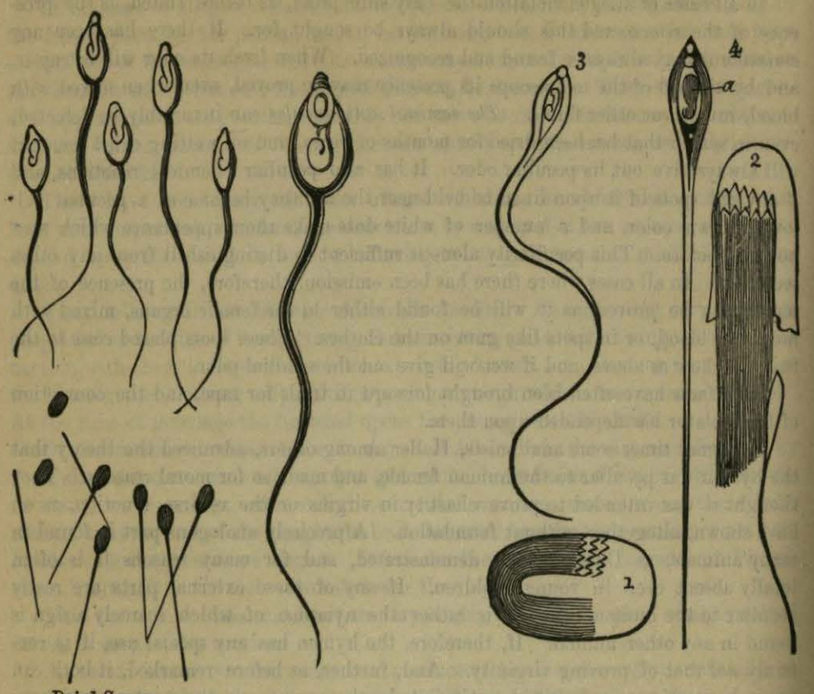


FIGURE 65.—*Human Semen, Recent and Dried.*

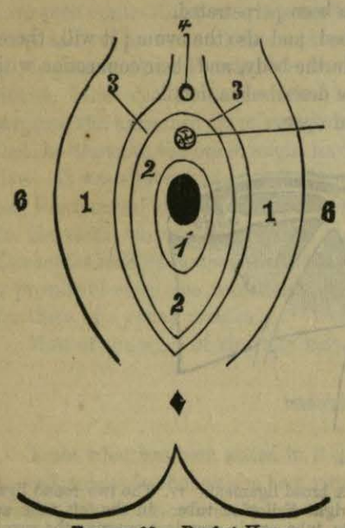


FIGURE 66.—*Perfect Hymen.*

FIGURE 67.—*After Violent Rupture*

On the preceding page is shown the appearance of the human semen under the microscope, both recent and when long dried. In 1—Figure 64—the animalcules are shown coiled up in one of the vesicles in which they are formed. In 2 the vesicle is opening for them to pass out. 3, 4 are perfect animalcules, and in 4, at *a*, are seen the internal organs.

In the dried semen the heads and tails are often separated.

The first of the lower cuts, Figure 66, shows the appearance of a perfect hymen unbroken. The second, Figure 67, shows one that has been ruptured by some violence.

THE FALLOPIAN TUBES.

The Fallopian tubes, as already explained, form the only means of communication between the ovaries and the womb, and it is into them that the ripe eggs are passed when they leave the ovary. The structure of these organs is very peculiar, and they are of great importance to *health*, besides being essential to generation. In dissecting them, the interior passage is found to be covered with a number of cilia, or hairlike threads, which are directed toward the womb. These cilia are in perpetual motion, like small worms, drawing themselves up and then elongating, and the tube itself is also constantly contracting, in successive waves, from the ovarian end to the uterine end. The result of these combined motions is, that, so long as they continue, and ob-

Fig. 68.

