SEXUAL ANATOMY AND PHYSIOLOGY

By

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SPECIAL INTRODUCTION.

By Thomas J. Allen, M. D.

A few years ago I was invited by the president and secretary of the Federated Women's Clubs of the State of Oklahoma to give a course of lectures at their state convention at Chickasa, Okla., on subjects of special interest to women.

It may be presumed that such a body of women would represent the highest intelligence of American women, since that state is settled chiefly by the best classes of people from the older states. Yet, in a consultation one women asked if I thought her trouble was due principally to prostatitis, as she said a woman doctor had suggested to her, and another asked whether it were natural that one kidney should be lower than the other in a boy.

In proportion as the sexual life is fundamental, a knowledge of the anatomy and physiology of sex is im-

portant. The school text books of physiology and hygiene have always excluded the treatment of this department, properly enough, no doubt, on the theory that such knowledge should be carefully imparted by the parents, at the appropriate periods. But how little qualified the average parent is to give such instruction may be judged from the circumstance above mentioned, which comes to me at the moment as I ponder to consider how best I may illustrate the unfortunate ignorance that still exists on this vital subject.

The women of certain eastern countries cover their faces with a veil when they appear in public, so that their charms may be hidden from the gaze of the vulgar of the opposite sex. We can readily agree that a beautiful face should excite only admiration and a feeling of emulation; and, in an ideal state of society, of individual purity, that would be true of the entire form. But such ideal conditions do not exist—do not exist even in the less sacred.

Whatever objections might be made to presenting the important information contained in this book in an indiscriminate way, there can be none to giving it in the proper way in which it is here presented for adults, and especially for parents and for those looking forward to marriage and to parenthood. To all such the information contained in the volume is of vital importance.

It is important to recognize the fact that acquired characteristics are transmissible—that the parent can transmit to the child a better physical constitution than that with which he or she was endowed, that nobility and stability of character, acquired after the weaknesses incident to youth and to ignorance have been surpassed, a better physical, mental and moral constitution can be transmitted to the child. Most great men and women have been younger children of younger children, born after the parents and grandparents had developed the superior qualities with

which they were endowed, as in the conspicuous case of Benjamin Franklin.

The view here presented in regard to prenatal influences I have found to be correct from the observation of many cases. I have seen cases in which the mother might have prevented the inheritance of most undesirable qualities or habits in the child had the importance of prenatal influence been duly recognized and a reasonable degree of industry exercised to prevent harmful results. Moreover, by the proper influence, qualities may be developed in the child which will be a source of satisfaction to the parent for life.

There is still a difference of opinion as to the factors that influence the determination of sex, but the major influences are known, and these should be complied with in the cultivation of those qualities that give the chief distinctions of manliness and womanliness. The best qualities of the father should be transmitted to the daughter through the mother and vice versa.

We are just beginning to realize how serious has been our loss due to the lack of such knowledge as that imparted in this book. We hope that it may have a wide reading.

THOMAS J. ALLEN, M. D.

Elmhurst, Ill., August, 1923.

PREFACE.

The sacredness of the subject of sex is recognized by all people of a refined nature. It is for this very reason that there is so much objection to sex literature which has any tendency to be vulgar.

In all my books, and in "Health and Life" Magazine, it has been my endeavor to maintain this sacredness of sex, and to make an appeal for purity and idealism, while spreading an enlightenment that will enable human beings to obtain the maximum of joy in life and love, and especially assist them in steering clear of the dangers of life which are only too abundant for those who remain in ignorance.

This work of "Sexual Anatomy and Physiology" is like an ordinary text book, but throughout, I have endeavored to saturate my remarks with the idealism and reverence for my subect that I feel is so essential in its treatment.

It is obviously necessary for every person to be in possession of a knowledge of the structure and functions of the organs of reproduction, which are not purely organs of reproduction but are also the organs which function in co-operation with the very highest sentiments and emotions of human nature. However, I have spared no pains to make my meaning clear, and I shall not hesitate to say exactly what I mean. In this way I hope to avoid the insinuations and innunendos which I believe to be so seriously suggestive of impurity and prudery.

It is extraordinary how few people really know the anatomy and physiology of the sex organs, from a scientific standpoint. The chief reason is, of course, that the subject of sex has been shunned by the majority of respectable people. The cause for this is that sex has been considered some vile thing which only lowers or degrades human kind. But, as I have been endeavoring to expound all my life, it is the abuse of sex and seeking to make sex a means of sensual

pleasure, that reaps such horrible results and is such an enormous curse to mankind. On the other hand, the correct use of the function is associated with all that is beautiful, refined and good.

It is to enable human beings to obtain this sane view of sex, and to allow it its proper place in life (that is, as a means to joy and life, and not for sensual pleasure) that I am writing this book, and, in fact, that I compile any of my writings.

I hope that this book will prove of universal value to adults, for it is only intended for adults. I do not believe that children need the information contained in this book, although they should be given some reliable sex information and warning as early as they can possibly understand.

My whole endeavor is to put sex in its right place in human life. There are some people who ignore it, and ruin their lives in consequence. There are some people also who make a god of it, and also ruin their lives in consequence. Many a true and good man and wife

have been separated from each other because they believed that the function was something which should be kept out of their lives as much as possible. They should, instead, see in it a unifying factor which will enable them to express their love and finer feelings for each other.

Other people, on account of the universal ignorance surrounding this subject, are endeavoring to obtain more from the function than it is possible to get. They strive for physical satisfaction and sensual enjoyment, and what they get is mental and physical inefficiency, weakness, moral degradation, sometimes disease; but hardly ever do they get any true enjoyment.

Sex is only a small part of life. He who would magnify it into a god, destroys it entirely. Sex is a means for the perpetuation of life. Let it not be misunderstood, let it be fully realized, that it is the function through which man hands down Life from generation to generation. In this respect it is undoubtedly the very first and most im-

portant of all human functions, and it is therefore the most sacred. What is more beautiful than the sight of a babe nestling in the arms of its mother! What is more glorious than the love that exists between that mother and her child! Then what can be more sacred than the relationship between mother and father of that child which begets all this loveliness! Truly, the degradation of this function is the greatest sin, and it is not to be wondered at that it leaves in its train such serious consequences. The worst and most horrible diseases are associated with unnatural indulgence between the sexes. The most degrading and weakening conditions of the body are set up by solitary abuse of the function; and then, again, sentiment, emotion, love, and life itself, are withered and handicapped by denial of the natural function.

Every person has a right to live and seek happiness. Every person, therefore, has the right to the joys of love. Those things which destroy love and happiness should be avoided like de-

mons, while those things which make for more abundance of life and love should be encouraged. A sound knowledge of the anatomy and physiology of sex will make for the appreciation of the beautiful things associated with life and love, and will enable human beings to see what the apparatus consists of which is associated with life and love. Above all, this knowledge will show clearly the delicate nature of this apparatus, and so assist in the avoidance of those things which make for weakness, illness and disease, and will enable human beings so to grow and conduct themselves that when the time comes for the relationship which means an expression of the unity of human kind and the handing down of life to the next generation, there shall be full appreciation and experience of the communion as the supreme act of love.

There will then arise a humanity that is healthy, strong and beautiful in mind, body and morals. Strife within matrimony will cease, and love will predominate. This is not a mere dream, it is

the experience of those who have followed out the philosophy I have endeavored to spread in my works. Every day I receive hundreds of letters from those who have read my messages, and they tell me the truth of what I write here. What knowledge, idealism and love have done for them, it can do for every other human being.

INTRODUCTION

In order to understand the physiology of the sex organs, it is absolutely essential to know something about the anatomy of them. Anatomy is the science of structure, and physiology is the science of function. The function of any organ is dependent on the structure of that organ. The structure of the organ is determined to a great extent by the function of the organ.

Thus it is possible for an experienced anatomist and physiologist to ascertain from the structure approximately what the function will be. On the other hand, it will be possible for him to expect a certain structure from a certain function. Structure and function therefore are correlative. As a matter of fact, it has been the interaction, or interdependence, or unity, as we might say, that has resulted in the evolution of them.

It is only possible to obtain certain functions from certain structures. It

would be impossible, for instance, for an organism without wings to fly. On the other hand, it is the continuous functioning of the wings that develops them. This has been the process of evolution. Organs first made their appearance as small structures, and by the functioning, or use, of these structures, they are developed; but only as they are developed, do the functions become more perfect.

This same relationship exists in regard to the anatomy and physiology of sex. In the lowest forms of life, there are no sex organs at all. The sex function, we might almost say, is non-existent. The means by which the lowest forms of life reproduce is by simple cleavage from one into two individuals. For more of this information you should read my book "Sex Development."

Human beings, therefore, possess the most delicate, complex and sensitive sex organs of all organisms. Moreover, associated with what we might call the pure anatomy and physiology of sex, are all the other functions of the human body. It is impossible to interfere with

the sex apparatus and functions without effect on other parts of the body. There is no part of the body that is not influenced by sex.

One has but to observe the difference between male and female in human beings to see how true this is. A woman is a woman in all her nature, and a man is a man in all his nature. We mark off primary and secondary characters, but it is merely a matter of convenience. We find not only the primary organs distinct in woman, but also the secondary sexual characters are very definite. The fingers, the arms, the size of the head, the delicate and soft skin, the nature of the muscular tissue, the waist, the chest, whatever portion of the anatomy we care to examine, we find that there is a definite femaleness, or femininity, associated with it. The same applies to man. His primary organs, his face, his skin, his hard muscles, his large hands and head, his whole disposition, every portion of his being has the pecularity of maleness.

If we inhibit the function of sex, we

find a correlating disturbance in every portion of the anatomy. Everybody knows that if a woman does not get married, she becomes withered and frigid; she becomes hysterical; her functions become irregular; not only sex function but other functions as well. Her mental outlook becomes distorted also. The same applies to man, and if a man has his testes removed, he changes in character completely; his voice changes, he becomes beardless, his flesh becomes flabby, muscularity disappears; and so we might go on detecting a difference in every part of his body.

Sex is inextricably bound up in every function and structure of the human being.

Our work in this book, however, will be to confine ourselves chiefly to what are known as the primary and secondary organs, so that we may know their form or structure, and know their relationship to each other, and also the functions peculiar to them.

I do not wish to invade other prov-

inces of study in this book, but I really do hope that it will be of use in assisting you to unravel other problems of life. I believe that it is absolutely essential for people to understand the nature of sex. If they do not, I think that they cannot understand other problems of life. Recently there has been much discussion as to the equality of the sexes. It is impossible to discuss this question at all intelligently without a knowledge of the differences of the sexes. Most of those who talk about equality conceive of man and woman as two separate species of human beings, instead of just two parts of a single unit. The real unit is the human family, and the human family consists of a mother, a father and children. It is impossible to divide them up and expect to have a workable system. The woman has the mother's part to play, and the man has the father's part to play. This does not imply that the woman's place is the home while the man's place is the factory, or any nonsense of that descrip-

tion. It does recognize, however, that there must be harmony and agreement between male and female, between father and mother, and that the thoughts and acts of each will be expressions of both.

In times gone by, women have been subjected because they were looked upon as some lower form of human life, existing for the convenience of man. Women, of course, have been not a little to blame for this, because they have allowed themselves to be humored by men, but it is the stage of social evolution which is really to blame, because of the economic dependence of women upon men.

However, I want to insist that the ideal in human life is to realize absolute unity between husband and wife, so that whatever each does, will be an expression of the oneness of both. Where this philosophy is adopted, it means happiness and joy in life. There can then be no petty strife or quarrels. There will always be the same endeavor to

understand. The husband will endeavor always to give to his beloved wife all that he has, while she will always give to him all that it is in her possession to give. There is nothing which they possess which they should look upon as individual property. Even their thoughts belong to both of them, and neither should say that that was my particular thought, or that was my particular piece of work. Whatever happens is the outcome of the unity of the two human beings now become one.

This is the future superman, and it is going to become a general reality through knowledge and recognition of the responsibilities, privileges and obligations of sex life. It is therefore so necessary that we bury our old ideas of sex as a thing which is vile in itself, and see in it the real factor for progress, love and development which it means to humanity.

In my detailing of the various organs of sex, I have endeavored to be as explicit as possible. I have expressed my-

self in a plain, blunt, yet careful manner; so please excuse any expression which may appeal to you as not sufficiently reverent, for I recognize as much as anybody else the difficulty of giving information on this most important subject in a way that will not jar the sensitive reader.

It is really not to be wondered at that so many persons have shunned the subject, because so few have dealt with it in a refined and really decent way. A person of sensitive temperament can easily be hurt by vulgarity, and I must admit that I am one of these persons. To me, my wife and the love I bear her, and the love she bears me, are the most sacred things in the world. Anybody who vulgarizes the relationship between us is doing us a most regretable injury, which is felt by us very, very acutely. Others feel in exactly the same degree. It is therefore out of place to deal with th subject of sex in any way which will

degrade the communion which is the culminating expression of the love between a refined man and woman.

GENERAL OUTLINE OF THE SEXUAL SYSTEM.

The sexual system is divided into two parts,—the primary organs and the secondary organs. The primary organs are those which have to do directly with the process of reproduction. The secondary organs consist of those which have only indirectly to do with the function of reproduction.

Thus, in man, the beard and moustache, his muscularity, and base voice, serve only as enticements for the female sex in the function of courting, which acts as a preliminary to the function of reproduction, dealt with from the physiological standpoint.

The primary organs of sex are used in the immediate act of coitus, and, in the case of the female, for development of the embryo.

The Male Sexual System.

Primary Characters: Situated in the front, below the waistline, just by the junction of the legs, is the penis. This is the main primary organ. It protrudes from the body, and is stem like. During the period of repose, it is soft and pliable, and may be as short as one and one-half inches in length.

Immediately below is a bag, or sac, containing two glandular bodies; these are the testes. The bag is a continuation of the covering of the penis, and is loose and flabby. The testes vary in size according to the individual, but in the average normal person are about one and one-half inches in diameter.

The testes contain the spermatozoa, which are the male reproduction cells. These cells find their way into a channel which leads from the testes and connects with other channels which lead from other sexual glands which secrete

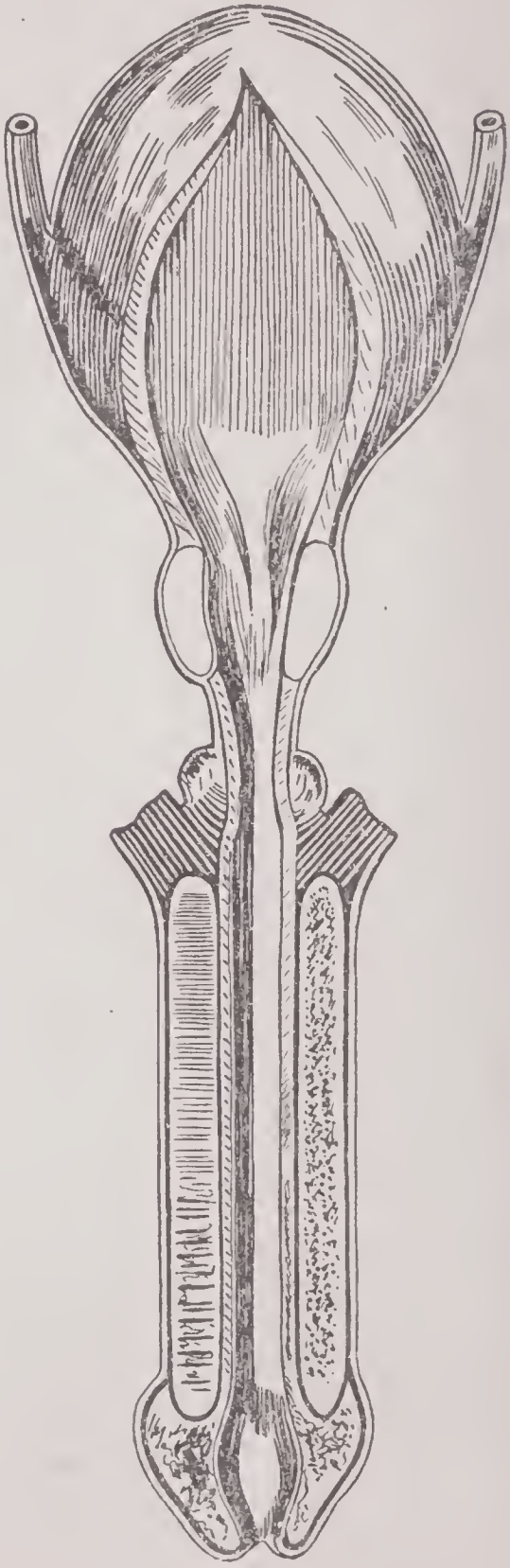


Fig. 1.

EXPLANATION OF FIG. 1.

Fig. 1 illustrates the main primary organ of the male. At the top of the figure are the two tubes known as the ureters which come from the kidneys and convey urine into the bladder. The bladder is the extended bag, and from it is seen leading the urethra, which conveys the contents of the bladder to the exterior. An inch below the neck of the bladder are the two small Cowper's glands, each of which secretes a fluid which is conducted by means of a duct into the urethra. Above these bodies, higher up, by the neck of the bladder, is the prostate gland, cut in two parts in this diagram, in order to show the internal apparatus. Lower down, around the urethra is the corpus spongiosum, a spongy mass of network of blood vessels. Dilation of these vessels with blood causes the erectile nature of the organ.

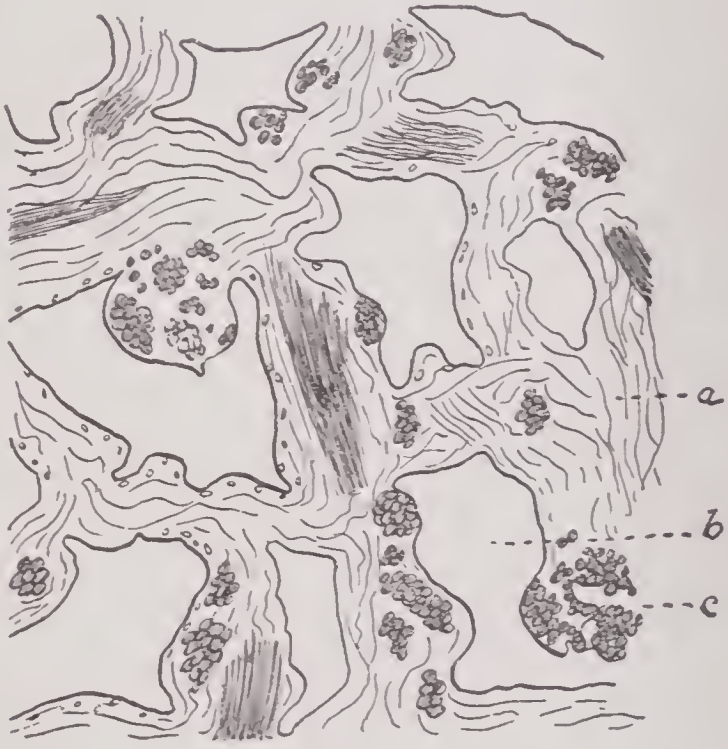


Fig. 2.

EXPLANATION OF FIG. 2.

Microscopic view of tissue which composes the male organ of generation.

A is the fibrous tissue, B the blood sinus or vein. C represents the muscular tissue.

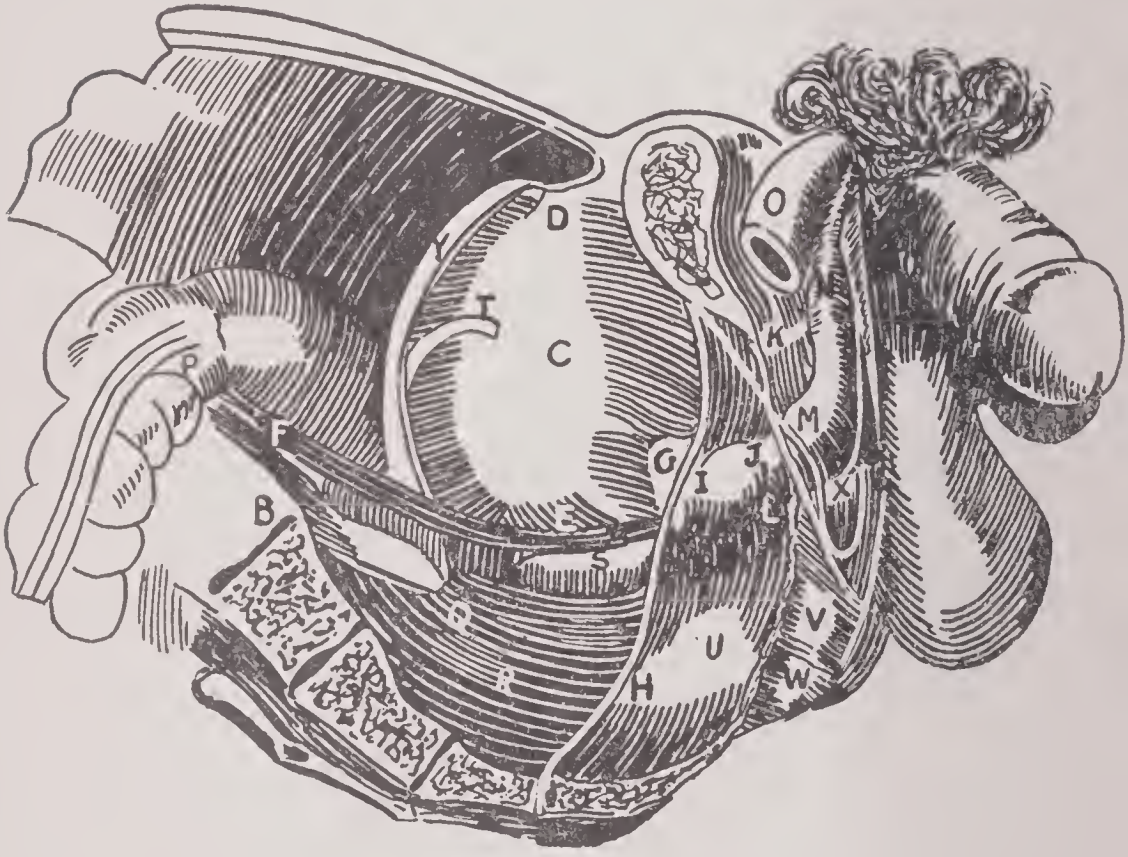


Fig. 3.

EXPLANATION OF FIG 3.

Section of the body in the pelvic region. B is the sacrum, the lower part of the vertebral column. P is the colon or large intestine. C is the body of the bladder. E and F represent the ureters coming from the kidneys.

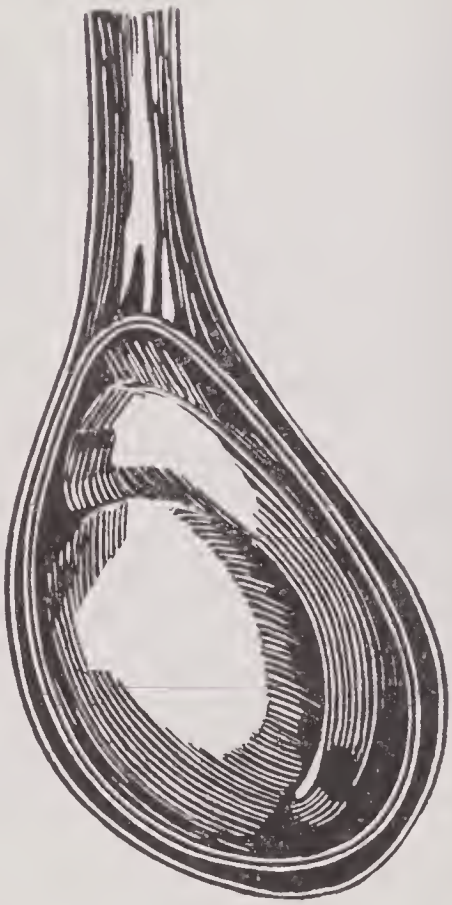


Fig. 4.

EXPLANATION OF FIG 4.

Longitudinal section through testis showing the outer skin or scrotum. Inside this is the testis itself, containing the oval body in which spermatozoa are developed, and the epididymis, the elongated body partly surrounding it. The spermatic cord conducts the spermatozoa up to the urethra, and is the stalk-like part of the diagram.

Fig. 5.

EXPLANATION OF FIG. 5.

Diagrammatic section showing in particular the ducts conveying the Spermatozoa to the Urethra, known as the Vas Deferens.

At the neck is a small gland or duct which acts as an ejaculatory gland. The body of the diagram represents the bladder; the stalk is the urethra; the large cup-like gland the junction with the prostate gland.

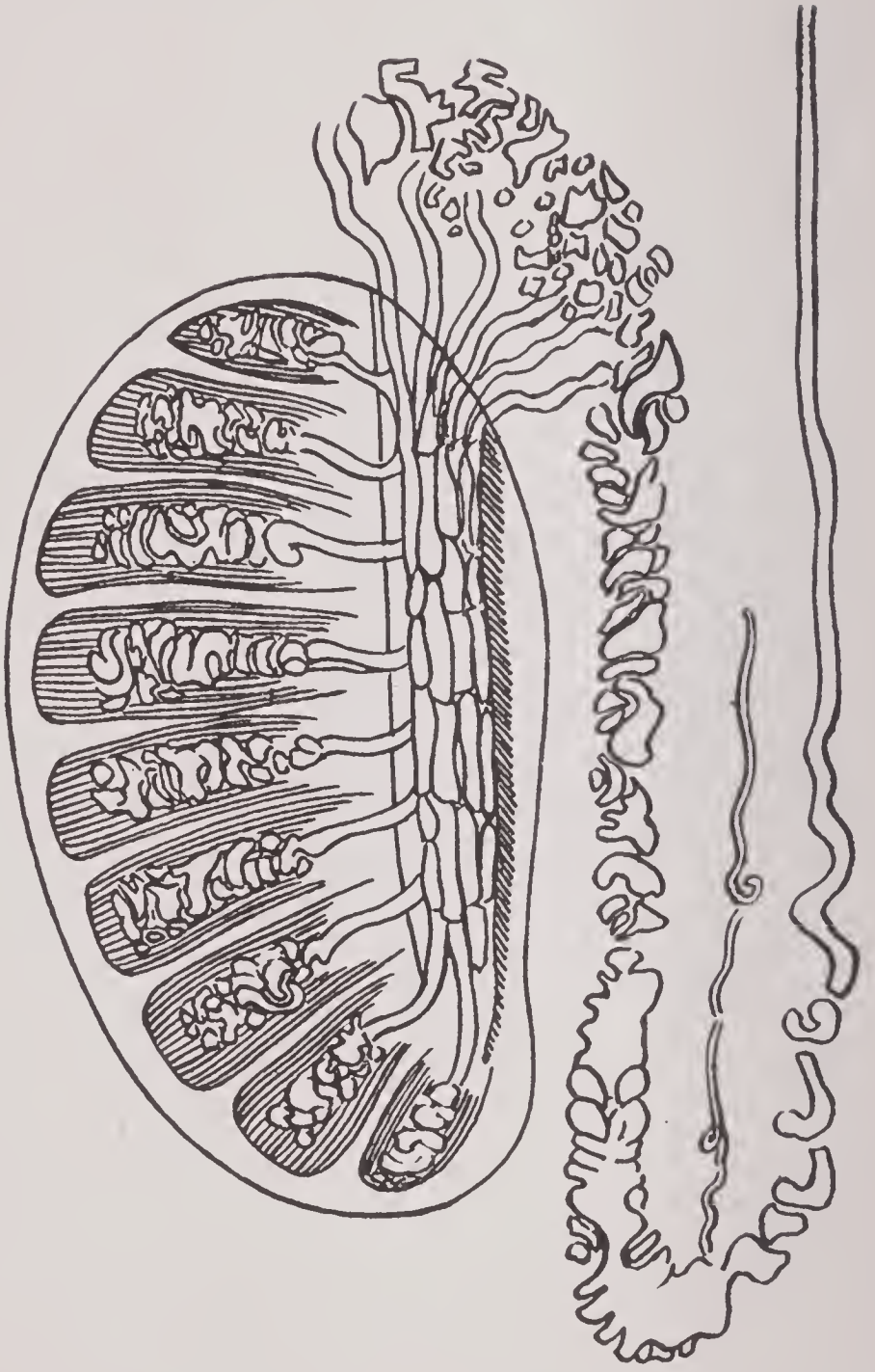


Fig. 6.

