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# DISEASES OF WOMEN

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## THE DISEASES OF WOMEN

A TEXT-BOOK OF  
SPECIAL PATHOLOGY

A TEXT-BOOK OF  
GENERAL PATHOLOGY

BY

J. MARTIN BEATTIE

M.A. (N.Z.), M.D. (EDIN.)

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# THE DISEASES OF WOMEN

A HANDBOOK FOR STUDENTS  
AND PRACTITIONERS

BY

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SURGEON TO THE MIDDLESEX HOSPITAL

AND

ARTHUR E. GILES, M.D., B.Sc. LOND., F.R.C.S. EDIN.

SENIOR SURGEON TO THE CHELSEA HOSPITAL FOR WOMEN, AND  
GYNÆCOLOGIST TO THE TOTTENHAM HOSPITAL

SEVENTH EDITION

*WITH 150 ILLUSTRATIONS*



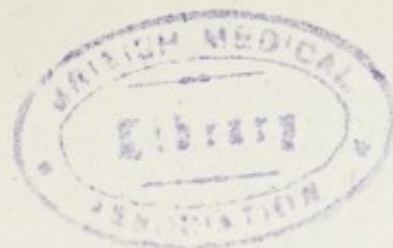
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## PREFACE

WE have taken the opportunity offered by the preparation of the Seventh Edition of this manual, not only to make a thorough revision of the text, but also to introduce a re-arrangement of the subject-matter. The Table of Contents shows a division into five parts: the first deals with the closely allied subjects of the Development, Anatomy, and Physiology of the Female Reproductive Organs; the remaining parts comprise Diseases, Diagnosis, Treatment, and finally Prognosis and Results. The most important re-arrangement is in Part II. In accordance with modern views we have departed from the "Anatomical" system of classifying diseases according to their locality; and have adopted the "Pathological" system. The former has, it is true, but few drawbacks in describing Injuries and Tumours of the Pelvic Organs, where we have to do with separate entities. But in dealing with Malformations, Displacements, and Infections, which are liable to affect several portions or the whole of the pelvic organs, it is evident that the anatomical classification must lead to confusion, whereas the Pathological Classification enables the student to obtain a much clearer idea of the sequence of the lesions involved. The topographical summary in Chapter XLVII will give the reader a connecting link with the older system, and enable him to see at a glance the diseases and disorders to which the various organs are liable.

We have introduced a number of new illustrations, most of which have been drawn for this work. The source of the others is acknowledged in the text.

We wish to thank Professor Peter Thompson, of Birmingham, for valuable criticisms of the chapter on Development.





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## PART I

### THE DEVELOPMENT, ANATOMY, AND PHYSIOLOGY OF THE FEMALE REPRODUCTIVE ORGANS







## CHAPTER I

### THE DEVELOPMENT OF THE REPRODUCTIVE ORGANS

IN order to understand the anatomy of the female generative organs and the malformations to which they are liable, some knowledge of the mode of development of these organs is necessary.

Men and women are distinguished from each other by two sets of sexual characters, primary and secondary.

**Primary Sexual Characters.**—These are directly concerned in the function of reproduction. In a man they include the penis, the testes, with the vasa deferentia, the prostate, and Cowper's glands. In a woman they consist of the vagina, the ovaries, Fallopian tubes, and the uterus.

**Secondary Sexual Characters.**—These comprise those features which enable the male to be distinguished from the female, irrespective of the organs of reproduction and those used for the nourishment or protection of the young.

The characters belonging to this group, so far as the human family is concerned, are exclusively in possession of the male. Man is distinguished from woman not only in the possession of a beard and greater muscular development, with its necessary accompaniment, greater physical strength, but he has a more powerful voice, and the skin of his trunk and limbs is thick, and more abundantly supplied with coarse hair, which has a somewhat different disposition in woman. In man the front of the chest is usually covered with hair, and that on the pubes passes upward to the umbilicus, whereas in the female it is restricted to the mons veneris. A less constant feature, but one which seems confined to men, is a luxuriant growth of hair on the prominence of the pinna known as the tragus.



Secondary sexual characters are not present in the young, but become manifest at puberty, by which term we signify reproductive maturity. At this period the generative organs increase in size, and in the male become functionally active. In the female, puberty is more strikingly declared by the institution of menstruation.

Until the advent of puberty, the boy, so far as secondary sexual characters are concerned, resembles the female as much as he does the male, but after that period he begins to assume those of the male.

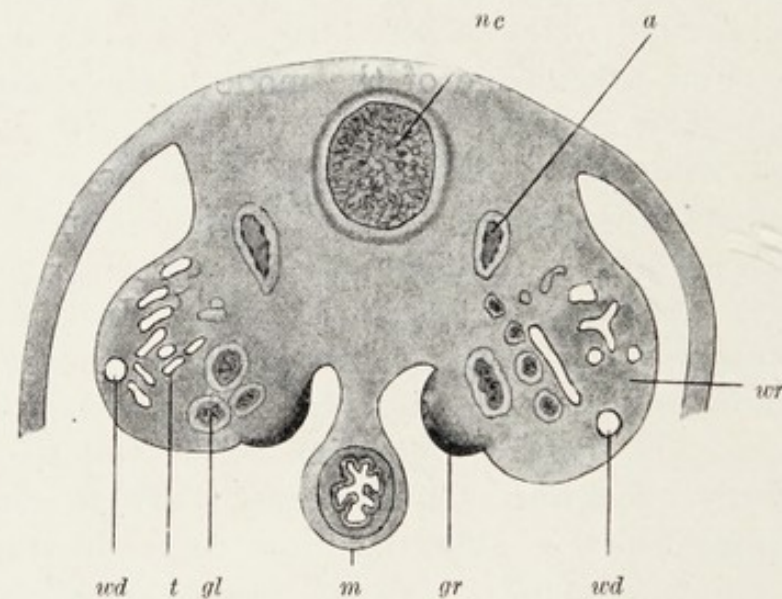


FIG. 1.—TRANSVERSE SECTION THROUGH THE ABDOMINAL REGION OF A RABBIT. EMBRYO OF 12MM. (MIHALKOVICZ.)

*a.* Aorta; *gl.* glomerulus; *gr.* genital ridge; *m.* mesentery; *nc.* notochord; *t.* tubule of mesonephros; *wd.* Wolffian duct; *wr.* Wolffian ridge.

Among all the primary and secondary sexual characters there is only one infallible test of sex, namely, the presence of the testes or ovaries. As we shall see, when studying pseudo-hermaphrodis, a true male possessing testes may have a vagina and uterus, and his outward appearance may be exactly that of a woman; and on the other hand a true female, having ovaries, may have not only a beard and a deep voice, but also a penis and a scrotum.

The genital glands (testes and ovaries) are developed on the same plan in all animals that possess a coelom, or body-cavity, and appear as a localized thickening of the mesoblast in that situation. The accessory organs or ducts,



## DEVELOPMENT OF REPRODUCTIVE ORGANS 5

including the vasa deferentia in the male, and the Fallopian tubes, uterus and vagina in the female, are derived from embryonic structures intimately associated with the excretory organs; and it is therefore necessary to study the development of the two sets of organs together.

When, at an early stage of development, the mesoblast on each side of the median line becomes split into two

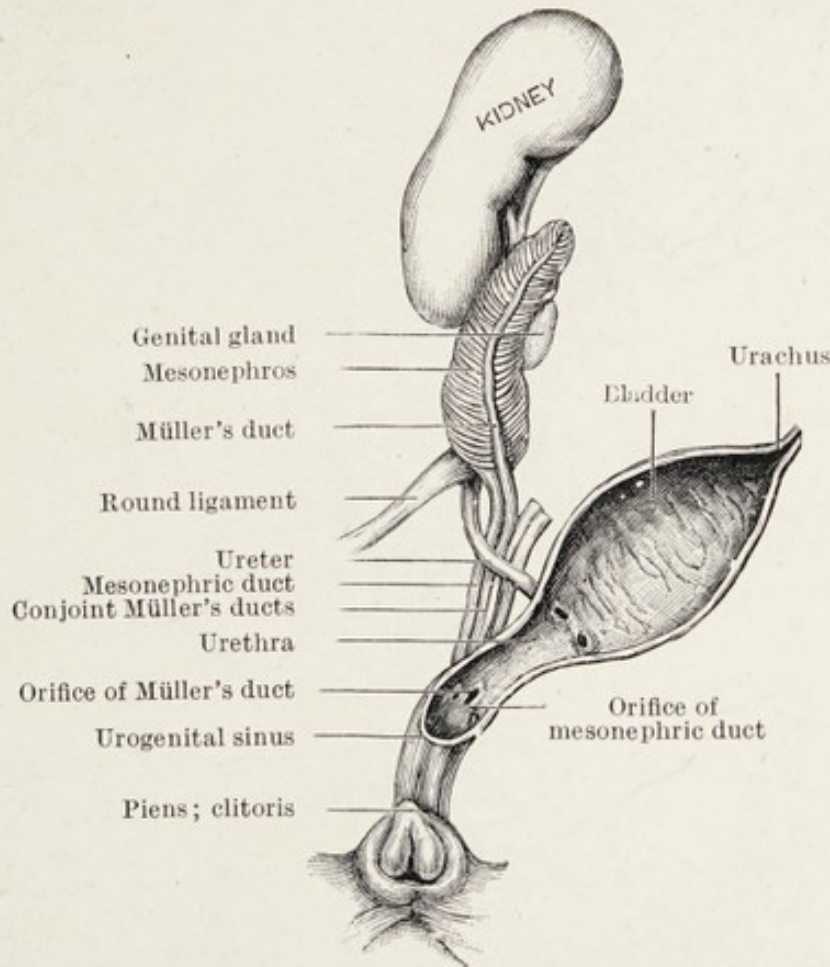


FIG. 2.—GENERATIVE ORGANS OF THE EMBRYO BEFORE THE DIFFERENTIATION OF SEX. (HENLE.)

layers—the splanchnopleure, investing the alimentary tract, and the somatopleure, remaining connected with the body-wall—the space resulting is the *cælom*, or pleuro-peritoneal cavity. The splanchnopleure (lined later by the visceral peritoneum), of course, meets the somatopleure (lined by the parietal peritoneum) on each side of the median line, just external, or rather lateral, to the future bodies of the vertebræ; and the mesodermic cells that lie along the line of junction of the two layers are known as the *intermediate*

*cell mass*. At an early stage the intermediate cell mass becomes thickened so as to form a longitudinal ridge projecting into the dorsal portion of the cœlom, and known as the *Wolffian Ridge* (Fig. 1). From it are derived the excretory organs and also those embryonic structures that were once excretory, but have changed their function in the course of evolution and have become the ducts of the genital organs.

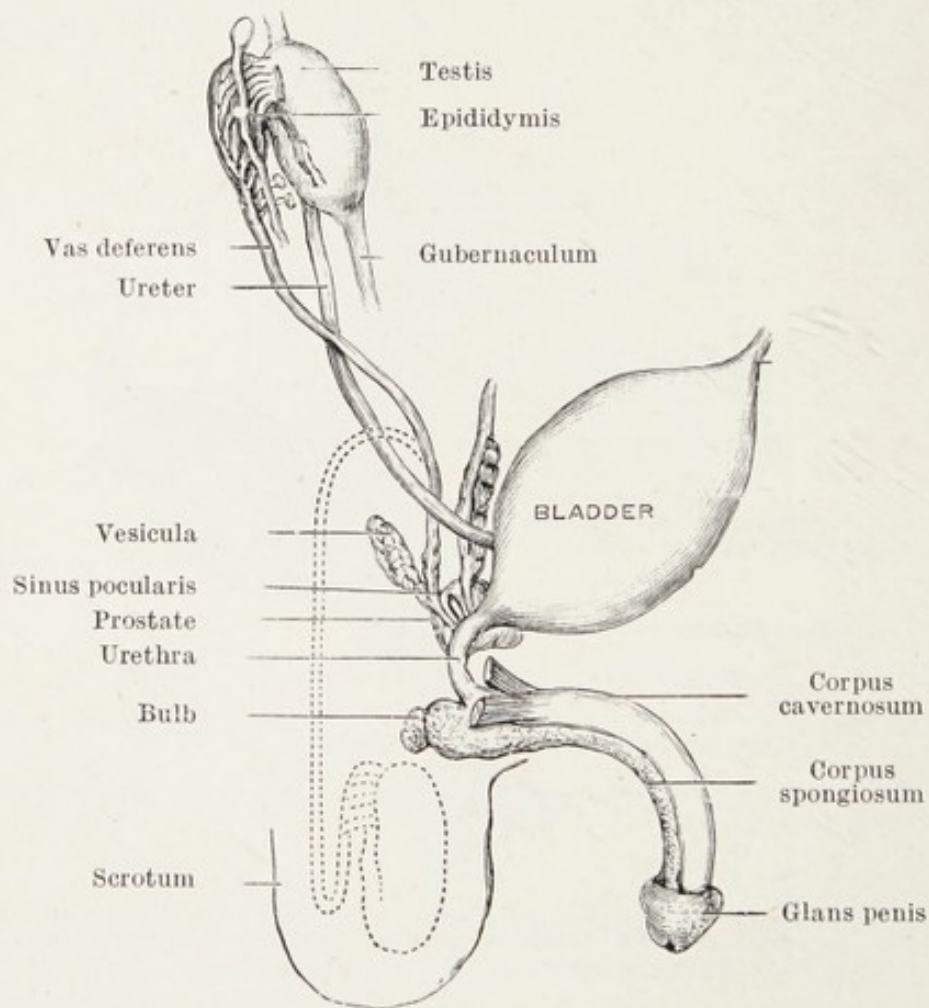


FIG. 3.—GENERATIVE ORGANS OF THE MALE. (HENLE.)

On the mesial aspect of the Wolffian ridge a secondary ridge soon appears: it is called the *genital ridge*, because it gives rise to the *genital gland* which, undifferentiated at first, is destined to develop into testis or ovary (Fig. 1).

In order of time, the first part of the urogenital apparatus to make its appearance is the *pronephros*, consisting of a few rudimentary tubules at the anterior extremity of what is to become the Wolffian ridge. Extending back along



the outer side of the ridge is the *pronephric* or *Wolffian duct*. In the higher mammals this duct has no connection with the pronephros: indeed, that part of it that is in front of the Wolffian body is not even patent; but in the lowest fishes the pronephros is the functional kidney, and the

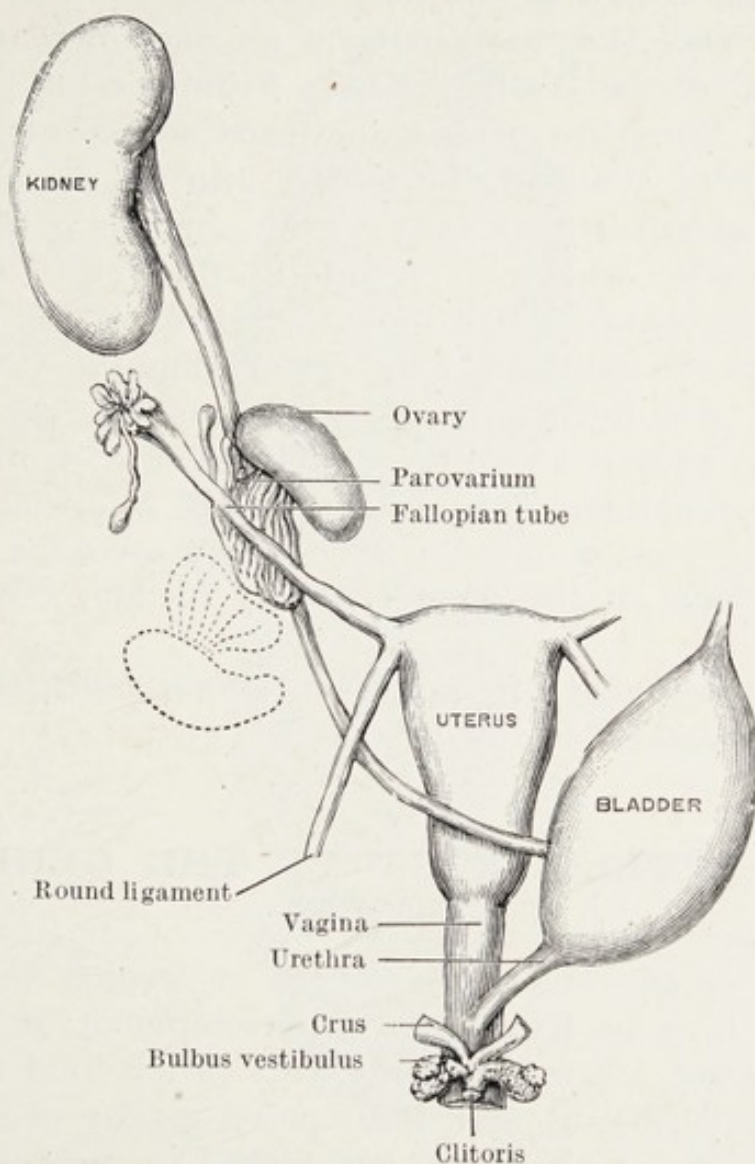


FIG. 4.—GENERATIVE ORGANS OF THE FEMALE. (HENLE.)

pronephric duct is its excretory duct. The pronephros is very transient, but before it has disappeared, the *mesonephros*, or *Wolffian body*, begins to develop just behind it, in the Wolffian ridge, and attains to a considerable size. It is composed of a number of convoluted tubules with glomeruli, and these tubules open into the Wolffian duct, which thus becomes, by adaptation, the *mesonephric duct*. In the higher fishes and in the amphibia the mesonephros is the functional



kidney ; but in reptiles, birds, and mammals the mesonephros functions as a kidney only during early embryonic life, and then, like the pronephros, atrophies ; and from the portion of the intermediate cell mass that lies caudad to the Wolffian ridge, the *metanephros* arises. This part of the intermediate cell mass is known as the renal blastema ; into it grows a bud, the *renal bud*, derived from an outgrowth from the caudal end of the Wolffian duct. From the blastema and renal bud the permanent kidney and ureter are formed. The discarded Wolffian duct enters into the service of the genital glands, together with certain portions of the mesonephros itself ; whilst an additional duct, the *Müllerian duct*, also appears. At the stage when sex is still undifferentiated in the genital gland, both Wolffian and Müllerian ducts are well developed (Fig. 2) ; later on, one persists and one atrophies, according to the sex, the Wolffian duct remaining functional in the male and the Müllerian duct in the female (Figs. 3 and 4) ; but in both sexes, as we shall see, rudiments of the discarded duct remain, even in the adult.