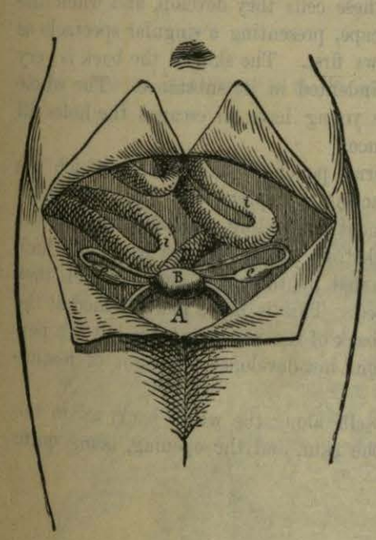
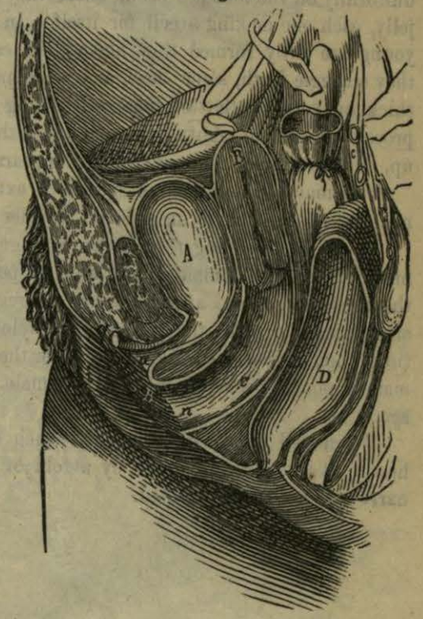


Fig. 69.



FIGURES 68 and 69.—*Internal Female Organs.*

Figure 68. Front view of the female organs. A. The bladder. B. The womb. *ee*. The ovaries with the Fallopian tubes above.

Figure 69. Side view of the female pelvis cut through. A. The bladder. B. the womb. C. The vagina. D. The rectum. *q*. The clitoris. *i*. The large lip, or labia.

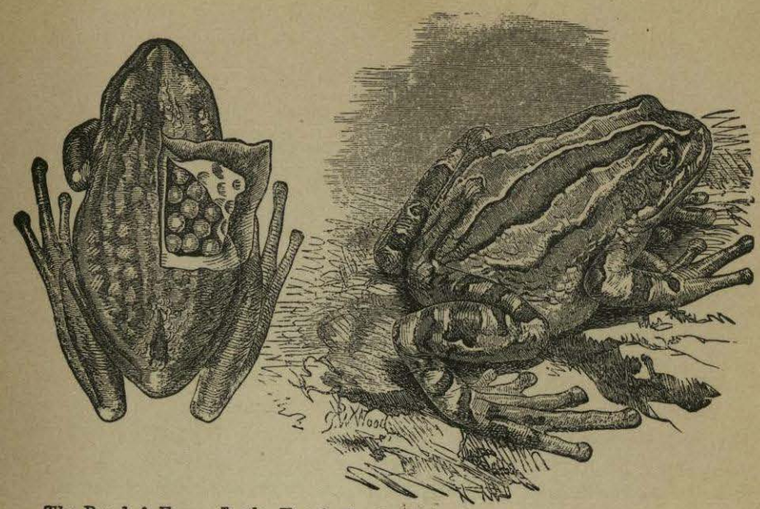
PLATE XIV.

In the Surinam toad, the male, when he has impregnated the eggs, places them uniformly on the female's back, where they become imbedded in a kind of sticky jelly, each one making a cell for itself. In these cells they develop, and when the young are fully formed they make their escape, presenting a singular spectacle as they struggle forth, some head and some paws first. The skin of the back is very thick and soft, to allow of these cells being indented in its substance. The whole process takes some eighty days, and after the young have all escaped the holes fill up, and the animal resumes its usual appearance.