EXPLANATION OF FIG. 6.

Section of testis showing the germ cell tissue in the body of the testis where the spermatozoa are produced. They pass from the lobules into the tubules and are conveyed by the various ducts to the epididymis, the epididymus conveying them up the spermatic duct to the urethra.

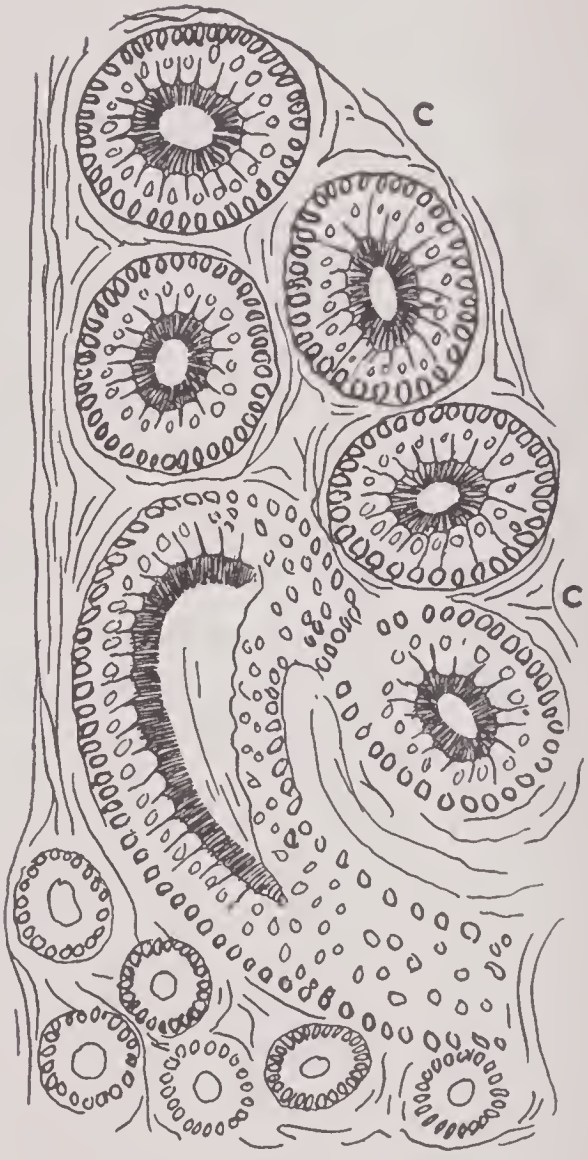


Fig. 7.

EXPLANATION OF FIG 7.

A diagrammatic section through the epididymis of a dog. This shows what cross-sections through the tubes would look like. The epididymis has an evolutionary history as the pronephros, and maintains its excretory nature even in higher evolutionary forms. As an epididymis it serves to convey the spermatozoa from the testis through to the urethra.

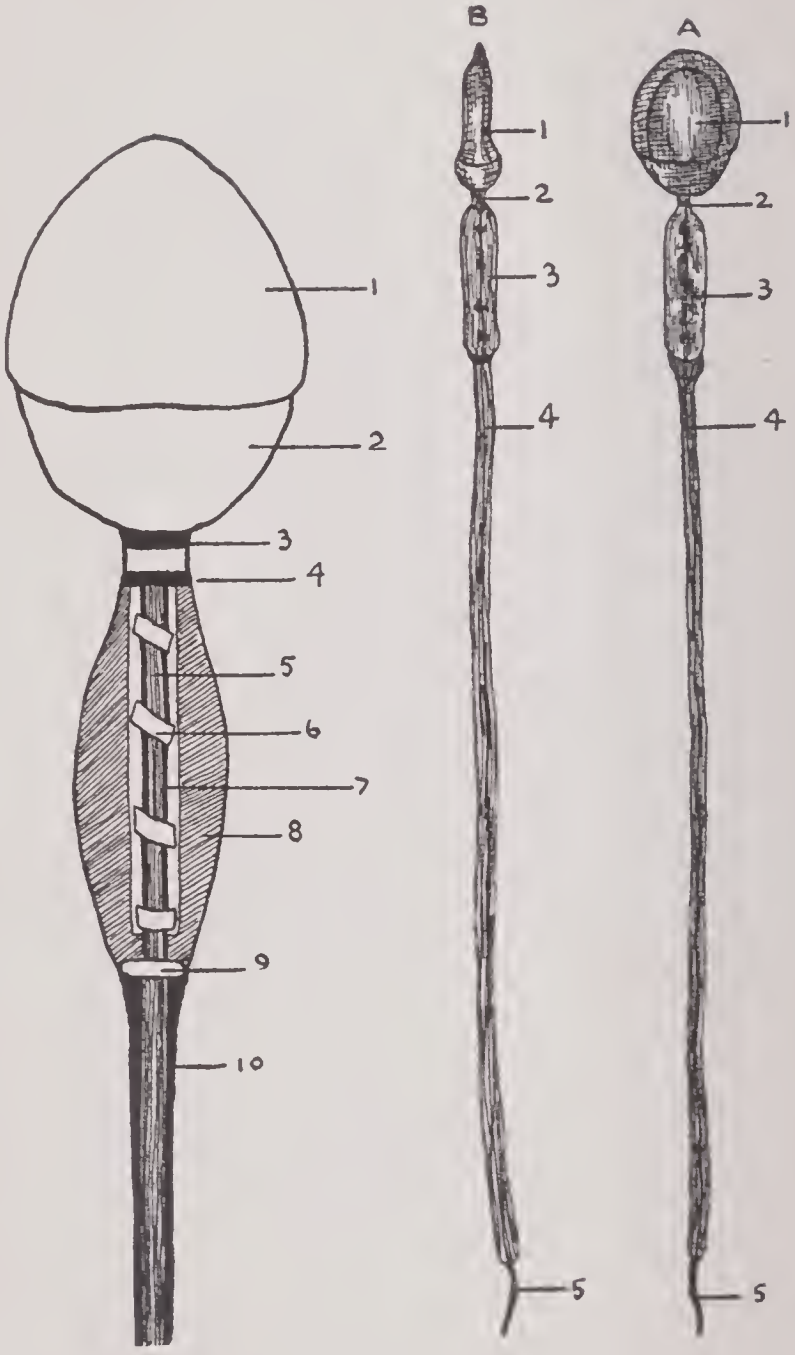


Fig. 8.

EXPLANATION OF FIG. 8.

1 represents the head or nose of the spermatozoon. With this it forces its way through the wall of the ovum. On the left is a portion of a spermatozoon very highly magnified to show detail. 2 is the body of the head. 3 and 4 the neck. 5 to 9 represent the axis and a spiral sheath which surrounds it. 10 is the continuation of the long tail. The center figure is a side view of the spermatozoon. 1 the head, 2 the neck, 3 the body, and 4 the tail with an end piece, 5. These figures represent the same portions of the anatomy of the spermatozoon illustrated in A, which is a front view of it.

mucus to lubricate the cells and thus form the semen, the fluid ejected in coitus.

These are the only apparent primary organs in man.

FEMALE PRIMARY SEX ORGANS.

Situated approximately at the junction of the legs with the body, a little anterior, is the vulva. This is the only apparent primary sex organ in woman. It consists of an opening about three inches in length on the exterior, but is really completely closed by a sphincter. It has a roll of flesh on each side, known as *labia*. The full name of these is the *labia majora*. Just inside the opening are the *labia minora*. *Majora* means larger, and *minora* means smaller.

The vulva leads into the body by a channel known as the vagina. It is into this vagina that the spermatozoa are placed in the sex act.

It is seen, then, that woman has practically no external primary sex organs. All the organs associated directly with the function of reproduction are internal. The vagina leads to the neck of the uterus, which is a pear-shaped organ in

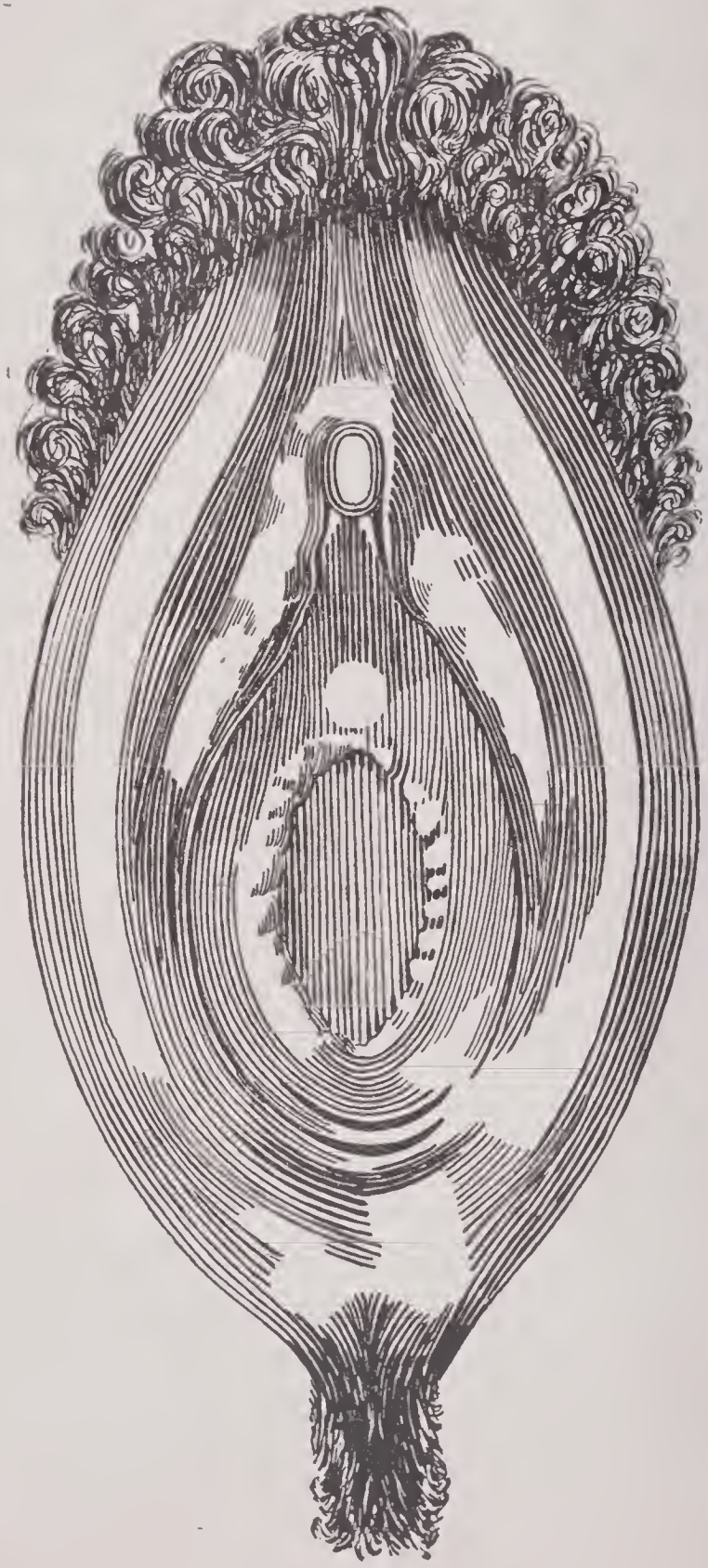


Fig. 9.

EXPLANATION OF FIG. 9.

Diagram of the Vulva.

In the center is the orifice of the vagina. The little body about one inch above it represents the clitoris. The larger external pads are the labia majora, while those just inside are the labia minora.

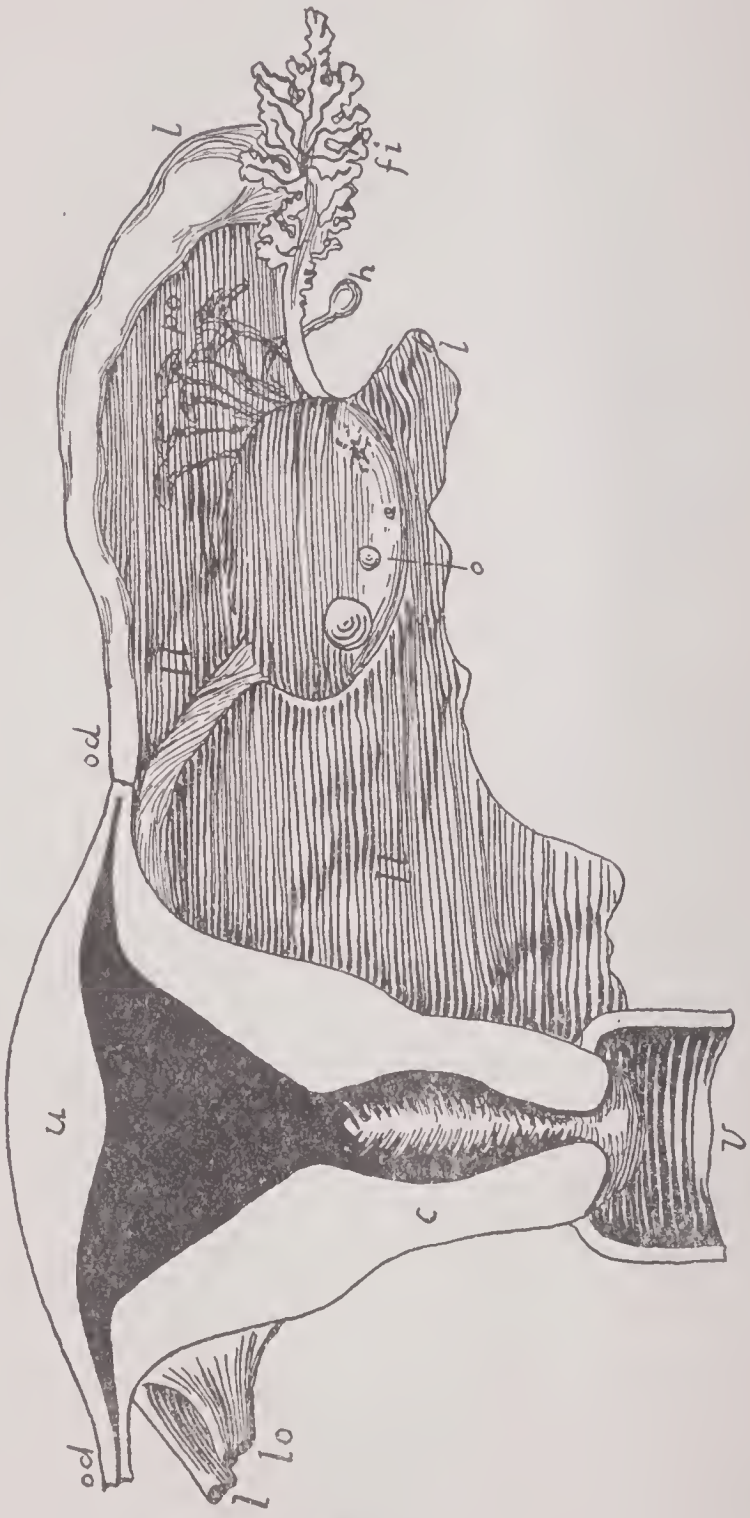


Fig. 10.

EXPLANATION OF FIG. 10.

Internal reproductive organs of female. V is the vagina. C is the neck or entrance to U, the uterus. OD represents the oviduct, which conveys the ova from the ovaries.

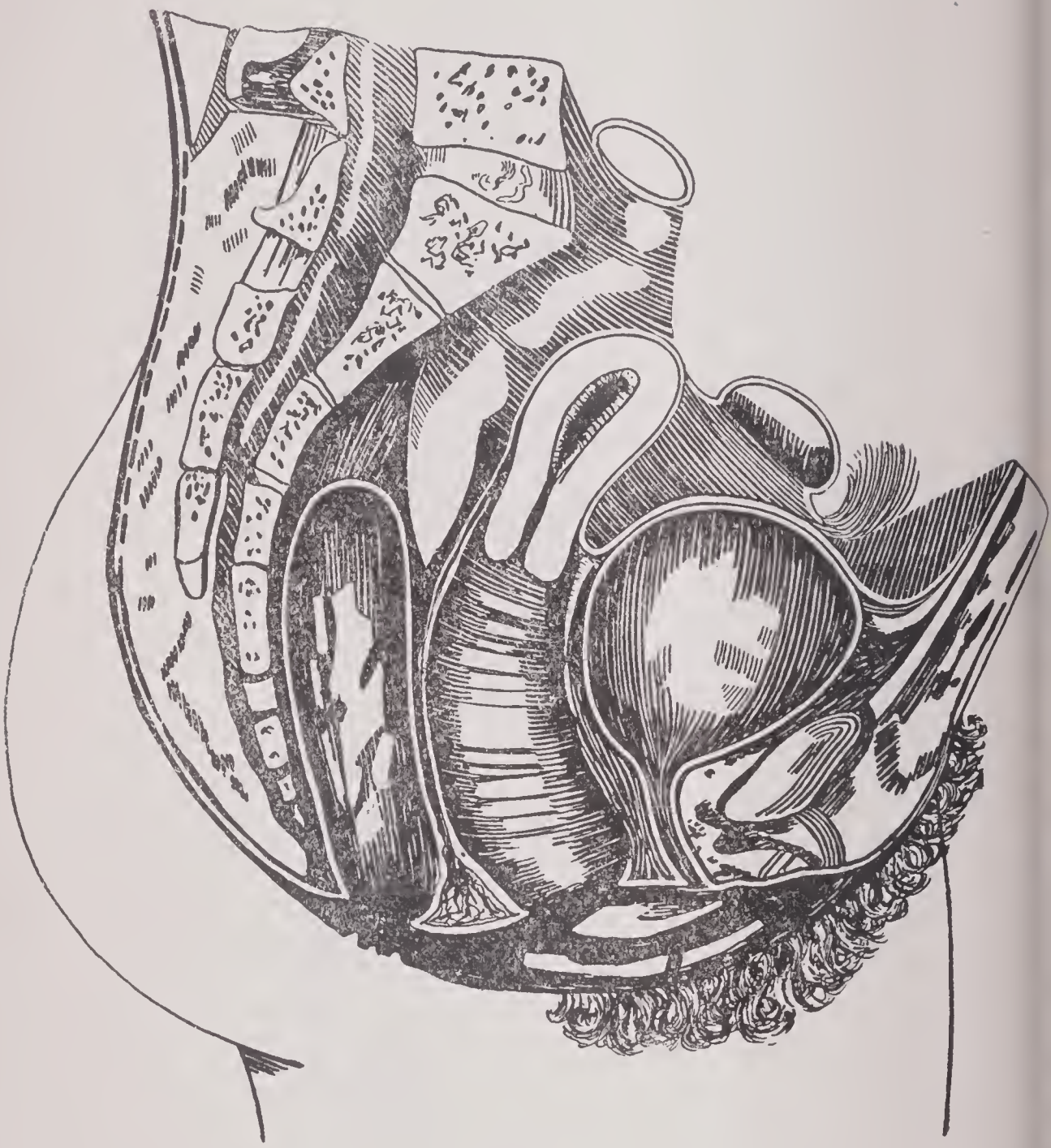


Fig. 11.

EXPLANATION OF FIG. 11.

Section through pelvic region of female. The uterus is the U-shaped body and from it extends the vagina down to the vulva. The bladder is in front of it, and has its ureters also emptying into the vulva. At the rear is the rectum, and posterior to that is the sacral portion of the spinal column.

which the embryo is developed and nourished while still in the body of the mother. Leading to the uterus are two ducts, one on each side; each duct leads from an ovary. The ovary forms the ova. One ovum is developed each month, it descends down one or other of the ducts just mentioned and into the uterus. If there it comes in contact with a male spermatozoon, it is fertilized and the embryo begins to develop.

Secondary Sex Organs in Man.

The most obvious secondary sex characters in man are the defined muscles. When contracted his muscles are readily apparent. This distinguishes the male in the possession of superior physical strength, and gives him a more rugged, and more powerful, physical appearance.

The next most apparent secondary sex character is hair on the face. As soon as the male reaches adulthood, hair grows on the upper lip and on the chin and sides of the face, distinguishing him entirely from the female.

Man is also distinguished by a narrow hip, or pelvic girdle. The pelvic bones are just sufficient to support his body and give strength to his frame at the junction of his legs.

Man has, normally, no breasts; he has the vestiges of what may have been breasts in his ancestors, but, normally, he does not develop them throughout

life. Small nipples are situated on the chest, but these, in the ordinary man, never attain that condition where they function in the provision of milk for offspring. It may be remarked, however, that there are a few cases in which the mammary glands, or breasts, do develop in man. It is sufficient to mention it, and to bear in mind that it is not a normal male character.

Man is a little larger, generally, in his whole body, than woman. His hands are broader and thicker, his feet are bigger, usually, so are his facial features. Investigation also shows that his brain is proportionately larger. This does not mean to say that it is more capable or intellectual.

Secondary Sex Characters in Woman.

The most obvious secondary sex organs in woman are the breasts. They consist of two glands situated on the front of the chest; each is composed of a mass of fatty tissue, containing glands which secrete milk for sustenance of the offspring during the first year of life.

The next most conspicuous secondary sex character in woman is the hip girth. The pelvic girdle is much larger than in man, and forms a basin in which the abdominal organs may rest, especially for the carrying of offspring within the body. The normal hip girth in woman exceeds the chest measurement, whereas in man, the reverse is the case. The chest measurement in man should always exceed the hip measurement.

Woman has no defined muscular tissue, the same 500 muscles which characterize the male body are also con-

tained in the female body, but the muscles are not so well defined.

This is due to the interweaving of fatty tissue among the muscular tissue in woman. The muscles of woman may be trained to acquire more strength than the average man who does not train his muscles, but no amount of training has yet been able to develop the muscles of woman to attain anywhere near the same strength as the muscles of a trained man.

The face of woman is normally without hair, and is a characteristic which makes the female conspicuous.

The waist is another secondary sexual character and is caused by the extra hip girth and the enlarged chest.

Woman is generally more supple and passive than man. Her body is smaller. Her fingers are more slender and thinner than those of man, as are her feet. The features of her face are smaller than those of man and her brain is correspondingly smaller, although, as I have remarked above, by no means necessarily intellectually inferior.

THE BREAST.

The female breast is the outcome of a long process of development involving millions of years. The technical name of the breast is the mammary gland, and every animal that has a mammary gland is known as a mammal.

The lowest form of animal to possess mammary glands is the Australian Duckbill or *Ornithorynchus*. It belongs to a group of animals called the Monotremes.

These Monotremes may be said to represent the initial stage in the development of mammary glands, and are interesting because they throw light upon the way the human ancestors must have developed mammary glands in the first place.

The Monotremes represent the next stage above the Reptiles. The Reptiles lay eggs; the young hatch from these eggs, and as soon as they are alive look

after themselves. There can be said to be no mother love, for the reptile does not care anything at all about her children, but just leaves the sun to hatch them out. So the Monotremes may also be said to represent the first stage in the development of maternal love. It is the first time in the history of development that the mother animal takes real care of her children from the beginning, and, as I have said, it undoubtedly represents a similar stage in the history of human evolution.

The Monotremes lay eggs from which the young are hatched, but she protects these eggs from the cold, and when the young come to life, she keeps them warm, and a nutritious fluid is secreted from the ventral or under portion of her body. At this stage the nutrition is practically just an exudation from the ordinary sweat glands, the young lick it off the hair of the mother as it trickles down.

So, at this initial stage in the development of the Mammalian group of ani-

mals, the young are cared for by the mother for some time.

The next higher stage in the development of the mammary glands may be said to be exhibited in another Australian animal, namely, the Kangaroo. The Kangaroo belongs to a group of animals known technically as Marsupials.

The Marsupials show a more complex stage of development in regard to the mammary area, and also in the development of maternal love. The kangaroo, therefore, is exceedingly interesting, because it shows us what must have been a similar stage in the development of human love in our own ancestors.

