppose that blood taken into a basin in venesection should again enter the torrent of the circulation, or that the extravasated fluid of a thrombus or ecchymosis should find its way back again into the vascular system. If the mother's blood could be poured into the hypothetical cells or vacuoles of the placenta, it would die by coagulation, for coagulation, which must ensue, is the death of the blood.

The blastoderm or germinal membrane is probably a progressive stage of the original maculae germinativa, or primary solid, and is stated to consist of three layers, which are the outer or serous layer, the inner or mucous layer, and the middle or vascular layer, for accounts of which I refer the Student to Rudolph Wagner's or Müller's Physiology. I shall not pretend to say that I know of a truth that the vascular layer gives rise to the sanguiferous system, the mucous layer to the digestive, and the serous one to the dermal and muscular system, ideas which, however well founded in anatomical truth they may be, seem at least to be altogether fanciful and hypothetical. Nevertheless, as there must be a germ-point, I have no objection to consider the maculae as the blastoderm, and as the analogue of the cicatricula in the birds' eggs.

After the absorption of the ovarian ovule by a Fallopian tube, and its fecundation there, it increases rapidly in size, the segmentation of the yolk proceeds, and the fecundated egg moves slowly towards the womb, which it enters from the tube within some five or ten days. Being detained in the cavity by falling in some deep sulcus among
the convoluted mass of the swollen mucous tissue, it is there at last affixed, mesenterically attached, or conceived, for conception is synonymous with the permanent affixation of the germ.

It is presumable that the vitellary membrane which was originally what we called zona pellucida, now becomes transformed into chorion in part, and partly into the coating of the umbilical vesicle. The chorion is soon after this observed to be quite covered or clothed with innumerable villi or tufts, a kind of club-shaped conical or cylindric masses of cells that shoot out from the exterior surface and plunge their extremities like so many rootlets or pollen tubes into the orifices of the tubular glands, or wherever they may chance to find a resting place or materials for their endosmotic absorption. It is probably by means of these spongioles that materials for the nutrition of the ovulum enter within it; a view that derives some confirmation from the fact that the spongioles or tufts of the chorion disappear as soon as the placenta has acquired a sufficient degree of branchial and absorptive power.

The developing ovule is very soon covered completely up by the deciduous, or rather the muco-tubular mass in which it has fixed itself. The living point of womb surface to which it is affixed, now represents the utero-placental surface, for the placenta, growing from the exterior of the chorion, sits only there, but the ovule, hourly swelling or growing, pushes before it its covering that consists of the reflexed decidua or muco-tubular membrane which has invested the unattached portion of the ball like a cap or hood. Upon attaining a certain size in the course of the third month, this hood-like covering or reflexed decidua has become so much expanded and so thinned, as to give way before the enlarging ovum, which comes through the rent or hila and then applies its chorion directly to the muco-tubular membrane, or decidua vera which lines the whole interior of the womb. As the ovum grows onwards through the rent it has made in the reflex decidua, that body retires or shrinks back towards the placental disk and becomes a sort of ridge or cushion which we often find all round the placental margin.

The before formless mass within the ovum now begins to assume specific form and properties, by the evolution of a nervous and sanguiferous system; for, as has before been stated, the heart, originally a pulsating cylinder that thrust forwards a droplet of red blood, which ebbed back again as often as it was driven forwards, now begins to take on the proper forms and to be able to drive the red drop further and further into the softish, plastic mass until the track of the aorta is established. This aorta, after dividing itself as
was shown into two umbilical arteries, and completely setting up the omphalo-mesenteric system of circulation, rises, as we said, on the sides of the allantois to the inner wall of the chorion, which it pierces like a cribiform plate to go on the outer surface and there spread itself out in the shape of innumerable capillaries, arterioles and venules, whose tufted extremities apply themselves to the living wall of the womb. It is from that living surface that the placental vascular tufts draw the liquor sanguinis which the great umbilical vein next pours into the torrent of the foetal circulation, where it is developed and converted into red blood through the force inducted by the endangium. Thus only can the bloodvessels be made; they are made by the blood itself which traces their paths, as it is injected by the heart into the soft and plastic sarcode mass. When once made, they ever afterwards restrain the blood, confine it within their own boundaries, and maintain its vitality by transmitting to it the forces of the nervous system of which they are the sole agents or machinery for this particular end; so that the blood, which created the vessels, becomes dependent on them for its whole subsequent life and powers.

The omphalo-mesenteric system appears to be designed as a means of maintaining the vitality of the yolk for a considerable period, indeed until the placental circulation being fully established there is no further use for it in the embryonal economy, after which it is laid aside and wholly disappears before the fourth month.

This omphalo-mesenteric apparatus does not, however, wholly perish, but loses only that portion of the vascular system that was spread on the umbilical vesicle. The artery, which is a mesenteric artery, and the vein, which is a mesenteric vein, is in fact the foundation of the whole portal system, on which depends the liver. The liver is supplied with blood from the portal vein and the hepatic artery, so that its great secretory office, so indispensable to the life of the creature, may with truth be said to spring in its origin from the omphalo-mesenteric circulation.

The Allantois is a sac or bladder that rises up from the pelvic or caudal extremity of the embryo, carrying on its sides the growing umbilical branches of the aorta. At first it is globular or oval in shape, because the abdominal walls of the embryo are still unclosed. But as these abdominal walls gradually lessen the aperture through which juts out the umbilical vesicle and the allantois, they all become confined in a narrowing opening which at last proves to be the navel. In fine, as the navel string attains its proper dimensions, they are inclosed within it in common with the omphalo-mesenteric vessels, so
that the portion of allantois which is thus constringed within the navel and the umbilical cord becomes a mere tube. This allantoidal tube is the urachus; the portion of the sac remaining in the belly becomes urinary bladder; while all the rest of it which lies in the ovum between the amnion and the chorion is allantois. Air blown into the bladder then ought, after distending it, to run in the tube of the urachus, along the navel string, after passing through which it should proceed to inflate the true allantois.

Very clear descriptions of the allantois may be seen in M. Flourens' lectures on the generation of mammiferous animals, and in Prof. Coste's great work on the development of organized bodies. Both of those writers have illustrated the subject with engravings, those of Prof. Coste being worthy to be called truly admirable.

**Umbilical Vesicle.**—The human yelk, as I said, is a microscopic globule filled with vitellary corpuscles. When the blastoderm has partly undergone the morphological changes that convert it into the earliest rudimental embryon, part of the yelk corpuscles still remain unappropriated; and, as they are still contained in their original vitelline membrane, they constitute a small but visible ball called the umbilical vesicle. Originally, the vitellus was a sphere, as in the Figure 57 annexed.

The blastoderm is developed upon a segment of this sphere, as in Fig. 58.

![Fig. 57](image)

![Fig. 58](image)

![Fig. 59](image)

![Fig. 60](image)
When the blastoderm doubles or folds its edges inwards, it pinches a portion of the vitellary ball, as in Fig. 59.

In a still further progress, Fig. 60, the portion of the vitellary ball that remains outside of the embryo is connected to the embryo by a delicate tube or vitellary duct. This tube or duct opens into the intestinum ileum of the embryo. Velpeau says that the yolk matter contained in the umbilical vesicle can be pressed along the tube and through it squeezed into the gut. It is supposed to furnish a pabulum to the early embryo, but is lost after the fourth month; for, by that time, the amnion has grown so considerably as to fill up completely the cavity of the chorion: Hence the umbilical vesicle, being squeezed flat betwixt the amnion and chorion, finally disappears, becoming of no functional value when the child has completely established its branchio-absorptive connection with the parent—just as happens to the urachus and allantois.

**Omphalo-Mesenteric Vessels and Cord.**—In perfect ova, aborted at the period of two months, or a little later, the Student will readily distinguish the umbilical vesicle shining through the chorion and lying betwixt it and the delicate amniotic membrane. I add here a figure (61), that may serve to explain its arrangement. Let a be a portion of the abdomen of the embryo, and c c the navel or umbilical ring; b b the navel string or cord laid open; d the umbilical vein bringing back the blood from the placenta, and passing into the belly at the ring to go to the liver; e f the two umbilical arteries of the foetus; h the umbilical vesicle or vitelline sac, whose pipe, conduit, or efferent duct runs along the umbilical cord to the navel, and passing into the belly empties itself in the ileum g g, which bends up to receive the discharge; k l represents the omphalo-mesenteric vessels.
In very early states, the knuckle of ilium rises quite high up in the root of the umbilical cord—occasionally it becomes fixed there, and the child, continuing to grow, is at length born with an irreducible exomphalos. A careless accoucheur may, in cutting the navel string, have the misfortune to cut off the top of the arc of intestine, and thus subject the miserable neonatus to the disgusting inconvenience of an artificial anus, as happened in a case within my knowledge. I have seen the major part of the convolutions of the small intestines detained in an immense exomphallic tumor, covered only by the cord and a lining of peritoneum to which they irreducibly adhered. As the cord is essentially deciduous, no hope is left to save a child thus deformed. It is non-viable. Fig. 62 shows one of these cases that fell under my care a few years since.

Now, as the umbilical cord is lined externally with amnion, it is clear that the umbilical vesicle lies outside of the amnion and inside of the chorion within a space which, perhaps, might be properly called the allantoidal space. There is no doubt of the normal existence of this allantois or allantoides for the birds and the mamiferous quadrupeds; but as to man it is much questioned, and, as I have said above, it cannot be demonstrated that there is a sac that may be dissected out, existing betwixt the amnion and chorion. Noortwyck's fine dissertation upon it towards the end of his volume, "Uteri Humani Gravidi Anatome et Historia," 4to. 1743, appears to me to settle the question: in his criticism on Walter Needham's views of the sac, Noortwyck shows that it is indifferent whether there be a sac or no, for the space between the chorion and amnion is to all intents and purposes a true and sufficient allantois, one in which the urine of the early foetus can be discharged, as it is well known to be in the allantois of the bird, in which urinous concretions may be found.
After all, the Student may rest satisfied upon the point, in so far as to understand that an allantois is a urinary bladder constricted in the middle, like an hour-glass; the narrow neck being the urachus; the interior sac being the ordinary bladder of urine, and the one lying betwixt the chorion and amnion the real allantois.

The embryo has now established its connection with the parent; it has surrounded itself with its amniotic membrane, which fills with the liquor amnii in which the new being is suspended.

As its umbilical cord comes out of the abdomen nearest the pelvic extremity of the embryo, it hangs suspended with its head downwards whenever the woman is in a sitting or standing posture. It is true that the cord lengthens daily, and sometimes attains the length of six feet, although inclosed in a womb never more than twelve inches long. With such a great length, or even with a cord of eighteen inches long, it can no longer be said to be suspended; still the cephalic extremity of it falls to the lowest place, and the foetus as well as the embryo directs its head to the os uteri—it presents its head to the os uteri during the utero-gestation as well as in labor.

**Circulation of the Foetus.**—The circulation of the foetus is peculiar to it, and its continuance in the same way after birth is inconsistent with respiratory life. If, therefore, the foetal circulation does not give place to the respiratory circulation, the neonatus perishes. This often happens. It is equally true, on the other hand, that, if the foetal characteristics of the circulation are lost before its birth, the child must of necessity be born dead.

Let us inquire into the nature of the foetal circulation.

The heart of the child in utero has four cavities—viz: a right and a left auricle, and a right and a left ventricle.

An opening in the septum auricularum, which is called the foramen ovale, or Botalli's foramen, and which, on the left side of the septum, is covered by a light floating valve, the valve of the foramen of Botalli, virtually converts these two chambers into one, just as two apartments are thrown in one by opening a wide door between them.

The left ventricle gives origin to the aorta. The right ventricle gives origin to the pulmonary artery. But, to speak rigorously, the pulmonary artery does not exist in the very beginning; for that which is called pulmonary artery is, in truth, the ductus arteriosus, from which the pulmonary artery afterwards arises at a more advanced period of the gestation. Seeing that this is the case, and that the ductus arteriosus joins the aorta below the arch, it is apparent that, when the right and left ventricles contract simultaneously, they con-
PREGNANCY.

cur; by their united power, to drive the blood along the tube of the aorta; and this combination of the force of both the ventricles is, perhaps, requisite to propel, not only the blood that circulates within the limits of the child’s body, but also that which it sends far beyond those limits, to take up plasma and oxygen in the placental tufts, at the distance, sometimes, of six feet, and generally not less than twenty-four inches from the systolic source. Thus it is seen that the foetal heart, though divided like that of the breathing warm-blooded mammal, into four distinct chambers, is, by means of the foramen of Botalli and the ductus arteriosus, reduced back, in fact, to the condition of the fish’s heart, which has but two cavities, one auricle and one ventricle, while the placenta, which is its branchial organ of aeration, takes up, like the gills or branchia of the fish, the oxygen it finds in the medium wherein it exists. Thus the heart employs the strength of both its ventricles to carry on such an enormous circulation.

There can nowhere be discovered a more admirable adaptation of a simple machinery to produce compound results, than in that of the foetal circulation; for, by the arrangement above mentioned, the single tube of the aorta is capable of effecting the double purpose of conducting the aerated blood to the tissues to oxygenate them; and, at the same time, of carrying back the carbonated blood to the placenta. The aorta, in this sense, is at once an oxygeniferous and a carboniferous tube. For, be it understood, the blood, when endowed with oxygen in the placenta, returns along the umbilical vein to the navel, and, running at the edge of the falciform ligament of the liver, enters the great fissure, and divides; part of the fluid entering into the hepatic porta, the rest continuing its course through the ductus venosus, is delivered into the left hepatic vein, which pours it into the lower cava. From the cava, it enters the lower, right, posterior part of the right auricle, behind the curtain-like valve of Eustachi, which conducts it across the posterior part of the auricle to the foramen of Botalli. Here, the current lifts the valve on the left side of the septum auriculare, to fill the left auricle. The auricle, being full, contracts, and pushes it into the left ventricle, whose next contraction injects it into the aorta: thus the oxygenated blood of the placenta reaches the aorta. Much of it is now determined to the brain and the superior extremities; the rest, turning through the aortic arch, is distributed in all the branches of that great trunk, a portion going back to the placenta again, in common with the carbonated blood of the foetus.

This is the systemic circulation of the foetus.

But that portion of the placental blood which passes into the carotids and subclavians, gives up, in their capillaries, its oxygen and part
of its substance to the brain and upper limbs. It is next found in the veins, and returns to the right auricle, by the route of the superior cava, which delivers it into the top of the auricle in front of Eustachi’s valve, and opposite to the *iter ad ventriculum dextrum*, which gapes to receive and ingurgitate it. As soon as the right ventricle becomes thus filled, its contraction follows, and this black blood, or venous blood, or carboniferous blood is injected into the ductus arteriosus, which pours it into the aorta below the giving off of the left subclavian, thus precluding the possibility of its return to the brain where its carboniferous nature would make it fatal, by the superinduction of asphyxia; for asphyxia is black blood in the brain. The venous blood that has thus returned from the encephalon and arms, mixed with the aërated blood, is, by this beautiful arrangement, carried with due precision back to the lower parts of the child’s body, with a portion of the carbonated blood of the trunk and lower extremities. The umbilical arteries receive their share of this mixed blood, and deliver it to the placental tufts, whence it returns through the same round of circulation as before. By this curious machinery of the cavities and openings of the heart, there is a crossing of the currents of red and black blood in the right auricle—the red blood running horizontally across the posterior part of the auricle, behind Eustachi’s valve, and the black blood falling perpendicularly downwards from the aperture of the superior cava, in front of it, into the *iter ad ventriculum dextrum*. Doubtless, the valve of Eustachi contributes much to the perfect operation of this mechanism, while Botalli’s valve insures it.

The branchial apparatus above described suffices, in all the mammals and birds, to communicate to the constitution of the embryo the requisite amount of oxygen; but it ought to be observed that that amount is small, indeed, compared with the freeness of the endowment required for a state of respiratory existence. The embryo requires no more than what suffices to oxygenate its fluids and solids to the extent of provoking an active nutrition and imparting a power of gentle and infrequent muscular motion—for the foetus in utero may be regarded as torpid, and approaching in torpidity to the state of a hibernating animal. To cut off even this slender supply is to insure its destruction. Now, inasmuch as the placental blood, entering in at the umbilicus, passing by the ductus venosus to the inferior cava, along that tube to the auricle, and through the foramen Botalli to the left auricle, left ventricle, aorta, carotids, and vertebrals to the brain, takes the only possible route from the placenta to the brain; it is clear that, if, before the birth, the foramen ovale should be closed, no
oxygen could possibly reach the brain. But oxygen in the brain is essential to the evolution of nerve-force. When, therefore, no oxygen reaches the brain, the brain evolves no nerve-force, and the patient dies asphyxiated. The law, then, is that the foetus is born with an open foramen ovale, which becomes closed after birth, generally within three or four days, often in ten or twelve days, not rarely about the twentieth day, and sometimes never.

I have said that the child’s foramen Botalli remains open during the whole uterine life; but the Student ought to observe that it is always covered by its valve, lying upon the left side of the septum—a valve so light and delicate as to be transparent, and so beautifully arranged as to enable it to cover the aperture in the most perfect manner. If the child should lie on its left side the weight of a drop of blood, on its right side, might lift, as a drop on its left surface might shut it down if lying on the right side. The normal direction of the current through the foramen keeps it open in the foetal heart. When, therefore, after the child is born, the two auricles act at the same time, in equal times, and with the same intensity, the valve is pressed upon the opening to cut off the foetal route, and compel the whole of the right auricular torrent to pass into the right ventricle. The first act of the diaphragm by expanding the foetal lungs opens a way by which the blood of the pulmonary ventricle may flow off through the pulmonary vessels, which they could not perfectly do before, for it is the expansion of the lungs that takes away the foetal atelectasis. If the left auricle should, after the child is born, be the strongest, the earliest, and the longest to contract, it is impossible that any black blood should come into it. If, on the other hand, the right auricle should, after the birth, contract sooner, longer, and more energetically than the left, the valve of Botalli would be lifted, and the black blood of the venous system, instead of flowing off by the pulmonary ventricle and artery to the lungs, would in part pass to the left auricle, ventricle, and aorta to inundate the neurine of the brain with its carboniferous stream, which, wholly incapable of exciting any biotic force in the brain, would end in cyanosis—asphyxia—death. When the nervous mass ceases to act, the whole constitution is dead; it always ceases to act where there is no oxygen. Where the oxygen reaches it in quantity insufficient to extricate the just amount of neurosity, the functions fail of their just force and regularity.