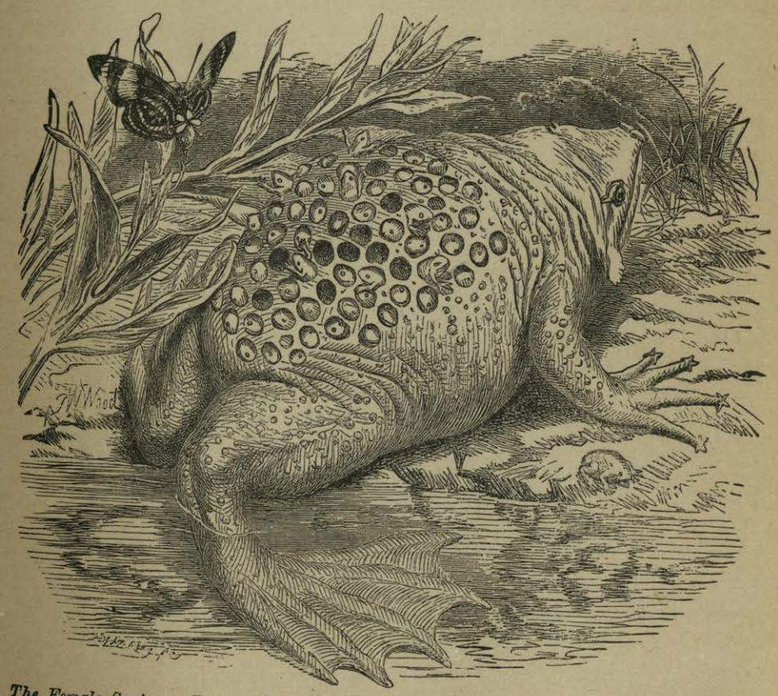
This may be considered a species of external pouch development, in which the male is indispensable as an assistant, besides acting as impregnator.

In the pouched frog there is an arrangement resembling somewhat that of the marsupials. The female has a kind of pocket, or pouch, on her back, in which the eggs are placed, after they are impregnated by the male, and in which they are carried about till the young are developed. This is not a place formed at the time when it is wanted, like the cells on the back of the Surinam toad, but is a permanent pouch, possessed only by the female, and not developed till she is of mature age.

When well filled with eggs this pouch swells along the whole back, up to the head. It is very firmly closed by a fold of the skin, and the opening, being quite narrow, is not easily detected.



The Pouched Frog. In the Female the Pouch containing the Eggs is thrown open.



The Female Surinam Toad, with the Young making their Escape from the Cells on its Back.

ject of proportionate size can enter at the ovarian end of the tube and be conveyed *down* to the womb, but nothing can enter at the uterine end, nor be conveyed *up* to the ovary. The ovarian end of the tube is also expanded, so as to embrace or cover any object, and is provided with fimbriæ, or fingers, to grasp with, but nothing of the kind exists at the uterine end. It is evident, therefore, that, except under peculiar and unusual circumstances, explained elsewhere, nothing can pass *from the womb to the ovary*, but only in the opposite direction. The great use of the tubes, is undoubtedly, to transmit the ripe eggs to the womb, after they are ejected from the ovary, but, besides this use, they also serve another purpose, of great consequence to female health. The continual excitement to which the ovaries are subject, causes them to be always secreting various fluids and other substances, which, if not expelled from the body, are apt to cause many evils. Now the only mode of escape for these secretions is down the Fallopian tubes, which are consequently perpetually embracing the ovaries, by their expanded terminations, to allow of this escape taking place. A portion of those discharges, therefore, occurring at ordinary times from the vagina, are really the secretions of the ovaries, transmitted down the tubes into the womb, and thence to the lower passage. If the tubes are obstructed or paralyzed, as is sometimes the case, this transmission cannot take place, and the ovarian secretions are retained. When this occurs, they either cause continued irritation by their contact with the interior surfaces, or acute inflammation by being absorbed. And in this way often arises inflammation and dropsy of the ovaries, tumors and abscesses.