The Kangaroo brings forth her young in a live condition, but they are immature. The young Kangaroo is unable to care for itself. A pouch is developed by the mother in the abdominal region, and the young are kept in this pouch until they are old enough to hunt about for themselves. But while in the pouch, they are nourished by the exudation from the mammary portion of the mother's body in very much the same way as

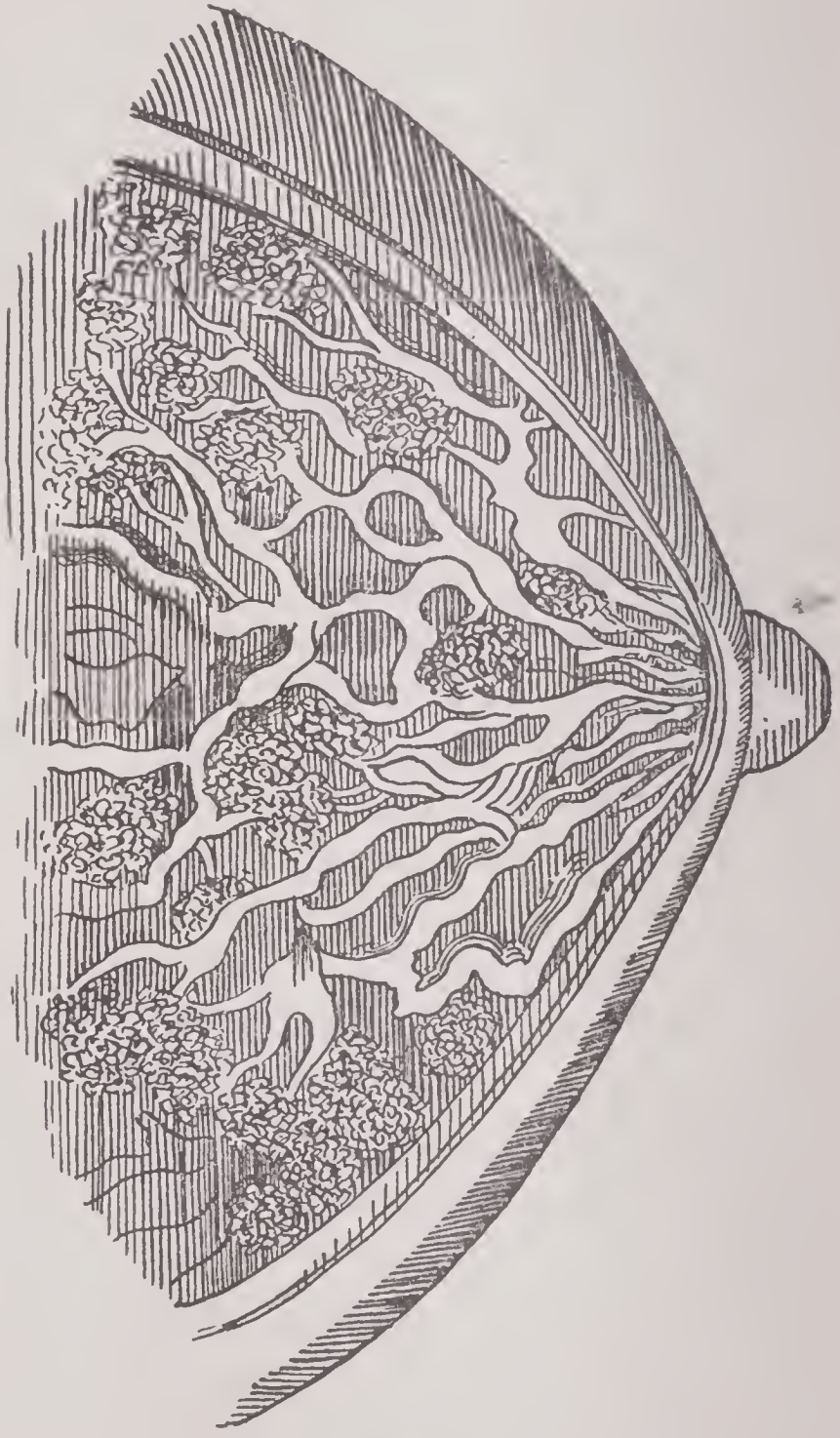


Fig. 12.

EXPLANATION OF FIG. 12.

Transverse section of the mammary gland. In the body of the gland are the lobules which gather the secretion from the sebaceous glands. This secretion is conducted along the tubules which converge at an area near the nipple, through which there are small ducts conveying the contents to the exterior.

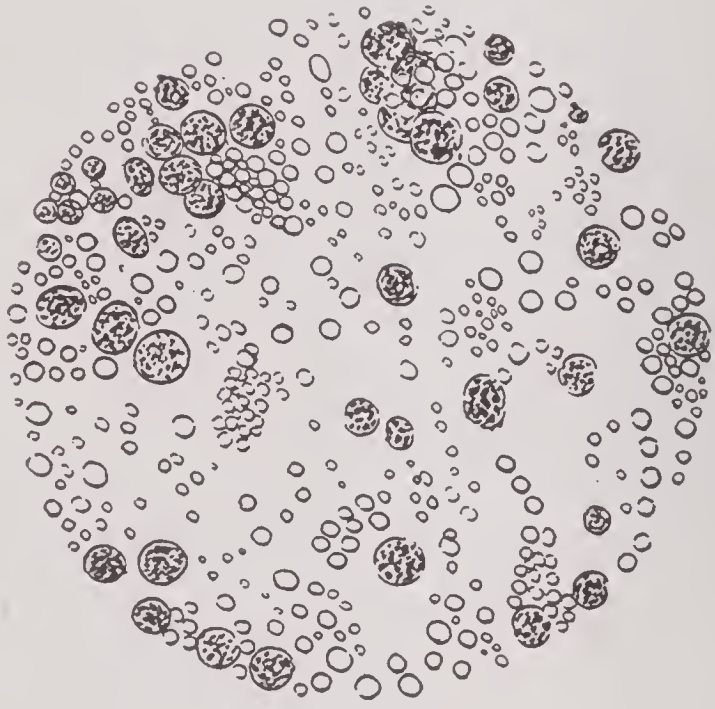


Fig. 13.

EXPLANATION OF FIG. 13.

Diagrammatic, vertical section cut through the breast to show the ducts and the blood vessels, where the milk is manufactured, and the globules from which it is made.

the Monotremes, explained above, but the mammary area is much more developed, and the mammary ducts are much larger and more specialized for the purpose of supplying this nutrition. The exterior mammary portion has small holes distinctly for the purpose of exuding the nutrition.

This process of development is biologically continuous, and goes on until the ducts become concentrated into a particular portion, and the external part develops the nipple, with which we are familiar in all the higher mammals.

If you have followed clearly the foregoing, it will better enable you to understand the human female breast. It is the most beautiful and the most complex of all mammalian mammary glands, and, in correspondence therewith, is associated with the higher emotions and maternal love. The human mother cares for her young longer than any other organism, and it is therefore not to be wondered at that men are in particular attracted by the woman with healthily developed breasts.

In woman the breast is composed of a mass of fatty tissue, and the mammary ducts become enlarged at the time that nutrition becomes necessary for offspring.

The size of the breast is determined to a great degree by the size of the woman, but it is well to remember that the size of the breast is not always a sign of the nutrition that is supplied. Many women with over-developed breasts are even incapable of feeding their children; others, having very small breasts before marriage, have a very full supply of milk for their children when they come.

The illustration of the human breast given in this book will show you how the ducts have become enlarged almost into small glands, and form a net work among the tissues of the breast. The net work of ducts converges at a small area near the nipple. The nipple is red, and has several holes or pores through which the child is able to extract the milk.

The nipple has also a spongy blood system, which works by nervous reflex

action, and so assists in the functioning of the breast. It works in approximately the same way as the *corpus spongiosum* of the male penis; a nervous impulse will set blood circulating into the spongy vessels in the nipple, so that the nipple will erect, and when the breast is out of use, the erection will die down.

Man still retains this power of erection in the nipple of his breast. The breast of the male is normally nonfunctionable, but there have been several men who have developed the use of the breast, and it has been known that some men in desperation at having lost the mothers of their children have put the children to breast and the breast has begun to function. It is all very suggestive of several theories of the development of sex.

For the first few days after the child is born, the mother's breast secretes only a colorless fluid known as calostrum. This is thought by some people to be useless, and even poisonous, for the child, but this is a great mistake. When the child is first born it is incap-

able of taking ordinary milk into its system, and the calostrum has the function of clearing out the alimentary canal and setting it into working order preparatory to taking more substantial nutrition.

The milk is secreted only when it is necessary for the child to take it, and is able to take it, but the colorless fluid which at first is secreted is an interesting sign of the development of the mammary function, and if you will think of the process of development I have outlined in the monotremes and the marsupials you will see exactly what I mean.

The breasts are naturally very tender in woman, and she is extremely sensitive regarding them. They are, to a great degree, a center of emotion, and play their part, not only in the nourishment of the young, but also in the preparation for the act that begets the young. It is a center of the same emotion which expresses itself both in the love of a woman for her husband and the love for her child. There is no line of demarcation between the woman's love for her hus-

band and the love for her child. The greater her love for her husband, the greater and truer will be the love for her child. The preliminary emotion exhibited in the heaving of her chest when first she meets her lover, long before marriage, is the first process in the development of the final emotion which is exhibited in the putting of her child to breast.

So it is no wonder that the female breast has played such a great part in the masterpieces of art and sculpture. I am not referring to the voluptuous exaggerations of charlatans, but the magnificent work of true artists, especially those wonders of ancient Greek Sculpture. They are beautiful and inspiring, not because they are sexual, but because they represent an expression of the highest stage of mother love. They represent the highest stage in human culture and an ability to bring forth and nurse children of the very highest quality.

The healthy woman has well rounded, well developed and shapely breasts,

and every woman should endeavor to acquire these for herself, so that she may fulfill her greatest mission in human life: the bringing forth and bringing up of healthy, strong, and beautiful children.

THE MALE FERTILIZING CELL.

The human male fertilizing cell is microscopic in dimensions; it measures one thousandth of an inch in diameter, and is therefore only to be seen under a high-powered miscroscope.

It is shaped like a tad-pole, having a thick head and a narrow, flagellate tail; it is therefore able to propel its way to the ovum.

It is only the head part of this cell which is of essential importance in fertilization. This head part contains the nucleus, while the tail is merely composed of ordinary protoplasm. Experiments have been made which prove this —in other organisms, of course. Where the head part of the male cell was put together with the female ovum, fertilization took place, but where only the tail of the male cell was put with the ovum, there was no fertilization.

The technical term for the human male cell is the spermatozoon.

If you were to stain the spermatozoon under a high powered microscope, you would observe the details of the nucleus. These details throw great light on many of the problems of life and sex; and it is therefore well worth while to understand something of the development, anatomy, and physiology of the spermatozoon.

The nucleus, as I have remarked, is the important or vital part of the spermatozoon.

Within this nucleus it will be observed that there are a number of little pieces of substance which differ from the general nuclear substances; these are what are called chromatin elements. As a matter of fact, they are the little bodies which may be said to contain all the characters of the full adult; because it is only these bodies which really go to make up the new individual or offpsring. Whether it is the color of the eyes or whether it is the size of the brain or the size of the feet, the characters are all in the chromatin.

The spermatozoon, as I have re-

marked, goes through an interesting phase of development. In the resting stage, which is the one we are supposed to be looking at now, we notice that these chromatin bodies are scattered all over the nucleus in no particular order. Now if we keep on watching a live spermatozoon we shall notice that these chromatin bodies begin to arrange themselves into a definite order. First we will notice that they all get end to end and form a big string, then this string will break up into a number of pieces and these pieces are named chromosomes; it will also be noticed—if skill is used in the staining—that a spindle has arranged itself in the nucleus, and stretches from the north pole to the south pole. Also at the north pole we shall see two other small bodies, known as centrosomes. On these spindles, which appear like fine lines from pole to pole, the choromosomes will arrange themselves about the center. Then we shall notice that these chromosomes divide themselves into two lots, one lot travelling to the northern portion and

the other lot passing to the southern portion of the nucleus.

After this, an indentation will be noticed at each side of the nucleus. This indentation will increase, until finally the nucleus divides into two.

A little later we shall find that the outside of the cell itself begins to develop a similar indentation, and these indentations increase until the whole cell divides into two cells.

It may appear to those who have not made a very detailed study of the subject of biology and physiology that this process is not a very important one, but, on the contrary, it is a most important one. Each particular species of animal has a definite number of chromosomes. The sexes differ in the number of chromosomes. In some animals, where 20 is the normal number for the male, we find 21 for the female, and so the question of sex becomes 50 per cent of the extra chromosomes being present. It takes only one of these spermatozoa to start the development of an offspring, and as the spermatozoa are particularly

active, it is not in normal circumstances a difficult matter for pregnancy to take place.

Only half the number of chromosomes are contained in the matured spermatozoon, the other half will be present in the female ovum, where these chromosomes will eventually find themselves, coalesce with those in the ovum, and go through another process to be discussed when outlining the anatomy and physiology of the ovum.

The spermatozoa are developed in the testis. They are ordinary tissue cells. Great numbers are produced. The process of development outlined above in the division and arrangement of chromosomes takes place in each tissue cell, and there are three divisions, the first division makes two cells, the second division four cells, and the third division eight cells.

In this way a great number of spermatozoa are manufactured. In each sexual functioning there are millions extruded, so that the process of development is exceedingly rapid in the normal person.

These spermatozoa are usually ejected in the natural or complete sex act. In pathological cases, such as prostatorrhoea, there are frequently none at all extruded. When the spermatozoa are ripe they pass up the spermatic duct and come in contact with the prostate fluid, from the prostate gland, where they are lubricated and become the semen.

In spite of all biological discussions and arguments to the contrary, the spermatozoa are in complete sympathy with the whole bodily organism. Weakening habits undoubtedly weaken their power: Moreover, a neglect or weakening habit in one region of the body will have a corresponding effect upon the spermatozoon in relation to that particular part which goes to make up the corresponding part of the body in the offspring.

This is not absolutely a determinable factor, but it is an undoubted fact. Where there is general weakness and debility produced directly by bad habits or lack of exercise and hygiene, it is possible to observe a deterioration in the offspring.

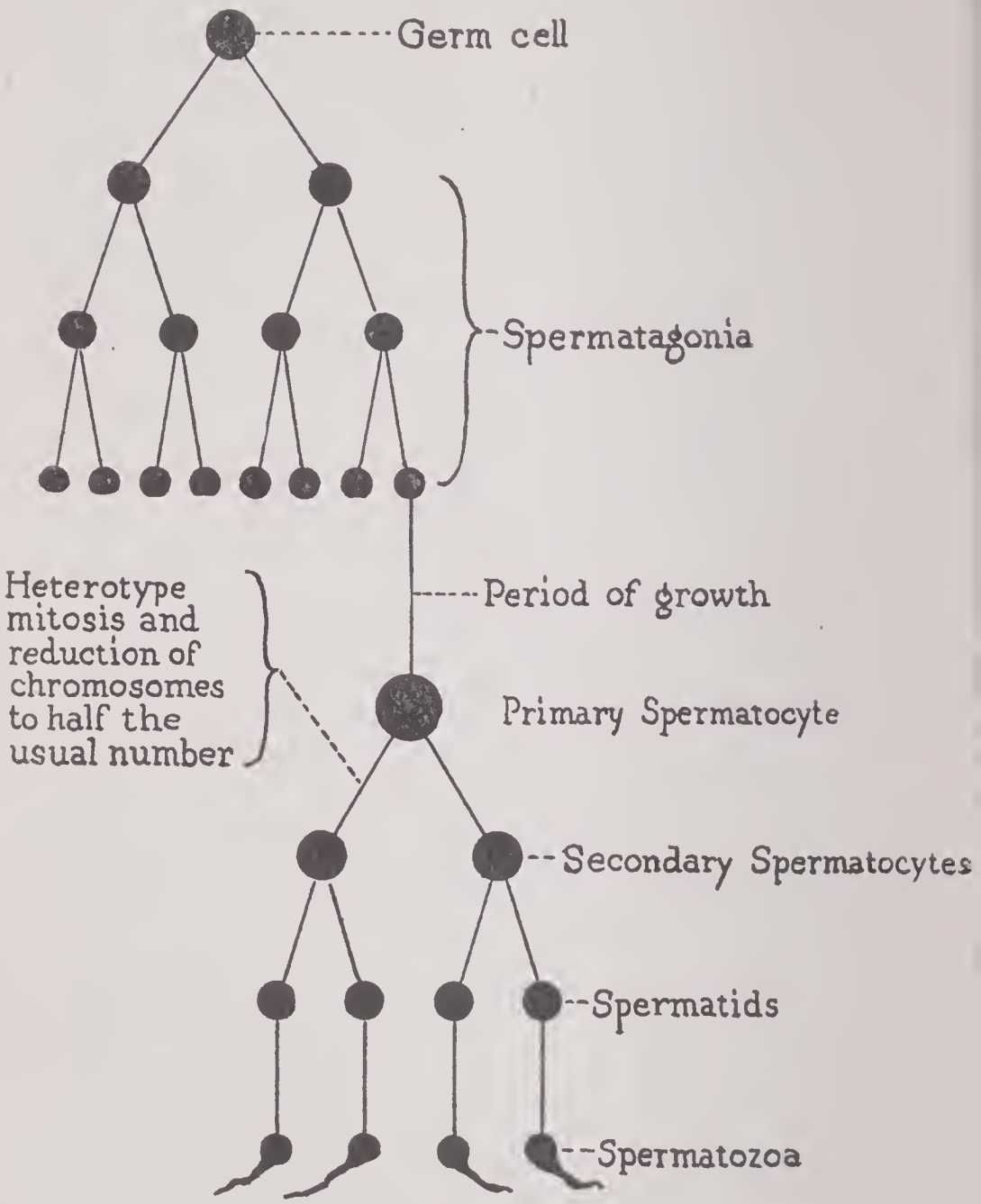

Germ cell
Spermatagonia
Heterotype mitosis and reduction of chromosomes to half the usual number
Period of growth
Primary Spermatocyte
Secondary Spermatocytes
Spermatids
Spermatozoa

Fig. 14.

EXPLANATION OF FIG. 14.

The development of the spermatozoa. From the primitive germ cell a process of spermatogenesis goes on. First of all the original germ cell divides into two, each becomes separate. The two divide into four, each separate, and the four divide and become eight, each separate and known as spermatogonia. Each goes through another process of division into two separate spermatozytes. These two each divide again, making four known as spermatids. These develop the tail and become the spermatozoa.

The process undergone by the chromosomes is explained in the text.

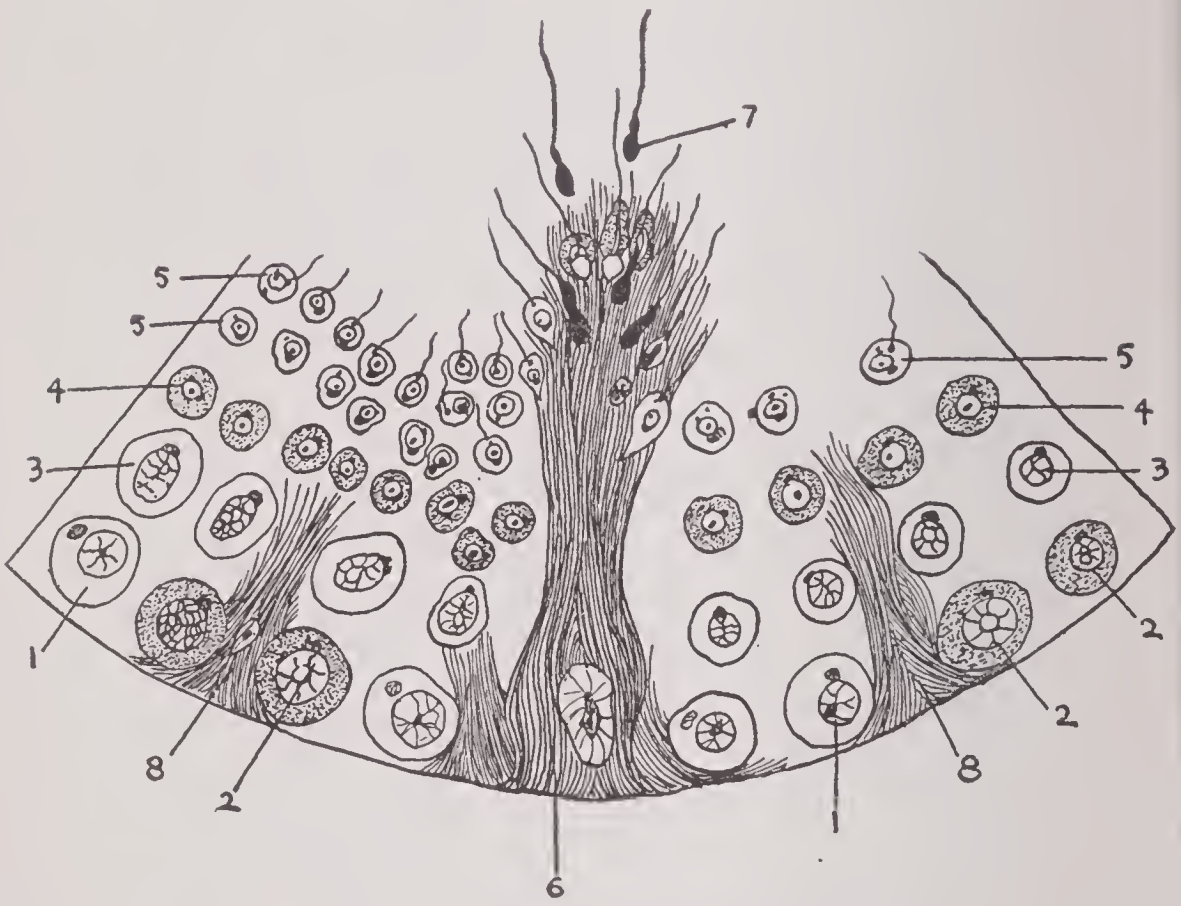


Fig. 15.

EXPLANATION OF FIG. 15.

Diagram showing the mature spermatozoa leaving the germ plasm then passing down a seminal tubule. The diagram also shows other spermatozoa in various stages of development. 7 is the mature spermatozoon. 1 to 5 show the various stages of development.

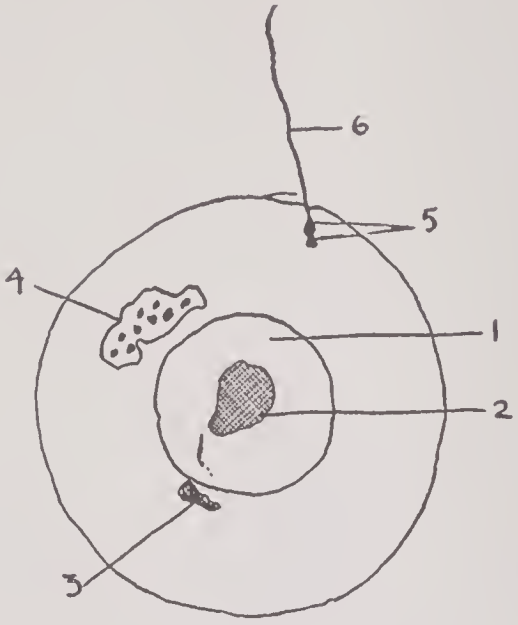


Fig. 16.

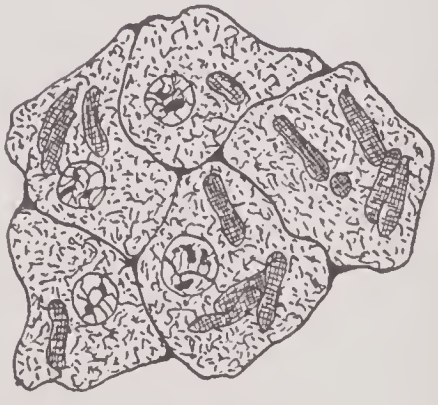


Fig. 17.

EXPLANATION OF FIG. 16.

Diagram of a spermatid very highly magnified, preliminary stage in the development of the spermatozoon. 1 is the nucleus of the cell. 2 is the neucleolus, which is the essential part of the cell, and which alone causes fertilization. 6 is the beginning of the development of the tail of the spermatozoon.

EXPLANATION OF FIG. 17.

An enlarged view of the interstitial cells of the testis, of which so much has been heard recently.

Where there is endeavor for improvement in the parent, there is also an accentuated ability for improvement in the offspring. Were this not so, all our struggles and trials to make ourselves better would be in vain. The work of the true eugenists has been to endeavor to show that faulty traits in the parent leave faulty traits in the offspring, but orthodox eugenists have made the mistake of claiming that it is not possible to affect the offspring by any influence upon the individual parent.

Recent experiments on animals have proved to the contrary. I could refer to many experiments by Bateson, De Vries, and other recent biologists, in their experiments on primroses, arthropods and other organims, in which they have been able to modify offspring by altering the environment of the parents.

It goes without saying that any interference with the sex function in a manner that is detrimental to the parent, is also in a degree, detrimental to the offspring. This shows the necessity for normal and healthy sex conduct in mar-

riage. If there is abuse of the sex function before marriage, there will be abuse of the sex function in marriage, unless there is a determined effort on the part of the individual to act in a way that is healthy and normal.

The constitution of the spermatozoon is very complex; the more we study it, the more do we come to the conclusion that man holds a great and sacred function in his control. In the spermatozoon he has the means of perpetuating himself. The spermatozoon is an actual part of the parent's body, and it is an actual part of the offspring's body. There is no absolute separation between parent and offspring. The offspring is merely a part of the parents, and is a carrying on of the same life process as exhibited in the parents.

There is no such thing as death. We can trace the life we posses by an unbroken chain connecting us with the first living organism. A man is the result of the division of the spermatozoon which has united with the female ovum, and

multiplied into a whole community of cells.

But there has been no death, the same cell has merely multiplied itself and it would be impossible to say that such a point is the beginning of the life of that individual. The spermatozoon, as I have explained, is an actual part of the tissue of man, and the ovum is an actual part of the tissue of woman. They come together and they develop, and the offspring is produced, finally growing up to adulthood. The tissue of this adult breaks away again, and coalesces with part of the tissue of another adult, and the same process is repeated until another adult is produced. I defy anybody to point his finger at the actual time of birth of any individual, and I will defy anybody to say which is the beginning of the individual life, and which is the end of the individual life of the normal human being.

So it will be seen that the sex act is the act of immortality; it is the act which

carries on the individual life into the race life away into posterity.

Looking backward we can see how each one of us was an actual part of our parents, and, in turn, an actual part of grandparents, then, again, of our great grandparents, and so on way back until we arrive at the primitive protozoon; and from the primitive protozoon, we shall see a gradual development from something even simpler. The living protoplasm forms out of the elements of the earth. All life is one. All the universe is one. There is no part which can be separated off, and of which it can be said, "This is independent." The life we possess is a part of the sun's life, of all solar life, all universal life.

THE FEMALE LIFE CELL.

The female life cell is known technically as the ovum. Ovum means egg. The human ovum is in principle the same as the ordinary hen's egg. It has its albuminous outer part, its internal yolk, and, right in the center, it has its nucleus.

The human ovum, however, is only one two hundred and fiftieth of an inch in diameter, and, of this, only a very small portion goes to make up the new individual. The nucleus is but a small part in the center of the ovum, and only a very small portion of this finally goes to make the new offspring.

While the ovum is in what we call the "resting stage," pieces of chromatin are dotted about the nucleus, but a process of development takes place exactly the same as in the human spermatozoon.