The Student will now understand that when the child is born at full term, its peculiarities, as to the structure of the heart, remain for some time unchanged; and he will be able to appreciate certain conditions of the neonatus dependent upon the continuance, partially, of
the fetal circulation—a circulation, in which the aeration of the blood is of so low a grade that it cannot supply the demand for the more vehement energies of the respiratory life.

Children are sometimes born dead without any known cause. It is probable that, in some of the instances, death has taken place in consequence of the too rapid progress of the development of the heart, which, hastening to reduce its fetal openings to the smallest diameter consistent with intra-uterine life, urges the reduction of the apertures beyond the legitimate bounds, and thus renders death inevitable by cutting off a part of the already scanty supply of oxygen to the neurine of the fetal brain.

If, in its gyrations within the womb, the child should enter a coil of the navel-string, and, passing through it, should thus make a knot on the cord—that knot, happening to be strongly drawn, might cause its death by hindering the complete return of the blood of the placenta. Sometimes two, or even three, such knots are found on the cord. I delivered a lady here of a very fine child which was dead-born, apparently from the closeness with which a navel-string knot was thus tied. It is true, however, that we meet with very healthy and vigorous children, notwithstanding the presence of one, or more than one of these knots on the cord, which, however, have not been tightened.

Since pressure on the cord, and obstruction of the course of the blood in it, may cut off the fetus in utero, it is evident that, where the cord prolapses in a labor, it may be fatally pinched betwixt the bony head of the infant and the osseous wall of the pelvis—nay, the resistance of the os uteri, vagina, and orificium vaginae, may suffice fatally to compress it. Of this, however, we shall speak in another page.

The child in utero is liable to a great variety of diseases, and to accidental monstrosities of structure that exert a very unhappy influence upon the labor. Thus it happens that the encephalon sometimes becomes the seat of a dropsical effusion, a deformity which renders the size of the head so vast as to make its transit through the pelvis impossible, until, by an embryulcia, the hydrencephalic fluid shall have been discharged.

In like manner, vast collections of water in the abdomen constituting ascites of the fetus may render the belly so large that the child cannot be born until it shall first have been tapped, which may be readily done with the long trocar, described by me in a future page, or by means of Holme's perforator, in cases where the signs of the death of the fetus are absolutely unmistakable.
It is proper that the Student should be here made aware that some of these great watery swellings of the belly of the foetus have, upon examination, been discovered to be cases of distended urinary bladder. The urinary bladder of the child has been known to rise as high as the scrobiculus cordis, and distend the belly like an enormous ascites, in consequence of obstruction or atresia of the urethra. The treatment of such a case, of which the diagnosis, before its delivery, is impossible, is the same as for ascites—videlicet, the paracentesis abdominis—which, reducing the swelling, allows the birth to be effected.

In addition to the cases of disproportion effected by dropsical collections, there are instances of accidental disproportion resulting from the union of two foetuses in one. The celebrated example of the Siamese twins is familiar in the United States, and it is easy to conceive that such a union could not but render difficult and preternatural a labor in which such twins should be born.

The instances of children with two heads are not rare, numerous examples of them being contained in the books. The example that has been so admirably described by M. Serres, in his Anatomie Transcendente, appears to me to be particularly worthy the Student's attention. This monster was born at Sassari, in the kingdom of Sardinia, in the year 1829. There were two heads, a double thorax, with four arms, and one abdomen with two legs. Being christened, the one on the right took the name of Rita, and the left one that of Christina. Rita-Christina was brought to Paris and exhibited there, until death closed the exhibition when the monster had attained the age of eighteen months. I subjoin a figure which represents a case of double-headed foetus, born in Adams County, Penna., in 1844, under the medical care of Dr. Pfeiffer, a German physician in practice there, who brought the monster to this city. I engaged Mr. Neagle, one of our best artists, to paint a portrait of it, from which this small cut is taken, and represents it very correctly.

In this figure it is seen that the monster possessed only a right and a left arm, whereas Rita-Christina had four arms, because, in her case, the cervical, dorsal, and lumbar vertebrae were complete for each child; whereas in this sample, the cervi-
cal and dorsal vertebrae only of each child were complete, while they united in a common or single lumbar spine, and one pelvis. Rita and Christina each had its own ribs, and a sternum for each, yet admitting of a single thoracic cavity for two hearts, and only two lungs. The liver was a compound of two livers; there were two stomachs, two duodenum, two jejunums, and two ilia, uniting, towards their lower extremities, into a single short ilium, inserted into a single cæcum. There was but one colon and one rectum, and one bladder of urine.

The Comptes Rendus of the French Academy of Sciences for Sept. 4th, 1848, contains a description, by M. Valenciennes, of a porpoise with two heads, but having, like the child in Fig. 63, only two arms.

There is, in my collection, a specimen, consisting of two children united by the ileum intestine, which comes out from the navel of each child covered by the umbilical cord. The two cords, midway betwixt the children, merge into a single umbilical cord, inserted into one placenta. This specimen was presented to me by Dr. Clarke, of Philadelphia County. The children are separated by the omphalodymic cord about four inches; and there are two apertures in the cord, each of which is an accidental anus, from which the meconium escaped freely. There are also two apertures from which flows the urine produced by both children. There are many cases to be met with, of children with only one head, yet possessing two bodies and four legs; and some, in which the heads are united at the summit, or crown. I refer the Student to the Amer. Journal of the Med. and Phys. Sciences for July, 1855, p. 13, for a paper illustrated with engravings representing a double foetus, presented to me by Dr. G. W. Boerstler, of Ohio. As those illustrations are copied from fine photographs by M. Root, of this city, they are to be relied on as faithful portraits.

Here is a correct portrait of a foetus that was shown to me by Dr. Rohrer, of this city, soon after its birth under his professional care. The great tumor on the vertex consisted of scalp lined with the ordinary encephalic meninges, and filled with the water of a vast dropsy of the brain. The posterior part of the parietal and occipital bones was wanting; some hairs grew on the part of the tumor near the vertex; the rest was bald. The child was in other respects well formed, and very large. The tumor was soft and fluctuating, but not reducible in size by pressure in the hands. Its greatest length was nine inches. I shall refer hereafter to this figure, to that of the double-headed monster of Dr. Pfeiffer, and to Rita-Christina, and to Dr. Boerstler's specimen, to show the necessity and nature of what is in Midwifery called Evolution of the foetus in all such cases. Obser-
M. Serres's work, and that of M. G. de St. Hilaire, exhibit a great variety of Teratological foeti, to which I must merely allude, as the limits of this volume will admit of no extended observations upon them.

I have mentioned them here, chiefly with the view to put the Student on his guard as to the midwifery of such cases; and still more in order that he may early learn that these monsters are merely results, not of excess, but of failure in development. The double-headed foetus, Fig. 63, has two stomachs, and probably two hearts, but only one intestinal canal, composed by the union of the two jejunums, or the two iliums, into a single jejunum or ilium, a colon and rectum. This child is a twin, which has not acquired a superfluous head, but which has lost, one a left, and the other a right arm; one the right, and the other the left half of its thorax—one kidney—half the colon and rectum, half the bladder, testes and penis, and a right or a left leg.

This double-headed fetus then has lost, not gained: it has been fused, or, to use a term in horticulture, grafted. The right child has sunk part of its body in that of the left child, which in like manner has sunk the right half of its body in the left half of its twin brother. In Rita-Christina, if both children happened to be asleep, and one should tickle Rita's foot, she would wake and smile: so, if Christina's
foot were tickled, it would cause her to laugh, without at all affecting her sister, for the left leg was Christina's and not Rita's, and vice versa.

Happily, when twins are conceived, they inhabit each its own amnion, and in some instances, its own chorion—which insulates them. When the development of the amnion fails, and the two germinal membranes are suffered to come into contact within the womb, they may unite, or weld, or engraft together, under a certain law; but the back of one cannot unite to the abdomen of the other, nor the head of one child to the other's pelvis. In order to unite, only the edges of the still unclosed germinal membrane can weld—that is, the left edge of one with the right edge of the other, and mutatis mutandis. Hence the law of development is binding; that law ordains that the right edge of the membrane, when bent over to shut in the trunk, should unite with the left edge turned inwards in like manner. Hence, it may fuse with the left or the right edge of its foetal twin.

If we might suppose the germinal area of the germinal membrane to be in shape a long oval, like Fig. 65, and $a$ the cephalic pole, $b$ the pelvic pole; $c d$ the brachial, and $e f$ the crural regions; we may conceive that no sublunary power could develop a pelvis at $a$, or a head at $b$; a leg at $c d$, or an arm at $e f$; for even in this microscopic mass the generic law is as imperative and coercive as the attraction of gravitation is for the whole universe. There is nothing generically in common or identical in $a$ and $b$, or between $c d$ and $e f$; $c$ unites with $d$ only, and $e$ with $f$ only; when the scaphoidial germinal membrane has become completely bent so as to bring into apposition the edges $c e$ and $d f$ to make the cavity of the belly and thorax, $d$ could not unite with $e$ nor $c$ with $f$.

If in the adjoined diagram, Fig. 66, the two ovals may represent the germinal areas of twins, not separated by amnia, then $a$ and $l$ may unite if brought into apposition, or $b$ and $m$; $c$ and $g$, and $e$ and $i$, have no affinity. If $d$ and $g$, which have affinity, should unite, the result would be a foetus with one head, two arms, and four legs; if $f$ and $i$ be placed in contact in utero, their affinity would cost a left leg for the right hand membrane, and a right leg for that on the left. Thus we should have a Rita-Christina. It is a curious subject of reflection, that of the individuality or du-
ality of a creature with one head and two bodies, or with two heads and one body! Rita-Christina was dual, as was Dr. Pfeiffer’s monster, Fig. 63; but as to the monster figured in Serres’s Plate 12, it is to be doubted whether the personal identity was absolute for each of the children—as there was one common cerebellum. Doubtless it is not possible, in Teratology, to suppose that half of one child should sink into and be totally lost in half of another child, thus making out of two independent personal identities a single one. In nature, the union must take place from the liver upwards only, or from the liver downwards only; whence, it cannot happen that the whole right symmetrical half of the left twin should be sunk in the left symmetrical half of the right twin. We may therefore expect to meet with cephalodym or hepatodym or pelvidym, and not with such a union of two personal identities as would serve to personify the ancient fable of Salmacis and her lover.

All such fusions imply loss, not gain of substance—monstrosity by default, and not monstrosity by excess. If a child is born with six fingers on either or each hand, or six toes on either or each foot, it presents a case of excess of development, or monstrosity by excess; and the samples of five-legged calves, &c., that are commonly met with, are, perhaps, cases of monstrosity by excess.

There was a singular example of cephalodym here some four years ago: it was a healthy pig with one head, two fore legs, and two abdomens, with four hind legs. It was a remarkable fact that the genitalia of this creature were not under a common influence of its cerebro-spinal system. When the animal was in heat, it was either as to the genitalia of the right or those of the left trunk; but they were not observed to be in heat or rut at the same time, one trunk appearing to become the subject of the periodical excitement about ten days after the other had ceased to be so. What was the real condition of the identity of this monster!

The instances of monstrosity by default of development are sufficiently numerous; as, for example, in the cases of spina bifida, of anencephalous and acephalous foetuses, and of foetuses with imperfect limbs; and those with imperforation of the rectum, and with other atresias.

The Student will have little trouble to understand and explain these strange freaks of nature, if, in all cases, he will remember that the monstrosity is dependent either upon fusion of the parts of two different children, or excess in the development of otherwise natural parts, or on cessation, during the embryonal stage of life of that growth and progress which, but for the arrestation, would have finished and
rendered complete, parts that now exhibit the appearance of the most shocking deformity.

We meet with numerous cases of ectopy; cases in which organs or parts are displaced or deviated. In Fig. 62, page 217, is the picture of a child born here under my care. It lived for several days. The tumor on its belly is an exomphalos, consisting of the entire liver of the infant, which was contained within the root of the umbilical cord. There was no covering of this liver save the deciduous matter of the cord. Of course when the cord should fall after five or ten days, the liver would be wholly exposed. Such an accident renders the child absolutely non-viable. I possess another specimen, in which every abdominal viscus is outside of the belly inclosed within the umbilical cord.

**Duration of Pregnancy.**—The duration of gestation is ordinarily computed to be nine months or 280 days; and the Women, who understand these questions by a traditionary learning, commonly make their calculations with sufficient accuracy.

According to the Civil Code in France, a pregnancy may properly be held to continue until the 300th day; which is allowing a latitude of twenty days beyond term. I have been surprised to find how prevalent has been in all ages the opinion that a great latitude exists as to the duration of pregnancy, and that some of the ablest men of our profession, both ancient, mediæval, and modern, have admitted a latitude far greater than that allowed in the French Code. I rejoice that this is the case, because, having myself had reason to believe that pregnancy may endure even beyond twelve months, as I shall relate in another page, I conceive it desirable that the truth should be established for the conservation of the credit and peace of individuals or families, in cases where such extraordinary postponement of the term might give rise to the greatest injustice, as well as unhappiness. A great controversy arose in Europe in 1764, which was carried on by various writers until 1770, and brought out the opinions of the most celebrated medical men of the time; a collection of pieces on this subject, in three volumes, is in my library. The dispute arose on the question of legitimacy of a child, whose father, Charles, born January 15th, 1689, was more than 72 years old when he married Renée, Marchioness of Ingreville, who was at the time 30 years of age. He lived four years with his wife, and had no children. On the night of 7th–8th of Oct., 1762, he fell sick with fever, and violent oppression, which continued until his death. During his illness, his wife Renée did not sleep in his apartment. He died with gangrene of the leg,
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on the 17th of Nov., æt. 76 years. More than three months after his death, Renée gave signs of being pregnant. She was observed and carefully assisted by order of the collateral heirs, and gave birth to a son, Oct. 3d, 1763. From Oct. 8th, 1762, to Oct. 3d, 1763, is one year, lacking five days. The question was submitted to various leading medical persons for their opinions as to the legitimacy of the child, and the said three volumes exhibit the most striking examples of the disagreement charged among doctors, many strongly denying the possibility of Renée's purity, and others as earnestly vindicating the legitimacy of her son.

It would seem that the most common and ordinary observations and proofs are incapable of expelling from the public mind opinions long established, upon whatever foundation. There is hardly to be found an old wife in the country, who does not know that the term of incubation of the barn-door fowl is uncertain; and that, though it ordinarily lasts twenty-one days, the chick may be found to escape from its shell on the twentieth, or to linger in it, sometimes, to the twenty-second or twenty-third day. Similar facts as regards the gestation of our domestic quadrupeds are abundant, and sufficient to demonstrate the latitudinarism character of what is called term. To show the differences in gestation, I subjoin the following tables which I find in M. Rainard, Traité complet de la Parturition des principales Fémelles Domestiques, tom. i. p. 233, et seq.

The date of the Covering was noted as to fifteen mares, of which eight foaled after 340 days, three after 342 days, three after 343 days, and only one at 346 days.

Brugnone, in like manner, in fifty-five mares found that the foaling took place in

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"The difference between the most precocious and the most protracted gestation amounts here to seventy-seven days, or two months and a half. From his table, Brugnone concludes that the gestation is not complete in less than one year, and that, when it goes beyond that term, there is no fixed period."—P. 233.

M. Tessier found that in the gestation of 200 mares, there was a latitude of eighty-three days.—P. 239.

The Journal d'Economie rurale Belge, 1829, finds a minimum of 322 days, a mean of 347 days, and a maximum term of 419 days; difference, ninety-seven days.—P. 234.

M. Grille's statement, Mémo. de la Société Industrielle d'Angers, No. 2, 11e année, p. 55, shows in 114 mares a difference in gestation of ninety-three days.—P. 239.

The observations made by order of Earl Spencer, as to the gestation of 764 cows, show that the shortest period of gestation is 220 days, though the ordinary duration is of 284 or 285 days.—P. 235.

Among sixty-five sows, two littered on the 104th day; ten from the 110th to the 115th; twenty-three from the 115th to the 120th; twenty-seven from the 120th to the 125th; two on the 126th, and one on the 127th day. This is a latitude of twenty-three days.

M. Rainard further gives, from the Bulletin de la Société Industrielle d'Angers, the following statement of the duration of gestation in 154 rabbits, viz: one littered on the 27th day; seven from the 28th to the 29th; fifty-three on the 30th; sixty-one on the 31st; and twenty-nine from the 32d to the 34th day.

These statements show with sufficient clearness that the duration of gestation is by no means a fixed term in any of the observed genera, and I should suppose that the least reflection might lead one to the same conclusion, since the nature of the womb, as well as that of the child, is such as to render it impossible that the laws that govern the contractility of the one or the rate of development of the other, should operate in all cases in equal times and force. The womb of one individual, as well as the foetus within it, may be ready for the act of parturition earlier or later, according to the force of a variety of causes to the operation of which they are subject.

The duration of gestation must bear some necessary relation to the mass of the foetus to be developed. Yet, in the elephant, the young at birth stands only about three feet high, which is not higher than the new fallen calf or foal, though the weight must be far greater. In this animal, the gestation lasts twenty months, according to the showing of Mr. Corse Scott, who had one born of a dam in his possession in India. He noted that the gestation commenced about the
1st July, 1798, and terminated about the 1st April, 1795. An account of this elephant may be found in the Brit. Cyclop. of Nat. History.

Professor Asdrubali, in his account of the thirteen months' gestation of the Signora N., cites the following passage from Spigelius, who, in speaking of the causes of labor, or of the completion of pregnancy, says: "Hae nulfa alia esse potest, quam maturatio, et perfectio fetus, quae fit in utero incerto tempore et variis interdum mensibus, ob facultates corpus fetus gubernantes vel debiliores vel robustiores."