There are many causes that tend to weaken the action of the Fallopian tubes, and which, therefore, dispose to the above diseases, and also lessen the liability to conception. In some persons they are almost totally torpid, *from want of sexual feeling*, the production of which puts them in vivid motion almost invariably. It follows, therefore, that this peculiar excitement—which many uninformed persons affect to despise and totally condemn—is really, in many instances, a preventive of disease, and its experience becomes essential to the preservation of health. On the other hand, *excessive* amorous indulgence will so weaken the tubes, by the incessant excitement to which it subjects them, that they will almost lose their power of contraction, and then the individual will be liable both to disease and sterility. This is, in fact, the chief reason why prostitutes do not conceive so frequently as married females; the continued and excessive excitement which they experience, causes a paralysis of the tubes.

In several instances proof has been obtained that, at the moment when the egg passes from the vesicle, the tube *erects*, and its fimbriæ grasp round the ovary, so as to include the ovum within the open end. It is probable also that, at the same time, the body of the uterus expands, while its mouth closes, owing to the excitement experienced, and thus there is powerful *suction*, by which the egg is drawn into the first part of the opening. In some females the motion and erection of the tubes can be distinctly *felt*, and it is occasionally so energetic, that it may be *seen* externally. It is always very readily excited, by external treatment, and is often all that is required to remove many diseases, in their incipient stages.

A perfect paralysis of the tubes, or closure of the passages down them, of course, necessarily causes sterility, because the egg cannot reach the womb. This fact is sometimes of practical value in preventing breeding in female animals. Instead of *spaying*, or removing the ovaries, which is the common operation, a ligature is tied

round each tube, which, by closing its passage, and preventing the passage of the egg, effectually prevents any future conception. In some females the action of the tubes is very slow, and the egg becomes decayed and spoiled before they convey it to the womb. The sterility arising from this cause may always be cured by quickening the action of the tubes. In ordinary cases, the egg is conveyed down them in about two days, and it first passes into them immediately it is expelled from the ovary, which is just about the cessation of the flow. The egg, therefore, reaches the womb, as a general rule, about the second day after menstruation is over, and then commences the liability of conception. It may, however, pass down in one day, or less, and may be as long as five or six days, or more, as explained elsewhere. It is probable that sexual excitement, just at the termination of the flow, hastens the passage of the egg, and thus makes conception possible so much earlier.

It is probable that many cases of *hydatids*, and other living bodies, and also polypi, are caused by eggs being retained through the inaction of the tubes. This retention first causes inflammation of the ovaries, and then the inflammation causes the ova to imperfectly develop, as already explained.

At the present time, barrenness from want of passage in the Fallopian tubes, can be cured, an operation being performed, by which they are opened. This consists in passing a silver tube, properly made, into the womb, till the end of it touches the opening of the Fallopian tube, and then a very small probe is thrust out of it and pushed along the passage, so as to open it, or remove any obstructions. With proper instruments, and by using due care, this apparently difficult operation becomes quite feasible, and its results are often as acceptable as they were unexpected. I have known barrenness of many years' standing cured by this practice—conception occurring in a few weeks after.

The usual length of the tube is about three inches, but I have seen them four, and even five inches. Sometimes they are too short, and cannot reach the ovary, which is, of course, another cause of sterility, and an incurable one.

THE WOMB.

The uterus or womb, called also the *matrix*, was formerly thought to be the most essential of the female generative organs, but is now known to be merely a receptacle, in which the ripe egg is placed for a short time after its ejection from the ovary, and in which it develops into the new being if conception occurs. There is no uterus, therefore, in those animals that do not bring forth their young alive, the egg in them being expelled and developed externally.

The situation of this organ in the body will be readily understood by the explanations already given. It is placed midway between the lower edges of the two hip-bones, and its upper part lies immediately upon the bladder, which is in front of it, while behind it is the rectum, or lower part of the large intestine. The womb does not extend downward but about two inches, or little more, and immediately below, connected with it, is the passage called the *vagina*, which leads up to the womb, and opens externally at the vulva, between the labia. When viewed externally, the womb and vagina seem to form but one organ, but internally, the distinction between them is easily seen.