The development of the genital glands and ducts must now be considered in further detail.

### THE DEVELOPMENT OF THE GENITAL GLANDS

The Wolffian ridge is the stage on which the drama unfolds. It is at its maximum development at the fifth or sixth week, when it extends from just behind the heart to the pelvis (Fig. 5), and is composed mainly of the mesonephros. The mesonephros is attached to the dorsal body wall by a constricted portion, the *Wolffian mesentery* ; along the ventral aspect of the mesonephros runs the longitudinal genital ridge, of which a portion becomes the genital gland ; and the portion of the genital ridge by which the gland is attached to the mesonephros is called the *genital mesentery*. Its upward extension along the genital ridge is called the *upper genital fold*, and the downward extension is the *lower genital fold*. These have an interesting history in the female, as the upper genital fold becomes the tubo-ovarian



## DEVELOPMENT OF REPRODUCTIVE ORGANS 9

ligament; whilst the lower genital fold forms the ovarian ligament in its upper part and the round ligament in its lower part.

In that portion of the genital ridge which is destined to become the genital gland, the cells covering it form a

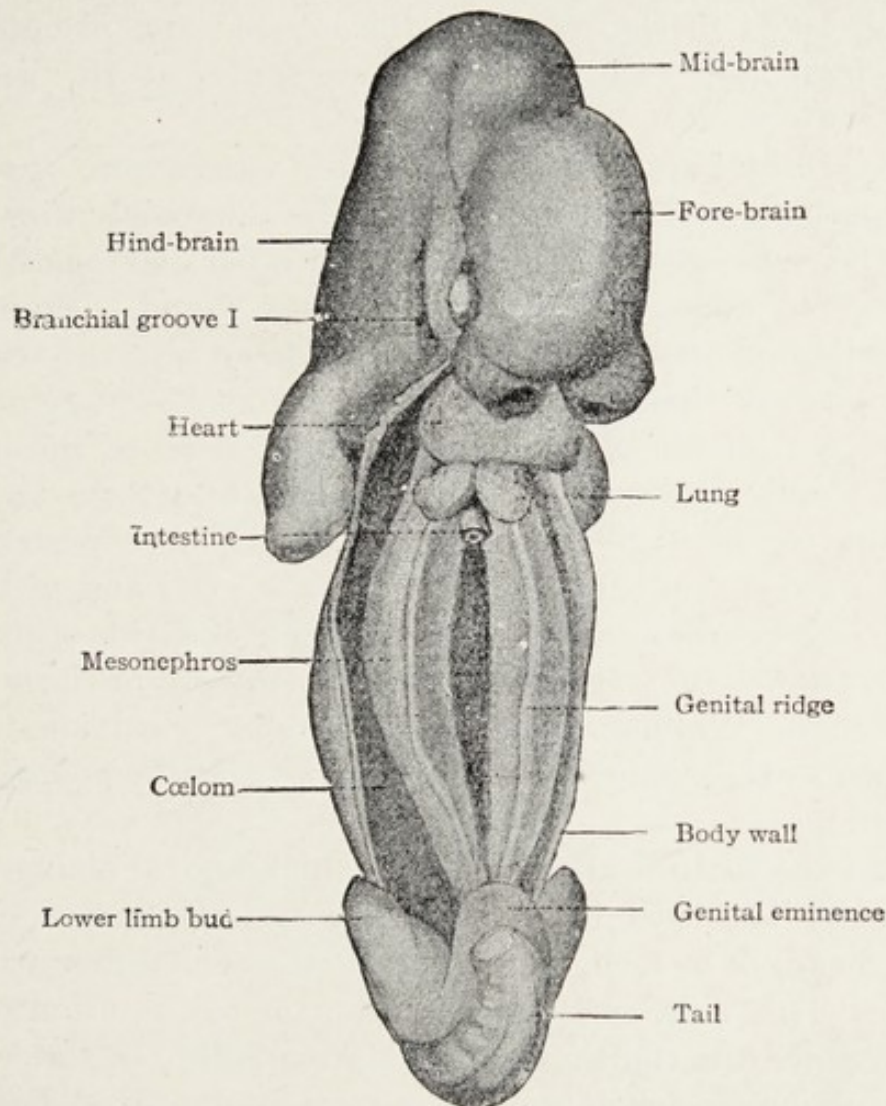


FIG. 5.—AN EMBRYO OF FIVE WEEKS SHOWING THE WOLFFIAN RIDGE.  
(BAILEY AND MILLER.)

thickened layer known as the *germinal epithelium*. Two classes of cells may soon be distinguished: (1) large spherical cells with clear cytoplasm and large vesicular nuclei; these are the *sex-cells*; (2) smaller cuboidal cells with cytoplasm that stains more readily. It is held by some observers that the sex cells can be recognized as having a distinct individuality at a very early stage of the segmentation of the ovum. Possibly, in the lower forms, of the two cells



resulting from the first cleavage of the fertilized ovum, one is destined to form the soma or body, and the other the sex-cells of the genital gland. It is inferred that in this case the sex-cells become segregated later on by migration. This may hold true also of the higher forms; certainly, in human embryos of three weeks (2·5 mm.) sex-cells have been observed in the region of the cloaca; and in embryos a few days later (4·9 mm.) they are found at the root of the mesentery.

The germinal epithelium soon shows two layers, of which the superficial one retains its epithelial character and contains the sex-cells, whilst the deeper layer has small cells which go to make up the stroma of the gland. From the superficial layer columns of cells grow down into the stroma, carrying with them some of the sex-cells. Those at the anterior end of the gland grow deeply, and reach the hilum of the gland; they are called *rete cords* and form the *rete testis* or *rete ovarii*; the columns that lie more posteriorly do not extend so deep; they are the *sex cords* and give rise to the *seminiferous tubules* in the testis, and the *medullary cords* in the ovary. Meanwhile the attachment of the genital gland to the Wolffian ridge becomes more constricted, and is known as the *mesorchium* in the male, and the *mesovarium* in the female.

Up to the fifth or sixth week the histological changes are practically identical in the two sexes, and the sex of the embryo cannot be recognized; but thereafter a differentiation occurs. The very earliest indication of sex is afforded by the presence, in the male, of a layer of fibrous tissue, the *tunica albuginea*, situated between the superficial layer of the germinal epithelium and the deeper parts of the gland. This appears about the sixth week, and does not occur in the female gland.

It is not necessary to trace the other changes in detail, but the outstanding feature is the development of the sex cords into seminiferous tubules in the male and into medullary cords in the female. The sex cells (ova) are much larger in the latter; and in the course of development they become surrounded by follicular cells, each ovum with its surrounding group of cells forming a *primary Graafian follicle*.



## THE DEVELOPMENT OF THE GENITAL DUCTS

Along the outer side of the Wolffian ridge runs the Wolffian duct, and just external to it is the Müllerian duct. The two ducts are attached to the ridge by the urogenital fold, and this merges with the Wolffian mesentery behind the Wolffian body to form the *urogenital mesentery* (Fig. 6).

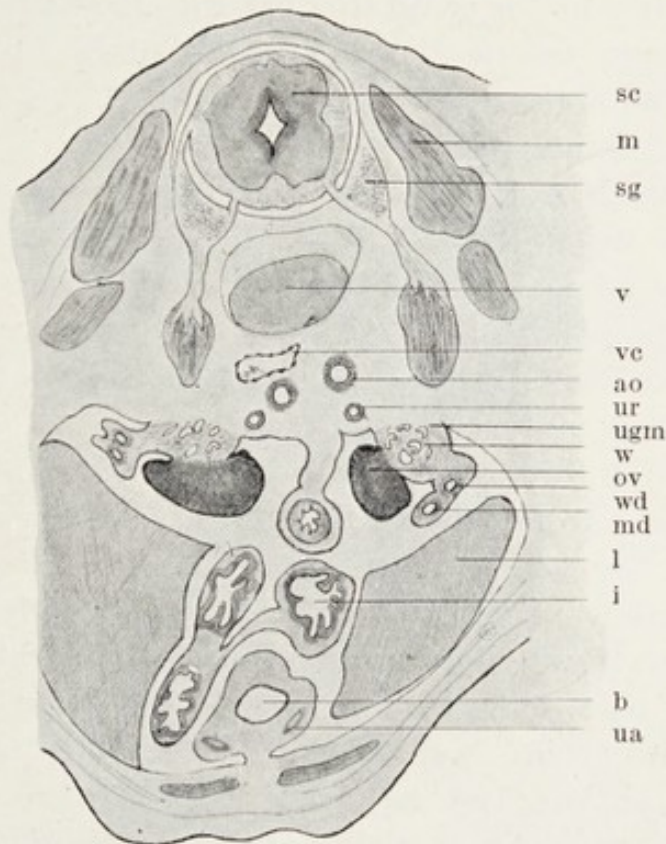


FIG. 6.—TRANSVERSE SECTION THROUGH THE ABDOMINAL REGION OF AN EMBRYO OF 25MM. (AFTER KEIBEL.)

sc. Spinal cord; m. Muscle; sg. Spinal ganglion; v. Vertebra; vc. Vena cava; ao. Aorta; ur. Ureter; ugm. Urogenital mesentery; w. Wolffian duct; md. Müllerian duct; l. Liver; i. Intestine; b. Bladder; ua. Umbilical artery.

By this time the Wolffian ducts have opened posteriorly first into the cloaca, and later into the urogenital sinus, when this has become divided off from the rectum. The Müllerian ducts also open into the urogenital sinus. The ureters open at first into the cloaca; the opening does not, however, like that of the Wolffian duct, become transferred to the urogenital sinus: but each ureter becomes implanted



on the base of the bladder by growth of the latter against it, and fusion, whereby a new opening is formed.

The next important change is that the urogenital mesenteries of the two sides approach each other and then fuse, forming the *genital cord*. During this process, the Müllerian ducts become turned inwards, crossing over the Wolffian ducts, and thus come to lie next to one another, occupying a median position, with the Wolffian duct on either side. Then the Müllerian ducts in turn fuse in that part of their course that lies in the genital cord (Figs. 7, 8 and 9).

The changes described so far take place in both sexes alike; but the subsequent development of the ducts differs in males and females.

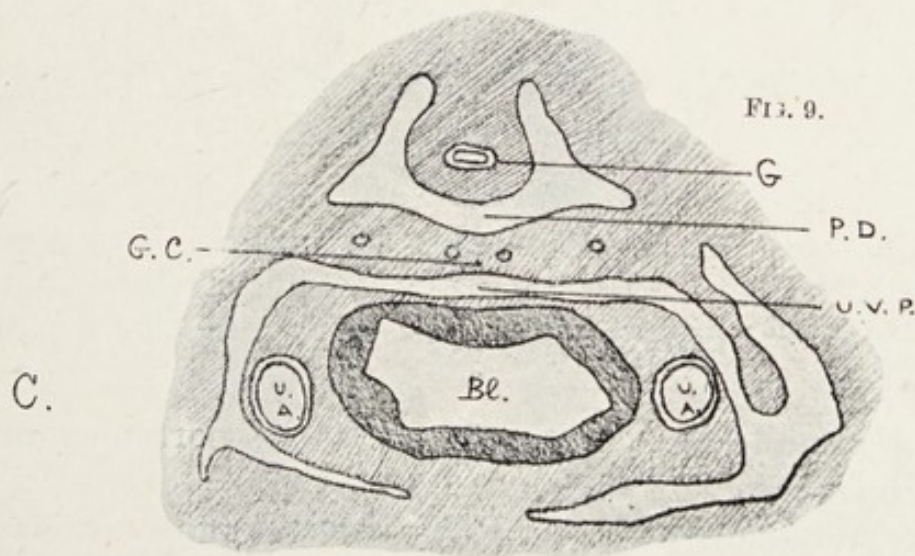
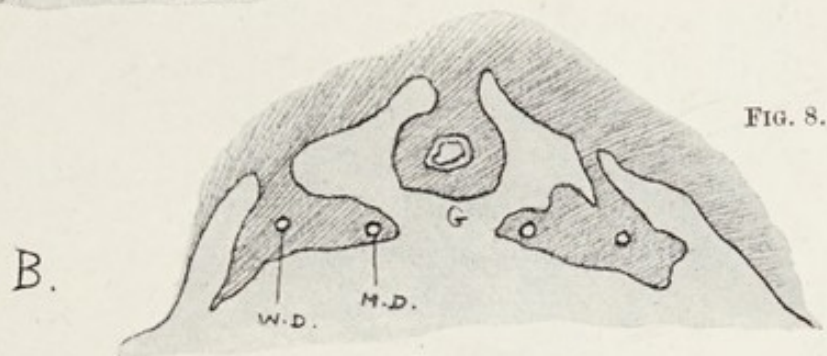
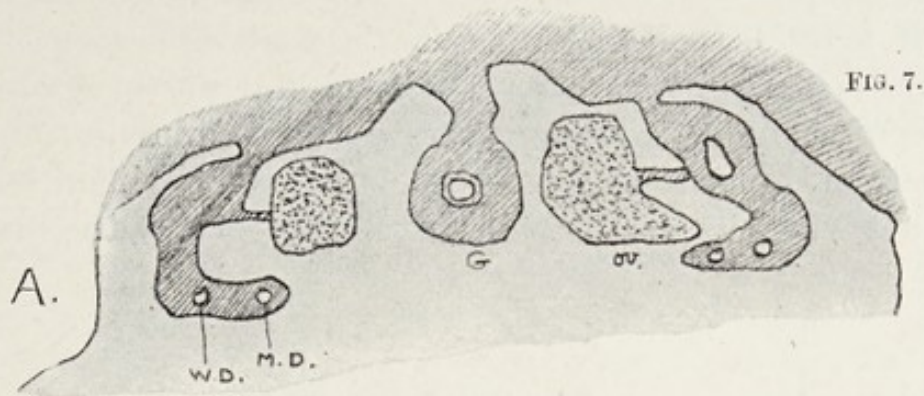
(a) **In the Male.**—The genital cord remains of insignificant size because the Müllerian ducts atrophy, leaving as their only traces a small portion of the head end, which is believed to persist as a *hydatid of Morgagni*, and a small portion of the fused posterior ends in the form of the *prostatic utricle* or *uterus masculinus*.

The Wolffian duct, on the other hand, remains functional and becomes, from above downwards, the canal of the epididymis, the vas deferens, and the ejaculatory duct: a diverticulum from its lower end becomes the seminal vesicle. The Wolffian body undergoes considerable atrophy, but some of its tubules remain patent and effect attachment by their glomerular end to the testis; they thus become the *coni vasculosi* and *vasa efferentia* of the *epididymis*. Other tubules lose their attachment to the Wolffian duct, but persist in a rudimentary form as the *paradidymis* or *organ of Giralès*. The testis passes down from its lumbar position to lie on the brim of the pelvis; and later on the descent of the testis into the scrotum is effected through the agency of the lower part of the lower genital fold, which becomes extended to the inguinal ring as the *plica gubernatrix*; and this in turn becomes known as the *gubernaculum testis*.

(b) **In the Female.**—The genital cord becomes an important structure, chiefly by reason of the development of the Müllerian ducts. These, as has been said, fuse together in that part of their course that lies in the genital cord; the upper part of this fused tube becomes the *uterus*, and



the lower part is the *vagina*. These undergo considerable enlargement, and particularly the uterus, which derives its



FIGS. 7, 8, 9.—THREE FIGURES TO ILLUSTRATE THE FORMATION OF THE GENITAL CORD. (THOMPSON.)

*G.* Gut and its mesentery; *Ov.* Ovary; *W.D.* Wolffian duct; *M.D.* Müllerian duct; *P.D.* Pouch of Douglas; *G.C.* Genital cord containing two Müllerian ducts (close to middle line) and two Wolffian ducts; *U.V.P.* Utero-vesical pouch; *Bl.* Bladder; *U.A.* Umbilical arteries.

muscular and connective tissue elements from the genital cord. The upper, non-fused portions of the ducts remain relatively small, and come to form the *Fallopian tubes*.