In the first stage the chromatin elements fall into a string. Then they

split up into a definite number of bodies, and arrange themselves on the spindle which forms between the north and south poles of the nucleus, just as we saw happened in the human spermatozoon.

At this stage each chromosome splits itself into two, one part travels to the northern hemisphere, and the other part travels to the southern hemisphere. At the side of the nucleus a constriction begins to appear, and finally divides the nucleus into two portions. This is followed by a similar constriction in the outer portion of the cell itself, and the cell divides into two cells.

The ovum is now matured, the above process being termed "maturation," and ready for fertilization by the spermatozoon.

The ovum divides twice, so that it becomes four cells, and each cell has half the number of chromosomes necessary to stem the cell resulting from the fertilization of the female by the male, but in the case of the ovum, only one

Fig. 18.

EXPLANATION OF FIG. 18.

A Hen's Ovary—Actual Size.

At the top end is seen the Fallopian Tube, cut off. The eggs are in varying stages of development.

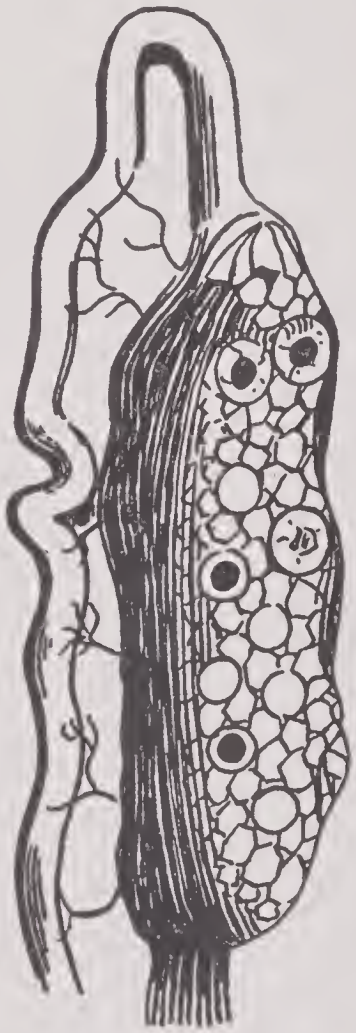


Fig. 19.

EXPLANATION OF FIG. 19.

Ova at various stages of development are seen at the heat period of the rabbit. The tube is the Fallopian Tube.

Fig. 20.

EXPLANATION OF FIG. 20.

Diagram of Human Ovary.

The Fallopian Tube is cut off on the left side of the diagram. At the top in the center is an ovum ready to break loose from the ovary. Other ova in various stages of development will also be noticed. One ovum only is matured each month.

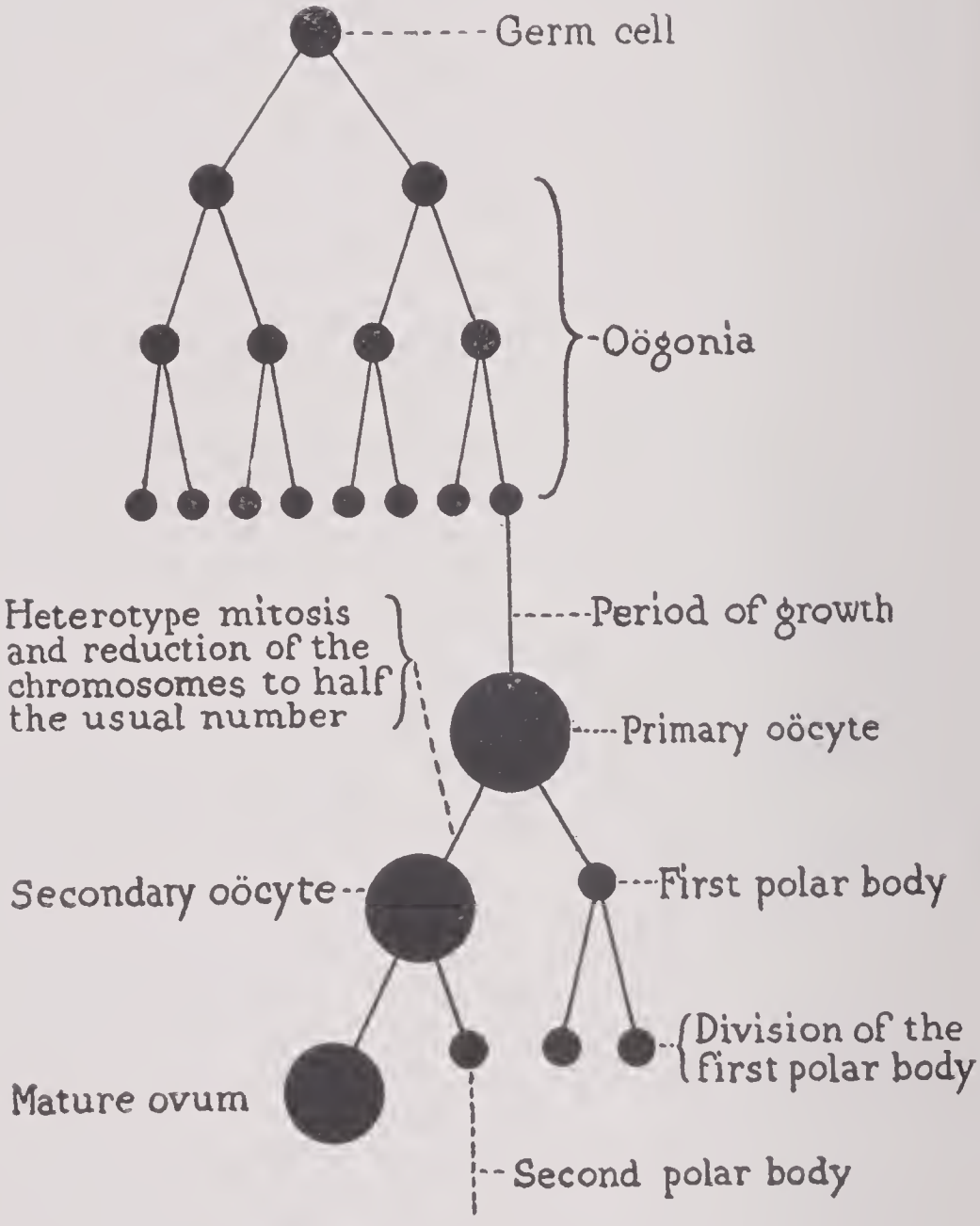

Germ cell
Oögonia
Heterotype mitosis and reduction of the chromosomes to half the usual number
Period of growth
Primary oöcyte
Secondary oöcyte
First polar body
Division of the first polar body
Mature ovum
Second polar body

Fig. 21.

EXPLANATION OF FIG. 21.

This shows the development of the mature ovum from the original germ cell. The germ cell divides into two separate cells. These two divide into four, and these four become eight, known as oogonia. The one selected for ovum begins to enlarge and the chromosomes undergo the process explained in the text. Half the number of chromosomes extruded in a form of division which results in the first polar body, and the polar body itself also divides just as if it were a cell. The oocyte which is left, known as the secondary oocyte, makes another division, leaving a second polar body and the mature ovum.

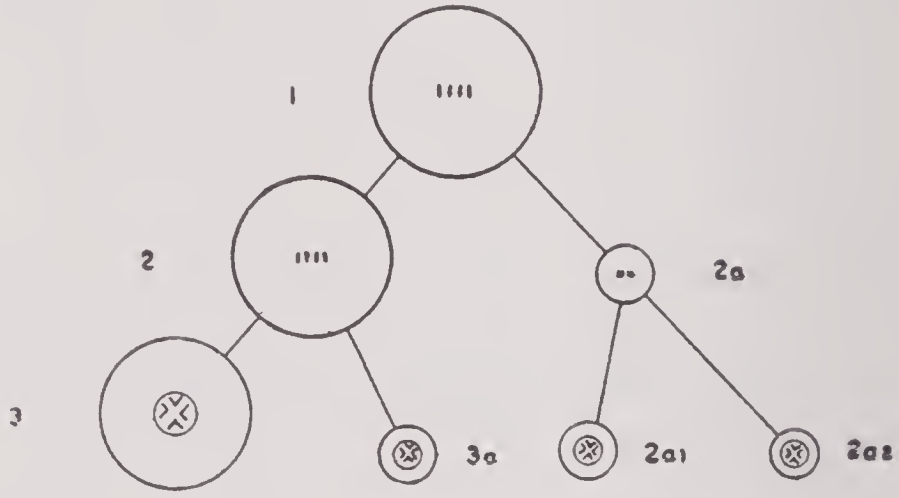


Fig. 22.

EXPLANATION OF FIG. 22.

1 represents the primary oocyte which is to become the mature ovum. Inside are diagrammatically illustrated the chromosomes, half the original number for the species.

2 is the secondary oocyte and 2-a is the first polar body. It is noted that the first polar body divides again, just as if it were a cell, and the chromosomes also go through the process of division. The oocyte itself again makes a sort of a division process, extruding a second polar body and leaving the mature ovum with half the number of chromosomes, which will leave a spermatozoon to supply with the other half of the chromosomes of the fully fertilized germ cell.

cell survives, the other three die and serve only to nourish the ovum.

In the case of the spermatozoon we saw that each cell resulting from each division was still kept alive and active and ready to function. In the ovum, it is only one cell out of the many that finally survives as the ovum.

There are some sixty thousand cells, all of a similar nature, that would be capable of becoming human ova were it not for the fact that only one is nourished at the expense of the others. Nature may appear to be very wasteful in this, inasmuch as it would be possible for her to produce sixty thousand egg cells, each capable of becoming a human being. But when the matter is considered intelligently it is seen that this is a very valuable provision of Nature, for if each person gave birth to sixty thousand new offspring every month there would soon be very little room on this earth for any of us.

However, Nature herself does not limit human conception to civilized demands. In spite of the fact that a hu-

man ovum is developed and ripened each month, it is possible for a woman to bring forth a child only about once a year, but if each woman gave birth to a child each year, we should still be in the same predicatment, and in a century or so human beings would be blotted out because of their super-abundance.

Nature limits the population by killing off a huge number of all species. Where there is a huge number of individuals produced the mortality is always heavy. The greater the number of individuals born the less the proportion which survives.

If you like to state it round the other way you may. The less the chances of survival the more beings are there produced. Thus the tape worm lays ten million eggs, and the chances of survival of these eggs is about one or two in ten million.

It is possible to find the same thing in regard to human beings. Where in the slums and poorer quarters the chances of survival are not so good it is usual to

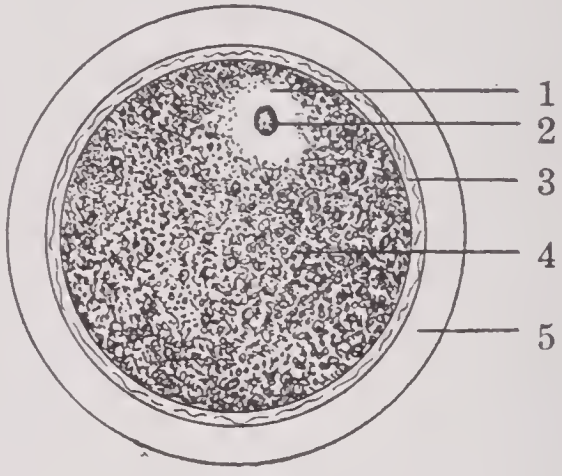


Fig. 23.

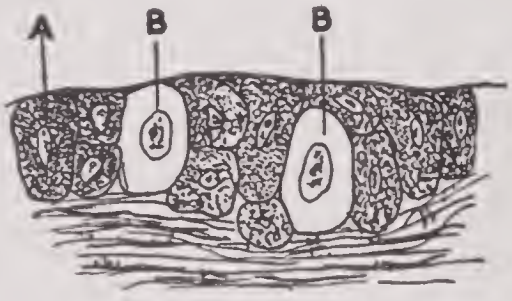


Fig. 24.

EXPLANATION OF FIG. 23.

The human ovum, very greatly enlarged.

5 is the outer wall, known as the zona pellucida through which the spermatozoon has to penetrate before it can fertilize the ovum.

4 is the protoplasmic body of the cell containing the nourishment of the cell.

1 is the nucleus. 2 is the nucleolus, the acual part of the cell which alone contains the characters which go to build up the new offspring.

EXPLANATION OF FIG. 24.

A section of the mammalian ovary very greatly enlarged showing the development of the germ plasm.

A and B are ova developing and going through the process of maturation, as described in the text. The dots represent the chromosomes.

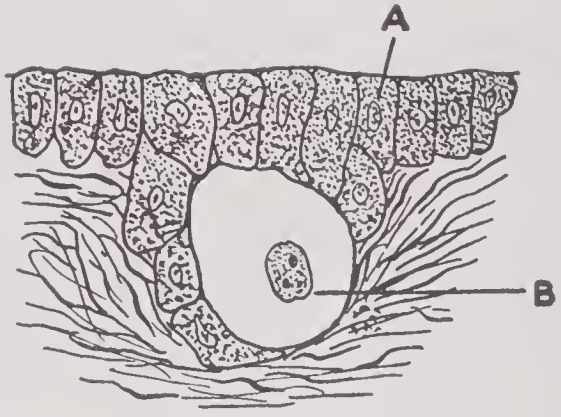


Fig. 25.

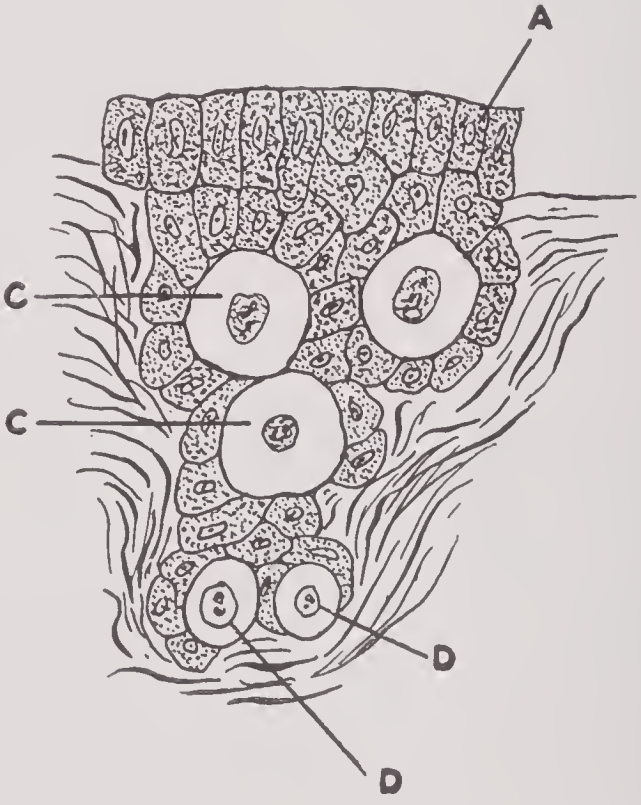


Fig. 26.

EXPLANATION OF FIG. 25.

Diagram of germ plasm of mammalian female in which the ovum has been released after maturation. The surrounding cells cling to it and serve to nourish it.

A represents the ordinary germinal epithelium of the ovary, and B is the nucleus of the ovum itself.

EXPLANATION OF FIG. 26.

Diagram of germinal plasm of mammalian female. C are ova which have just divided into two from one single ovum. D shows the stage before this where the nuclei have each divided into two, preliminary to the cell itself dividing into two.

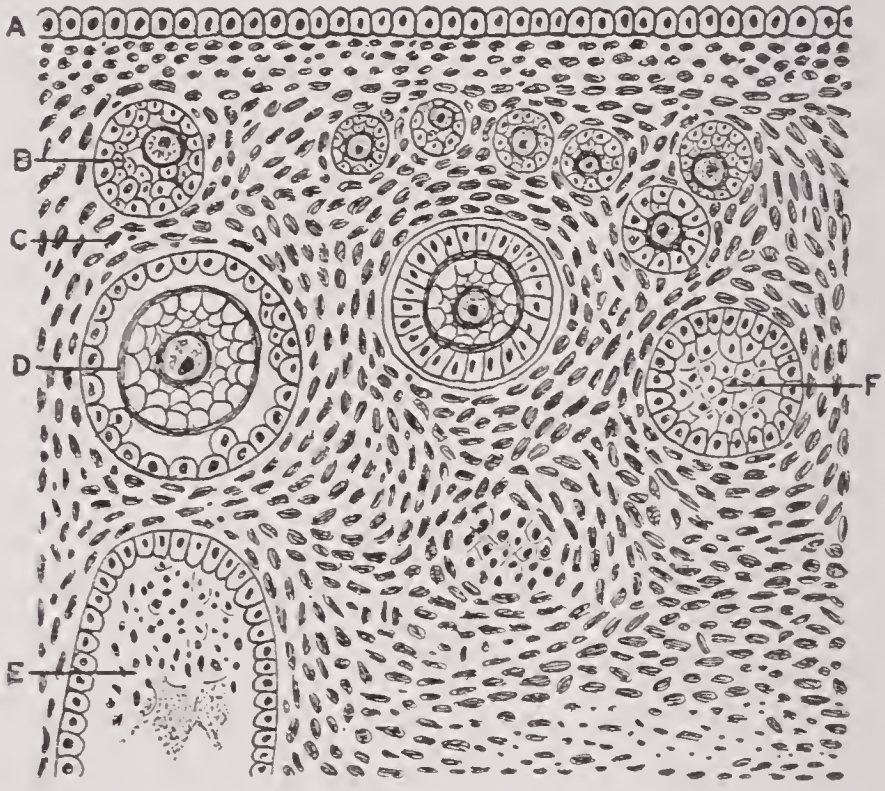


Fig. 27.

EXPLANATION OF FIG. 27.

Diagrammatic section of the ovary of a cat.

A represents the lining membrane (the lining epithelium), B is an ovum developing in what is called a Graffian follicle. C shows a further stage of development, with the zona pellucida enclosing the ovum. E represents the Graffian follicle after the ovum has passed out.

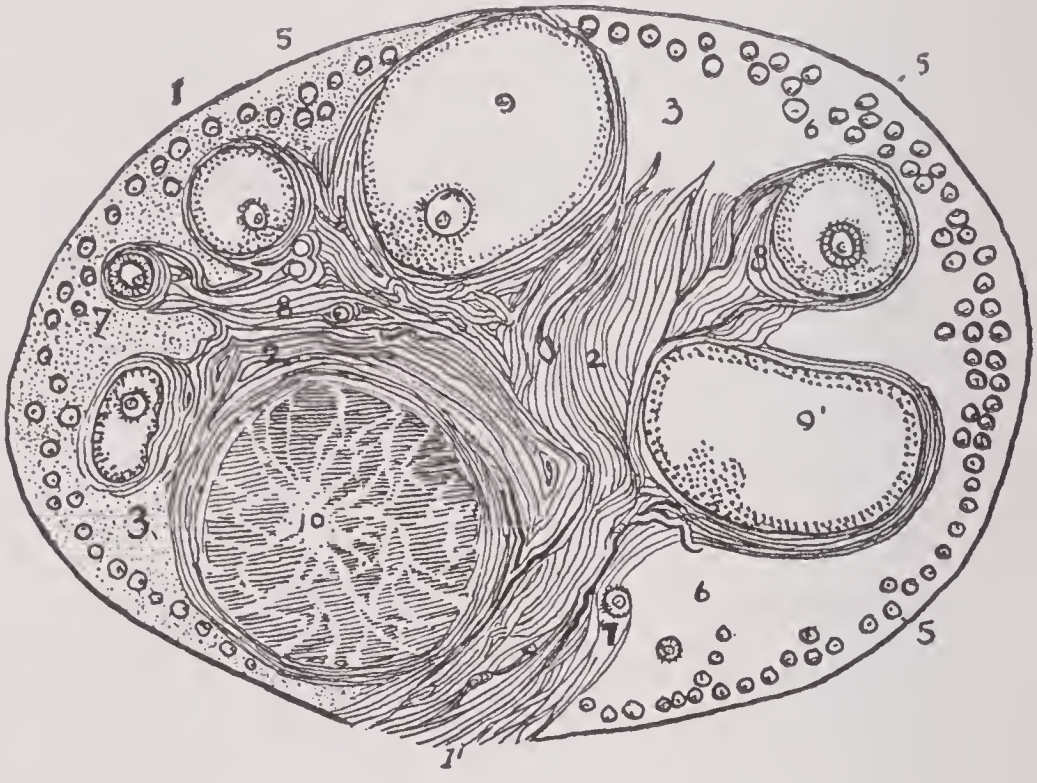


Fig. 28.

EXPLANATION OF FIG. 28.

Section of portion of the ovary of a cat showing ova in various stages of development.

The small ring represents primitive germ cells, while the large ones are the maturing ova in their follicles.

9 represents the completely developed ovum ready to pass from its follicle, while 9^1 represents the follicle after the ovum has departed.

find large families. On the other hand, where each child which comes into the world has the opportunity to survive the families are smaller.

Again, if you like to take this the other way around you may. Where the human families are large the chances of health and survival are less than where the families are small.

It does not matter which way you look at it, the fact still remains, and the common sense of making parenthood a voluntary matter is obvious. Children loved and desired before they are conceived will be fewer in number, perhaps, than those that are brought forth haphazardly, without any forethought or desire. But the former will be far more valuable, more powerful, more efficient, more desirable than the latter. Moreover, the parents themselves are more benefited by the begetting of children they desire than to have children thrust upon them.

The ovum is a cell of tissue that is produced in the body of the woman, in just the same way as are the other tissue

cells. The ovum is an actual part of the woman's body, and there is no stage at which it may be said to begin. It is, in fact, the same cell which was all that composed the woman when she was in the form of the first egg cell, resulting from the fertilization of her mother's ovum by her father's spermatazoon.

It is impossible to point to a beginning of life, or a beginning of the individual. There is no such thing as a separate individual. The same living protoplasm that is existent today is the same that has carried on the human life throughout the ages of evolution.

One ovum is ripened each month. When ripe it loosens itself from the ovary in which it has been developed, and passes down the Fallopian Tube, until it reaches the uterus. There it may be fertilized by the active spermatozoon from the male, and, if so, it adheres to the side of the uterus, and the process of development of the offspring is begun. But if it does not meet the spermatozoon from the male there, it passes down the

uterus, through the vagina, out of the body.

Contrary to what a great number of people think, the ovum does not pass out of the body at the menstrual period. It differs in individuals as to the time of its exit, but usually it is from eight to ten days after the monthly period.

It can be noticed by some women if looked for carefully. If a diaper is worn at this period a small amount of red tissue will be found to be emitted from the body.

The point is interesting because from this date, for about ten to thirteen days, is what is looked upon as the "safe period," but, as a matter of fact, it is not a safe period. It is recommended by doctors, purely because, either they do not know of the scientific means of controlling conception, or else they are prevented by law from giving detailed scientific instructions for the prevention of conception.

However, it is well to state that the idea that there is a safe period at this time of the month is untrue. The sper-

matozoon may be retained in some recess of the mucous lining and kept alive for some days, and finally work its way up into the uterus, so as to arrive when the matured ovum is ready for fertilization.

It must not be foregotten that the spermatozoon is only one-thousandth of an inch in diameter, that it is very volatile and active, and it can survive for many weeks.

The ovum is always passive. It never exhibits any movement toward the spermatozoon, and the entire characteristic of the female is to be passive. So obvious is this that Professors Thompson and Geddes, and other scientific students of sex, have characterized male and female as active and passive. The male is always the active, while the female is the passive. They stated that the male is catabolic, while the female is anabolic. The male breaks down, and is active, while the female builds up, and is passive.

This is an important point to remember, because it is really observable

throughout the entire make up of the male and female. In love and courtship the female naturally plays the passive part, while the male plays the active part. In marriage, and in the marriage relationship, the male plays the active and persuasive part, while the female plays the passive, if responsive, part.

But it must not be forgotten that when the spermatozoon mixes with the ovum there is a response from the ovum, and, in fact, there is a violent spasm, one might almost call it, in the union of the chromatin of the female with the male chromatin. So let it not be thought that the female is entirely passive. The female is passive in general preliminaries, but, after this, response is as intense in its nature as the activity of the normal male.

This is exceedingly helpful in our understanding of the normal sex conduct for married people. It is wrong to imagine that the male only has to play an active part and experience passion, while the female has to allow the male

this experience without responsive emotion on her part. Again, the husband must remember that it is his activity, and the employment of his courtship arts that enables his wife to respond. If he is to maintain for her all the love which he bears her, and if he wishes to maintain all the love which she bears him, he will always be thoughtful and understanding of this. By nature, she can be stirred normally. When the act is looked upon as something which is vile, then there can be no normal response. That is the reason for abolishing the abominable idea that the most sacred relationship in married life is something which is indecent.

It is my sincere hope that this simple outline of the anatomy and physiology of sex will enable people to get more joy out of life, and freely experience the noblest and most beautiful thing in life. They cannot do this when they are oppressed with the idea that something, which in their hearts they know to be sacred and beautiful, is immoral and indecent. The most important thing for

married people to eradicate from their minds is that there is necessarily anything indecent about their intimate conduct. It is lust and over indulgence which are domoralizing and harmful. The true communion of husband and wife loving each other devotedly is the noblest, most beautiful, most inspiring and most beneficial of all human functions.

The ovum is the living egg cell, and as such it is the most important cell in the human body. It is influenced by conditions of living. It is influenced by thought, and it is influenced by lack of care and attention to health. If we are to give rise to a generation that will be superior in every way to our own generation, we shall improve our bodies, make them healthy, strong and beautiful; improve our minds and make them efficient and sympathetic with what is good and true. We shall avoid all that is harmful or lustful, but enjoy all that is inspiring and beautifying in the noblest way.

The ovum is the cell which, after fer-

tilization, develops and becomes the new born baby, which will become the adult representative of humanity, connecting your life with the life of all humanity which is to come.

CONDUCT DURING PREGNANCY.

Human beings cannot be likened unto ordinary animals in regard to pregnancy. Animals live in a state of Nature, generally have their mating season, and coitus is indulged as an instinct and is in no way an expression of love. On the other hand, the human being indulges as a result of love. It is, therefore, more than a reproductive function. It has a very important place in social and family life and also as an expression of love.

In any consideration, therefore, of communion during pregnancy, the above should be borne in mind. For the first three months complete freedom should be allowed, and opportunity of harmony given so that the early stages of the embryo's development should be accompanied by a helpful psychology and refined emotions.

It may be the experience of the mother

that she requires the unity with her husband, and it must always be strictly borne in mind that such communion is for this end: for establishing harmony and unity in order to give the best condition for love for the unborn child.