The form of the womb is nearly that of a pear, the larger end being at the top. It is not round but flattened, being widest across the body from side to side, and it is slightly curved, or bent, the convex part being toward the backbone. The lower

part of it, called the *neck*, hangs down into the vagina, the walls of which are attached to the exterior of the womb, some distance above. At each one of the upper corners of the womb is one of the Fallopian tubes, with the ovary underneath, the tubes being about three or four inches in length, and the ovarian ligament about two or three inches. Underneath these, some little distance down the sides of the womb, there are also attached two round cords, one on each side, very firm and strong, which are called the *round cords*, or ligaments of the womb. These are about five inches

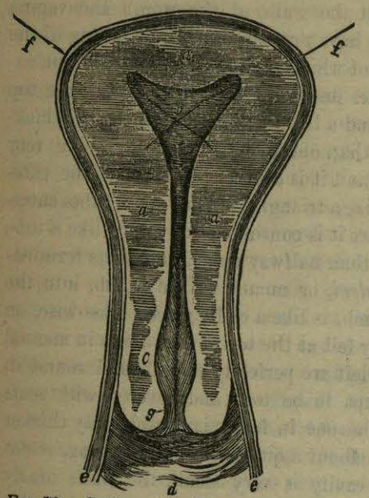


FIG. 70.—*Section of the Womb, natural size.*

aa are its thick walls. *b* is the cavity in its upper part, or *body*. *c* is the cavity in the lower part, or *neck*. *d* is the vagina. *ee*. The edges of the walls of the vagina cut through. *ff*. Two threads, passing through the openings of the Fallopian tubes, and appearing in the inside. *g* is the mouth of the womb, or os tincæ opening into the vagina.

This view, being of the *full size*, will give an idea of the astonishing change this organ has to undergo in the process of gestation.

FIGURE 71.—*Section of the Womb, natural size, cut through the other way.*

B. The walls of the womb. C. The vagina. *g*. The mouth of the womb.

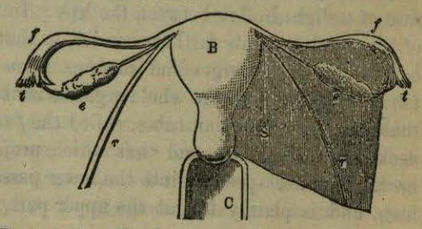


FIGURE 72.—*The Womb and its Appendages separate from the body.*

B. The womb. C. The vagina. *ee*. The ovaries. *ff*. The Fallopian tubes. *rr*. The round ligaments. *s*. One of the broad ligaments. *tt*. The fimbriæ of the tube.

long, curved round, and by their other ends firmly attached to the pubic or front bone. These act like stays, and keep the womb in the center of the body, on the rounded top of the bladder. Without them it would be constantly liable to displacement, but as each of the ligaments acts with equal force, and in an opposite direction to the other, they necessarily maintain the organ in the center. (See the view of the internal female organs in front.) Besides the round ligaments there are also the *broad ligaments*, which consist of two broad sheets of strong membrane, one on each side, which extend from the top of the womb, nearly the whole length down, inclosing the round ligaments, tubes, and ovarian ligaments in their substance. These grow fast to the sides of the pelvis, and assist in maintaining

the uterus, the ovaries and tubes, in their proper situations. There are also two ligaments that connect the womb with the bladder in front, called the *anterior ligaments;* and two others which connect it with the rectum behind, called the *posterior ligaments.* All these, however, do but little toward actually *supporting* the womb, which is really kept in its place more by the firmness and density of its own substance, and that of the vagina below, and by the tension of the muscles in the perineum, than by anything else. When these parts become weak, from debility or disease, the ligaments stretch, the perineal muscles relax, and the walls of the womb and vagina soften till all fall down together, and then we have *prolapsus uteri*, or falling of the womb, the causes, symptoms, and treatment of which are fully given farther on.