The union of the urogenital mesenteries to form the genital cord results in the formation of a bridge or septum across the pelvis, lying between the bladder in front and the rectum behind (Fig. 9); and while the median portion of this septum consists of the uterus, the lateral portions contain between their peritoneal coverings what remains of the thinned-out and atrophying mesonephros (or Wolffian body), together with the vessels and nerves that supply the uterus.

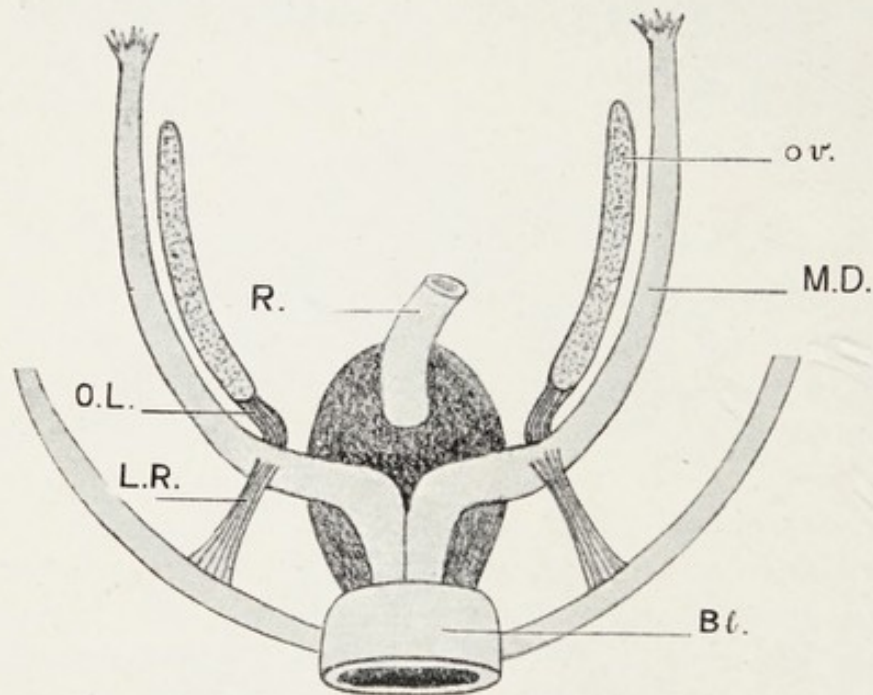


FIG. 10.—DIAGRAM TO ILLUSTRATE THE CONVERSION OF THE INNER FOLD INTO THE OVARIAN LIGAMENT AND THE ROUND LIGAMENT.

*Ov.* Ovary; *M.D.* Müllerian duct; *O.L.* Ovarian Ligament; *L.R.* Round ligament; *Bl.* Bladder; *R.* Rectum.

In the completed scheme, these lateral portions are the *broad ligaments*.

The Wolffian ducts and body undergo considerable atrophy. Of the latter, some rudiments persist as the *epoöphoron* (or *parovarium*), corresponding with the epididymis, and consisting of a few vertical tubules opening into a transverse one, which represents the head-end of the Wolffian duct. A few other remains of the tubules lie in the broad ligament; they are known as the *paroöphoron*, and correspond with the *paradidymis*. The remainder of the Wolffian duct commonly disappears, but at times a portion of it can be recognized running across the broad



ligament, and passing down in front of the lateral aspect of the cervix and vagina. It is then known as the *duct of Gärtner*. Vaginal cysts are due to persistent portions of the duct of Gärtner, which have become distended with fluid: their position betrays their origin. It is interesting to note that in some mammals, such as the pig, the duct of Gärtner is present normally.

When the Müllerian ducts turn inwards and fuse, they cross in front, not only of the Wolffian ducts, but also of the lower genital fold on each side, with the result that the upper part of this fold, which becomes the *ovarian ligament*, comes to lie behind the broad ligament; whilst the lower part, which becomes the *round ligament*, remains in front of the broad ligament, passing out from under the Müllerian duct at the junction of its fused and unfused portions (*i. e.* at the cornu of the uterus) to run forward to the inguinal ring (Fig. 10). In the early stages the round ligament is known as the *plica gubernatrix*, corresponding with the gubernaculum testis in the male.

### THE EVOLUTION OF THE ENTODERMAL CLOACA

At a very early stage the allantois appears as an outgrowth on the ventral aspect of the hind-gut; and while it grows out ultimately to form part of the placenta, that portion of it which lies within the body of the foetus becomes constricted off and finally contracts into a fibrous band, the *urachus*. The portion of gut immediately behind the allantoic outgrowth is called the *entodermal cloaca*. Into this the primitive Wolffian ducts open laterally, together with the ureters. Later on, the cloaca becomes divided by a septum known as the *uro-rectal fold* into two parts; the posterior is the rectum, and the anterior is the urogenital sinus, in which the openings of the Wolffian ducts are now found. A little before the end of the second month the fused Müllerian ducts grow downwards and open into the urogenital sinus between the orifices of the Wolffian ducts.

The anterior or ventral part of the urogenital sinus becomes the *bladder*; after the second month this enlarges and the



openings of the ureters become transferred into it as previously described; while the Wolffian and Müllerian ducts open into the narrower portion of the urogenital sinus, which lies just behind the bladder. The sinus becomes further constricted at its anterior or bladder end, and this part forms the *urethra*; and the more dilated posterior portion of the sinus now opens on the surface, by absorption of the dividing membrane: the opened out portion is called the *vestibule*. The next change is strikingly different in the two sexes.

(a) **In the Male**, the vestibule becomes closed in, forming the prostatic and membranous portions of the urethra; into the prostatic portion open the Wolffian ducts, now called the *vasa deferentia*. The Müllerian duct has by this time become atrophied, but its rudimentary lower end persists as the *sinus pocularis* (uterus masculinus).

(b) **In the Female**, the vestibule remains open on the surface, forming part of the vulva, with the lower end of the fused Müllerian ducts, now called the *vagina*, opening in the centre of it. The membranous septum which is found just before the vaginal opening is effected is regarded by some observers as the *hymen*; but others hold that the hymen is a crescentic membranous fold adherent to the external surface of the septum. In either case, when the opening takes place, by the absorption of the septum, the hymen forms an imperfect diaphragm guarding it.

### THE DEVELOPMENT OF THE EXTERNAL ORGANS

Just as there is a stage and a type in the development of the internal organs that is common to both sexes, so is it also with the external organs. The first indication is in the sixth week, when there is a depression on the surface corresponding to the position of the cloaca internally; and as the depression deepens from without, and the cloaca approaches the surface from within, the thinned-out tissue between them is known as the *cloacal membrane*. Around this depression appears a horse-shoe shaped thickening, of which the anterior or curved end soon becomes the most



prominent part, and forms a distinct protrusion known as the *genital tubercle*. The depression, as it deepens, becomes constricted laterally, till it is in the form of a groove bounded by the lateral portions of the horse-shoe thickening, which now increase in size and receive the name of the *median genital folds*. Outside these again another thickening appears on each side; these are the *lateral genital folds*. When the cloaca opens on the surface, by absorption of the cloacal membrane, the position of the opening is in the groove just mentioned, and at first there is only one external opening; but the downward growth of the urorectal fold, separating the bowel from the urogenital sinus, results in a septum appearing in the opening, which thus becomes divided into two, the posterior being the *anus*, whilst the anterior is the opening of the urogenital sinus. The lower end of the septum becomes thickened and forms the *perineal body*, and its cutaneous surface is called the *perineum*.

At the beginning of the third month the appearances are still so similar in the male and the female that the sex cannot be distinguished; but by the end of the fourth month development has proceeded so far differently in the two sexes that it is possible to say whether it is a boy or a girl. These changes are as follows—

(a) **In the Male.**—The genital tubercle grows rapidly to form the *penis*: the enlarged anterior end is the *glans penis*, covered over with a fold of skin, the *prepuce*. On each side, the skin of the prepuce is continuous posteriorly with the median genital folds, which become the membranous portions of the urethra, and fuse, enclosing the canal of the urethra. The lateral genital folds enlarge and receive the testes on their descent; and they also fuse in the middle line, forming the *scrotum*.

(b) **In the Female.**—The genital tubercle forms the *clitoris*, its anterior end expanding slightly as the *glans clitoridis*, which is a miniature edition of the condition in the male. The fold of skin round it is the *prepuce* of the clitoris; and it is continued backwards on each side of the vestibule as the *labia minora*, which are thus derived from the median genital folds. The lateral genital folds enlarge, though not so much as in the case of the male,



and become the *labia majora*. Thus all the parts of the vulva find their counterpart in the male external organs; and to complete the list, the glands of Bartholin in the female are homologous with Cowper's glands in the male.

When development is marked by "confusion of sex," the external organs of the male may resemble those of the female, and *vice versa*: and the confusion may be so pronounced that even in adult life it may be impossible to tell the sex from outward appearances. In this way are brought about those remarkable malformations known as *pseudo-hermaphrodism*, which will be described later.

It is possible to draw up a table of the homologous parts of the external and internal organs in the male and female; and such a table is here presented, showing the origin of each from the common or indifferent stage. The names in italics are those of structures that persist only in a rudimentary form.

A TABLE OF HOMOLOGOUS PARTS IN THE MALE  
AND FEMALE

<i>Fœtal Structures.</i>	<i>Adult Male.</i>	<i>Adult Female.</i>
Genital gland	Body of testis	Ovary (oöphoron)
Mesonephros (Wolffian body)		
Anterior portion	Epididymis, vasa efferentia	<i>Epoöphoron</i> ( <i>parovarium</i> )
Posterior portion	Paradidymis	<i>Paroöphoron</i>
Mesonephric (Wolffian) duct	Vas deferens	<i>Duct of Gärtner</i>
Müllerian duct	{ <i>Hydatid of Morgagni</i> <i>Sinus pocularis</i> ( <i>uterus masculinus</i> )	Fallopian tube Uterus Vagina
Upper genital fold	—	Tubo-ovarian ligament
Lower genital fold	Gubernaculum testis	{ Ovarian ligament Round ligament
Urogenital sinus	Urethra, prostatic part	Urethra
	Urethra, membranous part	Vestibule and labia minora
Median genital folds	{ <i>Folds at entrance to sinus pocularis</i> Cowper's glands	Hymen
Lateral genital folds	Scrotum	Bartholin's glands Labia majora
	Glans penis	Glans clitoridis
Genital tubercle	{ Corpus spongiosum Corpora cavernosa (penis)	Vestibular bulbs Corpora cavernosa (clitoridis)



## CHAPTER II

### ANATOMY OF THE FEMALE PELVIC ORGANS

THE female pelvic organs are a series of structures adapted to the function of childbearing. The dominant organs of sex are the *ovaries*, in which ova are produced. The accessory organs are concerned with impregnation by the male, fertilization of the ova by the spermatozoa, incubation of the oöperm, or fertilized ovum, and expulsion of the mature foetus into the outside world when the time is ripe.

Thus the external organs form collectively the *vulva*, in parts of which are found the peripheral end-organs concerned in sexual sensation, as well as glands whose mucous secretion acts as a lubricant. The *vagina* is adapted to receive the male organ, and its entrance is guarded in the virgin by a membranous fold, the *hymen*. Into the deeper part of the vagina projects the *uterus*, through which the spermatozoa pass up to reach the ova, and in which the fertilized ovum, on its descent, is anchored to allow of the development of the embryo. From the upper part of the uterus project the *Fallopian tubes*, one on each side, forming the channels of communication between the ovaries and the uterus. The spermatozoa pass up into these tubes and there meet and impregnate the ovum as it journeys towards the uterus.

Finally, the descriptive anatomy of the pelvic organs includes an account of the connective tissue structures that serve to hold them in place and to support the blood-vessels, nerves, and lymphatics with which they are supplied.

It will be convenient to begin with the description of the external organs.

### THE VULVA

The vulva is fringed with hair in the adult, and is bounded in front by a prominence over the pubic bone



called the *mons veneris* (Fig. 11), behind by the perineum, and at the sides by the folds of the thighs. The prominence of the *mons veneris* is due to a collection of subcutaneous fat, and the skin covering it is abundantly supplied with hair.

At the outer borders of the vulva are situated the *labia majora*, or greater lips (Fig. 11). Each consists of a fleshy

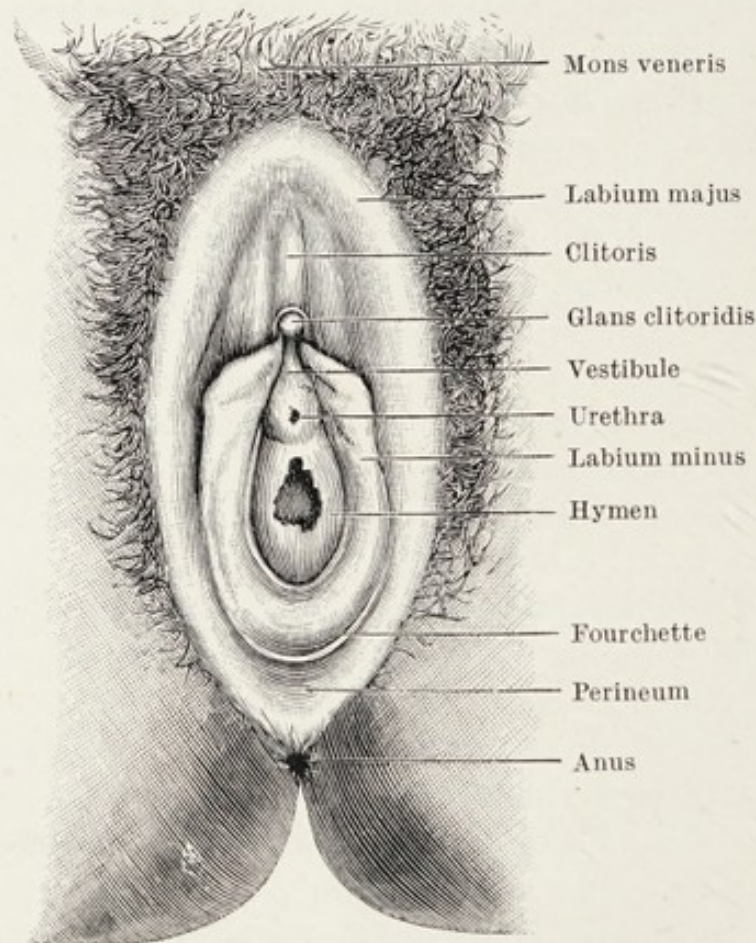


FIG. 11.—THE VULVA OF AN ADULT, WITH THE LABIA SEPARATED TO SHOW THE VARIOUS PARTS. (AFTER SAPPEY.)

fold of skin passing backwards from the mons veneris and terminating opposite the perineum: the labia here converge and meet by fading into a thin cutaneous fold, known as the *fourchette*, which forms the boundary between the vulva in front and the perineum behind. The labia majora are homologous with the scrotum, and, like this, their subcutaneous tissue contains dartos and fat, whilst deeper still are venous plexuses forming on each side an oval collection of erectile tissue known as the *bulbus vestibuli*.



The inner borders of the labia are nearly in apposition in the virgin, and the outer or exposed aspect of the skin is covered with hairs and pigmented. That part of the labia that is exposed by separating them shows hardly any hairs and is pink in colour and richly supplied with sebaceous glands.

The interval between the labia majora is called the *rima pudendi*; and on separating the labia other structures come into view.

In front is the *clitoris* (Fig. 11), which is a rudimentary homologue of the penis. The body of it is formed by the union of two crura, which arise from the pubic arch on each side, near the symphysis. The extremity of the clitoris is the *glans clitoridis*, containing erectile tissue. It is partly concealed by the prepuce, described below.

At the sides, and parallel with the greater lips, are the *labia minora*, or lesser lips (Fig. 11). They are thin, pink, cutaneous folds, devoid of hair, but rich in sebaceous glands. Posteriorly they fade gradually on the inner aspect of the labia majora, just as these are converging to form the fourchette. Anteriorly the labia minora become narrower and less raised, and terminate by dividing into two folds, of which the inner one passes to the under surface of the glans clitoridis, near the median line, and forms, with its fellow of the opposite side, the *frænum clitoridis*. The outer fold expands fanwise, and unites with the corresponding fold of the opposite side to form the *prepuce clitoridis*, which is a hood-like triangular structure with a free, slightly arched, lower border, as the base of the triangle, whilst the much longer sides meet in front at an acute angle, and are not sharply defined, as they merge into the inner borders of the greater lips.

The labia minora, which are known also as the *nymphæ*, are not seen in the young virgin till the labia majora are separated; but in parous and in most older women they are visible on the surface. Sometimes they are larger and even conspicuous; they attain an exaggerated size in the condition known as the Hottentot apron (Fig. 12).

In the space included within the labia minora, the vagina opens posteriorily. The anterior margin of the vaginal



orifice forms the posterior boundary of a triangular area whose sides are marked out by the converging borders of the labia minora, and whose apex is the clitoris. In this area, known as the *vestibule*, is seen the opening of the urethral meatus.