The physiological and anatomical factors which enter into the case are as follows: In regard to the physiological necessity during the first three months, it may be stated that the mother benefits from the absorption of the secretions from her husband. After three months the mother will feel less inclined, and the husband should respect and guard carefully the desires of his wife in order not to impose himself upon her, except when the desire on her part is ardent.

Great care must be taken to insure no physical injury to the child, and communion must be *purely* a communion and free from physical excitement.

This is a very important point, and, if possible, no orgasm should take place. However, if during the next two months it is ardently desired by the mother it is not especially harmful. Simple com-

munion of a peaceful nature is helpful and desirable. After six months, if any communion at all takes place it must be exceedingly gentle. There is not the slightest doubt that it will be desired at times, and if it can be indulged to the accompaniment of the tenderest emotions nothing but good can result from it, both for the mother and for the coming child. But every care and precaution must be taken against physical injury.

PREGNANCY.

As soon as conception takes place pregnancy begins. Not only are there great changes taking place in the embryo itself, but the body of the mother adapts itself to the condition. First of all the uterus becomes closed so that further fertilization cannot take place. The fertilized cell, now the embryo, travels down the Fallopian tube and attaches itself to the mucous lining of the uterus.

The embryo of the human being may be said to pass through all the stages of our human ancestors. It begins as a single cell, and is then representative of the Protozoa, the organisms composed of one cell. It divides into two, these two cells divide into four, the four into eight, and so on until a complete cluster of cells is formed, thus representing another form of life, representatives of which are found today, and the stage

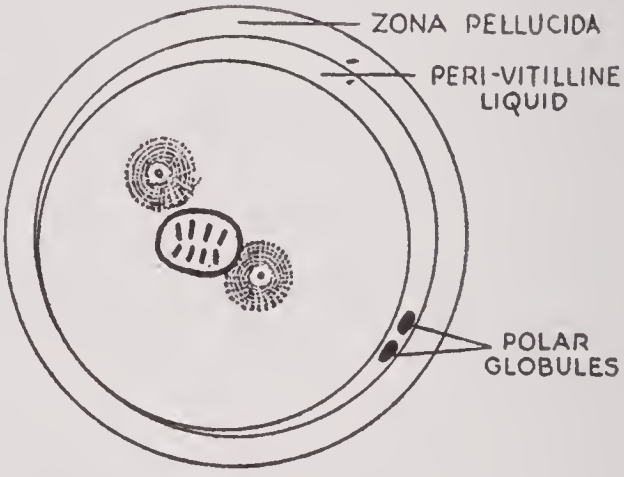


Fig. 29.

EXPLANATION OF FIG. 29.

Diagram of the fertilized ovum. The surrounding membranes are shown and the two polar bodies. In the center are the chromosomes, half from the male and half from the female.

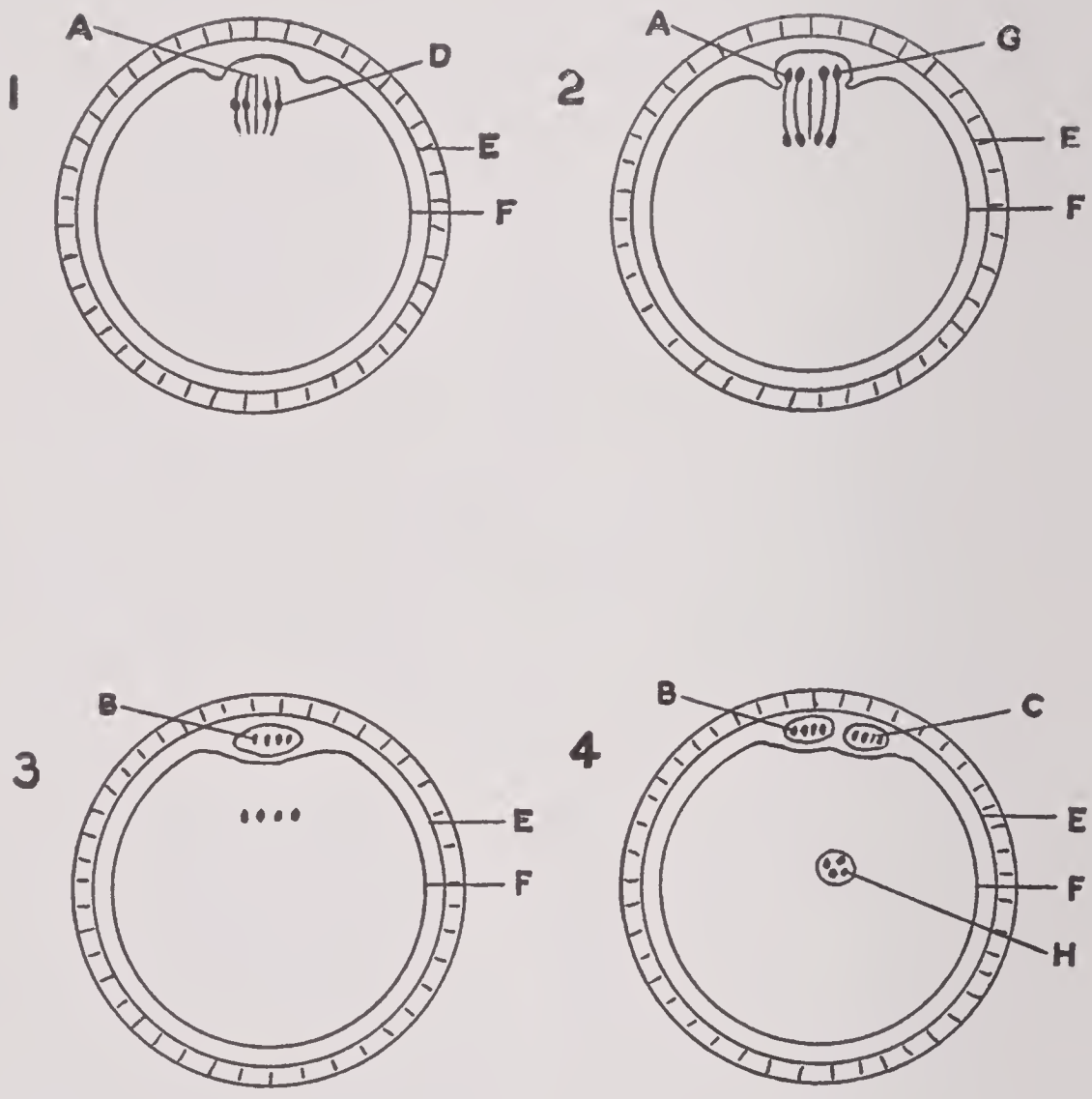


Fig. 30.

EXPLANATION OF FIG. 30.

The diagram shows the maturation of the ovum and the formation of the primary and secondary polar bodies. In 1 it will be noticed that the chromosomes are beginning to divide, and a constriction is being made at the north pole of the nucleus. In 2 the chromosomes have divided and the nucleus is in the process of giving off the first polar body. In 3 the first polar body is already separated from the nucleus. In 4 the second polar body has been extruded and the ovum is mature ready for fertilization.

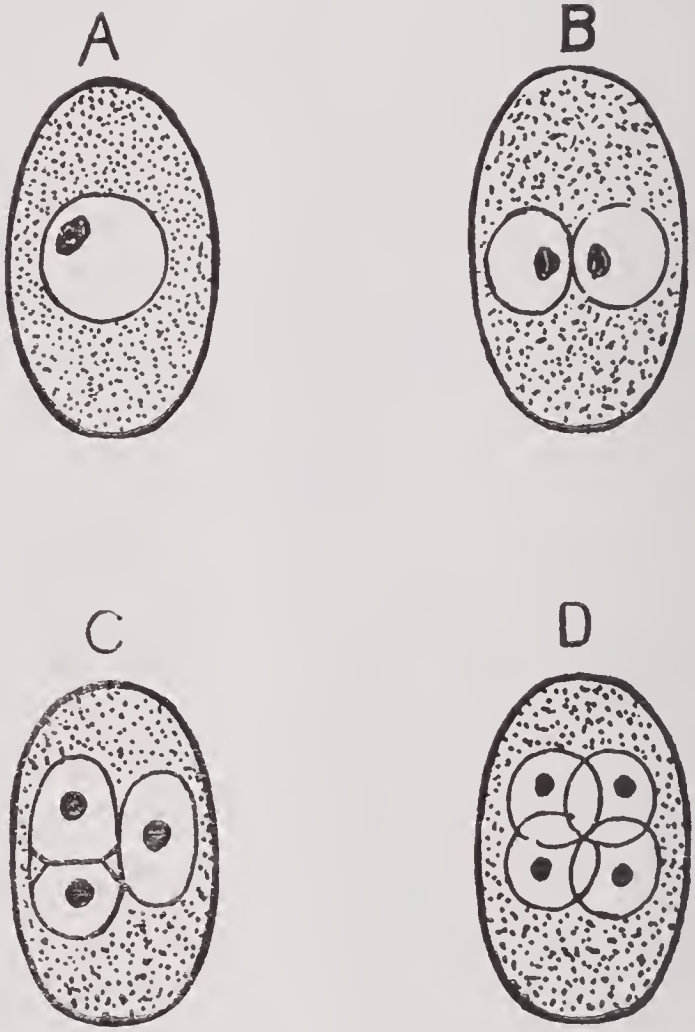


Fig. 31.

EXPLANATION OF FIG. 31.

Immediately fertilization has taken place the human ovum divides into two cells. The two cells divide into four cells, and so on. A represents the primary unicellular stage—the egg cell. B represents the egg cell having made its first division. C the two cells are in the process of making a second division. On the left the division is practically made, while on the right the cell is just beginning to elongate. D shows the four cells dividing from the two. The process is continued by similar cell division in the development of the fetus.

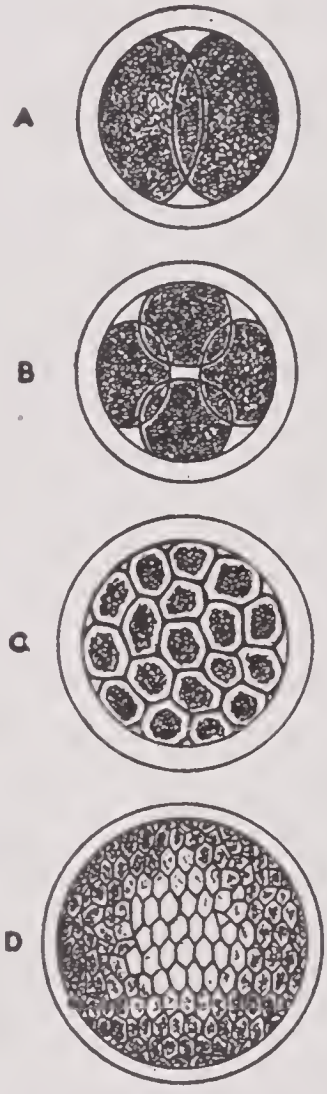


Fig. 32.

EXPLANATION OF FIG. 32.

The original egg cell develops by a process of division. The original cell becomes two cells, as illustrated in A. These two become four, as illustrated in B. The four become eight, and the eight sixteen, as illustrated in C until a whole cluster or sphere of cells is formed, as illustrated in D.

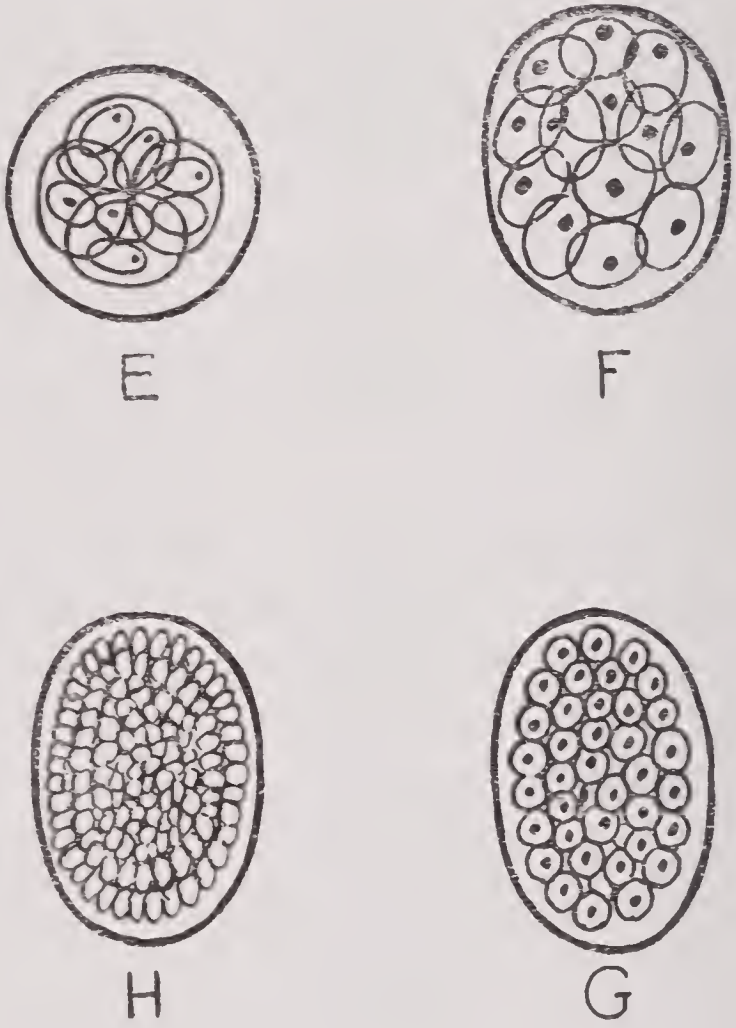


Fig. 33.

EXPLANATION OF FIG. 33.

The first stage in the development of the embryo as explained in Fig. 32. The development by simple division of the cells, forming the sphere or blastula.

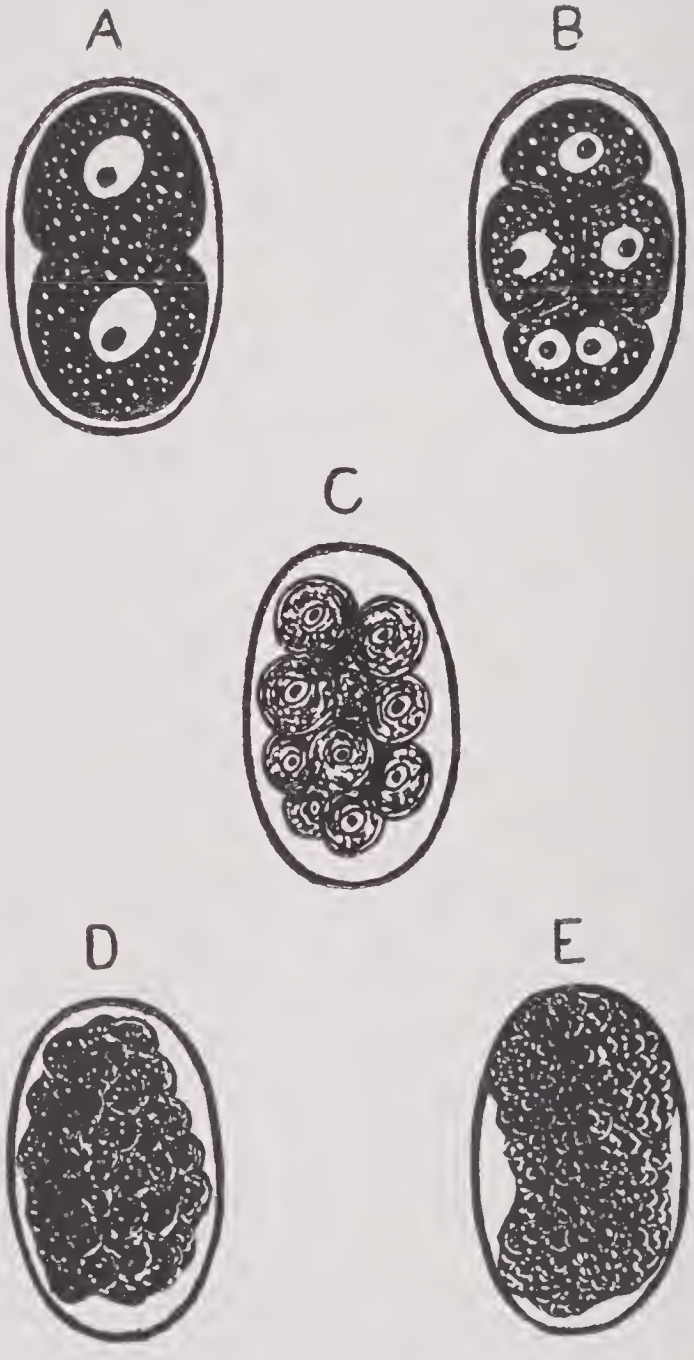


Fig. 34.

EXPLANATION OF FIG. 34.

Another diagram of the initial stages of the development of the human fetus. A represents the very first division of the fertilized ovum into two cells. B, the two cells have become eight cells. C, cell division has increased still further. D, cell division has taken place until the sphere or blastula is formed. E, the side of the blastula is beginning to indent prior to formation of the gastrula stage.

known as the blastula. This blastula stage continues its development by cell division until one side of it invaginates, so forming a sort of double bag. This cup-like stage is known as the gastrula. It is representative of a human ancestor of the hydrozoon group of organisms, and relatives of it may be found in animals living today, such as the *Hydra,* which is composed of a double bag of cells, and which has become invaginated from a simple sphere of cells.

We have in our human embryo now an opening which is the mouth, and an internal part which may be said to represent the gut. However, cell division continues until various layers are formed, and a fish-like form of embryo results. About this time we find that the nervous system begins to develop. Some of the cells of the outer layer begin to rise and cover over others of this outer layer. Those which are internal of this outer layer become the adult individual's central nervous system, and later on the spine and brain.

Also, if you could examine the embryo

of this stage you would find gills developing, just as you would find in a fish in the embryo. These gills only remain for a short time, for, by the continued process of cell division, they become adapted for other functions. The first gills become part of the jaw, the blood system supplying these gills also becomes adapted and one artery becomes the aortic arch.

Then an inter-circulation is developed between the mother and the embryo, or fetus. This inter-circulation is accomplished by the development of a placenta, which is a spongy mass of tissue which develops in the uterus of the mother. From it passes an umbilical cord, which attaches the offspring by what in the fully formed child is known as the navel, and the umbilical cord is known as the navel string. Also around the embryo is developed a double bag which contains fluid. Thus the embryo is properly protected from bumps and bruises.

The uterus expands, and the body of the mother adapts itself to the changes.

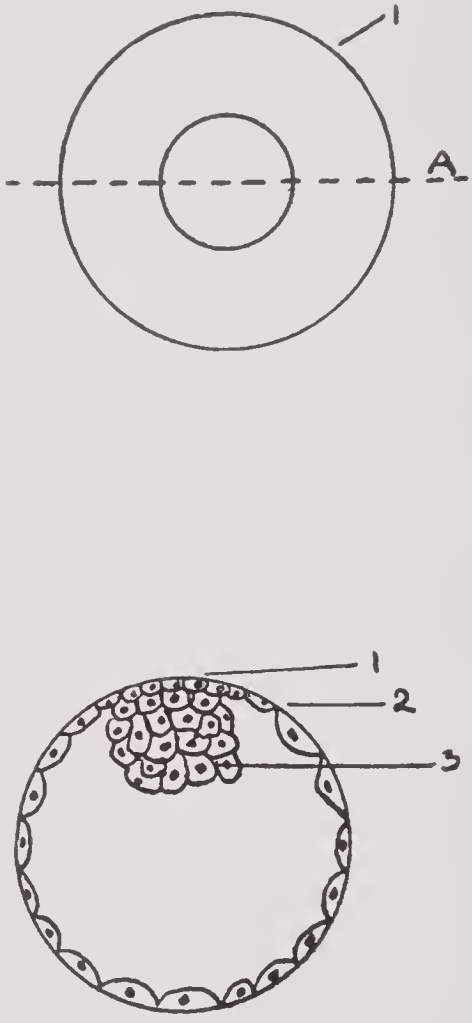


Fig. 35.

EXPLANATION OF FIG. 35.

A represents a line cut through the blastula or sphere stage of the embryo of a mammal. The lower figure is the result. You will notice that as the cells continue to divide they cause the development of the fetus. 1 is the outer layer of cells, and 3 the inner cells, which on continued division will go to make up the organs of the body.

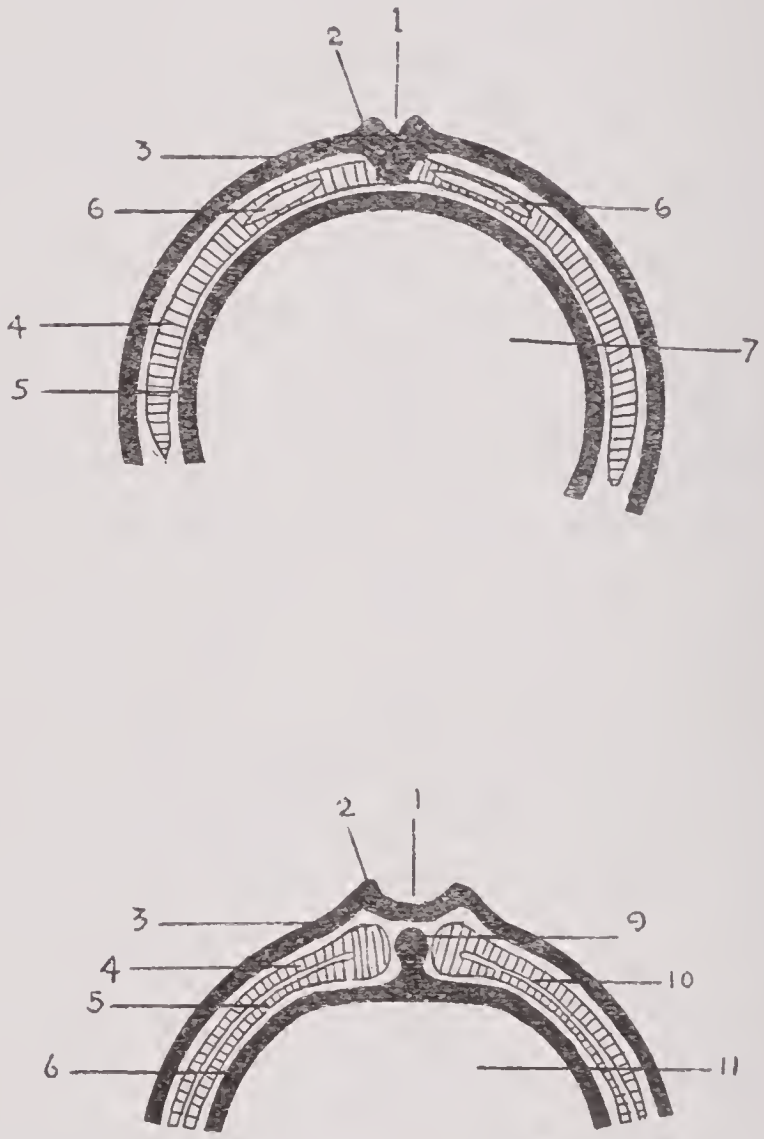


Fig. 36.

EXPLANATION OF FIG. 36.

Diagrammatic section through the blastula. 1 is the development of the neural groove, which becomes the central nervous system, or spine. It is noted that the cells from the outer layer begin to invaginate, and those from the side begin to envelop the neural cells. 9 represents the primitive cells which later on become the notochord, which, in a still later stage, becomes replaced by the backbone or spinal column.

The limbs develop gradually and the body organs develop, until after approximately nine months the child is ready to descend into the world.

Other changes in the mother occur in the breasts. They become fuller, more sensitive, and prepare for their function of supplying nutrition for the child.

Pregnancy must not be looked upon as a form of illness. A mother, by care and attention, may keep perfectly well; and, in fact, should be well and happy if her child is to receive the best advantage. About three weeks before delivery a few labor pains may be experienced, but these should not be serious.

A few days before delivery mucous fluid may pass from the body, and is an indication that delivery is near. This is caused by the mouth of the uterus opening and is an indication that labor is beginning.

It depends, of course, to a very great degree how the mother has lived what sort of pains she will experience, but the average mother passes through the

various stages where at first the pains are more or less indefinite, and are experienced for short periods at a time. As time progresses towards delivery the pains become more acute and definite.

Within a few hours of delivery the double bag enveloping the fetus will be ruptured and the mucous fluid will become more pronounced. The mother should hasten to bed with all precautions having been made and prepared for the final labor pains. These will be felt in relays and will become more and more pronounced until final delivery.

There is no need at all for the mother to be frightened by the pains. In the normally healthy woman they may be withstood quite easily, but doctors are accustomed to hearing a lot of fuss made about these pains, and most of them base their calculations of the actual birth of the child upon the acuteness of the pains felt, but such is not a reliable method of procedure.

The actual delivery of the child into the world is not such a terrible process as most people believe. Left to itself the

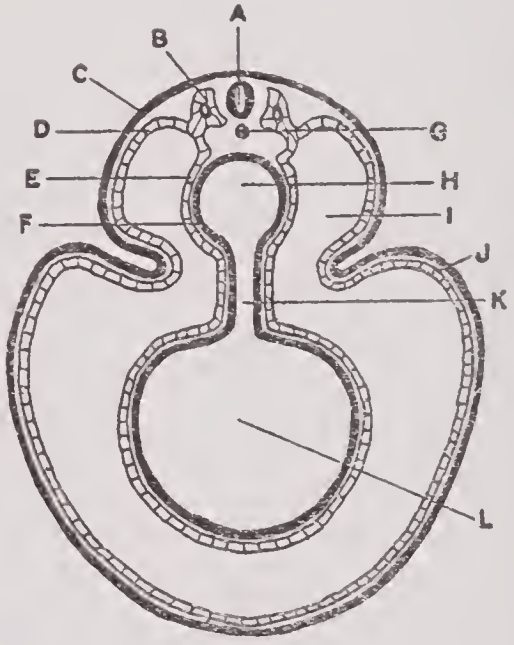


Fig. 37.

EXPLANATION OF FIG. 37.

Transverse section of fetus at later stage of development. A is the preliminary stage of the nervous system. G is the beginning of the formation of the cells which become the vertebral column. H is the preliminary alimentary canal. L is the body of the yolk sac.