The length of the uterus is about two inches and a half, its breadth at the top about one inch and a half, and at the lower end a little less than an inch; its thickness also, through the flat way, is a little less than one inch. The walls being very thick, the interior cavity is necessarily small, and it is different in form to the exterior. In the upper part the cavity is shaped like a triangle, the Fallopian tubes entering at the two upper angles; in the lower part it is continued downward like a tube which swells out considerably a little more than halfway down, and at its termination opens by what is called the *os tincæ*, *os uteri*, or mouth of the womb, into the vagina. This opening, or mouth of the womb, is like a cleft, placed cross-wise, on the prominent neck of the womb, and is readily felt at the top of the vagina in manual examinations. The two lips formed by this cleft are perfectly smooth and round in those that have not borne children, but are apt to be torn and covered with scars in those who have. The anterior lip, or the one in front, is considerably thicker than the other, so that the cleft, which is about a quarter of an inch long, is not quite in the center. In virgins the internal cavity is very small, the walls nearly touching each other, and the mouth of the womb, or cleft, is so narrow and its lips so firmly closed, that it can scarcely be ascertained. In young persons, in fact, the neck feels precisely like the end of the nose, the os tincæ merely giving the impression of a slight hollow between the lips. In those that have borne children the walls of the womb separate farther asunder, so that the cavity increases in size, and the os, or mouth, also enlarges and remains more or less open, so that the cleft is plainly felt. In speaking of the whole organ it is usually divided into three parts, namely, that above the Fallopian tubes, called the *fundus*, that between the fundus and the neck, called the *body*, and that which projects into the vagina, which is called the *neck*. The neck projects into the lower passage somewhat less than a quarter of an inch, and is plainly felt at the upper part, like a small firm tumor, across which is the cleft or *os tincæ*.

In virgins the womb is more straight than in those who have borne children, and it is also higher up in the body, and the neck is considerably thicker. In some persons, however, the womb is naturally much lower than it is in others, and also smaller, and is not so much altered by child-bearing even when they have had several.

The substance of the uterus is muscular, and is capable, in its contractions, of exerting most tremendous force. The increase in size which it undergoes at the different periods of gestation, are most extraordinary, and its after contraction to its original dimensions is still more so. Thus at the full period of nine months it will measure over a foot in diameter, each way, in some cases, and yet in a few days after delivery will return to its original dimensions. In the chapters on *Midwifery*,

all these changes are fully represented by plates, and instructions are given by which the period of pregnancy may be ascertained by them.

Arteries, veins, and nerves are plentifully supplied to the womb, so that it is abundantly nutrified, and highly sensitive. Indeed there is no other organ in the body, except the ovaries, that has such extensive sympathies, or that is capable of such rapid growth. The womb, however, is altogether dependent upon the ovaries both for its development and its functional ability. If there be no ovaries the womb will be found merely rudimentary, and if the ovarian actions cease, those of the womb cease also. The neck of the womb, which hangs down into the vagina, is usually the most sensitive part of it, and is, in many persons, the principal seat of sexual feeling, even more so than the clitoris. In fact, I believe that sexual excitement is never known in its full intensity excepting when it is experienced in the neck of the womb, it being always weak and partial when confined only to the clitoris and nymphæ. It is to this part, therefore, that our treatment must frequently be directed, when that peculiar condition becomes desirable, or not.

When the erotic excitement is intense in the female during connection, the womb experiences a species of erection and vibration, by which it becomes engorged with blood and is drawn with considerable force and rapidity up and down the vagina. This brings the neck into contact with the glans of the male organ, which is also the most sensitive part, and their mutual pressure hastens the orgasm in both. This fact has never been mentioned by any previous writer on physiology, so far as I know, and it is one of considerable medical and moral importance. The idea which some persons entertain that the male organ enters the womb is both erroneous and absurd, as a consideration of its structure will show; neither is it true, as others think, that *always* when conception ensues the semen is thrown *into* the womb. It is true, that during a perfect orgasm, such as referred to above, the *os tincæ* opens when the womb descends to meet the male organ, and if the semen is emitted at that time also, it will pass directly into the mouth. This is the reason why conception is *more likely* when the orgasm is mutual and simultaneous, but still it is not absolutely necessary in either.