The vaginal orifice is partly closed in virgins by a membranous crescentic diaphragm, the *hymen*, attached to the vaginal wall at the sides and behind. When the labia are

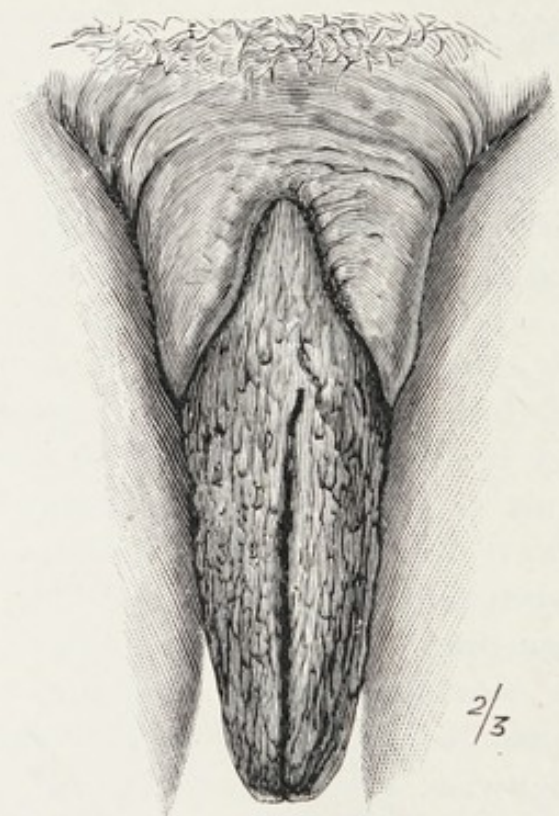


FIG. 12.—THE HOTTENTOT APRON.

separated, the orifice is circular, and the diaphragm presents a concave anterior border. In the natural position the sides of the hymen fall together with the edges turned outwards, and the orifice becomes a narrow slit, running from before backwards.

As the attachment of the hymen to the vaginal wall is a little internal to the vaginal orifice, it follows that there is a sulcus between the hymen and vagina posteriorly and at the sides. The posterior part of the depression is limited behind by the fourchette, and is known as the *fossa navicularis*; and on each side is found a minute orifice, the opening of the *Bartholinian duct*. When traced outwards



for about a centimetre, each duct conducts to the corresponding *gland of Bartholin*; these glands measure one centimetre in width and are found in the deeper part of the labia majora immediately behind the rounded end of the vestibular bulb (Fig. 13).

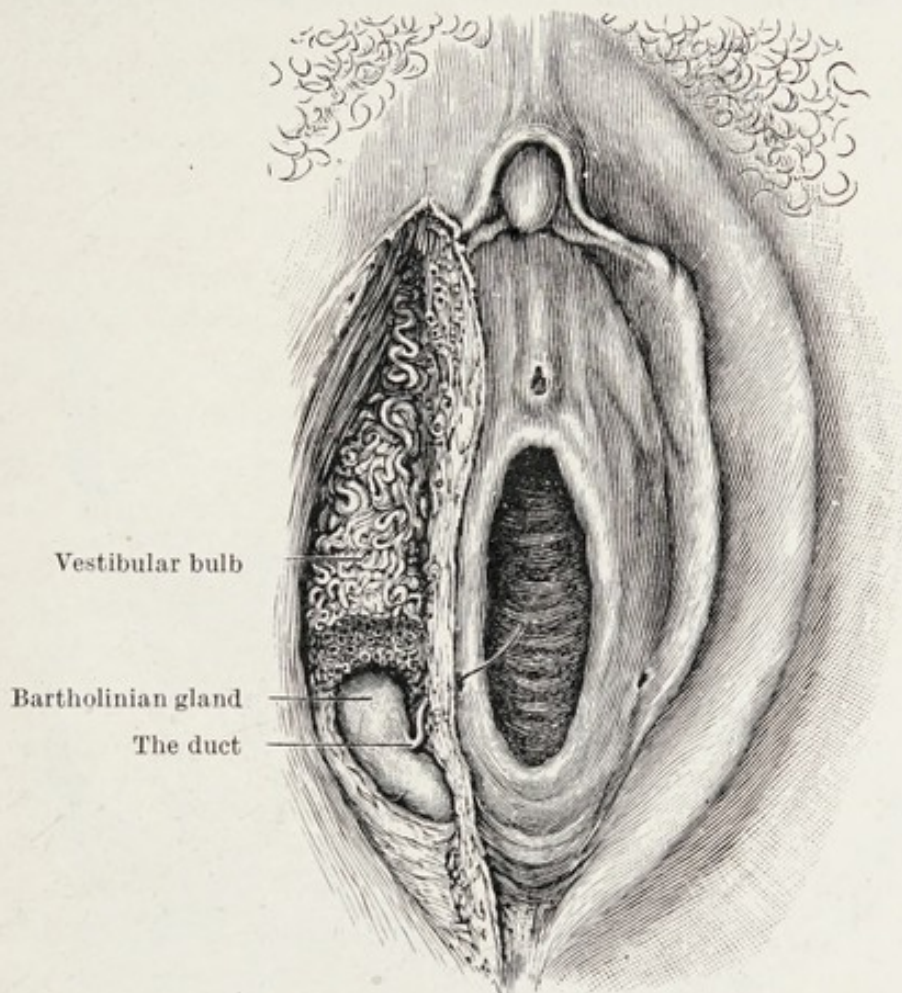


FIG. 13.—THE RIGHT LABIUM MAJUS DISSECTED TO SHOW BARTHOLIN'S GLAND AND ITS DUCT. (SEMI-DIAGRAMMATIC.)

### THE PERINEUM

The cutaneous and subcutaneous tissues between the posterior part of the vulva, that is the fourchette, and the anus are called collectively the perineum. The deeper part of it is specially designated as the *perineal body*, and is roughly pyramidal in shape. Its centre corresponds to what is known in the male as the central point of the perineum. In sagittal section (Fig. 14) it is nearly triangular—or, as anatomists describe it, irregularly four-sided—with an antero-superior side corresponding to the posterior vaginal



wall, an inferior side formed by the cutaneous border, a postero-superior side bounding the anterior wall of the rectum as low as the internal sphincter, and a postero-inferior side extending from the internal sphincter to the anus. The sphincter of the anus, the rudimentary bulbo-cavernosus and the transverse perineal muscles meet in the

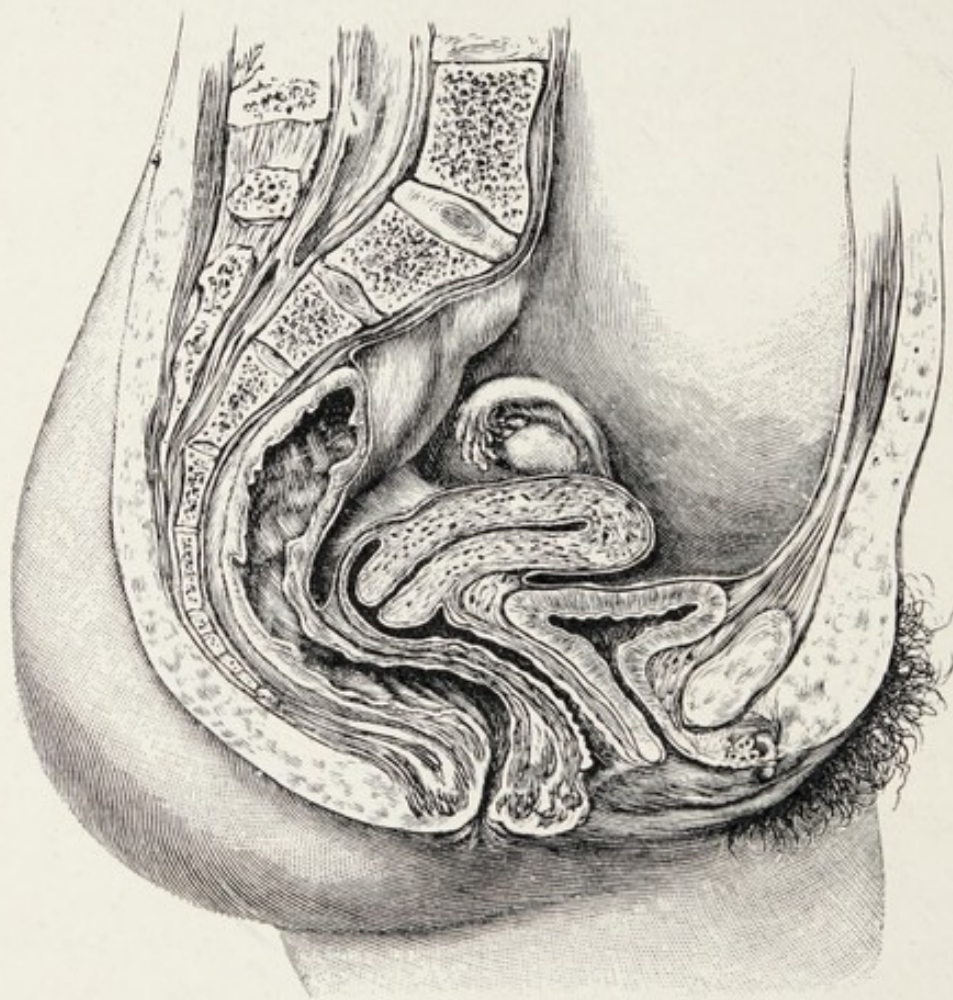


FIG. 14.—SAGITTAL SECTION OF THE FEMALE PELVIS. (DICKINSON.)

substance of the perineal body, where they are mingled with connective tissue and elastic tissue so arranged that the whole perineum is capable of a remarkable degree of distension when subjected to the strain of childbirth.

### THE VAGINA

The vagina is the passage leading from the vulva to the uterus. In the erect position the vagina passes upwards



and backwards, its line of direction making at first an angle of about  $60^\circ$  with a horizontal line drawn through its orifice (Fig. 14). If the line of this first part were extended it would reach the skin of the back nearly opposite the spine of the last lumbar vertebra; but instead of this the direction takes a slight downward curve, to pass under the cervix and then a sharp upward curve behind the cervix. The actual shape of the vagina, therefore, in sagittal section, somewhat resembles the longitudinal section of a sauceladle.

The cervix projects into the vagina at its deeper part obliquely, in such a way as to encroach on its anterior wall, which measures on the average 6.2 centimetres ( $2\frac{1}{2}$  inches), whilst the posterior wall measures 8 centimetres ( $3\frac{1}{4}$  inches). When distended it is circular in section; but in the natural state the anterior and posterior walls fall together, producing in transverse section the effect of a very wide H. At the orifice, however, it is the lateral walls that come together, so that the slit-like channel is here sagittal. The projection of the cervix forms recesses; the anterior is the shallowest, and is called the anterior vaginal fornix: the posterior vaginal fornix, behind, is the deepest; the lateral fornices are deeper than the anterior, but shallower than the posterior. The anterior vaginal wall is intimately attached to the bladder above and the urethra below. The posterior wall blends with the anterior wall of the rectum, except in the deepest part of the posterior fornix, where it comes into relation with the peritoneal cavity in the pouch of Douglas.

The lining membrane of the vagina, when undistended, falls into numerous transverse ridges, especially at the sides; on the anterior wall a vertical ridge extends upwards for about 2.5 centimetres (1 inch): it is known as the *anterior vaginal column*: a similar but more pronounced ridge on the posterior wall is known as the *posterior vaginal column*. These columns represent the lines of attachment of the septum which, in the early embryo, divides the vagina into two canals.

The lining membrane of the vagina is sometimes spoken of as a mucous membrane; but this is a term of convenience only, since there are no mucous glands in the vagina.



**Microscopical Anatomy.**—The vaginal wall in section shows three layers :—

1. *The epithelium*, which is stratified like that of the skin : as in nearly all kinds of stratified epithelium the deeper cells are columnar, the intermediate ones cubical, and the superficial ones squamous. The latter are constantly being shed and renewed from below.

2. A layer of fairly compact sub-epithelial connective tissue.

3. The muscular layer in two strata ; the fibres of the inner or more superficial stratum are transverse and those of the outer or deeper stratum are longitudinal.

Outside the muscle layers is a sheath of loose connective tissue, containing the vessels and nerves that supply the vagina.

## THE UTERUS

The uterus is a pear-shaped body (see Fig. 17) somewhat flattened from before backwards and roughly triangular. At each of the upper angles it is continuous with the corresponding Fallopian tube ; and the truncated lower angle is formed by the cervix which projects into the vagina. In coronal section (Fig. 15) the cavity is conspicuously divided into two portions : the upper is the *cavity of the body of the uterus*, and maintains the triangular form : each of the upper angles marks the orifice of the Fallopian tube ; at the lower angle the narrowed cavity of the body passes into the lower portion, or *cervical canal*. The isthmus-like communication is known as the *internal os*, and at the lower end of the cervical canal the aperture of communication is called the *external os* or *os tincae*. The latter term is obsolete. The position of the internal os is roughly indicated on the outside of the uterus by a constriction, and thus the whole uterus is divided into two portions : the body, or *corpus uteri*, and the neck, or *cervix uteri*. These two portions have a somewhat different structure, are subject to rather different diseases and have a markedly different function. The body of the uterus is further subdivided by an imaginary transverse line connecting the orifices of the Fallopian tubes ; the portion above this line is the *fundus uteri*, and the part



below it, as far down as the internal os, is the body proper. Further, each upper angle of the uterus is known as the *uterine cornu*. The cervix is also subdivided; that part of it which projects into the vagina is called the *vaginal portion*; and the part above the vagina, as high up as the internal os, is the *supra-vaginal* portion. The subdivisions of the uterus are shown diagrammatically in Fig. 15.

The normal uterus of a young nullipara measures about 7.5 cm. (3 inches) in length; 5 cm. (2 inches) in width at

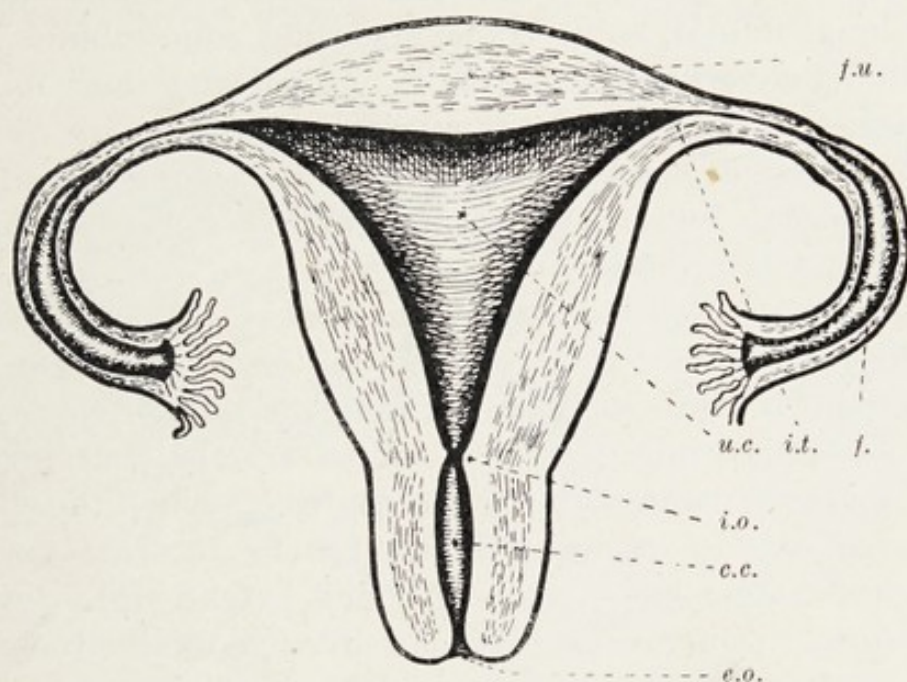


FIG. 15.—THE UTERUS IN CORONAL SECTION. (DIAGRAMMATIC.)

c.c. Cervical Canal; e.o. External Os; f. Fallopian Tube; f.u. Fundus Uteri; i.t. Inner End of the Fallopian Tube; i.o. Internal Os; u.c. Uterine Cavity.

the fundus and 2.5 cm. (1 inch) in thickness. The cavity is about 6.2 cm. ( $2\frac{1}{2}$  inches) long, of which the body of the uterus claims about 3.7 cm. and the cervix about 2.5. In a woman who has borne children all the measurements are a little greater, the length of the uterine cavity varying from 6.2 to 7.5 cm. The body and fundus of the uterus project freely into the peritoneal cavity, receiving an investment of peritoneum in front and behind. The peritoneum is continued down over the posterior aspect of the cervix as far as the vaginal reflection. In front the peritoneum leaves the uterus at the level of the internal os, to be reflected over the bladder, with the posterior wall of



which the anterior surface of the cervix is in contact (Fig. 14). At the sides the body of the uterus and cervix are in relation with the broad ligament, between the peritoneal folds.

**Microscopical Anatomy.**—On section, the uterine surface shows the peritoneum closely applied to a layer of fairly dense connective tissue. Within this covering is the main part of the uterine wall, containing a large number of bundles of plain unstriated muscle-tissue, closely interlaced, and running mainly in directions parallel with the surface, some longitudinal, some transverse, and some oblique, like the rubber covering of a golf-ball. Mixed with those muscle-bundles, though normally numerically inferior, are bundles of fibrous tissue, and in the interspaces among the fibrous and muscular bundles are found large numbers of blood-vessels and lymphatics.