The same author, Asdrubali, in his Trattato Generale di Ostetricia Teoretica e Practica, tom. v., gives us a succinct relation of the pregnancy and confinement of the lady, the Signora N., who carried twins in the womb over thirteen months.

Probably so great an extension of the uterine life of the foetuses may excite the reader to feel surprise, and even to a denial of the facts of that case. But I should think that that elegant and learned Scholar, who gives us the history of the pregnancy, ought to be held worthy of our confidence; and I believe it would be difficult to read his fifth volume, which is devoted to the examination of the subject of protracted pregnancy, without being convinced, not only of the sincerity, but of the truthfulness of the author. And it seems to me a very desirable thing that that case should be fully reported in the works on medical jurisprudence for the better information of our courts and juries. I shall at least make an abstract of it in this place.

Case.—The lady, aged 26 years, was married on the 15th of April, 1793. She became pregnant in March, 1795, after having been married 21 months. The child, which was born in December of the same year, died on the 8th day. About the 1st of March, 1796, she was affected with symptoms which induced her to suppose she had again conceived. On the 13th of the same month, she removed to a neighboring district. Upon returning to her residence, she was shocked to find her husband, who was a nobleman, ill with a disease of which he died on the 22d of the same month. To the grief occasioned by the loss of her spouse were added great distress and embarrassment connected with the inheritance of his estate, and notwithstanding she early declared the existence of her pregnancy, she was much tormented and baffled by the relatives of her deceased husband, who treated her declaration of pregnancy as false. At the beginning of the fourth month of gestation, she perceived the quickening in the womb. Throughout the fifth and part of the sixth month, the movement in the womb was so violent as to have the appearance of constant con-
vulsive action. Towards the end of the sixth month the motion almost wholly ceased. The abdomen appeared to be cold; the breasts became hard, and there was a discharge resembling whey from the nipples. It was about this time that her family quarrels, insults, and disappointments became most aggravated, and in this condition she passed through the sixth, seventh, and eighth months. At the commencement of the ninth month, she was seized with pains like labor-pains, and discharged from the womb a great quantity of watery fluid. The pains continued to recur during eight consecutive days. They now ceased, as well as the watery discharges, and the lady again began to feel the motions of the fruit of the womb, while the lower belly again recovered its feeling of warmth. The abdomen, which had ceased to grow, resumed its process of development. The breasts ceased to flow, and became flaccid. During the tenth and eleventh months, she experienced a sense of weight in the hypogaster, and had difficulty and pain in the act of urinating. In the course of the twelfth and thirteenth months, she was assailed, first every eight and then every fifteen days, with pains like those she had felt in the beginning of the ninth month. These pains lasted sometimes four and sometimes five hours alternately. On the 22d of April, 1797, she was attacked with symptoms of labor, and on the 29th gave birth to twins. The gestation seems to have continued from March 1, 1796, to April 22, 1797, a period of thirteen months and twenty-two days.

Such is a compendious relation of the case, of which the particulars are given in a long detail by Prof. Asdrubali. I lay it before the Student with the assurance that I cordially accept the story of the accomplished author, and that, notwithstanding it presents a rare example of procrastination of the Term, I find in it nothing impossible to believe, the more particularly as I have confidence in the correctness of the following statement of a case that fell under my own clinical care.

Having admitted the patient to my ward in the Pennsylvania Hospital, and having observed and attended her up to and in her accouchement, I rely on the facts as trustworthy.

Case.—Saturday, August 1, 1840. Being at the Pennsylvania Hospital, a lady came to me, and requested that, as a medical officer of the House, I would see A. G——, in Clark Street, Southwark, in order to her admission into the Lying-in ward. I was told that her confinement, which had been looked for in April, had not yet taken place, that she was suffering under the effects of this unnatural pregnancy, and that the neighbors thought she ought to receive the cares
of the Institution. Upon proceeding to Clark Street, I learned that she was twenty-six years of age, that she had been confined in the Pennsylvania Hospital on the 18th of February, 1839, and was again pregnant in the month of July, 1839, while suckling her son. Being very much indisposed, she called a physician, who directed her to wean the child, as she was doubtless pregnant. She did not, however, wean him until September, when she felt sure of her pregnancy. On the 20th of November she quickened, and her husband very distinctly perceived the motion of the child at Christmas. On or about the 10th day of April, 1840, being very large and lusty, she was taken in the night with the symptoms of labor, and called in her neighbors. She said the waters broke in the night, and wetted her profusely. After the rupture of the membranes, the pains were great, and she supposed the child would be soon born; but as the pains not long afterwards grew easier, she did not send for the doctor till morning; at that time, they had become much less distressing; in short, they gradually left her: but she continued big, and could daily, and even now, feel the child when it moved, which gave her great pain.

She was laboring under a decided hectic fever and irritation, that had already very much reduced her flesh and strength. She obtained but little sleep, and had a poor appetite. She daily suffered acute pains in the abdomen. I gave her a ticket for the Lying-in department, to come in on the 4th day of August. The os uteri was found to be not dilated, though the cervix was fully developed, having lost entirely its tubular or cylindrical form. The form of the abdominal tumor was conical, the umbilicus being at the apex of the cone. Two or three inches above the umbilicus was the commencement of an oblong tumor, extending to within a very short distance of the xiphoid cartilage, and about three inches in width by two in height. This was a hernia produced by the separation of the linea alba, through which protruded a quantity of the intestine, thinly covered, and restrained by the peritoneum and skin.

She remained in the ward, suffering daily and nightly with abdominal pains, until she fell into labor on the 11th of September, and the child was born on the 18th of September, about daylight. I sat up with her all night, being deeply interested to observe all the phenomena of the case.

The child, a male, was of a medium size, weighing seven or eight pounds; in good health. The labor was extremely tedious and distressing. She had a pretty good getting up, but the hernia of the linea alba caused great weakness, which was in a measure relieved
by a truss made expressly for her. She was discharged October 11th, 1840.

Of course, in relating this case, I do not consider myself responsible for the truth of its statements further than as they are worthy of confidence in view of the character of the patient herself, and as the facts came under my notice. She had the appearance of perfect candor and sincerity in all that she said about it, and I have no doubt she thinks her pregnancy began in July, 1839, and ended, as I have said, on the 13th of September, 1840, having endured near fourteen months, or four hundred and twenty days, instead of two hundred and eighty, the usual term of a pregnancy.

In July, 1841, she is pregnant again, and still suffers from the protrusion in the upper part of the linea alba.

Lamotte, t. i. 313, Obs. xci., relates the case of Madame de , who had had children of former pregnancies, and who conceived in the month of January, during which she experienced all the inconvenient sensations to which she had been accustomed in antecedent gestations. In the middle of May, she quickened at the same period as on other occasions. She made her computations for the term for September. Supposing herself about to be confined, she summoned the monthly nurse, who remained near her until the labor terminated by the birth of a child much larger than the other children had been. She was delivered of the child at the beginning of February, making a case of gestation protracted through thirteen months.

Dr. Merriman, of London, has published, in vol. xiii. part. ii. of the London Medico-Chirurgical Transactions, a paper on the Period of Parturition, which contains an interesting table of the births of one hundred and fourteen mature children, calculated from, but not including, the day on which the catamenia were last distinguishable.

By this table it appears that three were born in the thirty-seventh week, thirteen in the thirty-eighth week, fourteen in the thirty-ninth week, thirty-three in the fortieth week, twenty-two in the forty-first week, fifteen in the forty-second week, ten in the forty-third week, and four in the forty-fourth week, of which latter, one was born at three hundred and three days, one at three hundred and five days, and two at three hundred and six days.

Dr. Merriman states that he has calculated a great many more cases in the same manner, but has restricted his table to the above one hundred and fourteen cases, because he was able completely to verify them. The others gave results so nearly similar, that he has no doubt of the general correctness of the principle he desired to enforce, which was, that conception takes place, in general, soon after the cessation of the
catamenial flow, and not just antecedently to its expected return. The table is highly interesting, in the relations for which I would use it, showing, as it does fully, that there is a considerable latitude in the duration of gestation.

"Mr. Gaskoin communicated an account of suspended animation, during four years, at least, in a specimen of *Helix lactea*, now living in his possession. A remarkable feature in this case is the fact that utero-gestation was suspended, and resumed its process with the resumption of vitality."—Athenæum, Nov. 30, 1850.

**Computation of Term.**—The ordinary term of a gestation is attained in about two hundred and eighty days, and it is customary among medical men to assign the two hundred and eightieth as the day on which the child may be expected to be born. In making the computation for my patients, my own habit has been, to inquire as to the day and date of the disappearance of the last menstrua; to commence the series on the day following the disappearance, and add two hundred and seventy-nine days to it. This mode has answered my purpose well enough, but it is clear that it would not answer for the calculation of term, in the case of a religious Jewess.

That experienced practitioner, and most judicious author, Professor Nægèle, of Heidelberg, in his *Lehrbuch der Geburtshülfe*, 8vo., 1842, in a remark at the foot of page 82, gives the following method of computing term. Let the woman reckon three months back from the day when her menses ceased, and to the said three months let her add seven days. The day thus found is the one on which she ought to expect her confinement. If, for example, she had her courses last on the 10th of June, let her reckon backward three months, to March 10th, to which she should add seven days, which would bring the calculation to the 17th of March. This would be the day, to wit: March 17th, on which the woman ought to expect her lying-in. Such is the method of calculation recommended by Dr. Nægèle, and it must be admitted that, as no man in Europe enjoys a more enviable reputation as a teacher and practitioner in our art, one might feel safe in following his example in the practice of it. Still, I cannot perceive why the seven days should be added to the three months, or, rather, to the whole term, since the Professor gives no reason for us to suppose that the ovulum is not both mature and ready for fecundation as soon as the catamenial flow has ceased, and the genitalia have recovered their fitness for the congress of the sexes. As I have had no reason hitherto to find fault with my own method, I shall continue to compute from the day of cessation; so that, if my patient should inform me she saw
the last stain on August 27th, I should reckon backwards to July 27th,
June 27th, and May 27th, which day I should indicate as the one on
which the labor might be expected to commence, and not June 3d. My
opinions as to the connection of the menstrua with the acts of ovula-
tion are so settled, that I do not expect they shall be changed hereafter.
Still, those opinions do not prevent me from supposing it sometimes
possible for an ovulum to become mature, and even to escape from its
ovisac, without exciting the usual mensual molimen—and even, also,
that this escape might take place just before the period for the cata-
menial return, or at any other period. Under such fortuitous circum-
stances, a fecundation might be possible just before the period of
return; and if so, the calculations as to term would be liable to give
rise to a disappointment. In general, however, one may venture to
rely that a general rule will hold good—while no great surprise ought
to arise when an exceptional instance happens to fall under notice.

Changes in the Womb.—The form of the womb changes with the
progress of pregnancy. The vaginal cervix grows shorter, and at
length wholly loses its cylindrical, or tubular shape, leaving at the
upper end of the vagina a convex or conoidal protuberance with a
dimple in its apex, which is the os tincæ of the womb-at-term.

As the ovum expands, it carries the uterus along with it, at first
making use of the cavity of the fundus and body of the organ, and
only distending the upper part of the cervix in the first months of
pregnancy; so that, if an examination should be made of a woman
three months pregnant, the cylindrical cervix uteri would be found to
have undergone very little shortening.

The cervix certainly becomes fuller and larger, at a very early
period of pregnancy, and presents, in this respect, a sensible difference
from its unimpregnated state. At the close of pregnancy, the tubular
cervix uteri seems to have wholly disappeared, and the womb, instead
of exhibiting a straight or cylindrical neck, is become conoidal, the os
tincæ being at the lowest end. No decided change in the length of
the cylindrical part is discovered by the Touch until after the fifth
month, or, according to certain authorities, the seventh month. From
that period it grows daily shorter, until the last days of gestation,
when the cylinder is not discovered at all. A pregnant woman, there-
fore, in whom it has wholly disappeared, is said to be ready to com-
mence the process of labor. The attack of labor pains may begin very
soon after the disappearance of the cylinder of the cervix, or it may
be deferred for several days, from causes which are not understood.
In all instances that have fallen under my notice, the thickness of the walls of the womb, when at term, has been rather less than in the non-gravid organ. The tissue is much looser and easier to cut, and yields to any distending force far more readily in the gravid, than in the non-gravid state. It is incomparably more vascular, so that, in the last weeks of gestation, it may be compared to a purse or network of blood vessels, with abundance of loose cellular tissue, and muscular fibres interspersed. I have sometimes compared it to a vast hollow aneurism by anastomosis, in order to express an idea of the abundant vascularity with which it is now provided, and by the agency of which it is enabled to fulfil the wants of the fetus as to aération and nutritive absorption. The uterine arteries and veins which reach the womb near its lower extremity, inosculate freely with the ovarian or spermatic vessels, that enter its texture betwixt the folds of the broad ligaments, to supply the ovaria, the Fallopian tubes, and upper portions of the womb.

Smellie, vol. ii. p. 19, says that he had opportunities, in 1747 and 1748, of opening the bodies of two women who died at the full term of utero-gestation. The membranes were unruptured. They were each about a quarter of an inch thick. The same was the case with another specimen in his possession, which was in the eighth month of pregnancy. He had seen several others, in which the woman died soon after delivery, the womb not being much contracted, when the thickness of the walls was about the same as the above. But where the death did not occur for several days after delivery, and the womb was contracted, he found its parietes from one to two inches thick.
In the cases that I have seen of autopsy of the pregnant woman, I have always found the head of the child to present at the os uteri. I cannot agree with the opinion of M. Paul Dubois that the child is instinctively compelled to turn its head downwards, for I can neither discover any such instinct in the unborn foetus, nor power to obey it if it should exist. M. Dubois's paper on this subject in the *Transactions of the Royal Academy of Medicine* is, however, well worthy of a perusal.

**Uterine Muscles.**—With regard to the muscular structure of the womb, I shall remark that no person who has witnessed the exercise of its muscles in labor, can doubt of their immense power; particularly should he have felt its force while the hand has been compressed by it, in turning a child in utero. Some years since, a gentleman of this city found himself obliged to introduce his hand completely into the womb, in order to extract a retained placenta. While the hand was employed in separating the afterbirth from the uterus, the os uteri closed upon his wrist with such force as to give him very severe pain, and he found it impossible to withdraw the hand, which was completely fastened by the contraction. After various unsuccessful attempts to extricate himself from such an unheard-of difficulty, he sent for a Bleeder, and, after causing a large quantity of blood to be drawn from the lady's arm, the spasm of the cervix ceased, upon which he was liberated from an imprisonment of two hours. His wrist was marked, as if a cord had been strongly bound round it; the red traces of which impression were visible even the next day.

The operation of turning the child in a powerful womb, from which the waters have been entirely drained, not unfrequently produces from pressure, a degree of numbness so great as to make it necessary to withdraw the one, and introduce the other hand—the sensibility and motion of the first one being wholly suspended; the resistance to be overcome in the expulsion of a grown foetus requires a muscular force which cannot be exactly estimated, and must, therefore, be immense.

Different writers describe the arrangement of the muscular fibres of the uterus in different manners. The very discrepancies of these authors ought to convince us that their arrangement is not yet understood;
and, indeed, it is of no great consequence, in a practical view, that it should be demonstrated. It is enough to know that the fibres are so arranged as to tend, by their combined contractions, to reduce the uterus back from the gravid size to that of the unimpregnated organ. When their contraction is co-ordinate, the fundus tends to approach the os tincæ, and the sides tend to approach each other. Whatever is contained within the cavity of the organ is, under these circumstances, expelled therefrom.

It should be always understood that, in speaking of the muscular structure of the womb, we speak of the gravid womb only, in which the arrangement and condition of those fibres are perhaps very different from those of the virgin or the non-gravid organ. Fig. 68 is a representation of their arrangements, proposed by M. Chaillly, which differs from the very beautiful drawing of a dissection of them, that is given in Dr. Moreau's Atlas. Both of them are unlike Madame Boivin's figure—and I have no doubt that every successive representation will differ from those that do, or may, precede it. My own attempts to extricate the tangled maze of muscular fibres leave me convinced that the only anatomy of them to be depended on, is the Transcendent anatomy—or that which is performed by the reason and not by the scalpel. He who has felt the womb contract upon his hand in a Cæsarean operation, or in repositing an inverted uterus after labor, or in extracting the placenta in hour-glass contraction, or in turning the child long after the waters are gone off, will have a better conception of the muscularity and of the arrangement and distribution of the muscles than he who trusts to the dissecting knife alone.

The action of the muscles of the womb ought, if normal, to be perfectly co-ordinate, all parts acting together, and at the same time. It is, however, true that, in the state of contraction, all the parts do not always begin and cease to act at the same moment.

Labor does not always proceed with regularity. The muscular power of the womb is occasionally found to be morbidly exercised. Those fibres that tend to bring the fundus near the os tincæ, sometimes fail to act, or act imperfectly; while those that tend to approximate the sides of the womb act with such force as to compress the body of the foetus, and, instead of expelling, rather confine and detain it within the cavity. We frequently observe women to suffer under the most violent uterine pains, which nevertheless do not move the child downwards in the least degree; such pains should be suppressed, if possible, in order to admit of the co-ordinate and regular operation of all the fibres being restored, by temporary cessation or repose. It
is such an action as this that constitutes the hour-glass contraction of the womb, which takes place in consequence of the non-separation of the placenta from the uterine surface—thus disabling that placenta-uterine quarter from contracting equally with the rest of the organ. When this happens, the placenta is, of course, shut up within a cell, above the hour-glass contraction.

**Obliquity.**—The gravid uterus commonly occupies the middle of the abdomen, in hale young women, notwithstanding both the projection of the sacrum and the intrusion of the spinal column tend to give to it an oblique direction; hence, we generally find it to be inclined towards one side of the abdomen in persons of a lax and flaccid habit of body. So far as my observation enables me to speak, it is oblique to the left more frequently than to the right side.