Sometimes the womb is very small and imperfect, so that the egg is not retained, and barrenness, of course, results; and occasionally it is *absent altogether*. A remarkable case of this kind is given elsewhere, in which a young person, who had never menstruated, was married, and it was afterward discovered that she had *no womb*, though in every other respect quite perfect. This smallness and imperfection of the womb is very likely to be found in those who are late in menstruating, or who have been irregular.

The form of the uterus varies much in different beings, so much, in fact, that it scarcely appears to be the same organ. It is sometimes round, oval, and even triangular, and not unfrequently is forked, or divides into two horns, as in the cow, pig, horse, and whale, in which we also find the Fallopian tubes very long and contorted. It has even been found *double* in the human being, in some very rare cases. In most of the carnivorous animals, and in the rodentia, as the rat and squirrel, the uterus is very short, and divides at the lower end into two parts, communicating with two short and straight tubes. In the greater part of the rodentia, in fact, as in the hare and mouse, the womb is really double, there being a separate one in connection with each Fallopian tube, and consequently two mouths, both of which can be distinctly seen in the vagina. In the marsupial animals, as the opossum and

kangaroo, there is no uterus, properly speaking, but the end of each Fallopian tube, where it opens into the vagina, is expanded, and made to answer the purpose of one. In these imperfect wombs, the young are retained but a short time, and are then expelled, and placed in the pouch outside, as explained elsewhere, in which they are gradually perfected. The vagina, also, is double in these animals, one communicating with each tube. Occasionally the vagina is partly closed, previous to connection, by a species of hymen, as in the mare, the cow, and ape, but it is never so perfect as in the human female.

In very rare cases, as before stated, the womb has been found double in the human being, each organ being distinct and separate from the other, and opening by a separate mouth into the vagina. In such cases, one womb is connected with the right ovary only, and the other with the left, so that conception can occur in one and not in the other at the same time, though it may do so afterward, and cause a superfœtation, or conception in a person already impregnated. More frequently the womb is simply divided by a partition inside, and is not properly double, though, possibly, superfœtation might take place even then.

THE VAGINA.

The vagina is the passage leading from below upward to the womb. At its lower extremity is the *vulva*, or external mouth, between the lips, and at the top of it is the neck of the womb. The vagina is like a tube, with very firm, thick walls, capable of dilating or contracting to a very considerable extent. The length of it is from four to six inches, though I have seen it as long as eight inches, and as short as three. The diameter varies from an inch and a half to two inches and a half. It is not straight, but curved, the hollow part of the curve being in front, next to the bladder, while the convex part is next to the rectum, or large intestine.

The diameter of the canal of the vagina is not uniform in its whole length, it being some little narrower in the middle than at either end. It is lined with a mucous membrane throughout, like the uterus, and in virgins is not smooth, but is marked with a number of *rugæ*, or folds, which gradually disappear after connection, and especially after delivery. Under the mucous coat is another thick one of cellular membrane, and under that again is another coat, called the *corpus spongiosum vaginæ*. This is a true *erectile* tissue, like the *corpus spongiosum* of the male organ, and capable, like it, of becoming congested with blood during excitement, and of erecting and contracting. It is this power that enables the vagina to draw down the womb during the orgasm, as explained in the previous article, and it also makes it *compress* the male organ at the same time, by thickening the walls, and contracting the passage, and thus increasing the pressure and excitement in both. The principal portion of this erectile tissue is, however, confined to the lower part of the vagina, though it exists more or less in its whole length ; and it is a knowledge of this fact that enables us to use many internal instruments advantageously, for the cure of falling of the womb. When the instrument is once introduced, the contraction of the lower part of the passage which is acted upon by the presence of the foreign body, prevents it from being expelled. In some females the erectile tissue is much developed at the narrow part of the vagina, about halfway up to the womb, and it will contract so forcibly there, from any excitement, that a passage can scarcely be

effected beyond. Those who have the erectile tissue imperfectly developed, are always liable to a lax vagina, which leads to falling of the womb, and also to rupture of the bladder and rectum through its walls. In all such cases, if the erectile tissue is made to act, by the excitement natural to the parts, the relaxation is much relieved, and a step is made toward permanent improvement.