Within the muscular and fibrous coat is a layer of connective tissue, very rich in connective-tissue cells and relatively poor in fibrous tissue, forming the base of the stroma of the endometrium. In this stroma are the characteristic uterine glands: long tubular structures of which the shorter ones are mostly at right angles to the internal surface; while the longer ones, some of which extend right through the stroma to the muscle layer, are even so unable to accommodate themselves except by taking an oblique course. As the gland gets deeper it is usually wider; most of them are simple tubes, but a few divide into two portions at their further ends. The epithelium of the surface is columnar and ciliated; this epithelium is found lining the glands also, but at a short distance from the surface the cilia are lost. The cervix differs from the body of the uterus in several respects; the muscular bundles are less distinct and are more intimately mixed up with fibrous tissue, forming a close meshwork. The relative thickness of the muscle layer is less, and the general disposition of the muscle fibres is largely circular. The cervical glands are relatively more numerous than those of the body; and while simple tubular glands are found, the majority show a complicated branching arrangement. Many of them penetrate into the muscular layer.



## THE FALLOPIAN TUBES

As we saw in the first chapter, the Fallopian tubes represent those portions of the Müllerian ducts that remain ununited, when the lower portions of the ducts fuse to form the uterus. Each tube is continuous with the uterus at the uterine cornu, whilst the upper or unattached end lies free in the peritoneal cavity, into which it opens (see Fig. 17). The average length of a tube is 10 cm. (4 inches), and three parts are described. The part of the tube that runs in the substance of the uterine wall is the *interstitial* or *uterine*

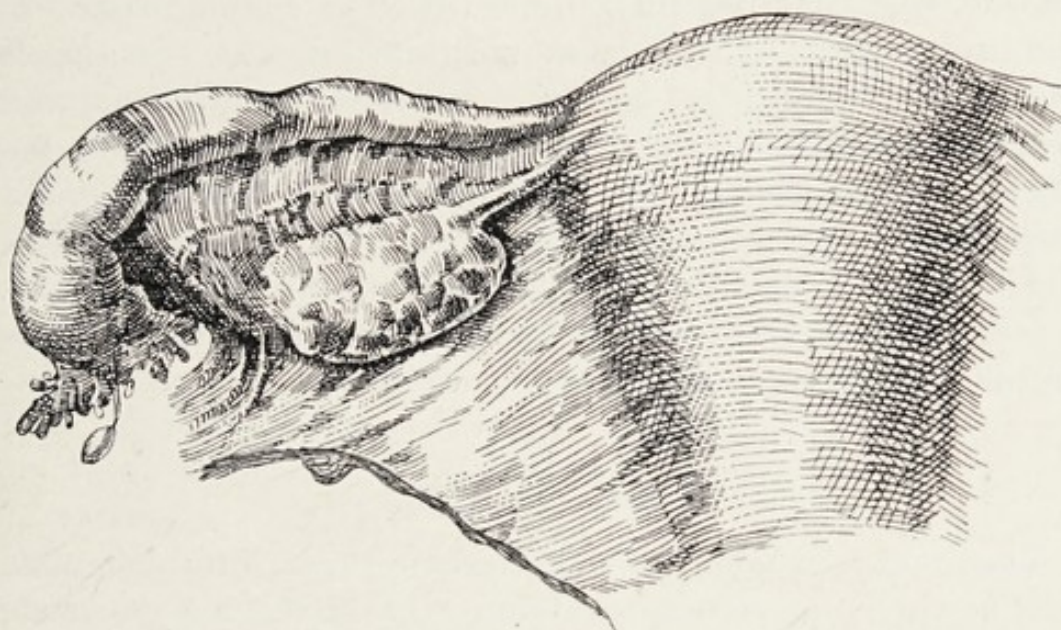


FIG. 16.—POSTERIOR VIEW OF THE UTERUS AND LEFT TUBE AND OVARY, SHOWING THE MESOSALPINX, BETWEEN THE TUBE AND THE OVARY, AND THE MESOMETRIUM BELOW THE OVARY.

portion, and is about 1·5 cm. in length : of the remainder of the tube the inner third is narrow and tortuous, and is called the *isthmus*. Lastly, there is a wider portion known as the *ampulla*, constituting the outer two-thirds. The general form of the tube is that of a long narrow funnel, and its fancied resemblance to a straight trumpet led the older anatomists to call it the *salpinx*. The opening into the peritoneal cavity is the *abdominal ostium*, and is surrounded by a fringe of narrow finger-like processes which give to this part of the tube the name of the fimbriated extremity. The general direction of the tube is a curved one, passing outwards and downwards, then downwards, and finally



somewhat upwards and inwards, so that the ostium faces the uterus, and within this curve the ovary lies, connected with the tube by a modified fimbria termed the *tubo-ovarian ligament*.

The peritoneum is reflected over the tube which thus forms the free edge of the broad ligament or mesometrium; and that portion of the mesometrium that is in relation with the tube is called the mesosalpinx (Fig. 16).

**Microscopical Anatomy.**—In cross section the tube shows an outer peritoneal covering, a middle muscular layer, and an inner lining of mucous membrane. But in that part of the tube that lies in contact with the cellular tissue of the broad-ligament there is no peritoneal coat. The muscle fibres are arranged in two layers, an outer longitudinal and an inner circular. In a thin layer of connective tissue between the peritoneum and the muscular layer are found numerous vessels.

The mucous membrane of the tube is thrown into folds; these are relatively simple in the isthmus, but in the ampulla they assume a very complicated form.

## THE OVARY

The ovary, which is the dominant organ of the female sex, is an ovoid structure about 4 cm. long, 2.5 cm. wide and 1.5 cm. in thickness; among normal ovaries considerable variations in size are met with. It lies in contact with the back of the broad ligament by its narrower edge, and its long axis lies obliquely; the uterine end is attached to the back of the uterine cornu by the *ovarian ligament*; the outer end lies lower in the pelvis and is connected with the extremity of the tube by the *tubo-ovarian ligament*. From the account given in the chapter on development, it will be recalled that the tubo-ovarian ligament is derived from the upper genital fold, and that the lower genital fold forms in its upper part the ovarian ligament, and in its lower part the round ligament, which will be described presently.

Developmentally, the ovary consists of two parts: that which projects into the peritoneal cavity is the *oöphoron*, or egg-bearing part; that which is connected with the broad



ligament is the *paroöphoron*, consisting of the degenerated remains of the posterior portion of the mesonephros.

For descriptive purposes, three portions of the ovary are recognized: the *cortex*, forming the outer covering; the *medulla*, which is the main part of the gland within the cortex; and the *hilum*, which is the portion attached to the broad ligament. The latter corresponds with the paroöphoron; the cortex and medulla form the oöphoron.

**Microscopical Anatomy.**—A section of the ovary shows, on the surface, a single layer of cubical epithelium, known as the *germ epithelium*. This rests on a layer of connective tissue, which is sometimes called the *tunica albuginea*; but a true tunica albuginea, as has been stated, is found only in the testis. Below the connective tissue layer is the main part of the *cortex*, consisting of a *stroma* in which are embedded the ova. The stroma is composed almost entirely of connective tissue cells, variously modified and presenting different shapes. Each cell has a large round or oval nucleus. Scattered about in the stroma are the ova, in different stages of development, from the simple ovum to the complete Graafian follicle. An account of this development is given in the next chapter, in describing the process of Ovulation.

**The Medulla** is the more central portion of the ovary, and is composed of fibrous tissue and unstriated muscle fibres; it contains the blood-vessels, lymphatics and nerves that supply the cortex. It is attached to the broad ligament, the area of attachment being called the *hilum*.

**Accessory Adrenals.**—From time to time observers have described an accessory ovary in the pelvis. The structures which have given rise to such a description are small rounded bodies, whose histological characters resemble those of the adrenal bodies. They are only found in the foetal stage.

## THE LIGAMENTS OF THE GENITAL ORGANS

Under this heading we have to describe: (1) The broad ligaments; (2) the utero-sacral ligaments; (3) the round



ligaments; (4) the ovarian ligaments; (5) the tubo-ovarian ligaments.

**1. The Broad Ligaments.**—The mode of formation of these has been described in the chapter on development; and from this it is evident that each broad ligament is essentially a "mesentery": first, of the Müllerian duct, and later, when the duct has evolved, of the Fallopian tube and half of the uterus. Consequently the correct designation of the broad ligament is the *mesometrium*, and that portion of it that is in relation to the Fallopian tube is the *mesosalpinx* (Fig. 16).

Functionally, the mesometrium may be regarded as a "mesentery," inasmuch as it has within its folds the arteries, veins, lymphatics, and nerves that supply the uterus and Fallopian tubes; and it may be regarded as a "ligament," in that it plays a part in maintaining the uterus in its proper position. It is a ligament, however, that allows of a considerable degree of movement of the uterus in the antero-posterior plane, these movements being necessary in order that the uterus may accommodate itself to the filling and emptying of the bladder.

Anatomically, the mesometrium consists of two layers of serous membrane enclosing a loose connective tissue in which various structures are embedded. Unstriated muscle-tissue replaces the fat of the subserous tissue, where the mesometrium is in relation with the uterus and tubes; but at the base of the mesometrium, where it is in relation with the pelvic floor, fat is found.

The mesosalpinx is bounded on its free, or upper, border by the Fallopian tube, and on its lower border successively from within outwards by the ovarian ligament, the ovary, and the tubo-ovarian ligament. The structures embedded in it are the parovarium and part of Gärtner's duct, and the tubal vessels and lymphatics. The uterine end of the round ligament raises the anterior surface of the mesosalpinx in a fold. The mesometrium proper has within its folds the ovarian and uterine vessels, lymphatics and nerves, and the lower part of Gärtner's duct; and the ovary projects from its posterior surface.

**2. The Uterosacral Ligaments** are strands of mus-



cular tissue, which pass from the lateral aspect of the cervix, about the level of the internal os, backwards to the sides of the second sacral vertebra. The peritoneum overlying them is raised by them into folds, which form the lateral boundaries of the pouch of Douglas.

**3. The Round Ligaments** are, morphologically, as we have seen, the lower part of the genital folds. They pass from the cornua of the uterus, coming out as it were from the angle between the Fallopian tube and uterus, and run outwards and forwards to the corresponding inguinal ring, through which they pass to gain the inguinal canal, and, emerging from this, they become merged in the tissue of the corresponding labium majus. It has been supposed that they hold the uterus forwards, but their lateral direction negatives this idea, and it is only when the body of the uterus is tilted very far back that they are at all put on the stretch. Each round ligament contains a small vessel, and raises the overlying peritoneum into a fold. As the round ligament passes through the inguinal canal, it carries with it an invagination of the peritoneum, called the *canal of Nuck*; normally, in the adult, this becomes obliterated. It is homologous with the "vaginal process of peritoneum" which, in the male, accompanies the testis in the descent of that organ.

**4. The Ovarian Ligaments** represent the continuation upwards of the round ligaments under the angle of the Fallopian tube, and so on to the posterior aspect of the broad ligament, where they are continued to the inner pole of the ovary. In the adult, however, the round and ovarian ligaments are not continuous, the cornu of the uterus intervening to break the line.

**5. The Tubo-ovarian Ligaments** represent the further extension of the ovarian ligaments from the outer pole of the ovary, whence they pass outwards to join the fimbriated end of the Fallopian tube. Anatomically the tubo-ovarian ligament is a modified fimbria.

## THE PELVIC PERITONEUM

In the course of its investment of the pelvic organs the peritoneum has a rather complicated disposition, and is



raised into various folds and sinks into various recesses, or fossæ.

Tracing it as it passes down from the anterior abdominal wall, it first invests the upper portion of the bladder, as far as the junction of this organ with the uterus, at the level of the internal os. Thence it turns up over the body of the uterus, leaving a recess between the uterus and bladder, known as the *uterovesical pouch*, or *fossa*. In its more lateral aspects the peritoneum passes on to the front of the broad ligament, and sweeps up over this till it reaches the Fallopian tube, over which it drops down to cover the back of the broad ligament. As it passes down to the front of the broad ligament it is raised into a fold on each side by the round ligament.

Passing down over the back of the uterus in the middle part of its course, and over the broad ligaments at the sides, the peritoneum reaches the floor of the pelvis, whence it turns up once more to cover the sacrum and the sigmoid. The uterosacral ligaments here raise it into two antero-posterior folds, between which is a deep recess, known as the *rectovaginal fossa*, or *pouch of Douglas*. The depth of this fossa is due to the fact that the rectum carries the peritoneum down with it; and as the rectum is placed to the left of the middle line the deepest part of the pouch is also on the left side. When the peritoneum leaves the lowest part of the cervix, and before it reaches the rectum, it covers over the upper part of the vagina for a depth of two centimetres; and in this region the vaginal cavity is separated from the peritoneal cavity only by the thickness of the vaginal wall and peritoneum.

Sometimes the ovary is so sunk into the posterior part of the broad ligament that a shallow recess is formed which receives the name of the *ovarian pouch*. This pouch may be so deep in the virgin that the ampulla of the Fallopian tube as it falls over the mouth of the pouch may conceal the ovary.

Whilst one surface of the ovary is in contact with the broad ligament and may depress it to form the ovarian pouch, the free surface of the ovary is, in the virgin, in contact with the peritoneum on the lateral wall of the



pelvis, where it may form another shallow depression, which has been named by Waldeyer the *fossa ovarii*.

In order that the student may thoroughly comprehend the relations of the pelvic peritoneum it will be useful to summarize briefly the manner in which it invests the parts :

1. *The Ovary*.—This projects from the posterior layer of the mesometrium, and strictly has no peritoneal investment.

2. *The Fallopian Tube*.—This is invested on two-thirds of its circumference. The tubal ostium communicates with the cœlom (peritoneal cavity) on the posterior aspect of the mesometrium, below the ovary and near the brim of the pelvis.

3. *The Uterus*.—The peritoneum covers, posteriorly, the whole of the surface of the body and fundus of the uterus and the supravaginal portion of the cervix; anteriorly, the fundus and body to the junction of the body and cervix. The sides of the uterus are in relation with the connective tissue of the mesometrium.

*The Round Ligament of the Uterus*.—In the pelvis this structure is invested by the anterior layer of the mesometrium. As it traverses the inguinal canal it is accompanied by the invaginated peritoneum which forms the canal of Nuck.

4. *The Vagina*.—The only part of this tube in relation with the peritoneum is the posterior cul-de-sac.

## THE VESSELS AND NERVES OF THE PELVIC ORGANS

**The Arteries.** 1. *The Ovarian Artery* (Fig. 17).—This arises on each side from the abdominal aorta below the renal arteries; the origin of the vessel is reminiscent of the embryonic position of the ovary in the loin. The artery passes down, dips over the brim of the pelvis, and turns inwards in the upper part of the broad ligament. It traverses the mesometrium below the ovary, giving branches to the ovary and tube, and reaches the side of the uterus near the cornu, where it inosculates with the terminal portion of the uterine artery. In this situation a small



twig is given off which runs down the round ligament to anastomose with a small branch of the deep epigastric artery.

2. *The Uterine Artery* (Fig. 17) has a variable origin; usually it arises from the hypogastric artery, derived from the anterior division of the internal iliac; sometimes it comes off direct from the anterior division, and occasionally from the posterior division of the internal iliac. It enters the broad ligament at its lower border, crosses the ureter by a kind of bridge of connective tissue, and so reaches the side of the uterus, where it turns upwards and

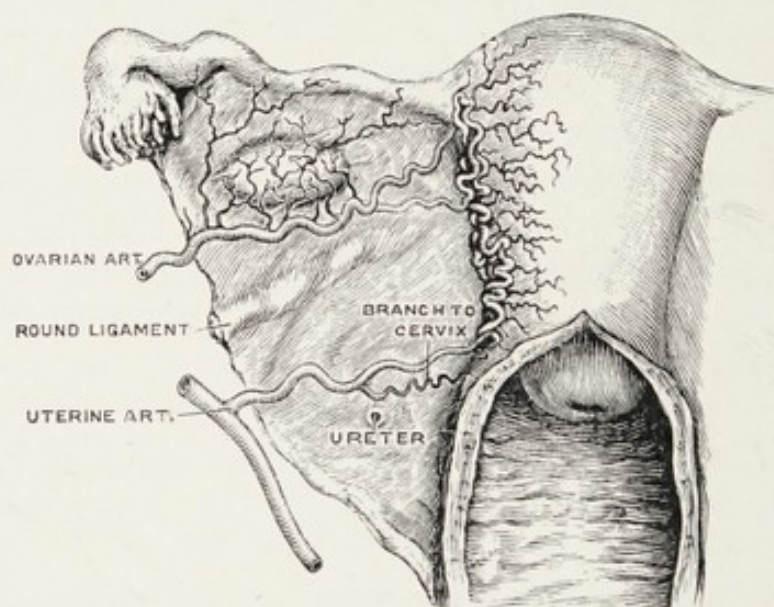


FIG. 17.—DIAGRAM SHOWING THE UTERINE AND OVARIAN ARTERIES.

joins the ovarian artery near the fundus. In its course through the mesometrium the artery is strikingly tortuous. It gives off branches to the upper part of the vagina, and as it approaches the uterus a branch passes downwards to the cervix. In its course up the side of the uterus, where it lies nearer the posterior than the anterior border, it gives off numerous branches which pass across the anterior and posterior walls of the uterus, and become so attenuated that a sagittal section of the uterus down the middle line is attended by hardly any loss of blood.

3. *The Vaginal Arteries*.—There are several of these on each side, arising from the uterine or hæmorrhoidal arteries, or direct from the anterior division of the internal iliac.



They break up on the walls of the vagina and anastomose with the vessels of the opposite side.