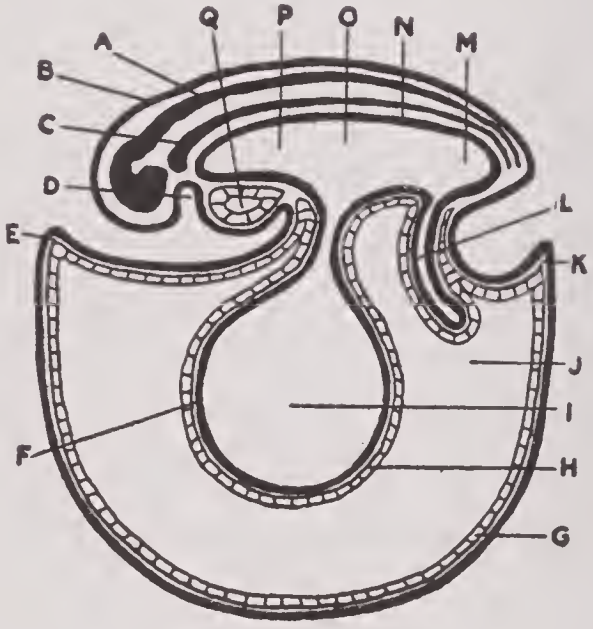


Fig. 38.

EXPLANATION OF FIG. 38.

Longitudinal section of primitive fetus. The diagram shows the fetus beginning to become a separate body from the yolk sac. The head end is obvious and also the navel cord, neural canal, and primitive alimentary canal.

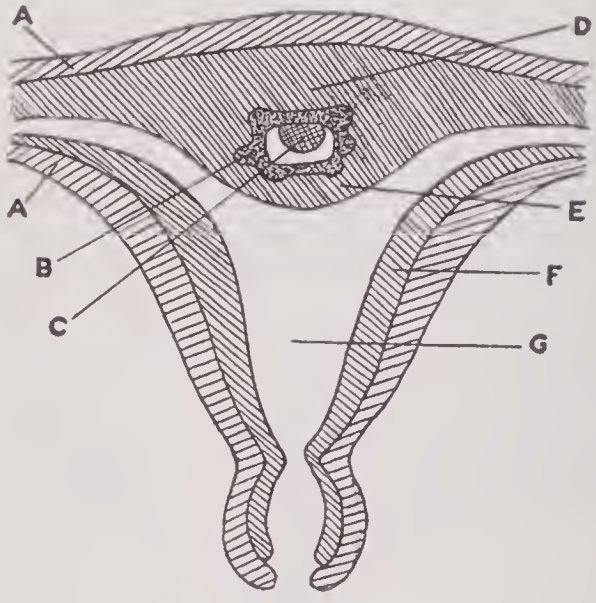


Fig. 39.

EXPLANATION OF FIG. 39.

Diagram of the developing embryo in the uterus. G is the general body of the uterus, C the small mass of the developing embryo. B is the outer covering of the embryo.

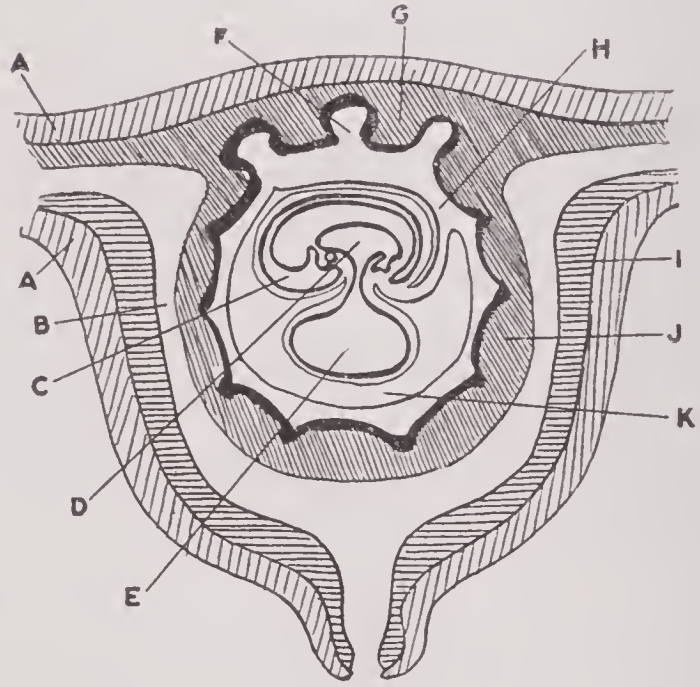


Fig. 40.

EXPLANATION OF FIG. 40.

A diagram showing the developing embryo within the uterus with its surrounding membrane.

H is the allantois. C is the amnion cavity. F is the villi of the chorion of embryo. E is the yolk sac of the embryo. D is the general cavity of the uterus.

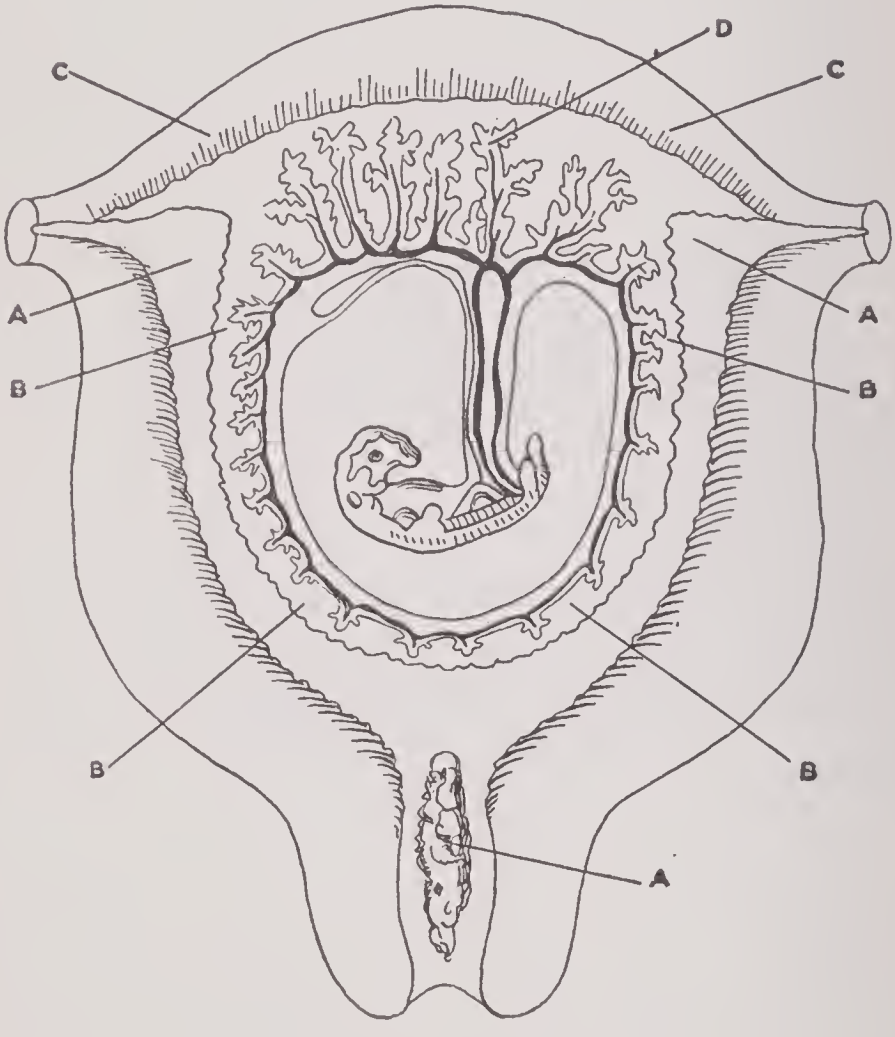


Fig. 41.

EXPLANATION OF FIG. 41.

Transverse section of embryo and uterus at about the seventh or eighth week of pregnancy. The embryo is seen lying within the amnion connected by the umbilical cord attached to the chorion and the yolk sac. The upper A is the cavity of the uterus. Just above it are the Fallopian tubes which have been cut off. The lower A represents mucous which has closed the entrance or cervix of the uterus.

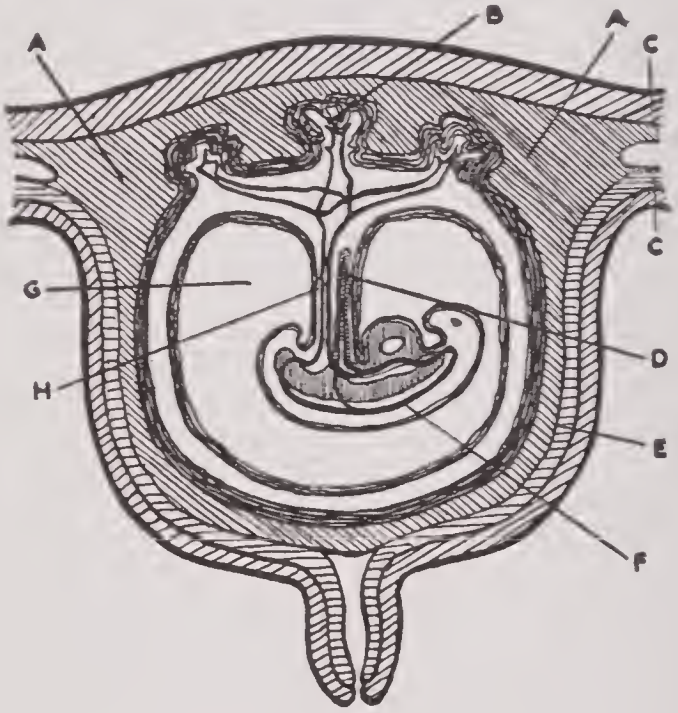


Fig. 42.

EXPLANATION OF FIG. 42.

Diagram chiefly to show the later stage in the development of the placenta for the nutrition of the embryo. The upper portion between A and A represents the placenta. G is the cavity of the amnion which contains the fluid protecting the embryo. D is all that remains of the yolk sac. B is a villus in the placenta.

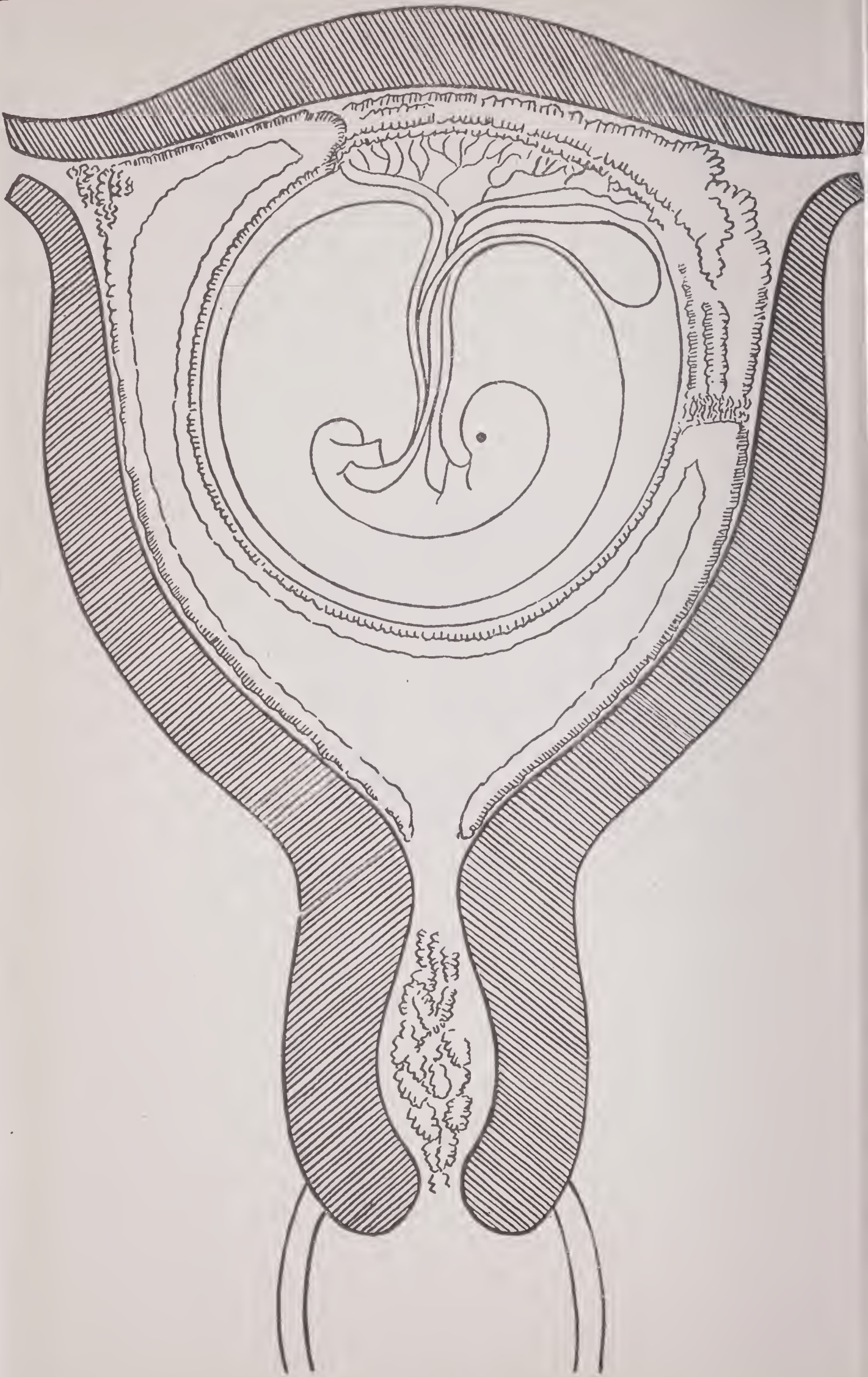


Fig. 43.

EXPLANATION OF FIG. 43.

Diagram showing longitudinal section of the embryo in the uterus at the stage where the placenta is developed. The embryo is connected by the umbilical cord. It is seen how well protected is the embryo by the membrane which surrounds it. The connection of the placenta with the uterus is also shown. At the lower end of the uterus the vagina is shown. At the entrance to the uterus is seen the mucous which encloses the uterus during the pregnancy.

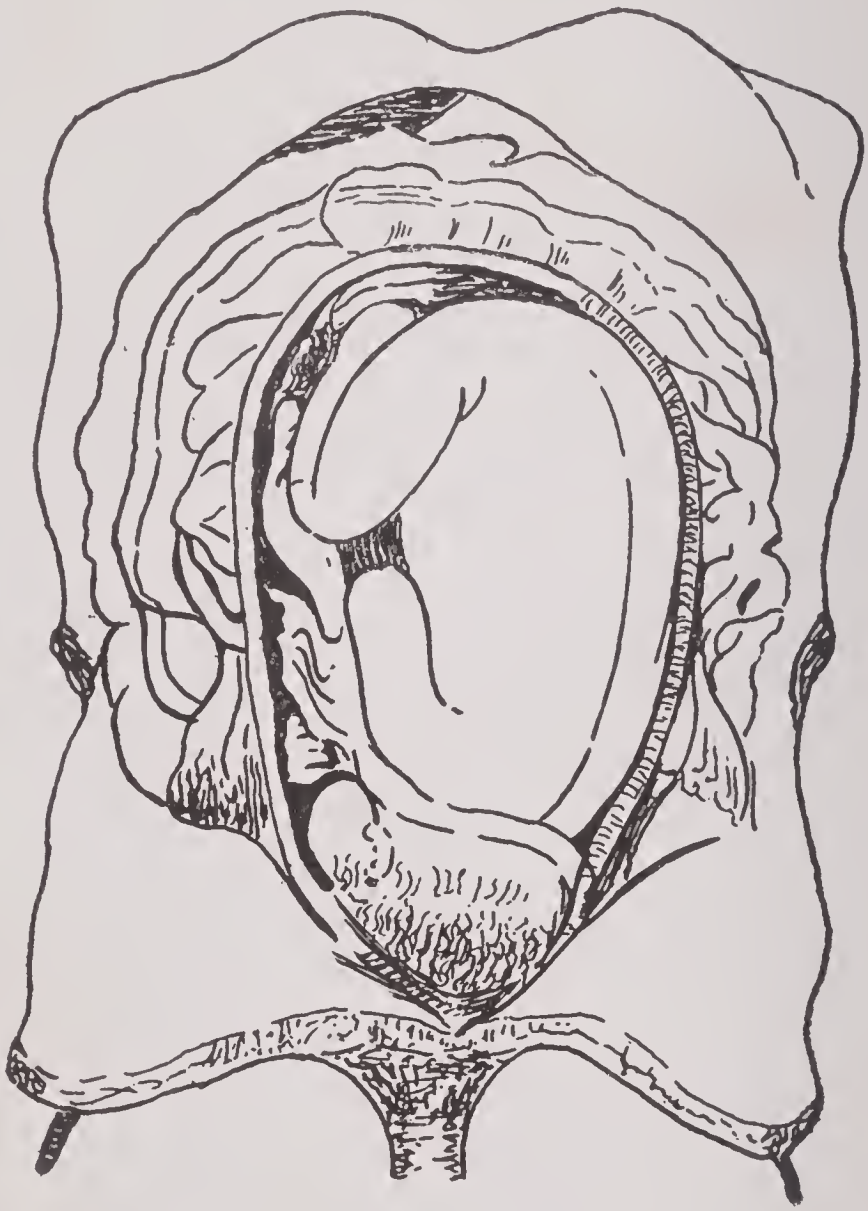


Fig. 44.

EXPLANATION OF FIG. 44.

Embryo at nine months after conception and at the full stage of development, ready for birth.

Fig. 45.

EXPLANATION OF FIG. 45.

The first illustration shows the developing ovum after fourteen days of growth. The second shows the embryo and the ovum after sixteen days. The third shows the ovum after three weeks of growth, while the fourth shows the embryo within the ovum after three weeks.

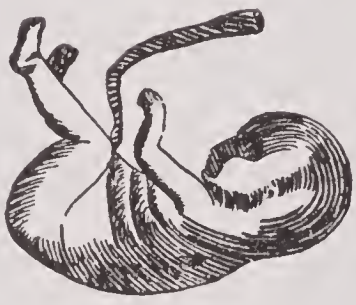
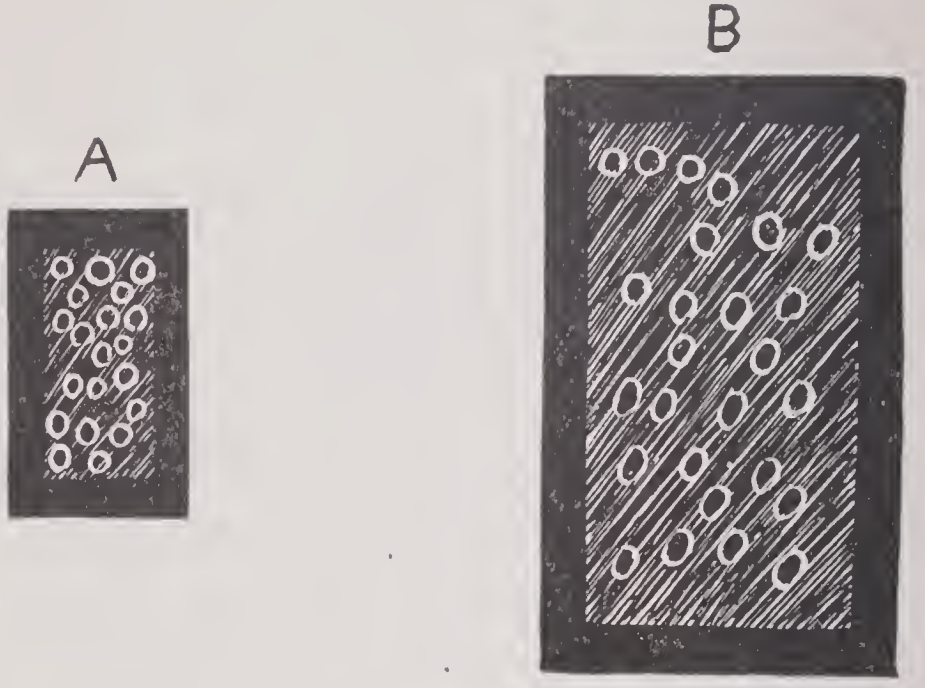


Fig. 46.

EXPLANATION OF FIG. 46.

The first figure shows the developing embryo at six weeks. Ears and limbs are being formed and the umbilical cord is seen extending from the umbilicus. The lower figure represents the embryo at two months after conception, showing further development of the limbs, and also the umbilical cord.



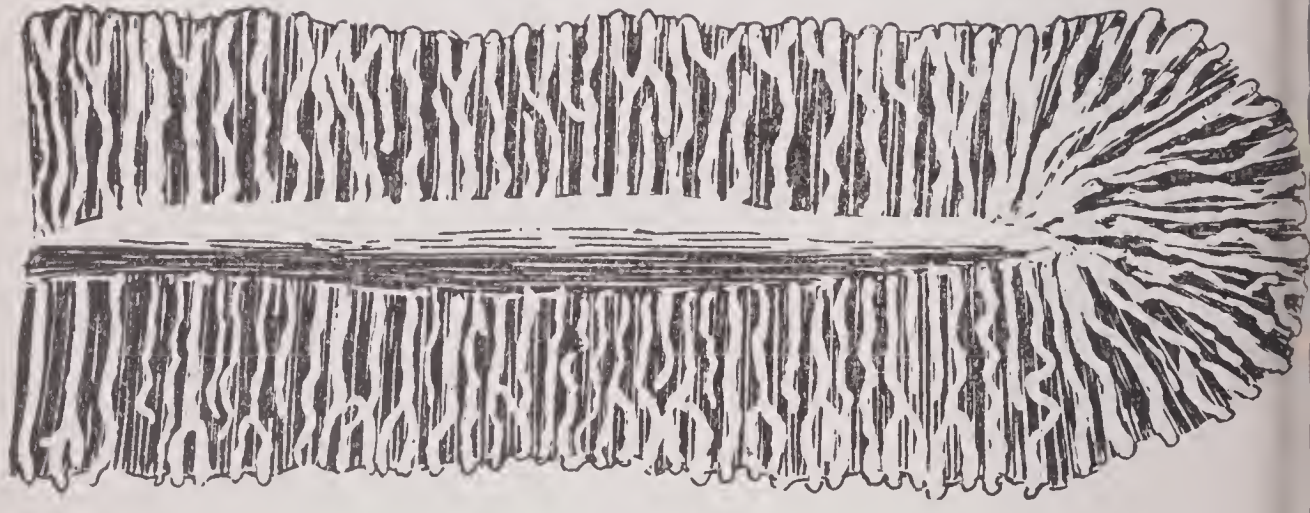


Fig. 47.

EXPLANATION OF FIG. 47.

The mucous membrane at the beginning of pregnancy. The lower figure shows the glands which secrete the mucous, and A and B show the orifices of the glands. In this way the embryo is supplied with its nourishment, and later on the placenta is formed.

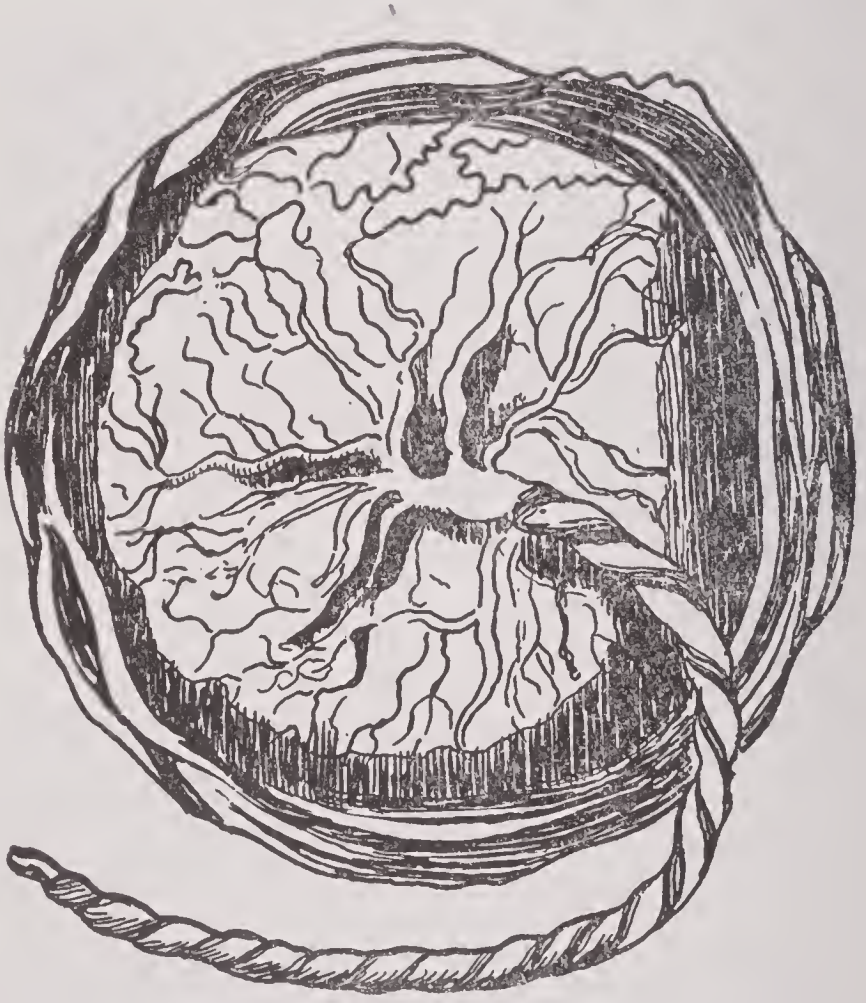


Fig. 48.

EXPLANATION OF FIG. 48.

Diagram of the placenta and umbilical cord. It is seen how the blood vessels converge from the whole area of the placenta to the umbilical cord, conveying their contents through this cord to the umbilicus of the embryo for nutrition.

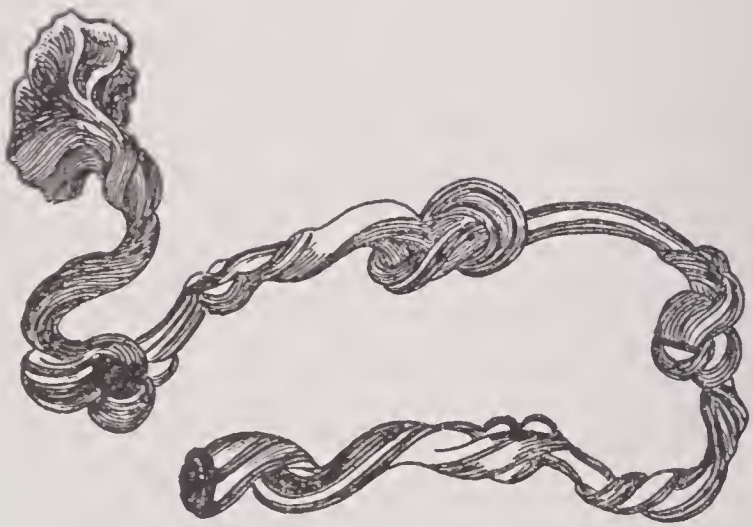


Fig. 49.