Great degrees of obliquity are scarcely met with in first pregnancies, in consequence of the vigorous contractility of the symmetrical abdominal muscles, which constrain the gravid womb to remain in the mesian line; whereas, in women who have borne many children, those muscles acquire such a laxity and want of tone, as to allow the organ to librate from side to side, or fall to the front, according to the attitude of the patient for the time being.

A right or a left lateral obliquity becomes very evident if the woman stands on her feet. In general, if the organ bears over to the right side, its faulty direction will be corrected by turning upon the left, and *vice versa*. In anterior obliquity, the fundus falls so far forward as to make the patient seem more lusty or larger than she really is. The figure is greatly improved, in such cases, by wearing a suspensory bandage, which assists the recti and obliqui abdominis to hold the gravid organ up nearer to the back bone. When a patient suffers herself to be annoyed by what she supposes to be an inordinate development of the womb, her fears may sometimes be allayed by showing her that, notwithstanding she is apparently enormously large, she is, in reality, not more lusty than common, and that the false appearance depends upon an anterior obliquity of the womb, which causes the belly to protrude unnaturally.

**Pressure of the Womb on the Vessels.**—Interference of the gravid womb with the functions of the kidneys, is now universally conceded to give rise to a convulsive disposition in pregnant women, that exhibits itself under the form of eclampsia, commonly known as puerperal convulsions. When the uterus has become inordinately large and heavy, and when the woman is at the same time affected
with costive and overloaded bowels, it can scarcely be supposed that
the great emulgent veins should not suffer more or less from pressure,
obstructing the course of the blood returning from the interior of the
kidneys. One could easily imagine that this pressure upon the emul-
gent veins should have an obstructing power almost equal to that of
a ligation of the vessel. Under such circumstances, the Bowman's
capsules, which contain the essential secretory apparatus of the kid-
neys, would be so distended as to suspend, in a good measure, their
offices, and so the azotized elements appointed to be carried off by the
urine would remain, and continue to accumulate in the blood. The
nervous disorders consequent on this vitiated condition of the circu-
lating fluid, are signs of the uraemia; and the convulsions, and other
signs—as paleness, weakness, delirium, &c., are symptoms of an ura-
emic intoxication. Any woman approaching the period of her confine-
ment, who has a swelled, or oedematous leg, may well be suspected as
prone to uraemic intoxication, and, provided she is vexed with head-
ache, nervous twitchings, or any disorder of the senses of sight, hear-
ing, &c., she should be at once taken care of, and all proper measures
should be adopted to prevent the explosion of an uraemic convulsion.

Women in whom the abdominal muscles have not lost their tone,
by repeated extensions in pregnancy, compress the uterus strongly,
in a direction towards the back; whereas, those whose abdominal
muscles have become weakened by repeated gestations, carry the child
very low, to use a common term, allowing the enlarged womb to rest
upon the muscles in front of it. In the former case, the pressure of
the organ against the spine must, to a greater or less degree, interfere
with the current of blood in the great vessels of the abdomen. Hence
the aorta and iliac arteries, and some of their branches, will pass on
their contents with less freedom than is natural, whereby the upper
parts of the body become supplied with more than their due propor-
tion of the arterial blood. Headache, vertigo, flushings of the face,
and tendency to paralysis and convulsions, may fairly be attributed to
excessive momentum of the blood thus distributed to the superior
parts, and rendered doubly noxious by an accompanying uremia.
Sighing, precordial distress, dyspnoea, and coughs are also found to
depend upon the same principles, and are to be treated with a view to
lessen this vicious distribution and sur-accumulation of the vital fluids.

Venesection, looseness of the bowels, light diet, warm baths, and
whatever tends to produce moderate relaxation of the muscular forces,
are in general employed with signal success in these circumstances.

Dr. Collins, App. 199, remarks, that "Puerperal convulsions occur
almost invariably in strong plethoric young women, with their first chil-
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dren, more especially in such as are of a coarse, thick make, with short
necks." He adds, at p. 201, "that of thirty cases occurring during his
Mastership, twenty-nine were in women with their first children."

Can this excess of propensity to eclampsia in primipara be attribu-
ted to any other cause than those excessive sanguine determinations
to the head, above indicated, and the disordered function of the kid-
neys, above spoken of? Ought we not to expect convulsions in women
in the first labor, when we reflect upon the tendency to hyperæmia of
the brain, caused by the above mentioned restraints of the downward
circulation? My experience in Midwifery having long since taught
me to be watchful of the signs of any excess in such determination of
the blood, I rarely permit my patients to lie on the back to be con-
fined; for I have been for some time impressed with the opinion, that
women who lie on the back in labor, especially in first labors, are more
liable to convulsion on account of the greater pressure against the
large vessels within the belly; a pressure which, at least, is always
relaxed during the absence of pain, in such as lie on the side.

I have frequently met with coughs in the latter weeks of pregnancy,
which proved rebellious against all treatment, until the delivery of
the patient; after which they yielded to the common means of cure:
the pressure of the womb on the abdominal vessels being removed,
the pulmonary engorgement and hyperæmic irritation previously sus-
tained and reinforced thereby proved no longer indomitable.

The same pressure of the enlarged womb, above spoken of, inter-
rupts the return of the venous blood from the extremities, and the
transit of the contents of the lymphatic absorbents. Hence, when that
pressure has reached its maximum, the feet and legs become cedema-
tous, or anasarcous; the veins of the feet and legs acquire an enormous
size, become permanently varicose, and in certain instances burst, so
as to cause effusions of blood to take place. In like manner, as has
been stated of the superior or arterial engorgements, this inferior or
venous engorgement ceases upon the abstraction of its cause; limbs,
when swelled even enormously, are observed to recover their natural
size in three or four days after the accouchement.

That worthy old author, M. Puzos, whose Traité des Accouchemens
was published in 1755, gives, at page 84, a sensible account of the
causation of this oedema gravidarum: "On sait que cette enflure ne
vient que de la difficulté que les liqueurs ont à remonter de bas en
haut, et à entrer dans le ventre; parce que le poids de l'enfant se fait
bien plus sentir lorsque la femme est debout que couchée, et s'oppose
plus fortement au retour de la lymphe, dans cette situation, que
lorsqu'elle est horizontale."
Puzos, it is true, makes a just discrimination betwixt this accident in Midwifery and a true dropsy; but the Student will be misled, should he not be convinced that the vast majority of the cases of infiltration, no matter how extensive, are owing to pressure on veins and absorbents, and not to a true hydropic diathesis. This accidental dropsy from mechanical obstruction requires no treatment by drugs. Puzos's explanation as to position ought to be remembered, and a confident expectation should be indulged as to a cure, a spontaneous cure, as soon as the obstructing cause shall have been removed, by the birth of the child.

Women sometimes grow apparently very fat in the last weeks or days of pregnancy; but the appearance of embonpoint is false—the delusion arising from an insensible watery infiltration of the whole of the superficial cellular tela: instead of increasing her embonpoint, she is really losing flesh by the constant waste of the elements of her blood, and when she comes to her lying-in she complains, a few days afterwards, of growing thin, whereas she may be in reality growing fatter. The deception consists in the elimination of the water of infiltration, which lets her contour down to the true state and expression of her real embonpoint.

**Hydatid Degeneration of the Ovum.**—A woman who has conceived in the womb, and in whom the pregnancy may have gone on for several weeks, or even for some months in the most regular and orderly manner, is nevertheless liable to subsequent faulty progress in the development of the ovum. For example, the whole mass of the placenta may become the seat of an hydatid degeneration. Hydatids are transparent vesicles or bullae, colorless, and distended with water resembling pure water. They are supposed by many authors to be independent animals, and were by Laennec denominated as the cysticercus. Mr. Milne Edwards, in his *Elémens de Zoologie—Animaux sans Vertèbres*, speaks of them as belonging to the class of the Helminths or Entozoars. Under the order Cystoid Helminths, genus Hydatins, he says: “Finally, the Hydatids are generally considered as the last link in the series of intestinal worms; but the bodies described under this title are perhaps not real animals, and seem rather to be mere pathological products.”

M. Pouchet, also, in his *Zoologie Classique*, p. 537, tom. ii., says:—

“It sometimes happens that women, affected with all the symptoms of pregnancy, discharge a considerable quantity of delicate vesicles filled with an aqueous liquor, that are perfectly analogous to the cysticercus, and that have hitherto been regarded as hydatids. The
vesicles seem to adhere by a pedicle to the organ that produces them. Bremser looks upon them as helminths, and says they are really endowed with individual life, and constitute a peculiar species of animals. But several French physicians do not partake of this opinion of the celebrated German helminthologist, and think that these pretended entozoors are commonly nothing more than a pathological degeneration of the product of conception. Such are the opinions of Messrs. Désormeaux, Velpeau, and Orfila, &c."

I have translated the above passages from Milne Edwards, and Pouchet, in order to confirm the opinion I have to express as to the pathological and accidental nature of the placental hydatids. I am inclined to regard them as depending upon an hydropic state of the villi of the chorion, which, by a process of endosmose, under some maladive condition of the life-force of the ovum, is able to convert them into cysts, to the ruin of the product of the fecundation.

When a villous chorion begins to be generally subject of this hydatid generation, it is to be deemed that the embryo must necessarily perish in consequence of the destruction of its branchial organ, the placenta, which, after all, is nothing more than a cellulo-vascular process from the chorion. I have seen many examples in which the placenta, at healthful term, has exhibited several of these hydatid-vesicles without harm to the foetus—while in others, the embryo has been prematurely discharged, accompanied with the debris of a placenta filled with innumerable small bullae resembling white grapes in bunches.

Let the Student observe that the ovum, when invaded and conquered by this attack, continues to augment in size, its progress being governed by no ascertained law of rate. The healthy ovum has an exact rate—it is finished in nine months; but the hydatid has no certain rate—it compels the womb to distend for its accommodation, and that at a rate which is uncertain. I have seen a young woman, at the fourth month after conception, as large as she ought to have been at the sixth month. It is easy to infer that such a rapid deploying of the womb, one so different from the gentle and lawful rate of a true pregnancy, must have the effects of a pathological, rather than those of a physiological force.

The term to which the development of placental hydatids may attain in any special case cannot be foreseen. The uterus may cease to tolerate their presence in the 3d, 4th, 5th, or even in the 7th month of gestation.

The signs by which they are known are either inferential or positive. We infer that the womb contains hydatids whenever we discover it to
be increasing with preternatural rapidity; a rapidity that could not be predicated of twins, of polypus uteri, or any tumor. We know that the case is one of hydatids whenever, upon Touching, we can find a softish mass in the cervix which bleeds upon being rudely pressed, and which discharges upon the finger or the napkin specimens of the aqueous vesicles.

As soon as the diagnosis is made, one is ready to take advantage of the commencement of any dilating pain, to provoke the earliest possible discharge of the hydatid mass. This may be done by introducing the index finger into the os uteri far enough to reach and break up the mass. It mostly happens here, as it does in turning out coagula from the womb, after labors, that, as soon as a portion, even a small one, is broken off and discharged, the uterus begins at once to contract upon its now lessened contents, so that, in general, the whole product rushes forth from the violently contracting organ. When, upon the discharge of a quantity of the hydatid mass, the labor-pain ceases too soon, it is well again to break in pieces the rest, so that, when the pain next comes on, there may be less resistance to its expulsion. The Touch reveals to us the truth at last, as to whether all the product is driven off or not.

In any case where it might be desirable to expedite the expulsion, resort should be had to a colpeurynter.

I have observed that, in the course of a labor for the expulsion of hydatids, the hemorrhage is occasionally most violent, and even alarming. The tampon constitutes an unobjectionable means of arresting such a troublesome waste of the blood.

Intense constitutional irritation accompanies the hydatid pregnancy in those examples of it where the growth is violently rapid. The over-hasty development of the womb or matrix of the mass may be compared to a bursting process. I leave it to the ingenious Student to study out the problem of the amount of constitutional disorder and its signs, likely to be made manifest upon such sudden and preternatural impetuosity of the uterine growth.

Moles.—Moles are altered ova. In the case of a false pregnancy or Mola, as it is called, we are to presume the conception was normal, but that, upon some accidental failure of the development of the embryo or, the secundines, the embryo perished and disappeared. In the mean time, by the operation of a principle of vitality communicated through the uterus, the mass continued to exist and to grow, until the womb, no longer tolerant of the foreign body, must commence a series of contractions, by force of which it is expelled. The mole, like the
hydatid, is called a false conception. Neither of them is a false conception; but a true conception, changed afterwards by some accidental diseased action.

Physometra.—There is said to be a false pregnancy called physometra or wind-pregnancy. I have recorded my opinion as adverse to this pretended state, in my Letters to the Class, and in a note to Colombat on this subject at p. 372. I cannot conceive of a womb distended like a balloon with gas. Some of the reviews with which my Letters have been honored find fault with my recusancy as to Physometra and Hydrometra. I receive with the greatest respect, and even thankfully, the strictures that have appeared together with a certain flattering amount of commendation of that work. Notwithstanding the remarks of my critics, I feel constrained to maintain the opinions I there expressed, to which I beg leave to refer the Student.

Authorities, however respectable, are after all to be regarded only as so many men or women. Authorities are not always lawgivers, but if they were, I must confess that I owe obedience to the higher law of my own perception.

The curious on this matter of Physometra may consult p. 605 of Schenck's Obs. Med. rariores. Fol. Lugd. 1644.

Hydrometra.—This is a state in which the womb becomes filled with water. The woman, supposing herself pregnant, suddenly finds herself deluged with water that, as is pretended, gushes in a torrent from the uterus, whereupon the signs of the pregnancy vanish away. Inasmuch as I cannot imagine the state of hydrometra, independent of some enormous sac, cell, vesicle, or acephalocyst in which it is contained, and as the supposition of such vast cells is impossible, I adhere to the opinion that Hydrometra is an hypothesis merely. I prefer to suppose the case to be one of over-distended bladder, and the water of the supposed hydrometra to be urine. If the womb should become affected with atresia of the os tincæ or cervix, and it should then fill with a great quantity of fluid, that fluid could not be water. I respectfully, therefore, claim to adhere to the dissenting opinions expressed in my Letters, to which again I refer the Student.

Abortion.—The ovum, however well protected by its recondite situation against the operation of any extrinsic causes of destruction, is, nevertheless, obnoxious to several influences that may cause its miscarriage. There are also many intrinsic causes that tend to effect its death; for, since the embryo is composed of a structure, and
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has functions that are vastly complicated and mutually dependent, it must be liable to disorders that may interrupt its growth, or health, and at last cause it to be thrown off as an abortion.

The embryo is so delicately organized, that very slight changes in the solids or fluids which compose it are sufficient to determine its destruction.

Its blood, out of which all its tissues are composed, is moved by its own powers of circulation, and it must, like all other living beings, be subject to engorgements, inflammations, hemorrhages, and all the other maladies that consist in derangements of the circulation.

Such a creature might perish from very slight faults in the power of the omphalo-mesenteric vessels, or the umbilical vessels—and unequal development of its more important internal organs doubtless serve, in many instances, to deprive it of vitality. Of the vast number of cases of early abortion, I presume a large majority depend upon disorders of the embryo itself, and not upon disorders or accidents happening to the mother.

While this is probably true, it is to be observed that the union of the placenta to the surface of the womb is so slight, that it is easily peeled off; so that a blow upon the region of the womb may destroy its connection, and blood become, at once, effused betwixt the placenta and the uterus; if a great quantity be effused, the whole surface of the placenta may be speedily detached or loosened, and of course, the ovum, now deprived of the sources of growth, must perish.

A sudden and very violent excitement of the bloodvessels, as by surprise, anger, &c., may cause the effusion of blood from the placental superficies of the womb. A contraction of the womb may break the connection. A violent concussion of the body, as by falls, jumping or rude motion in carriages or on horseback, may cause a detachment to take place; or the membranes of the ovum may be so weak and delicate as to burst upon very slight compression of the womb, as in coughing, straining at stool—upon any sudden and powerful exertion, as pulling, lifting, &c. Thus it appears that the abortion may be caused by the death of the embryo; by disease of the secundines; by sudden violent movements of the blood, causing the effusion of that fluid behind the placenta; by direct violence, or by the discharge of the water of the amnion.

If the ovum be ruptured, there is a discharge of water from the vagina, the quantity of which will depend upon the age of the embryo. This is sooner or later followed by pain, and flowing of blood. The pains, which are uterine contractions, become more and more frequent
and considerable, until the ovum or its remains are expelled, when the bleeding begins to diminish, and, for the most part, the pain returns no more. If any cause should have been applied that could detach a portion of the placenta without rupturing the ovum, many hours, or even several days might elapse, before the blood that follows the detachment should appear at the orifice of the vagina: the blood must first force its way betwixt the chorion, and the internal surface of the womb; but as soon as it reaches the orifice, it falls into the vagina, and then there is what is called a *show*. If the foetus perishes by an internal disease, or in consequence of some disorder that happens to seize upon any part of the ovum, the further development of that ovum, or of the embryo, ceases, and it is cast out by the contractions of the womb, sooner or later, according to circumstances. For the most part, the ovum, soon after it has lost its vitality, becomes an irritant or excretant of the womb. On not a few occasions, however, the dead ovum remains within the uterine cavity for weeks or even for months, without exciting its contractility—cases that are among the most embarrassing, on account of the diagnosis, that the obstetrician can possibly encounter. The dead ovum of three months may not be expelled until the seventh or eighth month of pregnancy. It undergoes no putrefaction, unless the membranes have been ruptured; in which case, it cannot remain very long undischarged.

There are some individuals in whom there seems to be so great an irritability of the muscular fibres of the womb, that the presence of the fruit of a conception never fails to bring on the contractions before the completion of the term of pregnancy; and I apprehend that this excessive irritability is among the common causes that produce abortions. This view seems to be maintained by a reference to what happens in those who have already miscarried, since such females are found to be greatly disposed to miscarry again, at about the same period as that at which they had sustained the first misfortune; which appears to me to indicate that the repeated accidents of this kind are attributable, rather to an excessive or abnormal irritability of the womb, than to any of the other circumstances that are enumerated as causative of abortions; for it is far more reasonable to suppose that the same uterus is endowed with too great a degree of muscular irritability, than to suppose that several successive germs should be so constituted as to perish always at about the same period.