4. *The Vulvar Arteries*.—The principal vessel is the internal pudic, a branch of the anterior division of the internal iliac. It supplies the skin and deeper tissues of the labia and the erectile tissue of the bulbi vestibuli, and, passing forwards, it terminates as the artery of the clitoris. For the rest, the labia get their blood supply from the superficial and transverse branches of the internal pudic, and from the superficial and deep external pudic arteries.

**The Veins.** 1. *Ovarian Veins*.—These form a considerable plexus in the broad ligament, known as the *pampiniform plexus*, whose outflow is gathered into a single vein, the ovarian, which empties itself on the left side into the renal vein and on the right side into the inferior vena cava.

2. *The Uterine Veins*.—These also form a large plexus, which during pregnancy and in the case of uterine fibroids may attain a formidable size. The plexus gives place to one or two large veins, from which ultimately a single vessel is formed, which joins the internal iliac vein.

3. *The Vaginal and Vulvar Veins* accompany the corresponding arteries and mostly join the internal iliac vein, but the superficial external pudic joins the great saphena vein.

**The Lymphatics**.—These accompany the veins, and terminate in three sets of glands. The lymphatics of the vulva and the lower third of the vagina and those of the round ligament pass outwards to the *inguinal glands*, with the exception of those of the clitoris, which accompany the internal pudic vessels, and, in common with the lymphatics of the upper two-thirds of the vagina, the cervix and the lower part of the uterus, terminate in the *iliac glands*. The lymphatics of the ovaries, Fallopian tubes, and fundus of the uterus run alongside of the ovarian veins and pass up to the *lumbar glands*.

**The Nerves**.—The nerve-supply of the external organs is sharply distinguished from that of the internal organs, inasmuch as the former is derived from the spinal nerves, while the latter is derived chiefly from the sympathetic system, reinforced by a few spinal twigs.



*Spinal Nerves.*—The internal pudic supplies the clitoris, where its terminal twigs end in tactile corpuscles; its superficial perineal branches are distributed in the labia. The greater part of the vulva receives its nerve-supply from the ilio-inguinal nerve and the long pudendal branch of the small sciatic; whilst the labia majora are also supplied by the genito-crural, which runs down with the round ligament.

*Sympathetic Nerves.*—The nerves of the uterus and vagina are derived from the hypogastric plexus, with the addition of some small branches from the third and fourth sacral nerves, and accompany the uterine vessels. The nerves of the ovaries and Fallopian tubes come down from the renal plexus, and are conveyed along the ovarian arteries.

### THE BLADDER, URETHRA, AND URETERS

These are so closely associated with the genital organs as to require a passing notice.

**The Bladder.**—When empty, the bladder presents a triangular appearance in sagittal section (Fig. 14). The base of the triangle is upwards, and corresponds with the reflection of the peritoneum from the uterus, at the level of the internal os, to the lower part of the anterior abdominal wall. This is part of the fundus of the bladder, and when it becomes distended the peritoneum is raised in dome-like fashion.

Of the other two sides of the triangle, the posterior is the base of the bladder and receives the ureters; it extends from the level of the internal os downwards and forwards to the urethra. The third side runs upwards and forwards from the urethra to the upper margin of the pubes, from which it is separated by loose connective tissue, forming the *cave of Retzius*. This part of the bladder also contributes to the fundus, and when the bladder is distended the raising of the peritoneum causes this part to remain extra-peritoneal, so that it can be punctured just above the pubes without opening into the peritoneal cavity.

The base of the bladder has a fairly close attachment to



the front of the cervix and the upper part of the vagina. The apex of the triangle is formed by the urethral orifice of the bladder.

**The Urethra** runs down parallel and in close association with the anterior vaginal wall: it is about 4 cm. ( $1\frac{1}{2}$  in.) long, and the urethral meatus opens in the vestibule, a little anterior to the vaginal orifice.

**The Ureters.**—The ureters gain the pelvis by crossing over the common iliac arteries about the point where these vessels divide into their external and internal branches, and by dipping down over the pelvic brim, whence they run down the outer side of the posterior wall, in close relation with the internal iliacs. Arrived at the floor of the pelvis, they run forward under the base of the mesometrium, gradually converging towards the middle line. Opposite the side of the uterus they lie only 1 cm. distant from the cervix, and here they enter a kind of tunnel whose roof is the condensed connective tissue that carries the uterine arteries, which thus cross the ureters. Emerging from this tunnel into the looser connective tissue behind the bladder, they converge further and enter the base of the bladder in a direction sloping downwards and inwards.

## CHAPTER III

### THE GENERAL PHYSIOLOGY OF THE REPRODUCTIVE ORGANS OF WOMEN

THE development, maturity, and decline of the reproductive powers in a healthy woman correspond to the menstrual life, the beginning of which is termed **Puberty**, while its termination is the **Menopause**. This period extends from the age of thirteen to that of forty-eight, with individual variations. Warm climates, sedentary and luxurious habits, and emotional stimulation are associated with early puberty; late puberty is commonly found in the opposite conditions. Puberty is sometimes defined as "reproductive maturity"; but it must be remembered, first, that conception sometimes occurs before menstruation has begun; secondly, that the uterus continues to grow till about the eighteenth or twentieth year, and the woman cannot usually be considered as sexually mature till this time.

The external indications of approaching puberty are: enlargement of the breasts (*mammæ*), development of hair in the axillæ and on the *mons veneris*; subjective sensations in the thighs; and lastly some alteration in the disposition, in the direction of shyness and reserve. The actual establishment of puberty is reckoned from the first menstruation.

### MENSTRUATION

**I. Clinical Features.**—After the first menstruation, which may be rather abundant, it is not unusual for a period of irregularity to succeed; then after some months the process assumes its regular rhythmic form. The periodicity varies with individuals, and in the same individual at different



times; most frequently twenty-eight to thirty days elapse between the commencement of one period and the commencement of the next. The total quantity of blood lost at each monthly period varies from 2 to 10 ounces (60 to 300 c.cm.), and the flow lasts from two to seven days. Sometimes on the third or fourth day it ceases, to recommence in diminished quantity after twenty-four hours for another two or three days. A discharge of mucus commonly precedes and follows that of blood. The latter has all the characteristics of ordinary venous blood, except that it does not coagulate, owing to admixture with mucus from the cervical canal; it also contains epithelium derived from the uterus and vagina. When abundant, it may be bright red, and clots may form. Under favourable conditions menstruation is painless, especially for the first few years. Later, and in some cases from the first, an aching pain in the sacrum precedes the flow, passing off as this becomes established. Suprapubic pain may either precede or accompany the flow—generally the latter. It is often associated with a dull aching, or with shooting pains in the thighs. In London about 30 per cent. of women continue to menstruate painlessly. The intensity of the pain varies from slight discomfort to intense agony, preventing the woman from getting about or from attending to her ordinary pursuits. No hard-and-fast line can be drawn between normal menstruation and dysmenorrhœa. Similarly, there is great variation in the nature and amount of constitutional disturbance; headache, lassitude, sickness, obscure reflected pains, are not infrequent, with mental depression or irritability; but in some cases there is no disturbance. After childbearing menstruation usually becomes less painful.

**II. Anatomical and Physiological Changes.** (A) *Ovulation*.—This signifies the ripening and escape of ova from the ovaries. When these glands (which are the dominant organs of reproduction in women) fail to develop, sterility results, and the woman generally retains the physical characters of the child. Thus the breasts are small, the pubic hair is scanty or absent, and the pelvis is narrower than usual, whilst menstruation does not occur or is much delayed. With the onset of puberty the ovaries,



previously small, enlarge, and exhibit the periodic series of changes known as *ovulation*.

Ovulation consists in the growth and shedding of an **ovum**, which first sinks more deeply into the stroma,

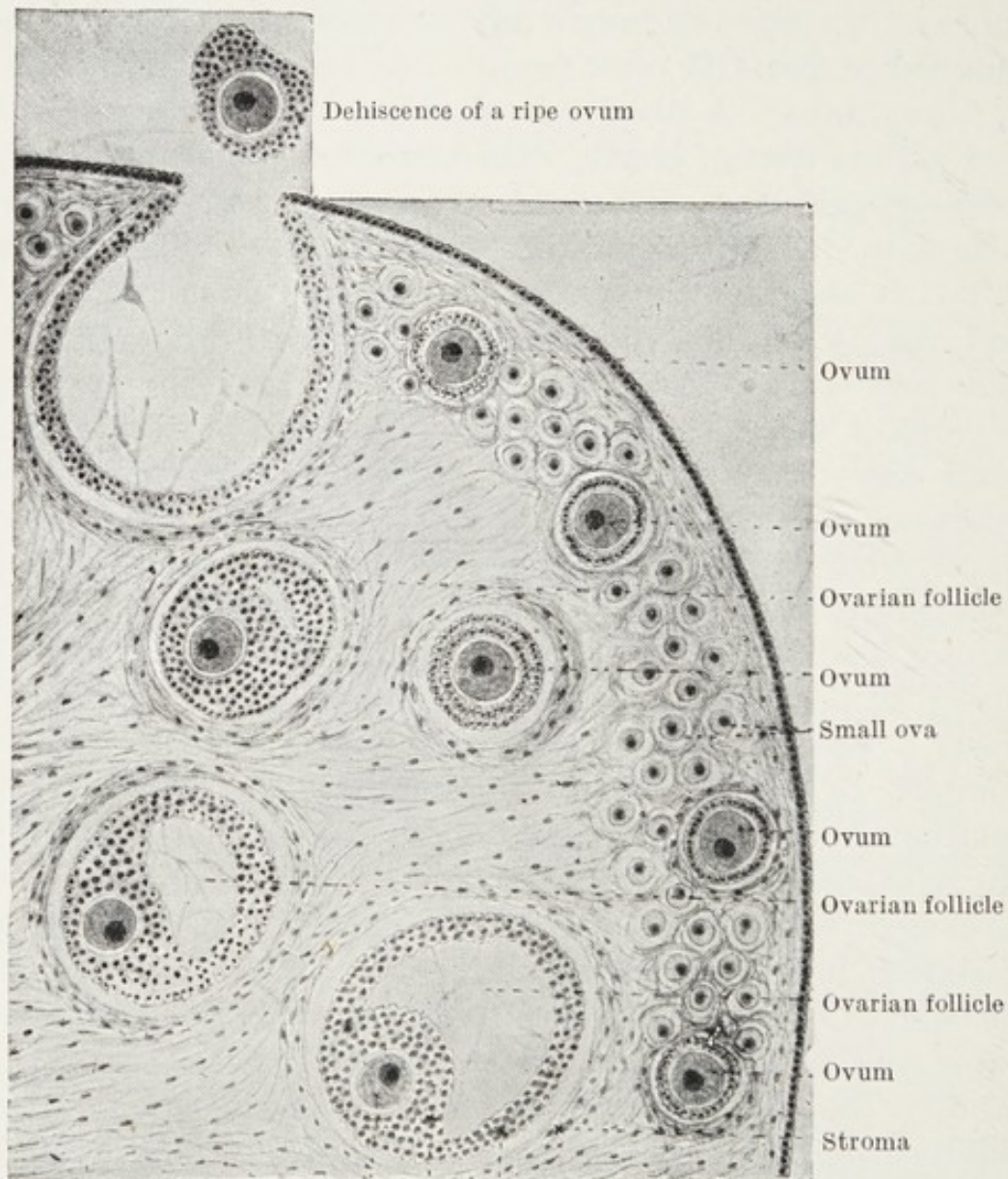


FIG. 18.—DIAGRAM ILLUSTRATING OVULATION : OVARY OF THE RABBIT.

and then approaches the surface of the ovary; the follicle in which the ovum is contained bursts, and the ovum itself is discharged. Normally it finds its way into the Fallopian tube, and is propelled along it to the uterus; should the ovum be fertilized, it develops into an embryo. Failing this, it passes out, probably with the menstrual discharges.



The process of ovulation will be readily understood by a reference to the accompanying diagram (Fig. 18) representing its successive stages. From this it will be seen that a given ovum first becomes surrounded by a layer of small cells, to form an **ovarian** (Graafian) **follicle**. At the same time the stroma bounding the follicle becomes denser. On one side of the ovum a line of cleavage occurs in the middle of the surrounding cells, and the space is found to contain fluid. The ovarian follicle now presents an appearance which has been compared to a signet ring; the marginal cells receive the name of **membrana granulosa**, whilst those immediately surrounding the ovum are called the **discus proligerus**. As the follicle grows it approaches the surface of the ovary, and its envelope becomes vascular from enlargement of vessels derived from the stroma. The ripe follicle bulges on the surface; the most prominent point, which is non-vascular, gives way, and the ovum escapes surrounded by the discus proligerus. This constitutes the **dehiscence** of the ovum. The cavity of the follicle becomes filled with blood, derived from the vessels in its capsule, and the capsule itself contracts in folds. The blood-filled cavity with its convoluted walls is called, from its yellow appearance, the **corpus luteum** (Fig. 19). By degrees the liquid part of the blood is absorbed. The corpus luteum becomes paler and shrinks, and is converted into cicatricial tissue, whose only ultimate trace is a scar or cicatrix on the surface of the ovary. By the repetition of this process, the smooth appearance of the young ovary is replaced by the rugged aspect of the ovary of the adult.

When pregnancy occurs, the corpus luteum, instead of reaching its fullest development in three weeks and disappearing in three months, persists in a well-developed form for three or four months, after which it gradually diminishes, and commonly disappears in two or three months after delivery.

Probably a certain number of ova fail, on their dehiscence, to enter the Fallopian tube, and are lost in the *cœlom* (peritoneal cavity). Maturation (ripening) of ova may occur before puberty, and ripe ova have been detected in the ovaries at birth. The view formerly held, that an ovum



ripens at each menstrual period, is now abandoned by most authorities. Nor is there any evidence that ovulation occurs alternately in the two ovaries; there is apparently no constant relation in the activity of the two glands.

(B) *Changes in the Uterus.*—The only part of the uterus which shows menstrual changes is that between the inner orifices of the Fallopian tubes and the internal os. The Fallopian tubes take no part therein (Bland-Sutton, Heape). The precise nature of the changes, which affect the mucosa alone, has been much disputed. The classical views have been as follow—

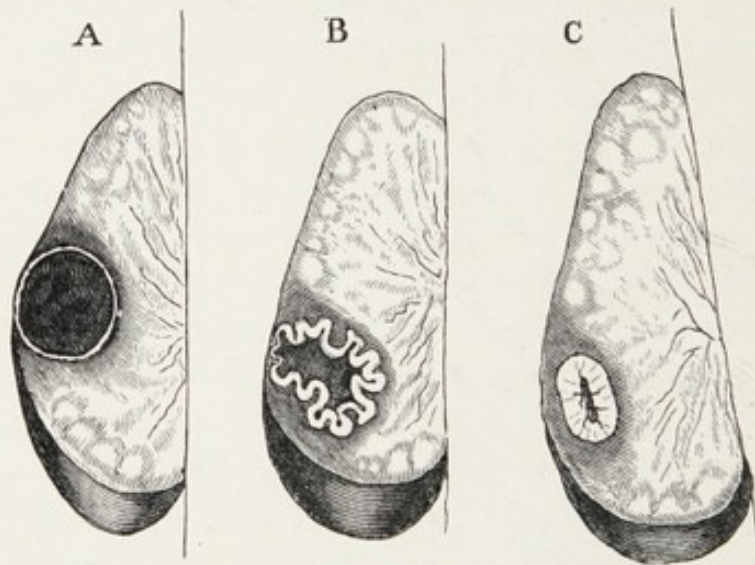


FIG. 19.—STAGES IN THE FORMATION OF A CORPUS LUTEUM: A, RECENT BLOOD; B, THE WRINKLING OF ITS WALLS; C, CONTRACTED STAGE.

(a) That the whole thickness of the mucosa, down to the muscular layer, is stripped off and shed at each monthly period (Pouchet, Williams).

(b) That the surface epithelium only is cast off (Leopold, Kundrat, and Engelmann).

(c) That the mucous membrane remains quite intact (Coste, Moricke).

The difficulty of obtaining specimens of the healthy menstruating uterus has led to this divergence of views. There is, however, reason to believe that in some of the higher apes the process closely resembles that which occurs in women; and, basing our description partly on comparative observations (Bland-Sutton, Heape), and partly on researches on the human uterus, the changes are as follow—



The mucosa of the non-menstruating uterus is composed of a stroma containing numerous glands and bloodvessels, and covered by a single layer of cubical epithelium. Shortly before menstruation begins, the stroma-cells proliferate, and the superficial vessels become dilated; with increased congestion the dilated capillaries break down, and blood is extravasated into the superficial parts of the stroma under the epithelium. Later the epithelium gives way, probably in part from a degenerative change, and is cast off, along with portions of the stroma and of the glandular epithelium. The debris passes out with the menstrual fluid. After a time, regeneration of the mucosal surface takes place, by re-formation of bloodvessels and by the reproduction of epithelium, partly from the torn edges of the glands, and partly by the transformation of stroma elements (Heape).

During menstruation there is a slight spontaneous dilatation of the cervical canal, attaining its maximum on the third and fourth days (Herman).