EXPLANATION OF FIG. 49.

Diagram of the umbilical cord at a later stage of development. The umbilical cord is large at an early stage, but as time goes on it becomes thinner, as the yolk sac disappears. It not infrequently becomes knotty in a very peculiar way as shown here.

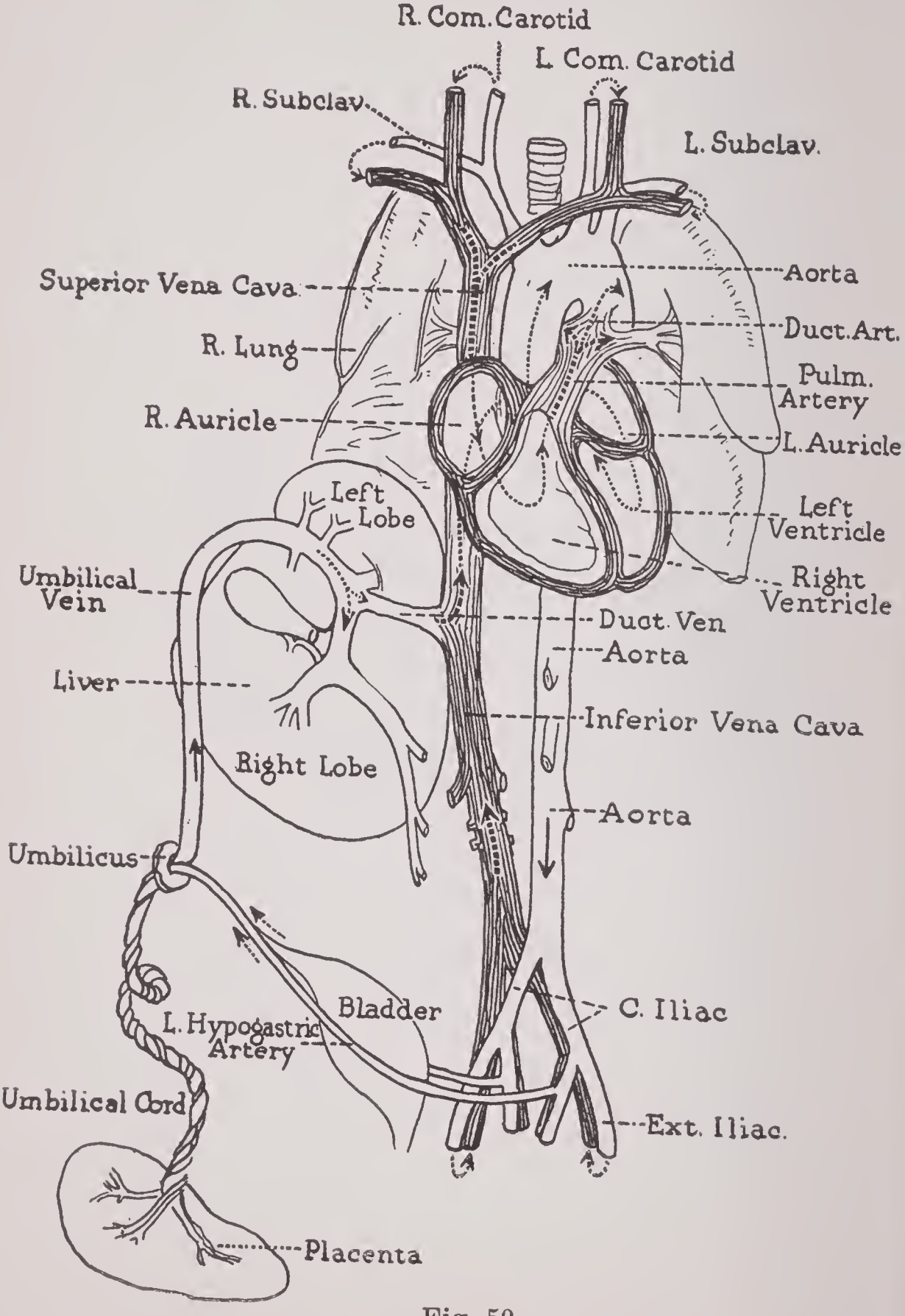

R. Com. Carotid
L. Com. Carotid
R. Subclav.
L. Subclav.
Superior Vena Cava
Aorta
R. Lung
Duct. Art.
Pulm. Artery
R. Auricle
L. Auricle
Left Lobe
Left Ventricle
Umbilical Vein
Right Ventricle
Duct. Ven
Aorta
Liver
Inferior Vena Cava
Right Lobe
Aorta
Umbilicus
Bladder
C. Iliac
L. Hypogastric Artery
Umbilical Cord
Ext. Iliac.
Placenta

Fig. 50.

EXPLANATION OF FIG. 50.

Diagram of fetal blood circulation. There is quite an inter-circulatory blood system connecting the placenta and the fetus. The diagram is self-explanatory, and is well worth studying carefully.

child will work its own way out into the world. This, of course, refers to the healthy mother. Where a corset has been worn, or the mother is fat, or where she is unhealthy in any way, inconveniences not outlined here will be experienced. But these are matters for the physician, and need not be dealt with. Of course, it is taken for granted that a physician will be in charge of affairs from beginning to end, but it is useful to know exactly what to expect during the pregnancy and at delivery.

The mother can help matters considerably by her own efforts to expel the offspring, and the physician should really only be there to see that everything takes place normally.

Immediately after birth the umbilical cord may be severed. At first it may be pulsating, showing the healthy intercirculation of blood between the mother and the child. It is carefully tied up and bandaged. Usually the lungs are stirred to action by a little slapping, and the little baby will begin to cry and then fall off to sleep.

Immediately the child is born the mother feels a sense of repose. Whatever may have been the mother's thoughts earlier, she, now, by natural protection of herself and her child, experiences a wonderful exhilaration of love for her child, and of rest after the exhausting process of pregnancy.

The placenta should be expelled and the mother should rest on her back until all the parts are receded to their normal positions.

It is a very bad policy for the mother to endeavor to move about immediately after pregnancy. She should have from four to six weeks rest in bed. She may during this time practise a few exercises that will help to strengthen the muscles and make firm those portions of the body left flabby by the extreme stretching they have undergone during pregnancy.

Then when she gets up, after five or six weeks, she should still be exceedingly careful. A little walking and deep breathing exercises should be performed by her regularly, and every care taken

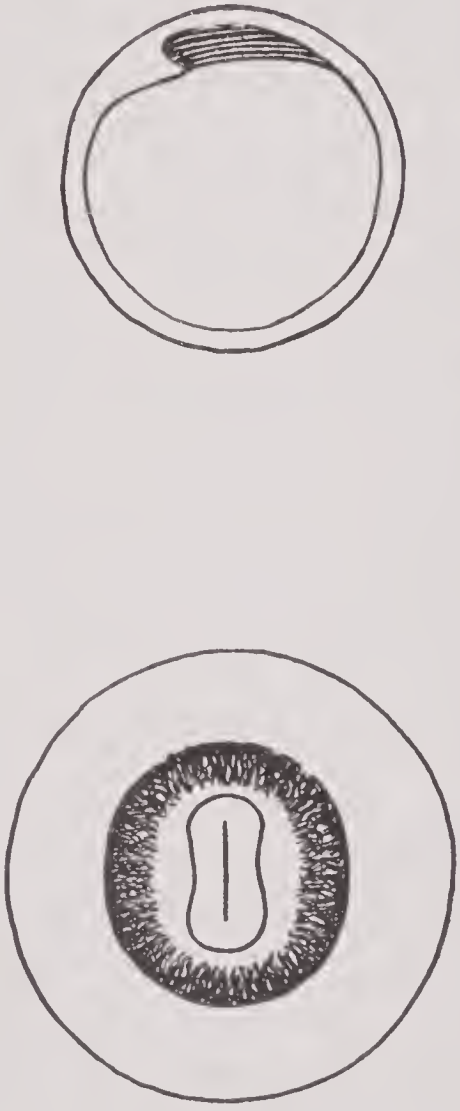


Fig. 51.

EXPLANATION OF FIG. 51.

Top figure represents a very early stage of the embryo, shortly after the ovum has been fertilized. At the top end is the actual spot where the fetus is beginning to develop. The whole interior is occupied by yolk, which merely furnishes sustenance for the embryo.

The lower figure represents a chick embryo thirty-six hours after incubation, showing the development of the layers from the germinal spot.

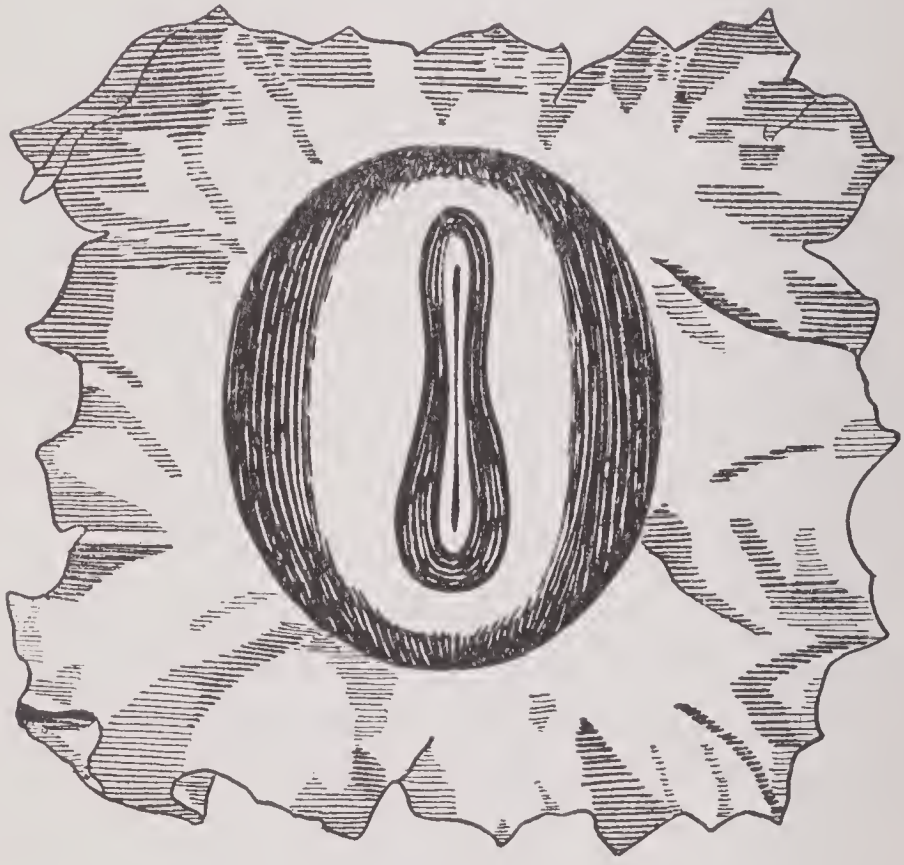


Fig. 52.

EXPLANATION OF FIG. 52.

Diagram showing the development of the germinal layers in the ovum of a bitch. The center line represents what will become the central nervous system. The outside ragged looking tissue is the membrane by which the ovum is attached to the uterus.

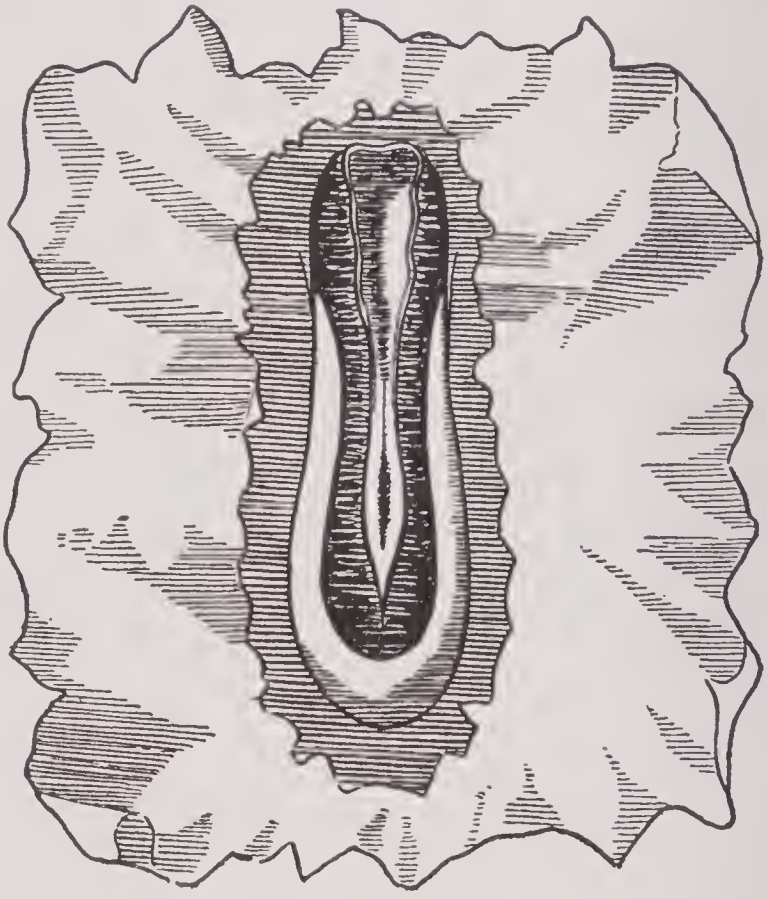


Fig. 53.

EXPLANATION OF FIG. 53.

This shows a farther advanced stage in the development of the ovum of a bitch. At the head end further development is taking place and the central nervous system itself is thickening into what will become the brain, the cerebral portion of the spine.

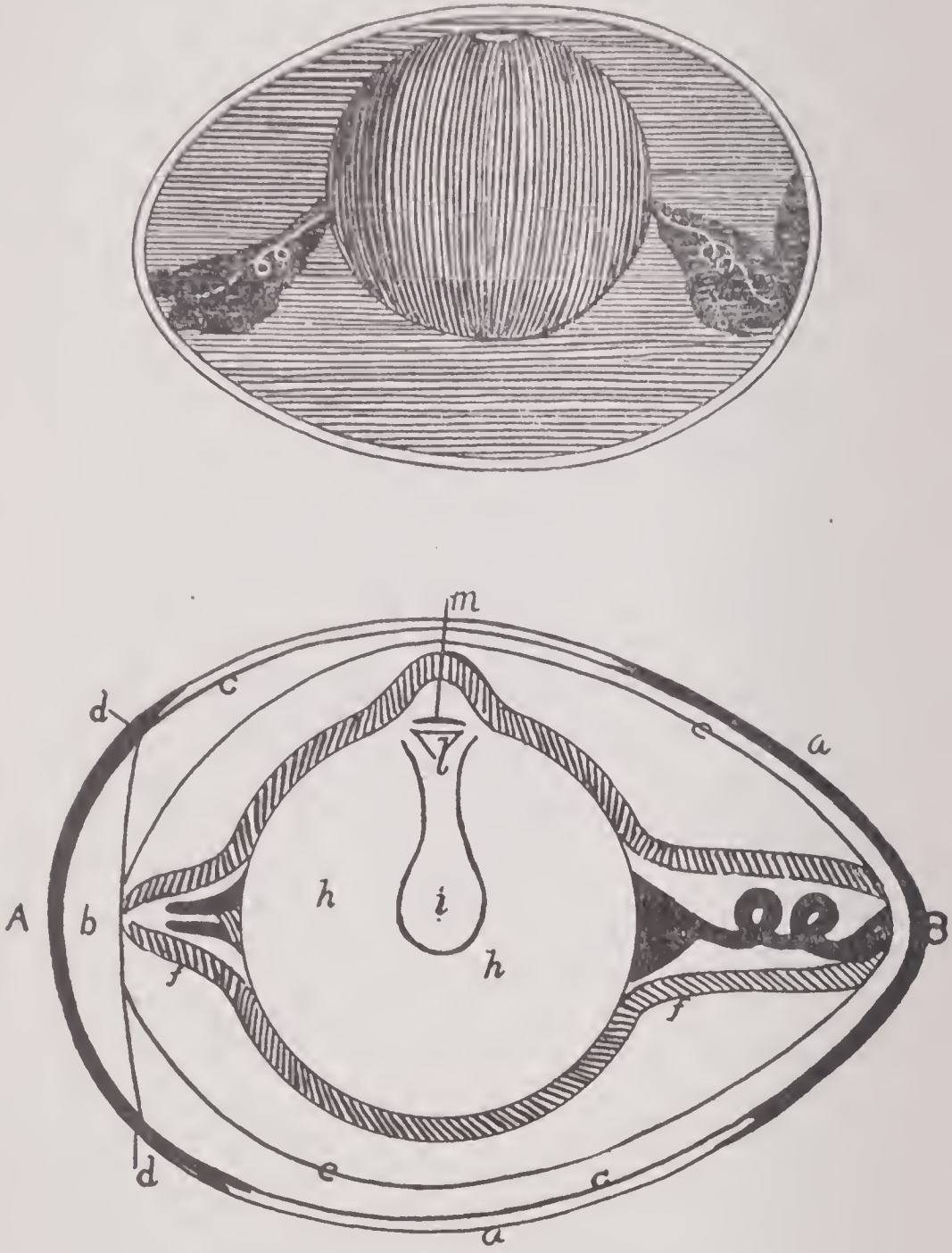


Fig. 54.

EXPLANATION OF FIG. 54.

Top figure shows longitudinal section of hen's egg. The center sphere is the yolk, with the germinal spot at the top. The yolk is attached to the north and south poles of the egg itself by membranes known as chalazae.

The lower figure is diagrammatically drawn to represent the parts of the chick embryo. M is the primitive nervous system. H is the yolk.

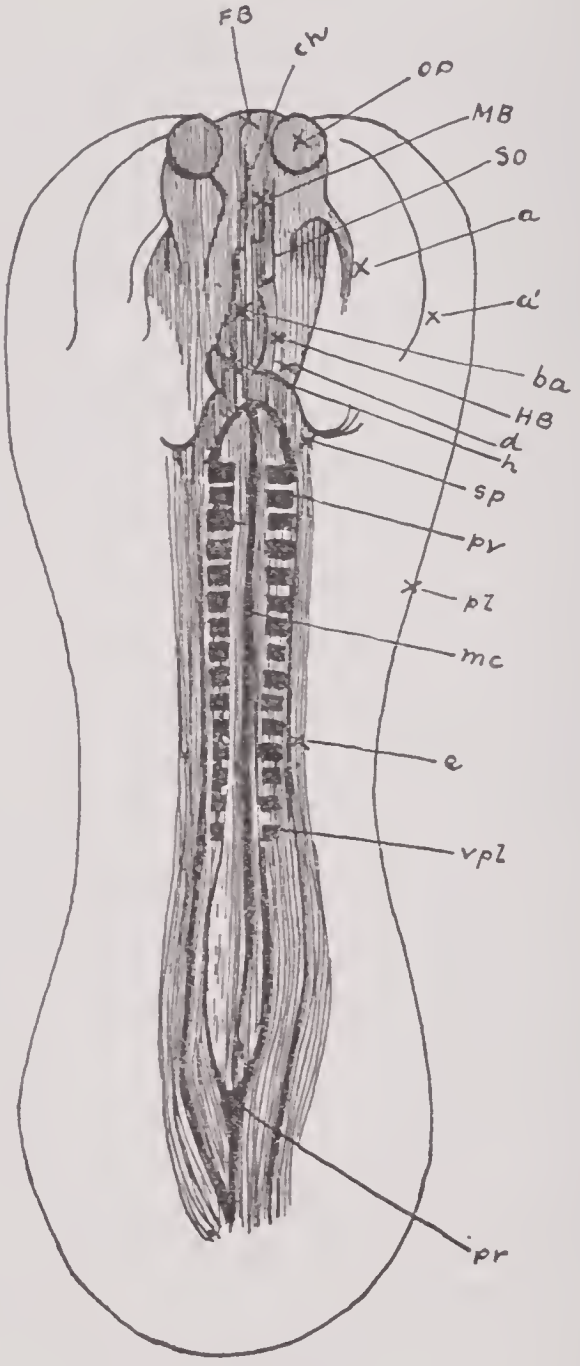


Fig. 55.

EXPLANATION OF FIG. 55.

Longitudinal section of embryo chick thirty-six hours after incubation. At the head end OP represent the primitive eyes. FB is the fore-brain. MB is the mid-brain. HB is the hind-brain. VPL is one of the vertebral plates that will form the vertebrae of the adult chick.

to insure the muscular system regaining its normal condition once more.

REPRODUCTION IS COMMON TO EVERY LIVING THING.

In the lower forms of life reproduction is accomplished by simple division of the unicellular organism into two individuals, as has been shown in an earlier chapter, and is also apparent in the egg cell which represents the first stage of the human embryo in its development. In the higher organisms sex organs are developed, and other adaptations made for the production of young. In still higher animals the internal sex apparatus makes adaptations for the nourishment and development of the young within the body of the mother.

The commonest method of explaining the process of reproduction is by means of the plants. Plants have sex organs and reproduce in exactly the same manner as all other organisms. In the lower plants, which are composed of simply one cell, we find the division of one uni-

cellular organism into two organisms. In the higher plants we find the adaptation I have just mentioned in regard to animals.

It is exceedingly helpful in explaining the process of reproduction to take the plant as an example. In a nature study lesson a parent or teacher can show her child, not only the beauties and wonders of Nature, but explain how the baby plants are formed from the parent plants. The pistil is the general body of the female part of the flower. It consists of three parts, the style, the part which projects upward, the stigma, which is really the upper portion of the style, and the ovary.

It is in the ovary that the seeds are grown.

The male part of the flower is on the stamen. At the head of the stamen is what is known as an anther. The anther develops the male element, or pollen, equivalent to the spermatozoa of animals.

Reproduction in the plants is accomplished by the mixture of this pollen

with ova from the ovaries, and it is accomplished in various ways. The most common way is for an insect to crawl or fly from one plant to another, thus securing fertilization of one individual plant by another, by transferring pollen which it brushes off the flowers and which adheres to its body and is released on contact with the flowers.

The embryological development of the plant is similar to that of the animal. First of all we have the egg cell, which is composed of one cell only. This divides into two—exactly as in the human being. These two cells divide into four, the four into eight, and so on until a cluster of cells, known as the blastula stage, is developed. This is also equivalent to the blastula stage in the human being. Also, as in the human being, one side of this blastula, or sphere of cells, becomes indented and a cup-like gastrula is formed. Other processes of development take place and the plant shoots its way up out of the earth, keeping on with the cell division process exactly the same as in the animal, but

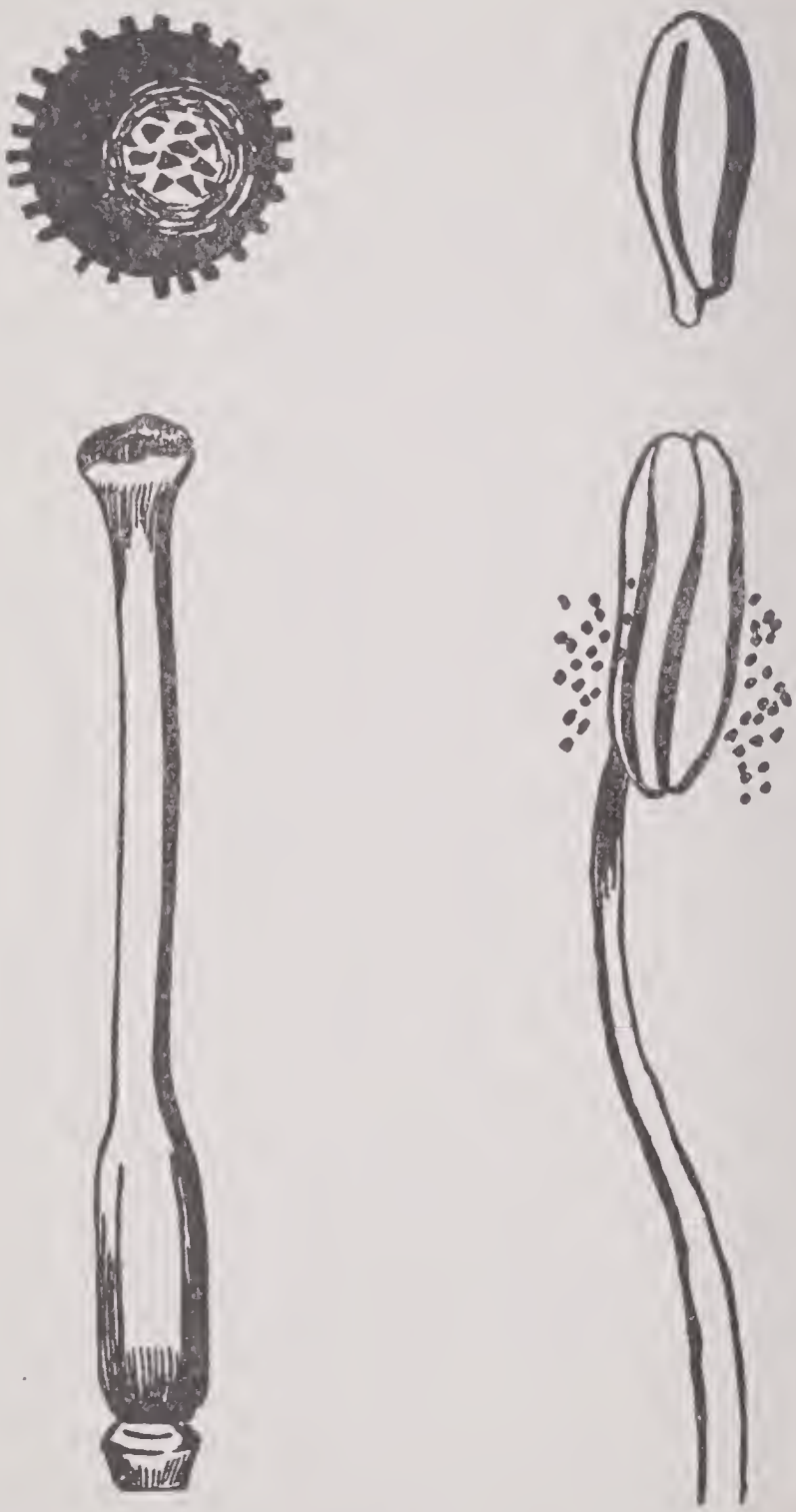


Fig. 56.

EXPLANATION OF FIG. 56.