A woman becomes pregnant by the *fecundation* and subsequent *fixation* of a deposited ovulum. The act of fecundation can only take place after the ovi-posit has happened. The conception does not necessarily put a stop to the periodical
development of ovarian ova—nor to their maturation and fall. But a woman who menstruates because of her ovi-posit, will tend to menstruate at regular periods, though she may have already conceived in the womb. Some women have this tendency so strongly, that they do actually menstruate during the earlier months of their gestation. Mrs. K. menstruated until the eighth month of her pregnancy.

Every woman who menstruates in her pregnancy is trying to miscarry; and she would miscarry if the monthly hyperæmia, giving rise to menstrual hemorrhage, should cause the outflowing blood to destroy the connection between the ovum and womb. If she does not miscarry in such cases, it is because the blood escapes from the uterine super-ficîes below the surfaces occupied by the ovum in the cavity of the organ, or because the connection of the ovum to the womb had become a sufficient bar to the discharge of blood from its uterine vessels.

The above may serve as an explanation of the very common opinion that a woman is most liable to abortion at periods coinciding with the menstrual effort, and there is good reason to believe that a great number of abortions do take place at those conjunctures. It is reasonable to suppose that the periodical hyperæmia of the reproductive organs that causes menstruation would, should it occur in pregnancy, expose the woman to the risk of miscarriage—and it is equally reasonable to take especial precautions against such an occurrence for those women who have, on former occasions, suffered the loss of the ovum, at or near to the menstrual periods, and without any other assignable cause than the menstrual effort.

Whenever, in abortion, the contents of the gravid womb come to be expelled from its cavity, that expulsion is effected by a real labor, often severely painful, and requiring for its completion many hours of greater or less suffering; sometimes many days.

I have had the medical charge of the same women in regular labor and in abortion; and they have informed me that, for acuteness and severity of pain, the abortion has far exceeded the labor at term. This is not always, nor perhaps most generally, the case. The reason why some women suffer so acutely in miscarriages is, that the canal of the cervix uteri requires for its dilatation, in the early months, a great deal of power to be employed in forcing the embryo, which at that time is contained in the cavity of the body and fundus, down through the long narrow canal of the cervix uteri; and the distress produced by this dilatation of a long and rigid canal must often be as great, and might à priori be supposed as great, as that occasioned by the dilatation of the os uteri at term, which in the last days of pregnancy
has become thin and yielding; whereas, in the early months, the whole cervix, as well as the os uteri, is of an almost cartilaginous hardiness and rigidity.

At the beginning of the effort to miscarry, the womb is shaped like Figure 69. The egg lies in the cavity made out of the expanded corpus et fundus; but, before the ovum can be expelled, the long cylindrical neck must first be converted into a cone, like Fig. 70. But, after the cervix has been altered in shape, so as to become a cone, the ovum cannot escape until by a further process of dilatation that cone is turned into a wide open cylinder, whereupon the ovum is thrust forth and falls into the vagina, as in Fig. 71.

Abortions sometimes take place very easily, with little pain, and almost without hemorrhage; but the quantity of blood lost in some instances of miscarriage is enormous; probably on account of the extreme degree of uterine irritation or sanguine molimen which the act of abortion develops. The hemorrhage is apt to continue until the contents of the womb are expelled; and it is, therefore, highly important to expedite that occurrence by all reasonable means. Unfortunately, these means are few.

Upon taking charge of a case of abortion, it is the student's duty to ascertain which of two indications he ought to pursue. First, he should decide whether he will attempt to save the pregnancy, by pre-
serving the vitality of the ovum; and second, he should determine whether any moral probability now exists of the death of the ovum. In the latter case, it may demand his respect no longer; in the former, he will act against duty if he fails to do whatever may hopefully tend to the conservation of the fruit of the womb. The quantity of blood lost already may serve in some degree to enable him to decide both these questions; for, if the pregnancy be not much advanced, the loss of a considerable quantity of blood is evidence of so incurable a detachment of the fixed ovum as to preclude any reasonable expectation of its continuing to live in the womb.

Besides his inquiries and observation as to the quantity and force of the hemorrhage, he should carefully ascertain by touching the existing condition of the os and cervix uteri. Therefore, whenever the flow becomes so considerable as to affect the pulse and the complexion of the patient, it is imperatively required that the medical man should ask for an examination per vaginam; and he will sometimes find that the ovum is sticking in the cervix, and needs only a little aid to escape from it—but, while it remains, it cannot but keep up the hemorrhage. The fore-finger may, in such instances, be pushed as far as practicable within the canal of the cervix, alongside of the ovum, and then bent so as to resemble a blunt crotchet. By the aid of the finger, used in this way, and the assistance of powerful bearing down on the part of the woman, the offending cause is without much difficulty removed, and the effect ceases. When the finger cannot be employed, Dr. Dewees’s placenta-hook may be employed.

I annex a figure (Fig. 72) of Dr. Dewees’s placenta hook or crotchet,

![Fig. 72.](image)

which is on some occasions a convenient instrument for pulling down the ovum when merely held by the cylindrical grasp of the cervix.

![Fig. 73.](image)

Dr. Henry Bond, an eminent practitioner of this city, has proposed a placenta forceps for the delivery of the secundines in abortion, of which Fig. 73 is a representation.
Dr. Bond's instrument is ten inches in length, and so rounded that it is difficult to conceive of an operator awkward enough to pinch with it any of the parts of the mother. An inspection of the drawing suffices, without further explanation, to give an idea of its usefulness.

While I lay before the Student these instruments for the extraction of the dead ovum, I ought to warn him against too facile a disposition as to the employment of them, and to assure him they will often disappoint his expectations, and sometimes, where they do succeed, lead to evil consequences as to the mother. The ovum, in abortions, inhabits the body and fundus uteri. The cervix stands guardian as faculas reentrix over the deposit, and reluctantly yields it a passage. In doing so, the conical neck of the womb must become a cylindrical canal, into which the fundus and corpus uteri thrust their intolerable burden. When this cylindrical canal hath received into its calibre a small ovum, or the remains of one, it has, of itself, little or no power of expulsion, but merely grasps the ovum and holds it fast. It holds it sometimes for many days. I have found it to hold the ovum in this manner for many consecutive days, because the very os uteri would not let it escape, failing to yield, chiefly perhaps because no dilating pressure was applied. In the long run it yields, the os tincæ becoming wide open, and then a bearing-down effort, a fit of coughing, or straining at stool or urine, drives it forth into the vagina. (Vide Fig. 71.) Now, until the canal has become truly cylindrical, Dr. Bond's forceps and Dr. Dewees's hook are not to be employed without much care and gentleness. For the most part, it is better to wait until all is prepared, and then remove the object with the index finger.

In those cases in which a proper attempt to extract the debris of the ovum has failed, those who like the support of high authority may console themselves by referring to Puzos, who at page 193 says that "cette terminaison est bien moins effrayante; mais elle est bien plus longue; j'ai vu de ces fontes durer six semaines à deux mois; et pendant tout le temps, où les vuidanges sont si fêtides, j'ai vu ces femmes tourmentées de fièves irrégulières de dégoûts et d'inquiétudes." He thinks these cases ought to be left to nature.

If, upon making examination in abortions, the state of the cervix is found to be unfavorable to the speedy expulsion of the offending cause, and the hemorrhage be not too threatening, recourse may be had to the application of napkins, wrung out of cold vinegar and water, to the hypogastrium and pudenda; to the administration of dilute aromatic sulphuric acid; to the acetate of lead, with opium; or to the preparations of secale cornutum—as the powder, in doses of five to ten grains repeated pro re nată, or its vinous tincture, of which a teaspoon-
ful may be given every half hour, or at intervals of one or more hours, according as the events of the case seem to demand. A powder consisting of five grains of alum and one grain of nutmeg may be given as a hemostatic every half hour or hour. The lancet may be resorted to, to aid both in diminishing the hemorrhagic nisus and in favoring the dilatation of the cervix, to which nothing contributes more powerfully than venesection. This, however, should be used with great and good discrimination.

**Colpeurysis** is a process or method of treatment used in certain sexual disorders, the employment of which is daily becoming more general in Europe and America. The instrument by which colpeurysis is effected was proposed and introduced into practice by Dr. Carl Braun, assistant physician at the Lying-in Clinic at Vienna. An account of the matter is contained in a work in three parts entitled *Klinik der Geburtshilfe und Gynäkologie*, published in the course of the years 1852 to 1855, by Messrs. Chiari, Spaeth and Braun. In part I. p. 126, is an article on colpeurysis by Dr. Braun, with a figure of Braun's colpeurynter, of which I annex a copy, Fig. 74. Colpeurysis is from the Greek κόλπος and ἔπειρα. The compound word is intended to express the idea of vagina and dilater. Previously to Dr. Braun, physicians and surgeons were accustomed to the use of various methods of dilating the vagina or the cervix uteri, such as sponge tent, the tampon, &c., but the apparatus delineated in Fig. 74 is found so convenient that it will doubtless become much in vogue in practice. The colpeurynter is a vulcanized gum-elastic bag fitted into a small hollow cone of horn. There is fitted to the apparatus a ring for holding a strap and buckle which serves to secure it from falling away when duly adjusted. There is also a stopcock, as seen in the drawing. The vulcanized rubber bag when empty may be introduced into the vagina, and then filled.
with air or tepid or cold water in quantity sufficient to distend the bag at discretion, so that the walls of the vagina may be made to expand as much as they do when distended by the foetal head in labor. This colpeurysis may be carried on so slowly and gently as to give no distressing pain, and if it be continued for a certain length of time it inevitably causes the neck of the womb to dilate. Hence it is a neck dilater as well as a vagina dilater, and is used daily for hastening the dilatation in abortions, in hemorrhagic labor, and other cases in which it is desirable to precipitate the delivery of the woman.

This colpeurynter makes a very good tampon, and possesses the great advantage of being employed warm or cold, as it may be distended with water of any desirable temperature. I have used it as a tampon in placenta prævia in a case that required speedy dilatation to enable me to turn and deliver by the feet, and I have used it in various other states of the female genitalia which I propose to speak of on the proper occasion; for the present I mention its use as both a tampon and dilater very appropriate in abortion cases. The Student doubtless understands that if the vagina should be very much distended with a colpeurynter, the cervix uteri must sooner or later yield to the force, or be pulled open by the upper end of the vagina which arises from the whole outer circumference of the neck.

**Tampon.**—But among the various means of putting an end to troublesome hemorrhage, I ought to name the tampon, or plug. This tampon may be composed of a sponge; or, what is far better, of pieces of cotton or linen cloth or patent lint, torn into squares of from two to three inches, which may be pressed into the vagina, one at a time, until the entire canal is filled and distended with them. They should be kept there by a napkin, worn as for the menstrua, or by pressure with the hand of a nurse, a napkin being interposed, until the flow is effectually checked, at least. The tampon may be allowed to remain *in situ* from six to twelve, or even twenty-four hours in winter. When removed, it is generally followed by the ovum or its remains, which are frequently found attached by a coagulum to the upper part of the tampon. Should any dysury be caused by its presence, the bladder may be readily relieved by the catheter while the woman preserves a horizontal posture, which should never give place to a vertical one until all probability of a return of the hemorrhage has disappeared.

I do not understand how a woman can be permitted to die with hemorrhage, in an abortion, while a colpeurynter or the materials for a tampon are at hand, since the discharge may always be effectually controlled. The remedy gives no pain, if properly used; and, so far
as my experience of its employment bears me out, it never causes any considerable inconvenience; while, I may add, it always succeeds.

A good many cases of abortion, in the early stage, as from the sixth week to the tenth week, have fallen under my notice, in which the uterus was unable to expel the debris of the ovum, and in which I could not extract it. The female, in such instances, save one, has always recovered without the ovum having been visibly discharged; but there always was an excretion, continued for many days, of offensive dark-colored grumes and sanies, which I accounted for by supposing that the substances in the uterus had macerated, and came off in a state of semi-solution, as in the instances mentioned by Puzos. I think that there is no danger in leaving such occurrences in the hands of nature; and that it is better to do so than reiterate attempts to extract by force, that have already proved quite vain; especially, considering that there is as great danger of exciting inflammation by those attempts as could be anticipated from the gradual maceration of the ovum. Let the Student reflect upon the demonstration made by my Figures 69, 70, and 71, and he will perceive that an attempt to take away the ovum, before the womb has become changed from Fig. 70 to the form of Fig. 71, not only ought to fail, but must fail of success. I am not disposed to deny that the presence of a putrefying substance, even of a small size, in the womb, is capable of developing inflammation and fever; but it has not happened so in my cases, and I have advised the same course to some medical friends, by whom I have been consulted, without the least cause to regret having given such advice. Let me be clearly understood, however, to recommend that the last remainders of the ovum should be brought off, where it is practicable, by employing reasonable efforts to do so.

I shall not omit the present opportunity for repeating, with regard to the tampon, that it is not a proper remedy for those cases in which any hope is yet entertained of saving the pregnancy.

Let us suppose an instance in which the placental attachment has taken place at the fundus uteri; that a partial detachment of the placenta has occurred; and that the blood, having forced its way in a narrow stream or rivulet betwixt the womb and the outer surface of the ovum, has at length made its appearance at the pudenda. Nothing is more common than to see such cases of show suppressed by section, recumbency, an opiate, some doses of elixir of vitriol, or cold lemonade. Should any practitioner, anxious to promote the formation of a coagulum, and thereby stop the effusion of blood and save the pregnancy, have instant recourse to the tampon, what would be the
consequence? The blood, instead of escaping externally, would be forced back on the ovum, while newly effused portions of it, instead of flowing by the route already formed, would continue to dissect off or separate the ovum more and more, until the whole of it should be detached, and at last come off, enveloped in the centre of a compressed clot. To use the tampon, therefore, is to insure the abortion; hence, it is only a remedy for the hemorrhage of abortion, and not a remedy for miscarriage, which it not only cannot prevent, but actually insures, or renders certain. The blood which continues to flow into the womb after the vagina has been closed by the tampon may be compared to a river dammed across its channel, whose waters, in consequence, overflow their banks, drowning the adjacent country.

With regard to the tampon, I wish to add that its employment in advanced stages of pregnancy, although allowable in certain instances, demands very great discrimination, inasmuch as it is capable of converting an open into a concealed hemorrhage, as we shall have occasion more fully to remark when we come to the consideration of uterine hemorrhage in labor. It may, under the proper indications, be with safety employed up to the close of the fifth month of gestation, since the womb, until that period, is incapable of admitting a sufficient quantity of blood to give any well-grounded fears of a fatal concealed hemorrhage. But at a later stage, the capacity of the uterus is so much increased that the tampon, if employed at all, ought only to be used while the practitioner himself carefully observes its effects, remaining at hand to remove it in case the uterine cavity should become distended and filled either with fluid or coagulated blood to a threatening amount. I was told, not long since, of an instance in which a gentleman, treating a case of hemorrhage after delivery, was pressingly called for to visit another woman in labor, and as he felt compelled to go, he tamponed the vagina with a handkerchief, by which he effectually suppressed the apparent hemorrhage, but upon returning shortly afterwards, he found the patient dead, the womb having filled with blood instead of expelling it from the vulva, just such a conclusion to the affair as ought to have been expected from the use of a tampon under such circumstances.

It has happened to me to see the tampon injudiciously employed in this way on several occasions. Two of the persons were nearly expiring, when I arrived and immediately removed them; and one other, for whom it had been applied early in a flooding labor, without placental implantation, was expiring when I reached the house—a dreadful case of mala praxis, to which I shall recur in a future page.
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Prolapsus.—It is commonly thought that women who suffer under repeated abortions are quite as much, if not more subject to a consequent prolapsus uteri than those who are confined at full term. The natural tendency of labor is to produce a prolapse of the womb, and that tendency must be much greatest where the vagina has been much distended and pressed out of its ordinary form. This might lead one to deny that abortions are as likely to bring on a state of prolapsus as labors at term. But those women who miscarry are, for the most part, not sick any longer than during the actual miscarriage: they generally get up, most imprudently, the next day, or in some instances even on the same day. The solid and weighty substance of the uterus now bears down the vagina, to whose upper extremity the organ is attached; and weakened and relaxed by the discharges of the miscarriage, and oftentimes after abortion affected with vaginitis, the vagina makes less resistance than is common, so that the womb takes permanently a lower level in the pelvis than it ought to have. All the difficulties and embarrassments likely to accrue from this vicious situation of the womb might be obviated by a little patience and prudence in the beginning. The woman should be warned, in clear intelligible language, that too early a getting up exposes her to the risk of suffering from a falling or bearing down of the womb, which may ruin her health, and thereby render her unhappy for life. Unfortunately, she feels too well to believe that our words are other than useless and needless vaticinations, and so she is not willing to maintain a recumbent posture more than one or two days.

It should be considered that while a woman, lying-in, is in a physiological state, one laboring under miscarriage is in an opposite condition—that she is sick, and often needs care not less sedulous than the other one requires. The womb is in fault, as to the miscarriage in some of the cases, and any man conversant with the events of our obstetric practice knows that the organ is occasionally left by abortions inflamed, or hyperemic, and irritable to the last degree. In these instances, the organ is situated much as it is when affected with hypertrophy. Long-continued uterine tenesmus, sanguine affluxion, enfeebling discharges, and persistent pain, might well be expected to result in a descent or prolapsus, scarcely to be avoided by those who suffer frequent distressing abortions, and especially by those who pay not the least regard to the common sense dictates of the medical man.

Retroversion.—In proportion as pregnancy advances, the womb increases in longitudinal diameter; so that, if it should from any cause happen to be turned over backwards, the top of the fundus
uteri would lodge in the hollow of the sacrum, while the os tinnæ would be pressed upon the symphysis of the pubes, or above it.

There is no reason to doubt that the uterus is frequently turned over backwards, but not retained; for the urinary bladder, when very full of water, extends backwards and downwards, pushing the top of the womb along with it. If this happen to a woman about two and a half or three months gone with child, she will scarcely fail to have a serious retroversio uteri, which will probably continue until the organ is reposited by some skilful hand.