**III. The Significance of Menstruation.**—We need not refer here to old theories, which are merely of historic interest. The first attempt to explain menstruation from the facts of anatomy and physiology resulted in the *Ovulation Theory*, which supposes that regularly, every month, an ovum ripens and is set free, leading to uterine congestion and menstruation. This theory, which was widely held during the second quarter of last century, through the work of Lee, Négrier, Bischoff, and Raciborsky, is now generally discarded, for repeatedly instances have occurred where menstruation has recently happened and there has been no trace of the ripening of an ovum; and, on the other hand, where ripe follicles and recent corpora lutea are present and menstruation has not been established, or has ceased, or is in abeyance. An explanation has therefore been sought in the periodic variations of nutrition, as shown by the pulse, temperature, blood-pressure, and the quantity of urea excreted. This is the *Cyclical Theory* (Jacobi, Goodman, Reinl, and others). The existence of the variations is established; but that they are the cause of menstruation is not.

Probably the simplest way to regard the whole matter is



as follows : The female organism presents a tendency to an alternation of nutritive and reproductive activity. The alternation has a monthly rhythm ; but to inquire why is as fruitful as to ask why the respiratory rhythm should be about four seconds, or the cardiac cycle something under one second.

The true explanation of menstruation is probably to be sought in comparative physiology. In mammals there occur certain seasons at which the generative organs of the female show signs of special activity, such as swelling of the vulva, coloration or flushing of surrounding parts, and a discharge of blood or mucus from the vagina. This is called the *pro-œstrum* (Heape). It is immediately followed by a period of one to several days' duration, during which alone the female is capable of impregnation, and will receive the male. This "period of desire" is spoken of as the time of "heat," or *œstrus*.

Heape has shown good ground for regarding the pro-œstrum as homologous with the menstruation of the human female. Now it is clear that the pro-œstrum is a preparation for pregnancy. It would appear that the fertilized ovum cannot become healthily ingrafted save on newly prepared soil. In the human subject the essential feature of menstruation is not the flow itself, but the series of changes of which the flow is the result and outward expression ; and these changes, as we have seen, are of the nature of a reconstruction of the uterine mucosa. We may, therefore, define menstruation as *a periodic uterine preparation for pregnancy*.

**The Menopause.**—The onset of the menopause presents very varied features. In some women there is no disturbance at all ; menstruation goes on normally, and then simply ceases, without prodromata ; this occurs most often among unmarried women. In other cases menstruation becomes irregular in its periodicity, while the quantity becomes variable ; after an unusually long interval there is a final and rather profuse flow, and the menopause is established without any constitutional trouble. But in the majority of women "the change of life" is not so easily effected. Various nervous phenomena appear ; the patient



is subject to hot flushes, attacks of giddiness, obscure pains in breasts, abdomen, and limbs. Digestion is disordered, with flatulence and constipation. There is a great tendency to deposits of fat, which, with the flatulence, may cause "spurious pregnancy," or a phantom tumour. Many women become depressed, and unstable minds may cross the border-line of insanity. It is, therefore, with many, really a "critical period," demanding careful supervision.

The pelvic organs show corresponding anatomical changes. The ovaries become smaller and wrinkled; the vagina contracts and assumes the shape of a cone, at the apex of which is a dimple representing the os uteri—for all the vaginal portion of the cervix atrophies and disappears. The uterine body diminishes in size, and in extreme cases can hardly be felt.

The hair on the mons and labia gradually alters in colour, and is shed. The labia majora atrophy, owing to the disappearance of the subcutaneous fat, and allow the labia minora to project beyond them, and the vulvar orifice is greatly narrowed.

## AGE-CHANGES IN THE REPRODUCTIVE ORGANS

It will be convenient to summarize these here.

**Age-changes in the Vulva.** *Infancy.*—At this period the mons veneris is devoid of conspicuous hair, and the labia majora appear as two parallel cutaneous eminences; the thin edges of the labia minora project between them, and are pink, like mucous membrane.

*Puberty.*—At this stage the pubic hair becomes conspicuous, and usually grows freely on the outer surfaces of the greater labia. The labia increase in size, and usually conceal the nymphæ. Their opposed or internal surfaces remain pink, whilst the outer surfaces become pigmented, especially in brunettes.

The nymphæ often grow after puberty, and instead of remaining concealed within the vulvar cleft, protrude, and resemble a pair of elongated molluscan palps. They then undergo a curious change: those parts covered by the



labia majora retain their pinkness, and possess as usual very large sebaceous glands, but the palp-like portions become deeply pigmented, lose their sebaceous glands, and occasionally delicate hairs of two or more centimetres in length grow from them. Labia minora elongated in this way are sometimes spoken of as "hypertrophied nymphæ." Some writers attribute the condition to masturbation. It reaches its maximum in Hottentot women, whose "apron" is formed of the greatly elongated nymphæ (Fig. 12.)

*Menopause.*—After the climacteric year the hair on the mons and labia, like that on the rest of the body, becomes white, and is gradually shed. The greater labia shrink as the subcutaneous fat disappears, and the nymphæ project beyond them, and the vulvar orifice becomes narrowed.

**Age-changes in the Vagina.**—In the child the vagina forms merely a tranverse slit. The walls are thrown into numerous close folds, mainly transverse, and more marked at the side.

After puberty the vagina becomes larger, the widening affecting especially the upper part. There are, however, considerable variations in individual cases; in some the vagina remains nearly the same width above as below; in others, the capaciousness superiorly forms a marked contrast to the narrow entrance.

After marriage the folds become somewhat flattened out, and the whole vagina becomes dilated, owing to the capacity of its walls for stretching.

Childbirth accentuates the changes, and after repeated labours the folds become almost obliterated, and the orifice may remain gaping, owing to stretching or rupture of the sphincter vaginæ. At the same time the walls become lax, and tend to protrude through the vulvar orifice.

With the onset of the menopause, atrophic changes set in. The walls now become quite smooth on the surface, and the lumen becomes contracted, especially at its upper portion, with the result that the fornices are obliterated, and the whole vagina assumes a conical form, with its apex upward. At the summit of the cone the cervix forms a small projection; or, this also becoming atrophied, the vaginal vault becomes almost pointed, with a small depres-



sion at its apex representing the external os, and barely admitting a sound or a probe.

**Age-changes in the Uterus.**—The uterus undergoes some important changes between birth and puberty. In the new-born infant the uterus has no fundus, its summit is often deeply notched, and the neck of the uterus is larger than its body. The arbor vitæ is very distinct. The body of the uterus lies above the level of the brim of the true pelvis, and its anterior surface forms a well-marked curve where it rests on the urinary bladder. Towards puberty the fundus develops, and the organ assumes the pear-like shape so characteristic of the mature uterus. After the menopause, it shares in the general atrophy of the reproductive organs. The cervix especially diminishes in size until it becomes merely a small button-like projection at the inner end of the vagina.

**Atrophy of the Uterus.**—Atrophy occurs normally after the menopause, and may proceed to such an extent that the cervix entirely disappears, leaving only a small aperture in the vaginal summit to represent the external os, while the fundus may shrink till it becomes a mere knob surmounting the vagina. The menopause may occur prematurely, but otherwise naturally, in women who have not borne children, and in whom consequently it cannot be ascribed to superinvolution; and in these cases a similarly marked atrophy may take place.

Atrophy may follow also an artificial menopause, due to the removal of the tubes and ovaries. Certain constitutional conditions produce the same result, especially tuberculosis and chlorosis, less frequently diabetes, Bright's disease, chronic morphinism, insanity, and other central nervous disorders. Lastly, it occurs in the form of superinvolution after delivery.

**Age-changes in the Ovaries.**—The variations in the shape of the ovary from infancy to old age are very striking. At birth the ovary is an elongated body, resembling in shape a miniature but somewhat flattened cucumber, lying parallel with the Fallopian tube; not infrequently its borders are crenate, and occasionally it is traversed by a longitudinal furrow. The infantile form of the ovary gradually changes,



and at puberty it has become transformed into the smooth, olive-shaped gland indicative of the mature woman. From the accession of puberty until the forty-fifth year the general contour of the ovary remains undisturbed, but the smoothness of its surface is marred by scars, the effects of repeated lacerations caused by the rupture of ripe follicles. The actual size of the gland varies according to the individual; on an average it measures in length 4 centimetres, transversely 2·5 centimetres, and is about 1·2 centimetres thick. Its average weight is 6 grammes. The two ovaries are rarely equal in size.

From the age of forty-five onward the ovaries diminish in size. This alteration is accompanied by arrest of menstruation. As the gland shrinks, its surface becomes irregular, and is often marked by deep wrinkles. At the same time profound alterations are in progress within the gland, for the ova and their follicles gradually disappear, and in advanced life nothing is left but a corrugated body consisting of fibrous tissue traversed by a few bloodvessels with thickened (sclerosed) walls. An ovary in a woman of seventy years weighs about 1 gramme (15 grains)—that is, one-sixth of what it probably weighed at the age of twenty. As a matter of fact the ovary is a temporary and ductless gland, its period of activity being coincident with menstrual life—the incidence of which we term puberty, and its natural termination the menopause.

The periods of life mentioned above for the supervention of age-changes are very arbitrary, and in some women they occur much earlier, and may still be regarded as physiological. But when the ovaries are small and puckered early in the sexual period of woman's life (thirtieth year), the condition is described as pathological, and the ovary is said to be atrophied. It is very difficult to estimate from a naked-eye examination of an ovary its ova-forming value. Many women with small ovaries have had large families, whilst others with sexual glands of twice or thrice their dimensions remain sterile in spite of every effort to become mothers.



## PART II

DISEASES OF THE FEMALE REPRODUCTIVE ORGANS





SECTION I  
MALFORMATIONS

CHAPTER IV

MALFORMATIONS OF THE REPRODUCTIVE ORGANS  
OF WOMEN

FROM a consideration of the facts of development, as we have briefly outlined them, it will be readily understood that malformations may occur in one of four principal ways, with minor variations, as tabulated in the following scheme.

I. Malformations by arrest of development :

- (a) Total arrest, or suppression of organs.
- (b) Partial arrest, or under-development.

II. Malformations by persistence of septa :

- (a) Persistence of longitudinal septa — double uterus, and vagina.
- (b) Persistence of transverse septa—atresia of the genital passages.
- (c) Persistence of longitudinal and transverse septa —unilateral atresia.

III. Malformations by excess of development :

Accessory organs or ostia.

IV. Malformations by combination of male and female characteristics :

Pseudo-hermaphrodisism.

We shall describe the malformations of the genital organs in the order indicated.

## I. MALFORMATIONS BY ARREST OF DEVELOPMENT

(a) **Total Arrest, or Suppression.**—*Absence of the genital organs*, is found only in the case of gross monstrosities, such as the *fœtus amorphus* and *acardiacus*, and is therefore very rare.

*Absence of the vulva* is also a very rare condition. The labia minora or majora may be absent, but even then some trace of the clitoris is nearly always found. The internal organs in such cases are generally under-developed.

*Absence of the vagina* sometimes occurs. The interval between cervix and vulva is then occupied by a fibrous thickening or cord-like band, which is all that remains of the vagina. The urethra comes to lie nearer to the anterior rectal wall, as in the male.

*Absence of the uterus* occurs even when a vagina is present, but we believe that such a condition is found only in the case of pseudo-hermaphrodites, when testes are present instead of ovaries. When ovaries are present, some trace of the uterus, however small, is usually found on dissection. Clinically, it is very difficult in many cases to determine whether the uterus is absent or not. The same remark applies to *absence of one or both ovaries or tubes*. Congenital absence of both ovaries is rare, and is associated with defective development of the uterus. Absence of one ovary usually accompanies deficiency of the corresponding half of the uterus and the Fallopian tube, and absence or misplacement of the corresponding kidney. The ovaries are absent also in the case of male pseudo-hermaphrodites, when they are replaced by testes.

*Absence of the anterior or posterior wall of the urethra* may occur, producing the conditions known respectively as epispadias and hypospadias.

(b) **Partial Arrest of Development, or Under-development.**—*Under-development of the whole genital organs* is not very rare, and all grades are found, corresponding with arrest of growth at various stages from birth to puberty.

*Under-development of the Vulva.*—Individual portions may



be concerned, such as the clitoris, labia minora, or labia majora. In the condition known as exstrophy of the bladder (Fig. 32), in which the abdominal wall from the umbilicus to the urogenital sinus fails to unite, the clitoris is usually bifid and rudimentary, and the labia minora are also small. Or the whole vulva may be small and infantile.

*Under-development of the Vagina.*—The vagina may be shorter or narrower than the normal. A short vagina, which affords a clear passage from the cervix to the outside, must be distinguished from the vagina of which a portion has failed to develop. Narrowing or stenosis of the vagina may

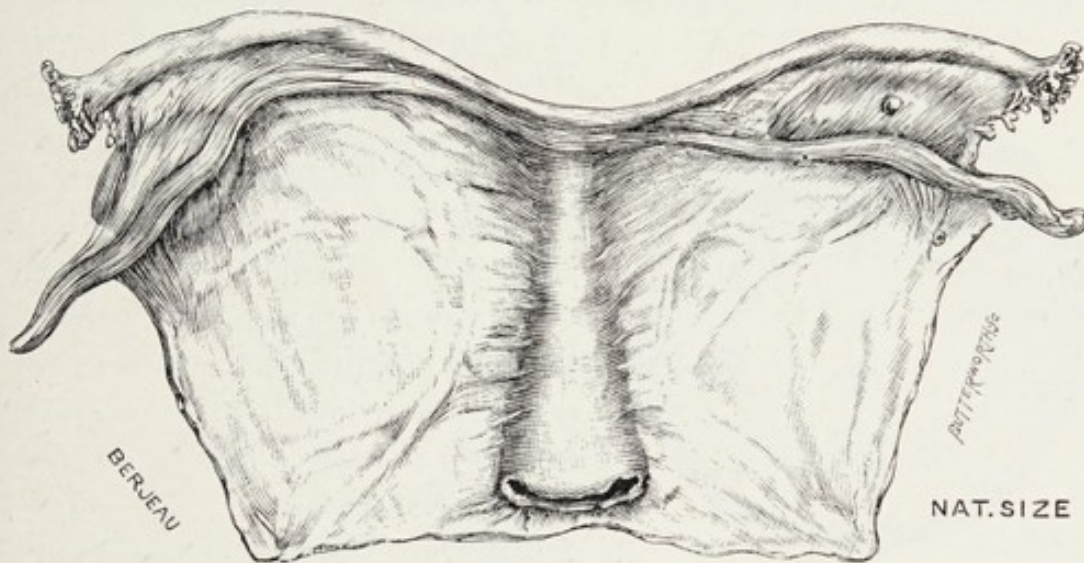


FIG. 20.—RUDIMENTARY UTERUS.

be due to simple under-development, or to non-fusion of the lower part of the Müllerian ducts and obliteration of one of them, or to non-development of one half. This may occur in association with a single-horned uterus.

*Partial absence of the vagina* is considered under atresia of the genital passages.

*Under-development of the Uterus.*—This may be present in one of two degrees—

1. **RUDIMENTARY UTERUS.**—The uterus may be represented only by a little knob surmounting the vagina. From incomplete examination such cases have been described as absence of the uterus. Or the cervix may be fairly well marked, whilst the body is very narrow, and the Fallopian tubes meet at the fundus (Fig. 20). The ovaries are small, and other



important malformations usually coexist, or there is general

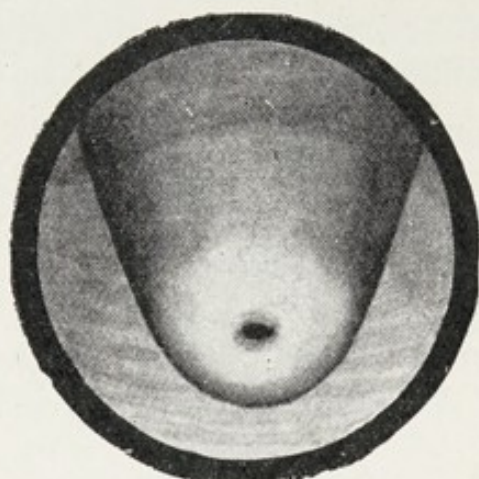


FIG. 21.—THE CONICAL CERVIX AS SEEN IN A SPECULUM.

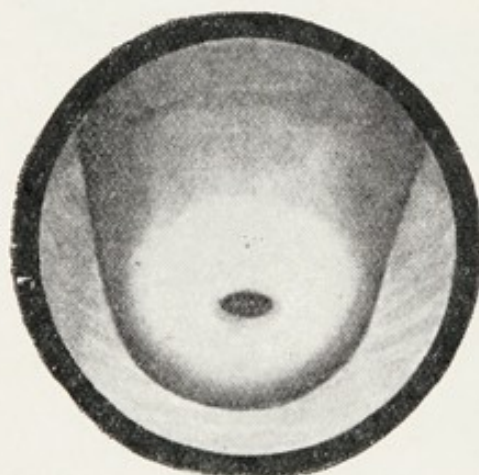


FIG. 22.—A NORMAL NULLIPAROUS CERVIX.

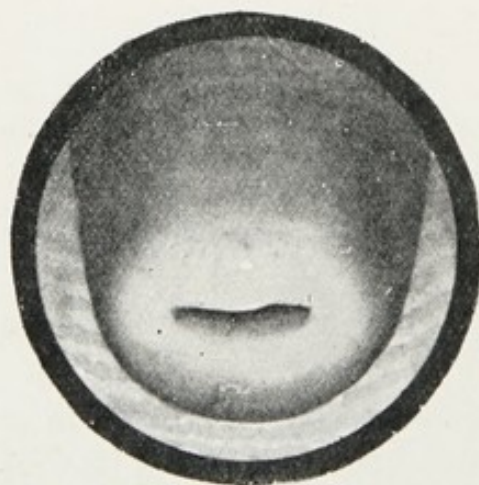


FIG. 23.—THE CERVIX OF A PAROUS WOMAN.

arrest of development, the woman of twenty-five presenting the physical and mental characteristics of the child. Menstruation is absent, and the secondary sexual characters, such as the breasts and pubic hairs, are developed late or not at all.