At the mouth of the vagina is a strong circular muscle, like that which closes the mouth and eyes. It is called the *sphincter*, or *constrictor vaginæ*, and when it acts properly, the mouth of the vagina is kept nearly closed by it. This muscle is of great importance in maintaining the parts above, by drawing the lower walls of the vagina together, and making them more firm. It also co-operates along with the erectile tissue in increasing the pressure during coition. In some females it acts so powerfully as to close the passage completely, so that an entrance can scarcely be obtained. This is often the case in those who have an irritable clitoris, or nymphæ, and every act is as difficult with them as the first, though not painful. When this constriction of the sphincter is conjoined with great engorgement of the erectile tissue, the difficulty is of course still greater, but in all such cases the intensity of the *orgasm* is also proportionably increased.

The relaxation of the sphincter muscle, which is very common, is a serious evil, as it disposes all the organs above to displacement, and much impairs the sensibility of the parts. The lower part of the erectile tissue, round the base of the nymphæ, exhibits a curious network of veins, called the *plexus retiformis*, which during excitement are singularly enlarged. They are apt sometimes to become obstructed, and swell, causing *varicose veins*, and enlargement of the lips.

The *hymen*, which partly closes the mouth of the vagina in virgins, has already been explained. The opening in it is usually crescent-shaped, and is thought to have originated the symbol of *Diana*, the goddess of chastity, which was a *half moon* or crescent.

Immediately within the vagina, on each side, are certain little openings called the *glands of Duvernay*. These secrete a thickish gray-colored fluid of a peculiar odor, which is often discharged in great quantities during connection, and was formerly thought, by uninformed persons, to be a kind of semen. The situation of these glands causes them to be compressed by the constrictor muscle, which is the reason why they discharge most during the strongest excitement. In some persons the quantity of fluid amounts to several ounces.

In addition to the glands of Duvernay, there are also a number of mucous follicles, both in the vagina and on the inner surface of the lips, which also discharge freely under similar circumstances.

The vagina, like the other parts, is liable to various malformations. Thus in some it is too small, and in others it is closed by the inner walls or external lips growing together. In others, again, it is unnaturally large, so that the womb continually falls down to the lower part of it. Many of those cases in which the vagina is closed, are not discovered till marriage, and then great distress and suffering result. Many such instances are given in another part, and also the means of remedying the defect, which can be often done without medical assistance. When the canal is too short, great distress may often ensue in marriage, unless certain precautions are observed.

Most of these difficulties appear much worse than they really are, it merely requiring time and skillful appliances to remedy the worst of them.

PLATE XV.

THE FEMALE UTERUS AND ITS APPENDAGES.

Figure 1. A. The body of the uterus. B. The vagina. C. The neck of the uterus, in the center of which is seen the mouth of the womb. D. The interior of the vagina. E. The fimbriated end of the right Fallopian tube, grasping the ovary. F. The right Fallopian tube. G. The left Fallopian tube. H. The fimbriated end, or pavilion, of the left Fallopian tube open, and just about to fasten on the ovary. JJ. The ligaments of the ovaries. LL. The round ligaments.

Figure 2. An ovary cut through, to show the ovæ, *aa*. *bb*. The pavilion of the tube. *c*. The opening of the tube *ee*.

Figure 3. This was a remarkable case in which one of the Fallopian tubes was obstructed so that no ovum could pass down it. It will be seen that both the ovary and Fallopian tube are deformed in consequence of this obstruction.

The use of all these parts in the processes of impregnation and fœtal development, can from these illustrations be readily understood.

In the act of copulation the semen is deposited in the vagina, from whence the animalcules ascend into the womb, and along the Fallopian tubes to the ovary. If a ripe ovum is there at the time, impregnation may then take place, after which the egg descends into the womb, and there develops into the new being, as will be explained farther on. When the new being is fully developed, the mouth of the womb and vagina expand and it is expelled by the process of natural delivery.