The top figure on the left illustrates a grain of pollen. Top on the right an ovule. The bottom illustration on the left is the pistil, which represents the female part of the flower. Bottom on the right illustrates the stamen, which is the male part of the flower, and the dots represent the pollen grains, the male fertilizing element.

Fig. 57.

EXPLANATION OF FIG. 57.

Various Types of Flower.

The above marked "C" is a diagram of the cherry bloom. The lower one is of the hawthorne. The cherry has but one pistil, whereas the hawthorne has three pistils. These variations in plants enable us to trace botanical evolution, and find that the development of life in plants is no different from that in animals, including man.

Fig. 58.

EXPLANATION OF FIG. 58.

There is no doubt that the pistil has evolved from a leaf. At the top right hand side is a diagram of a leaf. On the left of it is the pistil in section. The pistil will be seen to be very much like a leaf folded, the hollow part inside forming the ovary.

The lower figures represent the stamen and show the analogy to the leaf. There is much more variation from the primitive form than in the case of the pistil. The head of the pistil especially is quite complex. The middle figure in the bottom row is the head of the stamen cut through, containing the grains of pollen.

Fig. 59.

EXPLANATION OF FIG. 59.

The top two illustrations are pistils of the larch cone. The first figure is the preliminary development, and the second figure represents the development of the seed. The upper part of this opens and the seeds are given off.

The lower two diagrams represent the pistil of the stone-crop. On the right is the top of the pistil, and on the left is a section of the bottom part opened out, showing the part in which the ovules are developed.

shaping itself according to its hereditary characters.

It is in the Springtime that the great Renaissance takes place. It is then that the bees buzz from flower to flower, bringing the male element toward the female, and setting the whole countryside into blossom. The flower or blossom is really the sex apparatus of the plant, in all plants that blossom. Other plants have other methods, but this is the most common one.

INTERNAL FEMALE SEXUAL APPARATUS.

Extending inward from the external opening, the sexual canal is what is termed the vagina. This is a tube about three inches in length, and is lined by mucous membrane.

The vagina terminates at the neck of the uterus. This is known as the cervix. It has a very small hole in the center which is continued in a channel into the body of the uterus.

The uterus is somewhat pear-shaped, and is also lined with mucous membrane. Normally it is not so large as the clenched fist, but it is very elastic, and, as the fetus develops in size, so does the uterus expand.

On each side at the top of the uterus is a tube which leads to an ovary. There are two ovaries, and the tubes leading to each are known as the oviducts.

The ovary is composed of tissue cells, one of which ripens each month and forms the egg cell ready for fertilization, or to be passed out of the body unfertilized.

The vagina, although only three inches in length, is also capable of enlargement; in fact the whole apparatus is springy and elastic, and so gives to the touch.

Just to the front of the entrance to the vagina is the opening of the ureter. This is a duct leading from the bladder and empties it.

Externally there are the two labia major which are protective in function and serve as pads and covering to the internal apparatus.

Just inside the labia major are the labia minora. These are smaller lips, and these labia minora may be said also to be protective, but are in addition more sensitive than the labia majora.

Anterior to the entrance to the vagina is the clitoris. This is a small erectile body which plays a very important function in being extremely sensitive.

When no emotion or feelings are experienced the clitoris is small and soft, but when the feelings are aroused the clitoris erects by means of a system of blood vessels which become filled with blood (in just the same way as the nipple of the breast functions, and also the corpus spongiosum of the human male organ).

As a matter of fact, the clitoris is the equivalent of the penis in the male. It is what we term in biology as homologous. That means to say that it has developed biologically from the same organ which was common to the human ancestor before it took on its present form and function.

It is the clitoris which has an extremely fine and sensitive nervous system, and is responsible in great measure for the added sensation in the sex act. It should therefore never be manipulated with the fingers or interfered with in any artificial manner. To do so is abuse and to be avoided. Moreover, artificial stimulation in this manner destroys the natural act, and robs it of its

beneficial nature. In fact, artificial manipulation of the clitoris is responsible for a great deal of loss of power in women, and loss of emotion and natural response in the highest type of sex act.

In the sex act the penis irritates the clitoris and helps to set up sensation.

Along the sexual canal are several glands, which have ducts leading from them, and which secrete fluid chiefly for the purpose of lubrication. They are set into action not entirely by the act itself, but chiefly by the artifices of courtship preliminary to the act.

In the act the seminal fluid is extruded into the vagina, just by the cervix of the uterus. Some of the fluid will find its way to the entrance of the uterus, and one of the spermatozoa may eventually reach the ovum and fertilize it. This takes place in the uterus, and immediately the ovum is fertilized it attaches itself to the lining mebrane of the uterus, and begins its process of development. After it becomes larger the uterus expands, and the placenta develops, forming an inter-

circulation between mother and child. Finally, as the time for the birth of the child approaches, the neck of the uterus will expand, and the whole of the sex channel will adapt itself for delivery of the child.

I have tried to tell you as carefully as possible the organs of the internal female sexual apparatus and their functions. It is only your own sensitiveness to the subject and your own innate refinement that can interpret the sacredness of these organs. They are so fine, so delicate, so important, so responsive to the conditions under which their possessor lives, that intense care must be taken at all time to keep them in good condition.

As soon as the health begins to go down it is obvious in the monthly period, which is usually late or abnormal in the amount of discharge. Again, unnatural irritations are set up where the general health is not kept at its highest level. The only way to bear beautiful children is to keep the general health at its highest state; and to keep the health at its

highest state it is necessary to keep our thoughts clean, wholesome, sympathetic and true.

Just think for a moment, and you will see how wonderful it is to be in possession of such a marvelous apparatus, capable of producing the grandest work of Nature. It is necessary to realize that only when there is a sound understanding of the functions of these organs and when the health is kept at its highest pitch, that it is possible to realize the true experiences of love.

I have written so frequently about this matter that it may appear almost unnecessary for me to remark here that many a husband and wife have been estranged because they were unable to respond successfully, happily, and purely in the communion which makes them one. Instead of its being the means which enables the husband to repeat all the love sentences and expressions which he feels for his wife, and for her to feel his protective love, kindness and companionship, the act becomes depraved to lust because there

is no real experience of the complete act.

TWINS.

There is not the slightest doubt that man's early ancestors gave birth to several children at one time. Cases occurring today where three or four children, and in some instances five or six children, have been born at the same confinement prove this. However, in view of the extreme complexity of the human being, it is to be expected that naturally only one child will be born at a time. The period of gestation is the longest of any organism, and extreme care is required during pregnancy to insure the birth of a healthy child.

The most frequent deviation from the usual birth of a single child is that of twins. Triplets may almost be said to be a form of reversion.

There are two kinds of twins. In one kind two ova may be fertilzed, each developing to a human child. In the other

kind twins come from the same egg cell. It was shown in an earlier chapter how, when conception took place, and the ovum was fertilized by the spermatozoon, the resulting egg cell immediately began a process of division. That is, the egg cell divided into two cells. In the usual course of procedure, these cells again reproduce, making four cells, and so on until a single human child develops.

In the other form of twins, when the egg cells divide into two cells, each cell becomes independent and separated, so that each goes through a new process of of development similar, of course, to the usual one, and two offsprings result instead of one.

It is very easy to observe what kind any particular twins may belong to. In the first kind, where two different ova are fertilized, the twins have a large number of differences. But in the second kind where the twins are formed from a single egg cell the twins are extremely similar.

The kind of twins which results from

Fig. 60.

EXPLANATION OF FIG. 60.

The birth of twins. Diagram of full stage of development in the uterus.

the fertilization of a single ovum is by far the commonest. It throws more light on the subject of heredity. Some time ago the orthodox eugenists endeavored to show that the offspring was absolutely determined by what was present in the egg cell, and speculated that each piece of chromatin element had its peculiar characteristics, so that it determined definitely what the adult would be. In fact, some biologists went so far as to declare that they could observe in the egg cells of animals and plants distinct partitions or bags for each chromatin body, and they looked forward to the time when they could determine which particular one should form a particular character in the adult individual.

An experiment made on the embryo of a frog demonstrated the error of those observations and thinking. This experiment demonstrated that an organism is a unity, and that the egg cell was a definite organism representing the unicellular ancestor. It is only that this egg cell contains potentially all the characters which go to make up the adult

individual, but that those potentialities were common to the cell as a unity, and not attributable to any parts as separate entities.

Thus an egg cell of a common frog was taken and two divisions allowed to develop; which means to say that the egg cell had divided into four cells. The embryo was then cut into two pieces, composed of two cells each. One of these pieces was put into a centrifuge and whirled around, until all the parts were evenly distributed throughout the piece. Development was then encouraged and a complete frog was hatched out finally. The other piece was encouraged to develop, and the result was that only one half of the frog began to grow.

According to the teaching of the separatists, it ought to have been impossible to develop anything but half a frog from the piece which was whirled around in the centrifuge, but, as I have explained, all the characters were developed, which means to say that after the division had taken place in the egg cell, each cell still contained potentially

all the characteristics of the adult individual offspring.

In the twin resulting from one egg cell the same is also true, for, on the first division of the egg cell, instead of half the characteristics of the individual being in one cell and half in the other, separation in the form of twins results in development of all the characteristics of the parent, and, naturally, the twins resemble each other very closely.

HERMAPHRODITES.

There is no such thing as a human hermaphrodite. To be hermaphrodite an organism would have to possess both male and female organs. No human being has yet been discovered containing both these sets of organs.

What are commonly termed hermaphrodites in human beings consist of individuals who are neither male nor females in entirety. It has been known that some human beings with external male organs have had internal female organs, and *vice versa.*

An hermaphrodite would be able to fertilize itself if necessary. It would have the power of fertilizing another individual human being. It would also have the power of being fertilized by another human being.

So, when people tell you about human hermaphrodites you will understand what they mean, and know that there is

no such thing as human hermaphrodism.

The worm is a good example of an hermaphrodite. It contains both male and female sex apparatus. It can both fertilize and receive fertilization for the reproduction within its own body.

In copulation two worms lie apposed and fertilize each other.

There are a few fishes which are hermaphrodite, but it is uncommon even among fishes.

MENSTRUATION.

As soon as a female human being reaches puberty a discharge of mucous and blood occurs regularly once every twenty-eight days. This menstrual discharge is not the exit of the mature ovum, for that usually leaves the body some time after the menstrual discharge has ceased. There is no doubt, however, that it is due to the continual habit of the body to build up tissue for the offspring, and if the offspring is not forthcoming, that means to say, if the ovum is not fertilized, this tissue will pass out of the body.

It seems a very wasteful process of Nature to manufacture these products while they are not being used, but we must remember that man has evolved from the animal, and that the normal condition of the female, prior to civilization, was a state of constant pregnancy. No sooner had one child been

born than another was being conceived.

Thus it was necessary for those products to be manufactured in the female, and it is merely a relief and release that these should be discharged from the body if fertilization has not taken place.

But Nature is always wasteful. It has to be wasteful in order to keep beings alive. There are millions of spermatozoa produced every month, and in the lifetime of the average man it is only one in several million that is used.

Menstruation is an objectionable function, but it need not be an illness, nor need it inconvenience a healthy woman. Irregularities, pains, hysteria and nervous prostration associated with it are pathological, and may be remedied by building up the general bodily health.

Civilization is responsible mainly for the pathological conditions in menstruation. The average woman deforms her organs, pushes them out of place by corsets, goes without exercises, and causes a certain amount of prolapsus and general body toxaemia. Civilized foods also do a considerable amount of damage by

making the blood toxic generally and lessening its normal alkalinity, destroying the efficiency of functions.

The menstrual products undoubtedly are those for supply of the placenta and fetus. It is quite a normal functioning and should occasion no inconvenience in a woman leading a healthy and normal life.

THE PLACENTA.

Nutrition of the fetus is accomplished by means of what is called the placenta, the popular name for which is the "after-birth." It is a spongy, vascular mass of tissue which forms in the uterus, and is attached on one side to the embryo by the umbilical cord, which attaches at the navel of the infant. On the other side it is attached to the uterus of the mother.

There is a blood circulation, therefore, between mother and child, but it consists of two systems: 1, inter-circulation between mother and placenta; 2, inter-circulation between placenta and child. The first system is situated between the placenta and the uterus, while the second system is situated between the placenta and the umbilicus of the infant.

After the child is born the placenta comes away from the mother with the

umbilical string and the umbilical string is detached from the child by the attending physician.

HOW THE EMBRYO IS PROTECTED.

Surrounding the embryo in the uterus are two membranes. The first is known as the chorion. It is immediately next to the wall of the uterus. That is, it is external to the foetus. The inner one is known as the amnion. This consists of a double bag enveloping the entire foetus and extending down the umbilicus. It is really like a double bag containing a colorless or slightly milky fluid, so that the embryo is perfectly protected from jars or knocks. It develops as the embryo grows, and the quantity of fluid may vary from one to four pints. This fluid is discharged just defore delivery of the child, and is a sign that delivery is imminent. It also allows more room for the child to work its way out into the world.

THE PROSTATE GLAND.

Situated where the urethra leaves the bladder in the male is a gland about one inch in diameter, known as the prostate gland. It secretes the prostatic fluid, which is of milky appearance and serves to lubricate the spermatozoa.

Abuse of the sex functions puts this gland out of order, irritation sets up in it, and a great deal of sexual inconvenience caused. Wrong methods of living may result in concretions being developed in the prostate gland, thus setting up irritation of the sexual nerves, and causing sex feelings without any ability of their being satisfied. Many men of very high moral character have been oppressed by irritations of this gland in the manner described here, and fallen from the path of rectitude merely because of the physiological inconveniences and aggravations set up.

The way to keep the prostate gland in

good order is to live a clean, moderate life. Eat wisely, avoiding bad food combinations and an overabundance of proteins and starches.

COWPER'S GLANDS.

Further down the urethra there are two small yellowish bodies about one-quarter of an inch in diameter which are known as Cowper's glands. Each has a little tube leading from it about an inch in length so as to conduct the secretions of the glands to the urethra.

They are active and of full size while the sexual powers are at their height. They diminish in size as the sexual powers are lost and as age advances.

THE HYMEN.

At the entrance to the vagina in the female is a thin membrane which stretches across. It has a small opening in the center. It is known in lay circles as "the maidenhead," for its unruptured condition is proof of virginity.

It is supplied with a few capillaries, and these, on the first occasion of coitus, may be ruptured and cause a slight hemorrhage.

It is, however, a mistake to think that the hemorrhage alone is proof of virginity. In some women the hymen is readily stretched and may be ruptured without any sign of hemorrhage. Many cases of unhappiness have been caused where newly married husbands have not found the expected hemorrhage. So it is well to bear in mind that hemorrhage does not always accompany first coitus.

BARTHOLINE'S GLANDS.

At the beginning of the vagina are two small bodies, oblong in shape, which are homologous with the Cowper's glands in the male, and are known as Bartholine's Glands. They supply a mucous to the vagina in the same way as Cowper's glands supply mucous to the urethra. Each gland has a long duct for this purpose. They are approximately of the same color as Cowper's glands, possibly of a little more reddish appearance.

HEREDITY.

All theories of eugenics rest upon the facts of heredity. It is only recently that many of these facts have been known. Of course, many more are still being discovered and yet to be discovered. But even the facts of heredity may be interpreted by different thinkers in different ways, so that theories of eugenics may differ on account of these differences in interpretation.

The most recent discoveries in the facts of heredity are not taken into account by most of the students of eugenics. Eugenists usually confine themselves to economics, and only a smattering of biology; at any rate, of biological heredity. Eugenists in the past have contented themselves with mere knowledge of the Mendelian doctrine, and have omitted entirely from their calculations the recent experiments of Weissmann, De Vries, Bateson and others.

The consequence is that the orthodox eugenist believes that it is only by a process of parental selection that human ills and weaknesses can be stamped out.

The research of these more recent biologists has proved that heredity is no hard and fast thing which is unalterable in any individual. It has proved beyond doubt that careful training of the individual has a tremenduous lot to do with the nature and growth of that individual. It has shown that valuable tendencies may be ruined by lack of scope for development.

This is the true knowledge on which our education and eugenic theories should be based today. In addition to the foregoing we must also remember that many of the diseases and weaknesses which are deemed by orthodox eugenists to be absolute heredity qualities, and, therefore, incurable diseases, can be stamped out by modern natural curative methods. The fault lies with the inefficiency of modern medical ideas, and a man with medical training, if he

shuts himself off from the experiences of unorthodox workers and thinkers, prohibits himself from a balanced understanding of these things. In the same way students of eugenics gain false ideas and aim at false ambitions. It is a foolish ambition to seek to eradicate tuberculosis, for instance, by merely restricting the breeding of individuals suffering from tuberculosis; for tuberculosis is a curable disease, in its early stages, and the children of tubercular people need never develop tuberculosis, if conditions and upbringing are favorable to good health. The same applies in regard to epilepsy, which is a favorite complaint that the eugenist seeks to obliterate by selective breeding.

The first fact of heredity is that like produces like. For instance, rabbits always reproduce rabbits; cats always give birth to kittens, and so on. You would not expect your dog, for instance, to give birth to a cow. Heredity, then, means the continuation of qualities in the offspring known to be present in the parent.

This fact is applicable up to a certain point. For the very second fact we observe is that every offspring differs from its parent. In scientific words, every offspring varies.

It is obvious, then, that there is scope, because of this law of variation, for development. An offspring is like its parent only to a certain degree, and in general characteristics. What determines the variation is the fact that no two things in Nature are alike, and also the germ plasm is influenced in the parent by his surroundings, his acts and the use to which he puts his own hereditary characters.

When Charles Darwin, in 1859, published his "Origin of Species," he substantiated his claims in regard to the development of organisms as they exist today from lower or less complex forms, by breeding pigeons and securing a wonderfully varied number of types of pigeons. He also pointed out that development had taken place the same way in Nature. There is not the slightest doubt of the fact that organisms as they

exist today have evolved from lower forms of life. But in order to explain this Darwin speculated that all these characters which may be developed in an individual may be passed on by heredity. This means to say that "acquired characters are hereditary." This theory as to the "inheritance of acquired characters" was not at all necessary to the Darwinian doctrine, and Darwin's establishment of the Evolution of the Species doctrine, but it was a satisfactory speculation, for the time being, which served to explain the phenomenon of evolution.

Weissman, the great biologist, set to work to disprove Darwin's speculation, and succeeded. However, Weissmann's followers were carried away with his early experiments, which tended to show that an acquired character could under no circumstances be inherited, and they went much farther than Weissmann did himself. Even orthodox eugenists today misuse Weissmann's research as to the non-inheritance of acquired characters, and their impossibility of

any influence on the germ plasm.

After some years, Weissmann modified his views, and came to the conclusion that, although it is not true that characters acquired by an individual are inevitably passed on to the offspring, yet the surroundings and accomplishments of the individual do have a definite effect upon the offspring and cause some variation.

This is an established fact which has lately been discovered by modern biologists; so that a correct statement of the meaning of heredity is now: a reproduction of the inborn characters of the parent with tendencies towards development of characters acquired by the parent, with the possibility of a modification of the inborn qualities in the offspring by the environment and conditions of living of the offspring.

It would be very well to bear this in mind in all problems of biological, economic, pathological or sociological study. It is the latest interpretation of scientific discovery, and unbiased by any orthodox university teaching; although

it is accepted by the leading scientists of today.

So when you keep your health up to one hundred per cent efficiency you give your child a maximum start of inheriting good health. If you neglect your health, your talents, your abilities, you will handicap your child to a certain degree. Again, if your parents did not pass on to you the maximum of virtue, your endeavors to live rightly, in accordance with the simple, acknowledged rules of health, will give you every opportunity to pass through life normally, healthy and efficient.

Even psychological influences may register themselves in the offspring; at the moment of conception parents may handicap their children with licentious thoughts, or imbue them with love.

I am quite aware that the ordinary scientist will omit psychological prenatal influences, because of his inability to place his finger on a material substance that can be said definitely to exhibit psychological influences; but he must remember that thought is an at-

tribute of the brain, and the brain can be shown definitely to exhibit variations in accordance with correlated influences on the germ plasm.

It is essential for all students of sociology, economics and education to understand the power of psychological influences. Today, we see around us hundreds and thousands of mediocre men and women who are the result of chance conception, often resulting from a fleshly indulgence. The time is coming when men and women will have control of their bodies, when children will be desired before they are conceived, when the psychological qualities for the betterment of the future generation are handed down to children, as well as good, healthy physiques. Today, ignorance in regard to the scientific methods for controlling conception prevents this, but the light grows more bright, and through love, and knowledge of nature in regard to the control of conception and sex, will a true social system with happiness come about.

The fact, however, remains that an

acquired character in an individual is not passed on *in its entirety* to the offspring.

For instance, you may develop your right arm, so that your biceps muscle is twice as big as your left biceps muscle. This may be said to be an acquired characteristic, but the acquired characteristic, namely, the huge right biceps muscle, need by no means appear in your offspring.

At the same time this does not preclude the fact that your development of the right biceps muscle has some definite influence upon the germ plasm in respect to the size of it in the offspring. Students of eugenics and heredity should always keep a balanced view of heredity in mind. They must understand that the characters that have been developed as a result of the struggle for existence lasting millions of years, are more dominant than those that have just been developed for a few years in the individual parents. But this merely proves that all life is one; that the offspring is not merely the son or daughter

of the parent, but a continuation of the whole line of human life; that the brain he possesses has been passed on to him as a result of struggle, and the possession of a brain by hundreds, nay, thousands of ancestors before him. He, in turn, possesses the same human brain, except that it is reproduced. He possesses a brain because his parents had a brain, because they inherited a brain from their parents, and so on.

The mistake, however, is to imagine that this brain's capacity is governed entirely by the parent, and that what was apparent in the parent only is capable of development in the offspring. It absolutely depends upon the use that this brain is put to by the offspring what will be made of it. But it is absolutely demonstrated that a child may be trained to become accomplished in some art or profession, or his talents may be retarded in their development so that the offspring becomes an imbecile.

We breed too many imbeciles today because we do not understand the

way to develop the human brain, because we do not take the child from its cradle and promote the use of the brain.

Or, it may be, that we feed the child badly or allow its blood to be contaminated with vaccination virus, anti-toxin, and other rubbish that makes the blood filthy. Then the child develops rickets, or epilepsy, or perhaps consumption, or any disease to which it may have a predisposition, because of its lowered vitality, and then we look to heredity, if we are eugenists, for the final answer as to what the child ought to become.

What we ought to understand, and what human beings will begin to understand when they master a balanced view of the scientific findings of research, is that a healthy, correct nurture can ensure a healthy and normal human being. Even where predisposition to diseases may be traced there is still the ability on the part of that individual offspring to overcome the dangers of that predisposition.

Many people get mixed up in regard to the matter of hereditary diseases.

Sometimes you will hear a person say that so and so suffers from tuberculosis, and that the disease is hereditary. That means to say that the parents suffered from tuberculosis, therefore, it is only to be expected that the child would develop tuberculosis.

Orthodox scientists were rather upset over this matter of hereditary diseases, because while they thought to show that diseases are hereditary, they also had speculated a germ theory, which says that each disease is caused by a particular germ. Well, now, let us take tuberculosis, as the "hereditary" disease. If tuberculosis were an hereditary disease, there is only one thing that could possibly happen. That is, you would find the tubercular germ in the egg cells which result from conception. Now, it is absolutely and conclusively proved, and not only proved, it is an undeniable *a priori* fact that no germ could possibly exist in the chromatin which goes to make up the new individual. This was recognized by the biologists and scientists, so that the conclusion was

definitely arrived at that no disease could possibly be hereditary because no germ could possibly live in so small a space as a chromosome.

So the scientific statement of hereditary predisposition of disease remains as follows: no disease is hereditary, but that an offspring of a diseased parent will have a predisposition to that disease. This means that the liability of the offspring to catch the disease is one hundred per cent where the conditions favorable to the development of the disease are encountered during the offspring's life.

This is an accurate statement of hereditary predisposition to disease, and it would be well for eugenists and orthodox scientists to notice that it is only where the conditions are favorable to the development of the disease that such disease will afflict the offspring.

Thus, in our example of an offspring with a predisposition to tuberculosis, the eugenist will say that tuberculosis will appear in the offspring, but the biological statement does not say so.

It says that *only where this offspring encounters conditions favorable to the development of tuberculosis will the tuberculosis develop.* But, again, orthodox scientists err in their reasoning, for they will insist that tuberculosis is caused by the *tubercle bacillus,* which is sometimes found in the lungs of patients suffering from tuberculosis. As the chances of any individual coming into contact with the *tubercule bacillus* is about one hundred per cent, again the orthodox eugenists will say that an hereditary predisposition to tuberculosis, or any other disease, means a one hundred per cent chance of developing tuberculosis, or the other disease, in the offspring.

But such is not the case. In the first place, the germ theory is not accepted generally. It is merely a makeshift for those who still adhere to methods of drugging and anti-toxins.

In the case of tuberculosis, for instance, Professor Greene, the eminent medical professor, in his text book for students, speaks of tuberculosis as being

caused by the tubercle bacillus, and yet, later, he actually says that the tubercle bacillus need not be present in a case of tuberculosis, and often is not present until a late stage of the disease, and also in other cases of tuberculosis the tubercle bacillus need never appear at all.

It must be obvious to any clear thinker that if the tubercle bacillus is the cause of tuberculosis it must be present from the very beginning. But even according to Professor Greene, the cause, the tubercle bacillus, is not there from the beginning.

As a matter of fact, tuberculosis, like many other diseases, is set up by civilization. It is caused chiefly by eating civilized foods which have been robbed of their life elements by various civilized devices. (See my book on "Correct and Corrective Eating.")

One of the favorite diseases that the orthodox eugenist deals with in order to show the necessity for practicing parental selection, is epilepsy. Epilepsy is a disease of civilization, just the same as is tuberculosis, and I have seen cases

of epilepsy cured by avoiding the dangers of civilized eating, and by resorting to methods of living which enabled the patient to secure all the vital elements contained in food in its natural condition.

These facts ought to be taken into consideration by all biologists, but they are not. Nor have they been taken into consideration in any text book dealing with heredity. Such a great thinker as Havelock Ellis has been led astray with regard to the inheritance of disease. Forel, the great French physician, who has contributed enormous work to scientific knowledge, seeks to eradicate epilepsy by parental selection only, and does not know that it is curable by avoiding the dangers of civilized nurture.

For the purpose of this work it is sufficient to remember that the offspring is an actual part of the parent; that it is a continuation of the parent; that the offspring inherits all the characteristics of the parents, and that it is every parent's duty to convey to the offspring

the very best of which he or she is capable.

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