There are persons who bring on these uterine deviations by a habit of retaining the urine until the bladder becomes over-ful. Such, at least, is the opinion I have formed from inquiries addressed to the patients themselves.

Some women, from a fastidious delicacy, or from circumstances of the society in which they pass their waking hours, fail to yield to the ordinary solicitations of nature as to the discharge of the urinary bladder, and allow it to become so distended that it equals the bulk of a pint or even a quart measure, before they take notice of it. So great a bulk as this occupying the space behind the lower portions of the abdominal muscles and betwixt them and the sacrum, cannot but put upon the stretch both of the ligamenta rotunda, which is equivalent to the effect of thrusting the fundus uteri down upon, and even below the promontory of the sacrum; but when the womb does turn over backwards, the cervix comes forwards by a see-saw motion of the organ, and this it cannot do without inordinately stretching the utero-sacral ligaments which are in this way, for many women, completely relaxed and ruined. Some women who have what is called retroflexion of the womb seem to have very sound and strong utero-sacral ligaments, which restrain the cervix from coming forwards to the pubis, as happens in ordinary retroversions. Can there be any doubt that such a habit, persisted in for years, would result in the state of retroversio uteri?

**Case.**—I saw this day, July 12, 1848, a young lady of 22 years of age, who has been married now ten months. She presented all the external characteristics of fine health. She has never conceived. She has a constant pelvic pain, and has suffered for eight years with the most distressing dysmenorrhœa, informing me that she never had her catamenia without violent pain; yet the menstrua are abundant and regular. She uses a dozen napkins at each period, and sometimes more than a dozen. There is severe pain in coïtus, which cannot be perfectly effected.
I found the os tincæ half an inch behind and below the crown of the pubal arch—though the fundus uteri occupied the recto-vaginal cul-de-sac. It was bent, with a short turn, backwards.

Upon causing her to turn over upon the face, I readily reposited the womb—but it came down again upon the least motion. When I pressed the index finger firmly on the lips of the os tincæ or on the cervix, she felt acute pain, and said the pain was the same in kind as that of her dysmenorrhœa. Her habit has always been to retain the urine long, so that sixteen or twenty ounces frequently collect before she discharges it. Now this person had never had any considerable illness, or met with any accident. Can there be any doubt that this habit is the cause of the retroversion? There is no other discoverable cause.

Suppose the fundus of a gravid uterus to be caught and detained under the promontory, as above mentioned, and that the child proceed in its growth, carrying with it the womb in which it is inclosed; the consequences must be a complete impaction of the womb into the excavation—a total prevention of the flow of urine from pressure on the urethra—a stoppage of the canal of the rectum—severe pressure upon the internal sacral foramina, with their nerves; and, unless by timely measures obviated, the certain and miserable death of the patient, as in the case related by me and illustrated by a plate in American Journal; for in the case examined by Dr. Hunter, so completely impacted or jammed was the womb into the cavity of the pelvis, that, after the death of the patient, it was found impracticable to get the uterus up out of the excavation, until the pubis was cut through with a saw, in order to admit of the enlargement of the brim of the pelvis. In my case, reported as above cited, the pubes were cut away to enable us to remove the uterus with its contents. It is difficult to conceive of a situation more frightful than that of a patient under such circumstances. The case, with the fine illustrative engraving, is contained in Hunter's Tables of the gravid womb.

My experience teaches me that most of the instances of retroversion are attributable to a distended bladder, whether after parturition or no. The modest delicacy of young women often compels them to resist the most urgent desire to pass off the urine. A female riding in a carriage, or placed in such a situation that she cannot withdraw from the company without being suspected of a desire to urinate, will allow the bladder to fill almost to bursting; and if she be pregnant about three months, she will scarcely fail to bring on retroversion of the womb. When at last she obtains an opportunity to evacuate the bladder, she finds she has a partial or total retention of urine. The usual re-
course is had to spirits of nitre, to watermelon-seed or parsley-root tea, and perhaps a dose of castor oil may be resorted to; but as relief can only come by some mechanical remedy, the medical man is at length, and reluctantly, sent for.

CASE.—A few years ago, I was called to a young woman who had been a short time married. She arrived in town by one of the public conveyances from the eastward. She had a constant and irrepres-sible desire to urinate, and could only succeed in getting off a few drops at a time. She told me she was pregnant; had just arrived from a journey; and that she was suffering the most acute distress from the constant inclination to urinate. As the disorder had come on sud-denly and in a state of high health, I at once told her she had a retroversion, the nature of which I explained to her, and she submitted to the necessary investigation; upon which I found her womb turned over, and upon repositing it she was immediately cured. I suppose that, in travelling, her bladder, for want of an opportunity to empty it, had become very much distended; that its bas-fond had pressed upon the anterior superior face of the womb more and more as it became more and more distended, until the fundus uteri, jammed under the promontory of the sacrum, could not get out again, without the aid of a physician.—See my Letters to the Class, sub voce. One of my critics condemns the rapidity of my diagnosis in the case. I respectfully refer him to the passages in which I explained that, by using the method of exclusion in the analysis of the symptoms, I could not possibly arrive at any other conclusion.

To see a healthy-looking woman seized with complete retention of urine, without having been before the subject of any urinary ailment, is always warrant enough for us to suspect a retroversion of the womb, especially if the patient be at the time pregnant, and not advanced beyond the fourth month. The symptoms of which such patients complain are either a total retention, a stillicidium, or a great dysury; with pains about the region of the pubis and sacrum; constant tenesmus, or bearing down, and a sense of obstruction or stop-page in the rectum.

No case like this ought to be suffered to pass without making an examination per vaginam. For this purpose, let the patient lie on her back, near the right side of the bed; the feet drawn up near to the breech; the head and shoulders raised with pillows. The physician should stand by the bedside, and with his left hand placed upon the hypogastrium, ascertain if the bladder be much distended: it will sometimes be felt almost as high up as the umbilicus. The forefinger
of the right hand may next be carried into the vagina in order to seek for the os tincm, which is to be found behind the symphysis pubis, or even thrust over and above it: the vagina seems to be obstructed by a hard body, which is the bas-fond of the womb, whose fundus is turned down into the hollow of the sacrum, and jammed into the cul-de-sac composed of the reflexion of the peritoneum, which lines the upper posterior third of the vagina and the front of the rectum.

Having thus verified the existence of a retroversion, the next steps required to be taken are those that are demanded for the repositing the womb. Among the most pressing indications of cure, is the relief of the suppression of urine, which in general is easily fulfilled by the introduction of the catheter. A long elastic male one is the best, because the womb, in changing its own position, carries up the neck of the bladder, and thus elongates the urethra so very considerably, that it will be found convenient to use a long instrument for the evacuation of the water.

Inasmuch as the most ordinary cause of retroversions is a distended bladder, it has been thought that the removal of this distension is the sufficient remedy, it being supposed that the uterus might recover its place as soon as the pressure which overset it should be taken off. Indeed, there are cases in which the restoration takes place soon after the bladder becomes emptied. I have related, in my *Letters on Woman*, &c., cases of retroversion cured by the catheter alone, and one, from an English authority, in which a most dangerous case of retroversion, in pregnancy, which could not be cured by the hand, gave way to the use of the catheter, left for a long time in the bladder, by which means that organ was completely hindered from filling up, and obstructing the tendency of the fundus to rise upwards to its natural situation. It has well been contended that, for retroversion of the gravid womb, a sound discretion indicates the propriety of leaving the case in nature's care, after this preliminary measure has been accomplished, lest, by any rude or too persevering attempts to replace the uterus, the ovum might suffer so much injury as to bring on an abortion. I admit that I am not prepared to decide as to the necessity for such great prudence, since I have only on one occasion put it to the test. On that occasion, I drew off the urine two successive days, the accumulation being very great; and then, finding that the malposition was not rectified, I was compelled to replace the womb with my hand: no inconvenience whatever followed the operation, although the patient was near four months complete gone with child. In a subsequent pregnancy, the same person suffered a retroversion of the
womb, nearly at the same period; and when I was called to see her, I immediately proceeded to restore it to the proper attitude. In this case also the pregnancy was not in the least interrupted.

Having succeeded in drawing off the water, the patient, if necessary, should have a copious enema, in order to unload the rectum, which, if replete with fecal matters, might offer considerable obstacles to the success of our attempt. In the next place, we ought to endeavor to raise the fundus, the patient lying on her left side, by pressing the bas-fond of the womb, which can be felt through the posterior wall of the vagina, upwards, with the fingers, so as to move the whole mass in a direction parallel with the axis of the brim. The cervix uteri is tied to the more anterior parts of the pelvis by the vagina and the vesico-vaginal septum, so that, if we carry the mass considerably upwards, it must be by tilting the fundus in that direction. Attempts of this kind will not always succeed. Where they fail, a finger may be passed into the rectum, the forefinger of the left hand if the woman is on her left side, and of the right hand if she be upon her back. Before the finger has passed very far, it meets with the fundus uteri, which presses upon the canal of the intestine; in this situation, we have far more power to move the womb than when the effort is made only from the vagina. Pushing gently and steadily upwards, we find the mass gradually to recede, until at length the fundus, liberated from its restraint, suddenly emerges, with a sort of jerk, from under the promontory, from which instant the woman is cured.

I have sometimes failed of success, until I placed the patient in a more favorable attitude; one in which she could not bear down, and thus oppose the success of my measures. I have directed that she should turn on her face, then draw her knees up under her until the thighs were in a vertical position, giving to the pelvis the highest possible elevation: the cheek was to be placed on the bed without pillows, and the point of the thorax was also to be touching the bed. Lying in this posture, the power of mere gravitation might suffice, in time, to unhitch the fundus uteri from beneath the promontory; since all tenesmus and bearing down are thus arrested. After waiting a short space, until the effects of the position were secured, I have pushed up the fundus very easily by acting either through the vagina or the rectum.

A pregnant woman, who has just recovered from a retroversion, ought to lie in bed two or three days, and should not, for a few days, be left more than six or eight hours without evacuating the bladder, either spontaneously or by the catheter; lest that organ, filling again,
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should unhappily a second time depress the fundus, and so cause us to lose all our trouble through want of a moderate precaution.

The gravid womb, doubtless, becomes, in four months and a half, too large to admit of the occurrence of retroversion: but the accident may occur at any period short of it; it may take place not only in the non-gravid, but in the virgin uterus.

CASE.—On the 22d of February, 1828, I was called to visit Elizabeth B., aged about twenty years. She had complained for several months past of dragging pain in the left side of the abdomen, with a sense of weight and great uneasiness within the pelvis. She has menstruated regularly. For the last three weeks she has been persecuted with constantly repeated and painful desire to go on the stool, and with symptoms of strangury, or dysury, amounting often to stilticidium urinæ. After a careful inquiry into the history of her case, I informed her of the nature of my diagnosis; and she at length agreed to permit an examination by the Touch, as I assured her that I had no means of relief for her, if there were really a retroversion, short of the Touch. In this painful necessity she submitted, with a laudable unwillingness, to the operation, and it was with no little difficulty that I at length carried the finger beyond a remarkably strong hymen, into the vagina. The os uteri was found near the symphysis of the pubis, and the fundus was discovered overturned into the Douglass's cul-de-sac. After a long perseverance in endeavoring to raise the fundus, I was compelled to attempt it with the forefinger of the left hand passed into the rectum, by which method I pushed the uterus up; whereupon she immediately declared that she was fully relieved of the sense of weight and pain that had so long been tormenting her. She continued well from that moment. I consider this a case of considerable interest, inasmuch as it further proves the possibility of a long-continued retroversion of the womb in the non-gravid and virgin state of that organ. I have seen many such cases since 1828.

There are some persons to be met with, in whom retroversion takes place so readily, that the least exertion of strength brings it on. In a single individual, I am sure that I have been called on to restore it to its position twelve or fifteen different times. So great, in that case, is the tendency of the womb to turn over, that it has several times occurred, notwithstanding the presence in the vagina of a very large globe pessary, and I did never regard her as exempt from the probability of an attack, except when in a state of advanced pregnancy. I presume that, in her case, there was not only a great relaxation of the vagina and its connecting media, the recto-vaginal and vesico-vaginal
septa, but there must also be supposed to exist a condition of the ligamenta rotunda et sacralia, which has allowed them to become elongated to such an extent, that the least pressure on the anterior face of the womb pushes it backwards and downwards. No one, I think, could suppose a case of retroversion without, at the same time, implying that the round ligaments, which pass from the angles of the organ out of the abdominal canal, and abdominal rings, are lengthened—and even stretched. A permanent elongation or laxity of those ligaments would add a great facility to the disposition to oversetting of the organ.

As there is reason to believe that there is a character of muscularity attached to the round ligaments, proceeding as they do from, and being composed of the same tissues as the womb, we may indulge, in any case, the hope that time, if not drugs and medicines, will bring them back to their natural tension and length, so as to obviate the evil propensity to the retroverted state of the uterus.

The accident of retroversion may be considered serious and dangerous just in proportion as it occurs at a more advanced period of pregnancy; for, according as the pregnancy is of an older date, is the necessity greater for a speedy reposition of the organ. I have, I think, pointed out sufficiently at length, the dangers to be apprehended from a retroversion continued until the whole mass becomes so impacted into the excavation, as to render its extrication, without abortion, impossible. As I have met, hitherto, with only two examples in which it was impossible to replace the gravid organ, I do not feel it incumbent upon me, at this time, to do more than refer to the severer methods of extricating the woman: these are, first, the artificial rupture of the amniotic sac, which, by allowing the water to escape, reduces the size of the womb so much as to enable the operator to succeed in restoring it to its proper position; or, lastly, the puncture of the womb itself, when it is found impossible to reposit or pass a bougie into the os uteri.

The Student ought early to become aware that some of these retroversions are rendered incurable by the formation of adhesive deposits, that tie the fundus uteri close down to the back part of the pelvis, and that as these adhesive bands cannot be approached with the bistoury, nor otherwise broken up, the womb is liable to remain in a state of permanent retroversion. M. Amussat mentions two such cases in his essay on retroversion, and I have met with three, two of which were verified by the necroscopy. I shall publish one case, as drawn up by Dr. Yardley, and illustrate it by a cut copied from a drawing by Mr. McIlvaine, who had the specimen before him, and which constitutes one of the most interesting preparations in the museum of the
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The following is the history of the case, as drawn up by Dr. Yardley himself, who allows me to publish it here.

Case.—"Mrs. N—— became my patient in the spring of 1840. I visited her on account of a diarrhoea, which had continued for some time, and which was attended with distressing pain in the left side.

"A regulated diet, saline frictions of the skin, which was cold and dry, together with small doses of mass. hydrargyri, opium, and ipecacuanha, soon cured the diarrhoea; but as the pain in the side and other symptoms of disease still continued, I was induced to investigate the case more fully. I then learned that since her marriage, about three years previously, she had had two attacks of uterine hemorrhage, which were pronounced by her physician to be abortions, though nothing like an ovum had ever been detected, and he had never examined the state of the uterus.

"The first attack came on on New Year's day, 1838, after taking a very long walk, and though the hemorrhage was not profuse, it was attended by such excruciating pain in the side on being moved that it was necessary to bring her bed into the parlor, where she remained several weeks. The hemorrhage and pain gradually subsided, and by the 1st of June she appeared to have regained her usual health.

"The second attack took place April 12th, 1839, and came on suddenly when making some unusual exertion while engaged at her toilet. The pain was so severe as to cause fainting, and was attended by vomiting, diarrhoea, retention of urine, tenesmus, severe bearing-down efforts, and slight uterine hemorrhage. These symptoms were mitigated by general treatment, without resorting to the catheter, or making a vaginal examination. She was confined to her chamber nearly three months under this attack, and was still suffering from its effects when I was consulted in her case. Her menses were irregular; her bowels frequently disordered; she was unable to take her accustomed exercise on account of a bearing-down pain and distress in the pelvic region, which was increased by exertion of any kind. Her husband informed me that since her last attack, she had always suffered severely from sexual intercourse.

"I considered these symptoms sufficiently indicative of disease or displacement of the uterus to call for an examination of the state of the parts. I found the uterus low in the pelvis, hot and swollen, and so sensitive as to preclude further exploration. Rest in a recumbent position, bleeding, cupping over the sacrum, and general antiphlogistic treatment, in ten days produced so much relief that the patient declared herself better than she had been for more than a year. I then made
a second examination, and found the engorgement, heat, and tenderness much diminished; but there was considerable prolapsus, and the uterus and vagina were morbidly sensitive.

"I was desirous that the patient should remain longer in the recumbent position, but the weather being warm, and confinement very irksome, I introduced a gilt-ring pessary, and sent her into the country.

"Mrs. N—— returned about the middle of September. She informed me that for three weeks after the introduction of the pessary, she felt unusually well; she was able to stand and walk without suffering, and the distress in the pelvic region was much mitigated; but about that time, when using considerable exertion, she felt the instrument move, and it continued to trouble her until it came away. After the displacement of the instrument, her old symptoms returned, though for a time she was better than before its introduction.

"After keeping the patient quiet a few days, I made another examination; all morbid sensibility of the parts had now subsided, so as to admit of a full exploration, and, for the first time, I detected in the hollow of the sacrum a round, hard body, with a deep indentation between it and the lower part of the neck of the uterus.

"It was difficult to decide whether this was a tumor, or the fundus of the uterus bent down in that position; but after a careful examination, I was disposed to regard it as the latter, though it was much lower and more prominent than I should have expected from the situation of the os tine, which was not more anterior than is usual in simple prolapsus of an equal degree.

"After pressing up the uterus as far as I could, I introduced a gilt-globe pessary under the fundus, hoping it would gradually restore the organ to its proper position, and that, if it came away, the patient could replace it herself, which was important, as these repeated examinations were very disagreeable to her.

"The globe pessary was retained but a short time, and as it caused considerable pain and uneasiness during its retention, the patient was unwilling to have it again introduced.

"At the suggestion of Professor Horner, of the University of Pennsylvania, I next placed the patient on her knees in the bed, with her head and shoulders as low as possible, and introduced an instrument into the rectum, under the fundus of the uterus, and, by that means, assisted by its own gravitation, endeavored to dislodge it from its position. In this manner, I succeeded in pressing the uterus up much higher than before, and after again introducing a ring pessary, I requested the patient to remain quiet for a few days. This ring kept
of its position two weeks, and was productive of much relief; but it then came away, and the unpleasant symptoms returned.

"This process of pressing up the uterus, and introducing a pessary, was repeated several times; and it was found that a ring pessary was the only kind that was of any advantage, for, while a ring retained its proper position, the patient was comparatively comfortable. This relief, from the use of a ring pessary, appears remarkable, when, after death, it was discovered in what manner the uterus was bound down to the rectum; there is, however, no doubt of the fact, and it may be explained, by supposing that the anterior wall of the rectum was pressed forward and upward, or the adhesions stretched.

"The difficulty of retaining the ring in its proper position, however, seemed to increase; rings of silver gilt, glass rings, ivory rings, rings of hard wood, such as ebony and lignum vitae, and rings of gum elastic, were all tried, but the gilt rings were found much the best.

"Discouraged by my want of success in the treatment of the case, I sought further counsel, and Professor Hodge, of the University of Pennsylvania, saw her with me, July 10th, 1841. On examination, he readily detected a retroflexion; a displacement of the uterus with which he was familiar, and which he calls a retort uterus, from the fact that the uterus is bent on itself in the form of a retort.

"He proposed the introduction and persevering use of a pessary of a peculiar form, which he has successfully used in many cases of the kind; I had an instrument made after his pattern, and introduced it; but it was not of the proper size, and caused considerable discomfort, which the patient attributed to the form of the instrument, and, to my regret, was unwilling to have another one of the kind used.

"During the following five years, she pretty much abandoned medical treatment, except that, whenever her sufferings became unusually severe, she applied to me, when, by pressing up the uterus and introducing a ring, she would be much relieved for a time. Several other physicians were consulted in the case, but nothing important or novel was suggested.

"Her symptoms gradually grew worse, and, in July, 1847, I visited her, and found her confined principally to her bed; she appeared slightly emaciated; her brilliant color was gone, and she suffered severely from sickness of the stomach. She informed me that, after passing her monthly period about three weeks, she had had a slight show, which had returned every few days for the last two weeks; making about nine weeks from her last regular monthly period. On making an examination, I found the uterus occupying the same posi-
tion it had heretofore done, and somewhat larger than before, but apparently not larger than an ordinary unimpregnated adult uterus.

"I declined adopting any active treatment without assistance, and suggested Professor Meigs, of the Jefferson Medical College, who saw her, with me, on the 17th of July. Dr. Meigs was sanguine, after examining the state of the parts, that the uterus could be restored to its proper position, notwithstanding the length of time it had been displaced.

"He came next day, prepared with an instrument to press up the fundus of the uterus, and with some small gum-elastic bottles, of the kind recommended by Hervez de Chegoin, in the hope that by gradual pressure in this manner we might succeed in restoring the organ to its proper position.

"The patient complained of much pain when the doctor attempted to press up the uterus, though but moderate force was used. I filled the bottles with curled hair, which I found to answer admirably on account of its elasticity, and introduced one of them carefully between the perineum and the fundus of the uterus. It gave no pain, and was retained without inconvenience, and appeared as though it would fulfil the indication.

"I kept her in her bed a few days, after which she rode out occasionally, and once walked several squares.

"On the evening of the 5th of August, after using much more exertion than she had done for several months, the ball was forced away, and she was attacked with severe bearing-down efforts, so that it was a considerable time before she could be removed to her chamber. After she had been carried to her bed, I made an examination, and found the uterus at the os externum, and the bearing-down pains so severe as to threaten its expulsion from the vagina.

"After administering an anodyne enema, and in some measure tranquillizing her system, I succeeded in pressing the uterus up to its former position, and introduced the gum-elastic ball at her own request, as she said she felt safer and more comfortable while it was in situ.

"The patient was unable to leave her chamber, and seldom her bed, from this time; and she often passed whole days and nights in the most awkward positions, because the least motion increased the pain beyond endurance. Her stomach became so irritable that it was seldom anything would be retained in it even for a single hour. She became weak for want of nourishment. The most excruciating neuralgic pains pervaded every part of her abdomen, so as to preclude
the possibility of any examination either externally or per vaginam; and, to increase the difficulty of diagnosis, she became tympanitic.

"The wise women of the neighborhood said she was in the family way; but of this we were not satisfied; and Dr. Meigs, who placed considerable reliance on the appearance of the nipple, examined her breasts carefully, and there was not the slightest change of the areola.

"An anodyne enema was administered every evening, but her nights were generally sleepless, and she gradually grew worse till the 19th of August, when I was obliged to leave the city for a few days. My friend Dr. Jewell attended her for me, and has furnished me with the following notes of the case:"

"My first visit to Mrs. N. was made on Thursday, August 19th, at the request of my friend Dr. Yardley, who was to be absent from the city for several days.

"Her condition, when I saw her, was anemic; countenance thin, pale, and sallow, expressive of long-continued and wasting disease; pulse sharp and frequent; abdomen tympanitic and exceedingly tender to the touch; tongue clean and moist; stomach so exceedingly irritable as to reject all nourishment and medicine, craving only ice, which, however grateful for a moment, afforded no relief. All her suffering was directed to a most excruciating pain in the left iliac region, accompanied with extreme gastric distress, which symptoms had been in existence, and increasingly so, for several days.

"Fomentations of brandy and spices were applied to the abdomen, and various anti-emetics and sedatives were ineffectually tried for the vomiting.

"In the afternoon, the symptoms being more aggravated, twenty-five leeches were applied over the stomach, and an enema of forty drops of laudanum in a gill of warm flaxseed tea thrown into the rectum. In the course of the night, the gum-elastic ball pessary, which had been introduced by Dr. Yardley for the retroversion of the womb, came away during an effort to vomit, and was not replaced.

"Friday, 20th. Found her very weak and exhausted, with some slight relief from pain and vomiting; expressed herself to be easier, but dreaded the return of the severe suffering she had experienced the day before. Was troubled with flatulency and slight oppression at the precordia. Directed the effervescing draught, with thin arrowroot, in small quantities, and to be frequently repeated. The fomentations to be continued as yesterday.

"In the afternoon, was sent for in haste—that Mrs. —— had convulsions. On my arrival at her bedside, I found her in a collapsed
condition, insensible, extremities cold, pulse and breathing scarcely perceptible, and her whole appearance completely blanched. By the persevering help of stimulants and artificial heat, she gradually revived.

"I learned from the family that, previous to her insensibility, she had complained of an agonizing pain in her left side, and an increase of sickness at the stomach, and in a few moments after went into convulsions.

"So forcibly was I struck with her bloodless condition at this time, I remarked to her husband that she had all the appearance of one who had lost a great amount of blood from flooding.

"Being comfortably restored, before I left, I ordered her brandy and water; ice in small and repeated doses, with essence of beef; and to repeat the enema of laudanum and flaxseed tea if the pain returned, together with the following prescription in doses of twenty drops every hour:

\[
R. \quad \text{- Solut. sulph. morph. } \frac{3}{j} ; \\
\text{Hoff. anod. liq. } \frac{5}{j}.
\]

"During the three following days, the vomiting continued with very little abatement. Every attempt to administer nourishment or medicine was indomitably resisted by the stomach, with the exception of the brandy and the morphine solution. On each successive day an anodyne injection was given, to subdue the attacks of pain in the left side. Her pulse, in the mean time, was feeble and frequent, her countenance blanched, and her whole condition so much exhausted as to afford but slight hope of her recovery. On Tuesday, 24th, however, there was an apparent amendment in her case; her pulse began to react, she was able to retain a little nourishment, the vomiting had in a great degree subsided, and her expression was, 'I feel comfortable.' Her bowels not having been open for several days, I ordered her a turpentine enema, to which they responded readily, though not freely.

"Wednesday, Aug. 25th. Had passed an easy night, but without much sleep; upon the whole she had improved, was cheerful, had taken a cup of tea, and had eaten some calf's-foot jelly; the tenseness and tenderness of the abdomen had subsided. I could make considerable pressure without causing either pain or sickness, and for the first time I was able to detect a tumor in the left iliac region, upon which spot, however, she could not allow pressure without acute pain.

"I felt quite encouraged with her appearance and the improvement in her symptoms, as did also her friends. Feeble hope was given that
she might be restored. She asked for a peach, which was allowed her, and I left her in good spirits.

"It was near 3½ o'clock P.M., when I was summoned by a hasty messenger, that Mrs. — was dying. On approaching her bedside, which was surrounded by weeping friends, I found her lifeless.

"I learned that she continued as well and as cheerful as when I left her in the morning, up to 3 o'clock, when she was suddenly attacked with violent pain, followed by a convulsion, which in a few minutes ended in death."

Having inserted the foregoing account of Mrs. N—'s case, by Drs. Yardley and Jewell, it only remains for me now to say, that the necroscopic examination of the body of this unfortunate lady was made by Dr. Ellerslie Wallace, in presence of Dr. Jewell and the author of this article, on Friday, August 27, 1847. Upon exposing the contents of the abdomen by a crucial dissection, and looking downwards into the excavation of the pelvis, there was discovered a great quantity of coagulated blood and serum, which being removed, the uterus was observed to extend across the pelvis from front to rear, lying horizontal in the excavation, and covered by the left Fallopian tube, which was turned over from left to right quite across the pelvis coincidently with the transverse diameter. The tube was enormously enlarged, having been converted into a sac which contained a fetus of near three months, developed in a tubarian gestation.

The uterus being measured, was a little more than four inches long, and at the broadest part three and three-quarter inches wide. The child-bearing Fallopian tube could be lifted up from where it lay upon the front surface of the womb—no inflammatory attachment having as yet been formed to bind them together. Upon lifting the tube-sac off the uterus, and then attempting to raise the fundus uteri out of its retroverted position, it was not possible to succeed, in consequence of the adhesive bands and bridles that bound it to the lower part of the sacrum. When these adhesions had been divided by the scalpel, Dr. Wallace could lift the fundus out of its bed, and reposit the womb. This I had been unable to effect during Mrs. N—'s lifetime, either with the hand or with Hervez de Chegoin's caoutchouc pessary. I was not surprised to find the fundus glued in this manner to the lower part of the sacrum, for I had, in June, announced to Dr. Yardley my belief that it was adherent—an opinion founded upon the firm resistance of the tumor against all my attempts to reposit it. I may remark here, that I believe the womb might have been got out of its false and adherent position by means of the caoutchouc pessary, or by slow and cautious proceeding with colpeyrusis, had not the tubal preg-
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Pregnancy unhappily supervened. I suppose that the adhesions might have been gradually broken or absorbed under the elevating power of M. Braun's method.

Fig. 75.

The rupture of the tube had occurred near its outer end, which, from its being turned over and laid upon the prostrate womb, was found nearer the right than the left ischium. Through the edges of laceration in the tube-sac, one of the feet of the embryon was protruding. The uterus and its appendages were removed, with consent of the friends.

Upon laying the uterus open, it was found to be filled with a deci-
duous mass and with bloody slime. The cavity was somewhat enlarged, but the paries of the uterus was very thick, like that of a uterus contracted after delivery. The tube was now laid over to the left, its natural position, and opened; whereupon it disclosed the embryo, as in the figure, which was taken by Mr. M’Ilvaine ad vivum. The deciduous membrane is seen in the cavity of the uterus, its edges being laid over on the cut surfaces.

I regard the case as an interesting one, from its showing the presence of its decidua in utero in a tubal pregnancy, and more especially as presenting an example of adherent retroversion; and, perhaps not less so, as exhibiting tubal pregnancy in a woman with adherent retroversion uteri. Since Dr. Braun’s invention of the colpeurynter, described in a future page, I have used his instrument as a means of repositing the organ in the following case, and conceive that I have been the first person to make that application of it.

Case.—In the month of June, 1856, a medical gentleman, practising in one of the interior towns of Pennsylvania, came to me to say that he had a case of retroversion in a woman, past four months pregnant, which he had in vain attempted to relieve. Nothing that he had done had in the least changed the posture of the womb, and he had accompanied his patient to the city for my advice and aid. On proceeding to the hotel, I took my colpeurynter with me, and found that I could barely reach the os uteri, by pushing the index finger as far as it could possibly be thrust upwards behind the symphysis pubis. I am sure the point of the finger was three and one-eighth inches within the orificium; so that, as the symphysis is but one inch and a half long, the os was situated very far above the top of the symphysis, and close behind the anterior abdominal paries. The pelvis was quite full of a fluctuating mass, which was the womb, distended with something, but whether with an ovum, I dare not now say. I prevailed upon the woman to lie on the back near the foot of the bed, with the limbs flexed, and, upon introducing and gently distending the colpeurynter, she complained of some uneasiness. In a short time, additional portions of water were thrown in, and I again desisted to let her rest. I soon afterwards allowed the sac to collapse, by letting the water escape into a bowl, and then repeated the injections, begging her to decide for me as to what amount she could, on trial, easily endure. It was not long before she, with a start, exclaimed: “What’s that?” My reply was: “I suppose it is your cure;” and truly, on withdrawing the colpeurynter from the vagina, I found, to my great satisfaction, that the uterus was completely reposited, the os being in its true nor-
mal position, and the fundus, that had long been turned over into the recto-vaginal cul-de-sac, being now above the plane of the superior strait. The woman was so overjoyed with this entire relief, as to signify her happiness, by the wildest expressions of delight, to her husband, who stood by her couch.

I have made use of the colpeurysis in a great many cases of retroversion of the womb, and I am free to say that I cannot now conceive of any such case that would not readily admit of repositing by the colpeuryneter, excepting always those cases in which adhesions have taken place, so as to confine the fundus low down in the cavity, and even in some of these, if the adhesions should not be very strong and old, repeated, gentle, and persevering colpeurysis might enable one either to elongate the adhesive bridles, or even break them, and force the fundus to rise up to its place.

Mr. Gemrig, surgeons' instrument maker, in Eighth Street, Philadelphia, prepares a most convenient colpeurynter. It consists of a vulcanized rubber bag, which, when collapsed, is not much bigger than a black walnut. To the sac is attached a hose, or tube, of the same material, about fourteen to eighteen inches long. A small brass stopcock is secured on the end of the hose, and fitted to receive the fistula of the syringe, by means of which water or air may be injected, and the bag distended at will. The great length of the hose permits one to use the apparatus in a way less shocking to the woman's delicacy, as the stopcock can be brought out from beneath the bedclothes, and the sac filled and emptied by turns.

In my practice, I am in the habit of teaching the patient to perform the colpeurysis with her own hands, first showing her how to adjust the colpeurynter, and then teaching her how to force the air or the water into the caoutchouc. This I have done for such persons as, having a chronic retroversion with considerable hypertrophy, I did not choose to attempt to cure by one violent operation; and I do believe, that in the bad cases, it would be, in general, for the interest of the sick woman to first teach, and then trust her as to the mode and degree of the colpeurysis.

I am very glad to have an opportunity to recommend the employment of the colpeurynter for the treatment of retroversion, particularly as such an application of the instrument appears to have wholly escaped the attention of its author, Dr. Braun, who, at p. 126, op cit., gives us a list of the affections for which he advises its employment, and which consist in cases No. 1. Metrorrhagia during dilatation of the cervix in labor; 2, bad presentations, as preparation for turning; 3, deformed pelvis; 4, bringing on, or hastening labor in eclampsia;
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5, for sustaining the parts in hernia intestino-vaginalis in pregnant women; 6, bringing on premature labor; and 7, as a substitute for the dangerous action of secale in the dilatative stages of parturition.

It appears to me unnecessary here to add anything on the subject of Braun's most useful instrument. I shall in subsequent pages have to speak of its various other applicabilities.

I have met with three cases of extra-uterine pregnancy in the tube, all of which proved fatal about the third month, and I should expect the death of the patient to take place, at or before the third month, in any case; since it is improbable that the tube can ever furnish the material for a matrix for more than some ninety days, at which time the tube-sac must become so much thinned and extenuated by its expansion as to burst. The rupture of the tube will be attended with fatal hemorrhage, because, being the seat of gestation, it has become highly vascular, in order to the carrying on of the gestation within its walls. I do not believe that a tubal pregnancy will ever be suspected until it has burst and begun to bleed. One of these cases I have just related, as drawn up by Dr. Yardley, under the head of retroversion.

If a woman should experience the signs of pregnancy, as to change of the aureole, as to nausea, pica and malacia, as to growth of the breasts, extraordinary sensation within the pelvis, &c., and thereupon, when having attained to the middle of the second or to the third month, be seized with horrible pain in the hypogastrium and pelvis, turn pale, lose the pulse, and faint—I should suspect the rupture of a tube-sac of extra-uterine pregnancy. It is true that the above symptoms might be expressions of affections of the ureter, perforation of the bowel, or fatal typhlitis calculosa; but, in case they should continue and increase, with signs of concealed hemorrhage, so as to leave no doubt of imminent death, I think the diagnosis could not be other than a ruptured tube-sac of gestation.

Such a diagnosis would not lead to any hopeful therapeutic or chiriurgical intervention, for nothing is to be done in these melancholy cases beyond the adoption of mere palliative measures. No man would be mad enough, under such diagnostic, to perform a gastrotomy operation.

CASE.—I had, some years ago, a young woman under my care who supposed herself to be pregnant some two or three months. One morning she took the broom to sweep her chamber-carpet, when suddenly she felt agonizing pain in the left iliac and pelvic region, which extended through the belly. She fainted, and became mortal pale and
pulseless; the agony was terrible. I supposed she had ruptured the sac of a tubal pregnancy. She expired in the course of a few hours, with all the symptoms of hemorrhage in the abdomen. I could not obtain permission to examine the body.

**CASE.**—I saw another case, which I shall relate in this place as follows:—

Mrs. ———, aged thirty-two, a healthy woman, mother of four children, was in excellent health on Sunday, October 7th. At six o'clock in the morning, she was singing and playing with her children. At seven o'clock, her husband, who was sick up stairs, heard her ascending the staircase, and groaning heavily; when she entered his room, she appeared alarmingly ill. A physician, Dr. ———, was sent for, and found her with a pulse one hundred and forty; in violent pain, extending from the top of the thorax on the right side, quite down to the iliac region. He attended her all day, applied a blister to the right side of the belly, gave a cathartic, &c. She passed a dreadful night, but was easier at eight o'clock next morning; the pulse then one hundred and twenty. He left her for a short time, but found her worse on returning to the house. I was sent for, and arrived at half past two o'clock. She appeared to be dying at the time of my arrival. As she had vomited very much, and had a most excessive tympany, with violent pain in the whole belly, she got an enema, which brought off a great deal of stercoraceous matter, without sensible relief. In half an hour, she said: "Raise me up—my breath is leaving me." I raised her a little on the pillows, and she swooned and died. Twenty hours after death, I opened the abdomen, and found it filled with about thirty ounces of blood, and bloody serum. The whole pelvis was filled with coagula, while a great quantity of blood was among the bowels.

This blood came from a ruptured left Fallopian tube, which contained a fetus of six or seven weeks. The ovarium was somewhat enlarged. The womb had a deciduous lining, and the canal of the cervix was filled with a claret-colored mucus or lymph. The womb was larger than a non-gravid womb, though not a great deal larger.

I have had under my care only one case of ventral or abdominal pregnancy, though I have had opportunities to witness the examination of bodies of persons perishing from this dreadful accident. I shall merely express some doubt that I feel as to the propriety of any gastrotomy operations in such cases save mere incisions for the easier escape of the contents of the suppurating sac and the remains of the fetus.
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I refer the Student to the records for samples of life not only continued long after the complete establishment of the extra-uterine pregnancy, but of good health enjoyed notwithstanding. The late distinguished incumbent of the chair of Midwifery in the University of Pennsylvania, Prof. James, published in the *Eclectic Repertory* an account of a lady who carried out a normal pregnancy, notwithstanding she had in the abdomen an extra-uterine fetus, which she carried many years.

**Signs of Pregnancy.**—I have been, on several different occasions, both vexed and amused upon observing how prone are some medical practitioners to overlook the signs of pregnancy even in married women, their patients.

One gentleman, of great experience, tapped a woman for ascites, but his trocar went into the gravid womb, and penetrated the shoulder of the fetus. She fell into labor, and recovered of the accident; the child had the mark of the trocar on his shoulder. She afterwards suffered from strangulated hernia of a knuckle of intestine, that escaped through the trocar-opening in the linea alba. This hernia being reduced by Dr. Pancoast, she recovered happily. At a subsequent period, the protrusion again occurring, the gut was fatally strangulated. Professor Pancoast, who made the post-mortem examination, preserved the specimen in the Jefferson College Museum. Many instances of the strangest oversight have occurred within my range of observation, instances in which the size of the belly, the married state of the patient, and the obvious evidences of gestation, as well as its probability, ought not to have been overlooked, nor mistaken for diseases requiring troublesome, disgusting, or dangerous therapeutical prescription. The safest rule would be to suppose every married woman as pregnant, if of the proper age, with suspension of the catamenia, and not giving suck, and to treat her as gravid until convinced of the contrary.

**Case.**—Mrs. ———, aged thirty-six, multipara, resident in Philadelphia, was ill on the 15th March, 1850, with diarrhoea, attended with very distressing tenesmus. That able physician, Dr. ———, attended to her during three days, and then left her in apparent good health. She was supposed to be, at the time, one hundred and twelve days gone with child. She had no doubts as to the pregnancy. Ten days after the attack of diarrhoea, March 25th, she began to grow rapidly larger, and the belly soon became so enormous, and so painful from tension, as to induce her to send again for the doctor, who found
her, as he supposed, affected with a vast ascites, consisting of many quarts of fluid contained within the peritoneal sac. I know not on what day Dr. —— first saw her again. The secretion of urine was nearly abolished. The reins and lower part of the abdomen were very painful, yet there was no pain produced by pressure or by palpation. No signs of pregnancy save that the cylindrical cervix was short as in a woman of seven months, and that the cone of the cervix, felt in the vaginal cul-de-sac, was expanded. The os uteri was well closed.

Neither palpation nor auscultation disclosed the reliable evidences of a pregnancy. Still, the woman insisted that she was pregnant and quick with child.

She became affected with nausea and frequent vomiting. She grew thin, and got a haggard expression of the face. She was costive. There was not the least cedema of the limbs or face. Under these circumstances, Dr. —— announced his desire to tap the patient, which he looked on as the only hopeful means of arresting the vomiting, which now caused her to throw up the whole of the ingesta. The pain from abdominal tension was almost insupportable, and the emaciation extreme.

On Monday, April 22d, I was called in consultation. She vomited everything—was in great distress from distension of the belly. Pulse frequent and energetic. Tongue clean. She was tolerant of pressure in every part of the abdomen. The vaginal touch revealed to us nothing to be depended upon, though made with great care. Protracted and anxious auscultation of all the parts of the abdomen, disclosed no foetal sounds, and long palpation no foetal turbulency. The patient insisted upon the gravidity, which I could neither affirm nor deny.

Upon consultation, it was agreed to defer for the present the idea of a tapping. She took citrate of magnesia, which purged her well and brought an end to the vomiting. She then took acetic tincture of squills, combined with sweet nitre, for I fully believed in the existence of ascites having at least sixteen quarts for the collection, and I gave this as my opinion, concurring with Dr. ——, physician in chief. I did not deny nor affirm the pregnancy.

On Thursday, May 2d, at noon, Dr. —— was called to her in labor, which soon terminated in the birth of twins, of five and a half months, the first born being faintly alive for a few minutes, and the second quite dead.

While Dr. —— sat at the bed foot, a vast quantity of water (a great many quarts) gushed from the ruptured membranes; a very large bucket-full, was the doctor's expression. Soon after which, the
twins were expelled, and then the placentas, united in one disk, were removed.

To-day, May 3, 1850, I saw her at noon. The womb is firmly contracted in the lower part of the belly, though very large; being about five inches in transverse by seven in longitudinal diameter. I do not think there is any, the least degree of effusion in the peritoneal sac, and the patient is in every respect comfortable.

I do not suppose that I have ever been concerned with a more instructive case than this. Dr. ————, an able and most experienced physician, who has had about 6000 labors, mistook the developed belly for an ascitic tumor, an opinion in which I wholly concurred after the most careful observation, the employment of all the proper means of diagnosis, and serious reflection on the history of the case.

I never have met with a more fluctuating dropsy than this one, the waves being most distinctly and clearly perceptible, in whatever direction propagated by the percussions. It was dropsy of the ovum.

My objection to the paracentesis depended upon two points; first, the risk of peritonitis from the wound; and second that of interfering with the uterus, provided she was really pregnant.

But for this hesitation she would have been tapped, and that with my consent, which I was on the point of yielding!!

Let the perusal of this most interesting case serve as a memento for the Student in all instances of such sudden dropsies, complicated with averred gestation. Let the distress of this patient be referred to the same category of influences that occasion so much constitutional irritation from the too rapid growth of the womb, under hydatid gravidity, as in my case, related at p. 244 of this volume. I was greatly shocked, this morning, to find how grave a mistake in diagnosis I had made, and equally relieved to find the patient delivered of her twins and her ascites by the same gush. I beg the Student not to forget this lesson, and I hope he will refer to it before he taps a female of whom it is possible to suppose that she is gravid.

Let the Student also imagine, for a moment, how very disagreeable must be the reflections that follow the clearing up of so egregious an error as that of administering powerful emmenagogues to married women, who, nevertheless, would not miscarry; or who, now and then, are found to miscarry under such a diagnosis. The signs by which a woman knows herself to be pregnant are, the cessation of her regular menses and the subsequent enlargement of the abdomen; the movements of the foetus; certain constitutional or local disturbances or disorders, and modifications of the mamma. A married woman, who has been well regulated, suspects that she has conceived, if she fails to
menstruate at the proper term; but this cannot be considered as conclusive evidence of conception, since so many and such various causes are found to obstruct and divert the regular course of the menstrual function. A second failure, especially if it be not accompanied with any signs of depraved health, renders the suspicion still more valid; while after a third and fourth omission, the change of form, and at last the perceptible motion of the embryo put all doubt to flight. I may say, however, with great confidence, that the audible or palpable movements of the foetus afford the only true and infallible signs of the existence of pregnancy. But, the audible are far more to be relied on than the palpable signs, at least after the sixth month.

There are many accidental or correlative signs which establish a probability of the existence of pregnancy: among these I may mention nausea and vomiting; a gradual increase or development of the mammae; a change of the areoles of the breast, which become more protuberant or elevated, and acquire a dark brown hue, much to be relied upon, especially in first pregnancies. The nausea is mostly found to occur in the morning, and is attended in some individuals with a distressing heartburn and salivation or spitting of saliva. Some people are affected with gravel, or dysury, from the extension of irritation to the neck of the bladder, or from pressure of the enlarging womb upon the posterior surface of that organ. An irritable state of the temper indicates it in some women, which is attributable to the general malaise that must attend the gastric embarrassments which the early stages of pregnancy are so commonly found to produce. Toothache, earache, styes on the eyelids, morph on the skin, a dark aureole around the eyes, and strange, unaccountable longings or appetites are also signs of pregnancy, rather to be noted after pregnancy is fully ascertained, than to be depended upon as sure evidences of its existence.

By means of the Touch, pregnancy may be doubtfully ascertained, before quickening has taken place, but not surely. By the Touch we can readily learn that the womb is enlarged, altered in form, and contains something; but I do not see how any physician can absolutely aver what that something is, unless he can perceive a spontaneous motion in it; so that even the ballottement, or tilting the embryo upon the point of the finger, does not furnish, to my mind, any sure evidence that the tilted body is an embryo. I adhere, therefore, to the opinion I have already expressed, that we have no certain signs of pregnancy except those derived from the visible, palpable, or audible motions of the child.

Auscultation, either by means of the stethoscope or the direct appli-
cation of the ear to the abdomen of the woman, enables us to perceive
two very distinct sounds, one of which is the beating of the heart,
and the other that which has been called the placental souffle, bruit
de souffle, or bellows-like sound; the latter being occasionally attended
with a sound like the cooing of a dove. Whenever we can distinctly
hear the beating of the foetal heart, so as even to count the number
of its pulsations, all doubt must be at an end. The placental sound,
or the souffle, is a very distinct sound, which has been supposed to
indicate not only the presence of a foetus, but also that it lives; the
rushing or blowing sound being said to always cease as soon as the
foetus expires: it was said to be, in some way not yet sufficiently un-
derstood, connected with the movement of the blood in the placenta,
and to cease, of course, with the cessation of that movement, which is
itself dependent on the systole of the foetal heart.

Upon a more scrupulous inquiry as to the value of the bruit de souffle,
in the diagnosis of pregnancy, it has at last been found that the earlier
opinions of it were erroneous, and I believe that there are few well-
formed physicians to be now met with who give it even the smallest
portion of their confidence in the doubtful discriminations that they
are sometimes compelled to make. It is not to be doubted that the
sound is produced by the rush of blood in vessels, and in my opinion,
sustained by very long practice in obstetric auscultation, it depends
upon the motion of blood in the iliacs and hypogastrics. I have cer-
tainly heard the same sound after delivery as before the child was
born; and I have heard it, as dependent upon pressure by tumors
within the abdomen. Hence I have not the least confidence in it as a
means in obstetric diagnostication. The sounds of the foetal heart need
never be mistaken. They can be detected at the fourth month, when
the opportunity is good. M. Depaul has heard them much earlier.
To look for them earlier than the fourth month is, however, in gene-
ral, merely to lose one's time and find a disappointment.

It is perhaps, on some accounts, of less consequence to be able to
ascertain the existence of pregnancy in the married than in the un-
marrried woman. The lapse of twenty weeks, and sometimes of six-
teen weeks, makes it surely known; and the married woman, who has
no motive to keep it a profound and important secret, readily imparts
a knowledge of her situation, or her suspicions relative thereto, to the
physician, or her friends. Not so with the unmarried female, whose
reputation depends upon the concealment of her misfortune or crime.
I have frequently been sorely embarrassed by uncertainty as to the
condition of a patient whose ruddy cheeks and embonpoint seemed
quite incompatible with a suppression of the catamenia, and whose
complaints of aches and pains might possibly be merely assumed as a means of deceiving the medical adviser. Physicians are frequently applied to by the unfortunate or guilty for relief from "obstructions," when the applicant has only a design to obtain some powerful deobstruent or emmenagogue, which may serve to procure an abortion, that she knows no honest or respectable medical practitioner could be induced to procure for any pecuniary reward whatever. I hold it, therefore, to be a duty, in all cases, or ranks, to compare the complaints of amenorrhoea with the appearance of the patient, and if some evident malady does not accompany the supposed suppression, to withhold all medical aid, until time or necessity discloses the indications that are to be fulfilled. In physic, nothing should be taken for granted. It is too much to expect that a female, who has it at heart to conceal her pregnancy, will confess it to a medical man. Experience teaches us the very contrary.

Case.—I was requested some time since by a lady to visit a favorite servant, whose situation excited her apprehension, as she had failed to menstruate for the antecedent seven months, and was already considerably swollen with something like dropsy. Being directed to the young person's apartment, I found her in bed, covered up to the throat with bedclothes, but the face that peeped out from above them actually shone with ruddy health, or agitation, or both. The pulse was natural, the tongue clean, the respiration normal, and the entire physiognomical expression as healthful as possible. She informed me that she had a stoppage of the courses for the last seven months, and felt very bad, and was now alarmed at a swelling of the stomach, which had increased greatly of late. Suspecting that she had an important secret, I asked some questions about pains in the stomach, and, upon permission obtained, placed my hand on the abdomen, being almost certain that I should feel the motions of a foetus; but, however long I held my hand on the abdomen, no movement of the child could be felt; so that, although I was certain she was pregnant, I was as yet unprepared to tell her so. I at length got permission to apply the ear against the side of the abdomen, and distinctly heard the placental souffle, and afterwards the stroke of the foetal heart. Upon this assurance, I told her she was pregnant. "If I am," she replied, "I wish God may strike me dead!" and continued, with much temper and even passion, to declare that I maligned her and slandered her. I was obliged to leave her without the least assent, on her part, to my diagnosis, although she knew perfectly well that I spoke only a truth with which she had been long acquainted. She went out of town,
and was confined in the country with a fine boy. Many examples of similar perverseness, in denying pregnancy, the signs of which were perfectly plain to me, and ought to have been obvious to the most careless observer, have fallen under my notice; so that I deem it a solemn duty, previously to the exhibition of any medicines, to ascertain that some signs of disordered health are present, in order that I may not commit the unpardonable fault of provoking an abortion, instead of removing a morbid obstruction of the catamenia.

Let me, however, warn the young beginner here, to take special care, in his diagnosis, that he shall first know the woman to be pregnant before he dare venture to say so. How could a gentleman commit a more unpardonable, or more insulting error?

I might here abstain from any further enumeration of the signs of pregnancy; for I am accustomed myself to decline giving an opinion in any case, until I am sure that I cannot be mistaken, which I never can be when I hear the fetal heart, clearly and distinctly repeating its beats in the womb.

Quickening is not a sign to be depended on by the medical attendant, though it may convince the patient herself; for the woman may perceive it, when the physician cannot. Her conviction ought not to be equivalent to his own conviction. Even the sensible motions felt upon palpation of the abdomen may deceive both the woman and the doctor. Multitudes of such deceptive cases of "danse de la matrice" are met with in a long career of practice. I have seen a woman who had the sensible motions of a child in her belly, though she had given birth to a foetus at full term only six weeks before, and of whom several physicians who examined her had declared the motions to be caused by a child, yet her cervix uteri was an inch long in the vagina, and the abdomen so soft as to allow one to push his hand down so far as to feel the spinal column. She was not and could not be pregnant.

Many of my patients have engaged their monthly nurses and called me in, who were found, when I arrived, to be troubled with tympanitis only. *Tenues in auras evadit.*—See certain cases in my Letters to the Class, under the article Tympanitis.

The toothache, the ephelis, the hordeolum, the nausea, salivation, pica, pouting of the navel, and even milk in the breast, are merely inferential signs, and are by no means to be depended on. I repeat, that I can rely only on the heart's motion heard in auscultation, and that sign cannot be detected until the fourth month. This is the rule; the exceptions, few in number, are those in which it has been found in the pregnant woman as early as three months and ten days, as in the instance now to be related from Depaul, *Traité Théorique et Pratique*
CASE.—"Madame T——, who has already borne several children, had her courses on the 10th to 15th April. From the 17th to the 20th of same month, she cohabited with her husband; he then left Paris on a journey of a fortnight. Upon his return early in May, he found his lady confined to bed with the early symptoms of a typhoid fever, which in a few days became perfectly well marked, and continued twenty-four or twenty-five days. Her convalescence required a lapse of time nearly as long; and no sexual relation occurred until after her recovery. Nevertheless, upon the first of August following, as her courses had not reappeared, I was requested to see her with a view to determine whether this retention, which was very naturally attributed to the severe disease she had lately suffered, might require the employment of certain remedies for its cure. I confess that I was at first inclined to give up the idea of a pregnancy, begun previously to the commencement of the typhoid fever. I was little inclined to suppose its existence computing it from the new sexual relations succeeding her convalescence; but the examination per vaginam enabling me to detect a notable development of the volume of the uterus, I fell back upon the first opinion, of the propriety of which I became fully convinced, when, after having applied the stethoscope at various times upon the inferior region of the abdomen, I discovered the double pulsations, which were repeated 140 times a minute, while the pulse of the mother was only seventy-six. I could not hear the souffle uterin. Her confinement occurred in the following January."

M. Depaul, if the above case is to be relied on, heard the double sounds 100 days, or three months and ten days after the fecundation had taken place. The pregnancy continued 174 days after the audition of these foetal sounds.

Probably few such early detections will be made by all the readers of this paragraph.

Inasmuch as I have spoken at length on the signs of pregnancy in my Letters, I shall beg to refer the Student, for further information, to that volume sub voce.