2. INFANTILE UTERUS.—The uterus preserves the type which it presents normally at birth. The whole organ is narrow in proportion to its length, and the cervix is long in proportion to the body. The external os is small (pinhole os), and the cervix conical (Fig. 21). (Figs. 22 and 23 are introduced for comparison with the conical cervix.) Acute antelexion frequently coexists. The vulva, vagina, pubes, and breasts may share in the retardation; but in some cases they do not differ from the normal adult condition. Menstruation seldom occurs in the more marked types; in the lesser degrees it comes on late and is scanty and irregular. Sexual desire is usually absent, and the patient is sterile.

*Single-horned Uterus (Uterus unicornis).*—If one half of the uterus develops normally, whilst the other retains its foetal condition, the condition known as uterus unicornis results

(Fig. 24). The round ligament marks the limit between the



rudimentary horn and its Fallopian tube. Both ovaries may be well developed, but as a rule the one associated with the rudimentary horn retains its infantile shape. The vagina is often narrow, and the uterine cavity small. Nevertheless, no symptoms may be present, and the woman may menstruate, have sexual intercourse, and become pregnant, just as in the normal condition. But if the pregnancy occur in the rudimentary horn, it practically takes the course of a tubal gestation, resulting in rupture.

*Rudimentary Fallopian Tubes.*—One or both tubes may remain under-developed. Sometimes this is the result of foetal peritonitis. In rare cases, of which we have seen an

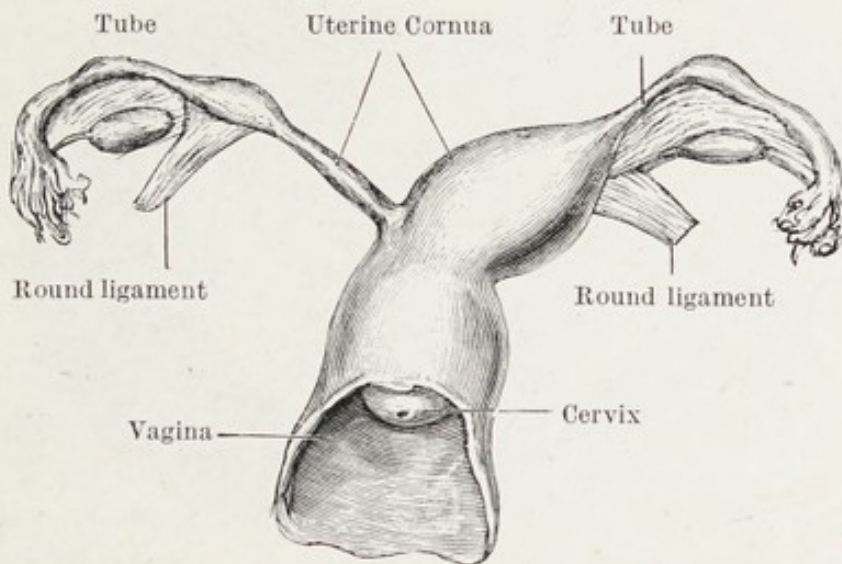


FIG. 24.—UTERUS UNICORNIS.

example, the tubes become occluded along their course, and divided. The fimbriated end shrivels up, and the remainder of the tube attains a striking resemblance to a vermiform appendix. In other cases the fimbriae remain well-developed, whilst the portion of tube nearer to the uterus atrophies to a cord-like structure.

*Rudimentary ovaries* usually present the long narrow shape characteristic of foetal life. This form is seen not infrequently in cases of undescended ovary and of congenital hernia of the ovary. In other cases the ovary is small, but of normal shape. Menstruation and sexual desire may be absent, and in any case sterility results.

**Undescended Ovary.**—In the embryo the ovaries, like the testicles, are in close relation with the kidneys;



gradually they migrate to the pelvis, and at birth they lie on the psoas magnus muscle in close relation with the internal abdominal ring (Fig. 25). Soon after birth the ovaries occupy positions in the true pelvis near its brim until disturbed by accident or pregnancy.

In very rare instances an ovary remains in the neighbourhood of the kidney or in some position between the kidney and the brim of the true pelvis. In such a case it retains the infantile shape. In a certain proportion of cases of undescended testis on the right side the cæcum fails to descend to its normal position in the right iliac fossa.



FIG. 25.—PELVIC ORGANS OF A FETUS AT BIRTH.

Retention of the right ovary in the loin is associated with a similar disposition of the cæcum.

In the case both of rudimentary and of undescended ovary the kidney on the affected side may lie in the pelvis; and when both ovaries are affected a horseshoe-shaped kidney may be found.

As the result of arrest in the development of the cloaca and urogenital sinus, several rare malformations occur. Thus the anus may be imperforate terminally, the rectum opening into the posterior vaginal wall, or the vagina may be imperforate below, but open into the anterior wall of the rectum. The urethra may be absent, the bladder opening into the vagina. There is an example in the museum of the London



Hospital of rectum and bladder both opening into the vagina, the orifice of which thus served as a general cloaca. There was apparently no suspicion of the state of things till the patient was ordered an enema in the hospital.

## II. MALFORMATIONS DUE TO THE PERSISTENCE OF SEPTA

Either a longitudinal or a transverse septum may persist, or there may be a combination of both conditions, and three types of malformation are thereby produced—

(a) Double uterus and vagina, from failure of coalescence of the two Müllerian ducts.

(b) Atresia of the genital canal, from failure on the part of the coalesced Müllerian ducts to open into the urogenital sinus.

(c) Doubling of the uterus and vagina, with atresia in one half—that is, unilateral atresia.

(a) **Double Uterus and Vagina.**—Inasmuch as the fusion of the Müllerian ducts occurs from below upwards, it is not uncommon to find a double uterus with one vagina, or a double fundus with a common cervix and vagina; but the reverse condition—that is, a double vagina with undivided uterus, or a double cervix with undivided fundus—is never found.

*Double Vagina.*—This occurs in some cases of double uterus. The septum between the two halves of the vagina may extend to the vulva, when the appearance of the vaginal orifices somewhat resembles a double-barrelled gun. Or the orifice may be single, and the septum, or portions of it, may be discovered only on making a digital examination. It may give rise to no symptoms, even after marriage; but the septum may be torn through during either coitus or childbirth, and its remains appear as median longitudinal ridges on the anterior and posterior vaginal walls. In other cases one half is enlarged by sexual intercourse, and pregnancy occurs in the corresponding half of the uterus.

*Double Uterus.*—Three types are found: the uterus septus, the uterus bicornis, and the uterus didelphys. In



the first two the cervix may be single or double; the uterus didelphys has necessarily two cervixes.

1. In the **uterus septus** the ducts have fused externally, but the septum formed by their approximation persists; consequently the uterus, seen from the outside, appears normal. On section it is found to contain two distinct cavities. The septum may extend to the vulva, producing a vagina with the appearance of a double-barrelled gun; or it may involve the uterus alone, the vagina being single; or it may fail to reach the external os, in which

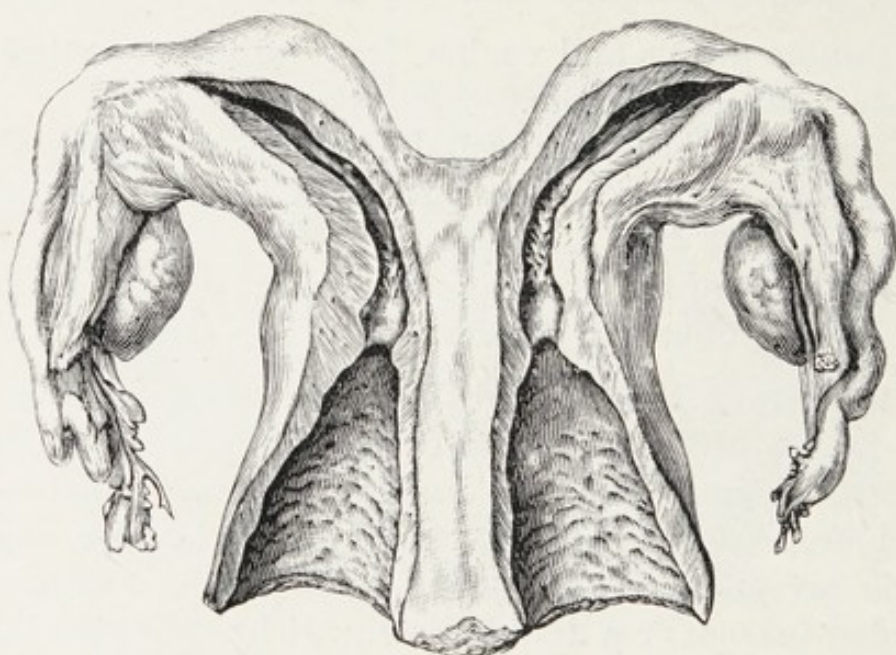


FIG. 26.—UTERUS BICORNIS.

case the cervix looks normal when seen through a speculum. The last kind is the *uterus subseptus*.

2. In the **uterus bicornis** (Fig. 26) external union has occurred in the lower parts of the uterine body, but is wanting in the upper part; so that when such a case is examined bi-manually, the depression between the two halves of the fundus is plainly felt. Here also the extent of the septum varies, reaching to the vulva, to the os externum, or to the os internum only. The last kind gives the variety known as *uterus bicornis unicollis*.

3. In **uterus didelphys** (Fig. 27) the two halves of the uterus have remained externally distinct, and can be moved independently of one another. The vagina is invariably



double, the two halves being united by connective tissue, and a loose bridge of connective tissue and peritoneum stretches between the cervices. A well-marked fold of peritoneum usually extends directly from the bladder to the rectum, passing between the two halves of the uterus.

Each uterus has its own Fallopian tube, whose point of

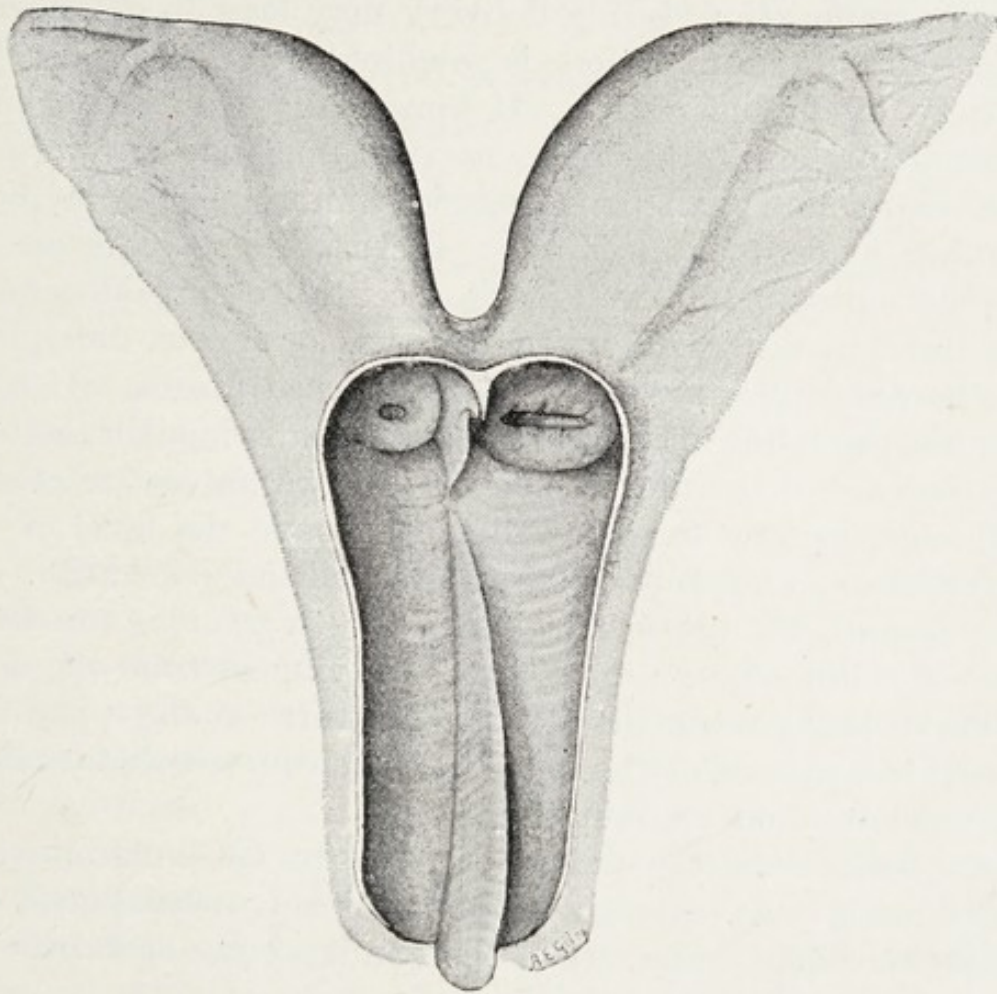


FIG. 27.—UTERUS DIDELPHYS.

junction with the uterine body is indicated by the origin of the round ligament; it has also its own ovary.

The two halves are often unequally developed, and one vagina may end blindly above the vulva, so that the corresponding uterus is quite shut off from the outside.

*Diagnosis.*—The presence of two vaginal canals is a certain indication that the uterus is double. Where the vagina is single, the malformation of the uterus may be discovered in one of several ways. Thus, when the division involves the



cervix, two ora externa may be seen through the speculum; on bimanual examination two separate uterine cornua may be felt, with a depression between. The condition may be suspected from the passage of the sound in two different directions; when one half has become occluded, with retention of menstrual blood, the opening of the fluctuating tumour may reveal the presence of the second canal; lastly, some complication during delivery may lead to diagnosis.

A careful examination is required to distinguish the variety of double uterus. If bimanually the fundus feels normal in shape, whilst two cervical openings are present, and two sounds can be introduced simultaneously without coming in contact inside the uterus, the case is one of uterus septus. If a well-marked central depression exists, we have to deal with uterus bicornis or uterus didelphys. If the cervix be single, it is a two-horned uterus. If it be double, the following points will serve to distinguish the two. In the case of the uterus bicornis the two halves are closely adherent usually for some distance above the level of the internal os; and they cannot be moved independently. In the case of the uterus didelphys, the two halves can be so moved; indeed, one may be found lying in front of, or at some distance from, the other; and, further, the separation down to the level of the external os can be felt distinctly by recto-abdominal examination.

In both cases the points of two sounds simultaneously introduced may diverge widely, pointing perhaps to the respective iliac crests, while the handles cross each other in the vagina at right angles.

As a rule, each horn or each half-uterus can be felt to have attached to it its own Fallopian tube and ovary.

*Complications.*—One half of a double uterus may be occluded at the cervix, or there may be atresia of the corresponding vagina, in which case the symptoms of hæmatometra arise. Otherwise a double uterus may give rise to no symptoms at all, and several pregnancies may be passed without the condition being suspected. In other cases some complication arises during delivery, leading to discovery of the condition; but considerable perplexity may be caused at first. Thus in some cases an obstetrician has on examin-



ation found a wide vagina and dilating cervix; a later examination, in which the finger has inadvertently entered the second vagina, has revealed a narrow vagina and a closed os.

The following are the clinical complications to which a double uterus may give rise—

1. Unilateral atresia, with retained menstrual products.
2. Dyspareunia.
3. Double vaginitis or endometritis, treated unsuccessfully by applications to one side only.
4. Obstruction to delivery by a displaced empty half.
5. Obstruction due to the vaginal septum.
6. Retained and undiscovered products of conception in one half in cases of double pregnancy.

The two halves of a double uterus may menstruate independently. When pregnancy occurs in one half, a decidua forms in the other half.

(b) **Atresia of the Genital Canal.**—Congenital atresia only affects the vagina. An acquired atresia of the os externum or internum may be present, but it is not strictly a malformation. We shall, however, consider all kinds of atresia when discussing the clinical significance of malformations.

*Vaginal atresia* is of various grades; in the simplest form a thin septum is present, occluding the vaginal orifice. This was formerly called atresia of the hymen; but the septum is vaginal, and the hymen can be distinguished adherent to the margin of its external surface. It must be remembered that the hymen does not, at any stage of its development, form a complete septum; it arises as a membranous fold from the margins of the urogenital sinus.

Vaginal atresia may be due, not merely to the presence of a thin septum, but to the fact that its lower end fails altogether to reach the surface; thus the lower third, half, or the whole vagina may be absent. There is generally, however, some portion of unoccluded vagina just below the cervix. Absence of the middle part of the vagina with persistence of its uterine and vulvar extremities has been described; but



we believe that the interpretation of the external cul-de-sac found in such cases is this: when the lower two-thirds of the vagina are wanting, the apex or lower end of the patent portion is connected with the vestibule by a fibrous cord, which fails to elongate as the pelvis grows, with the result that the vestibule is drawn up in the form of a cul-de-sac resembling the lower part of the vagina. It is very doubtful

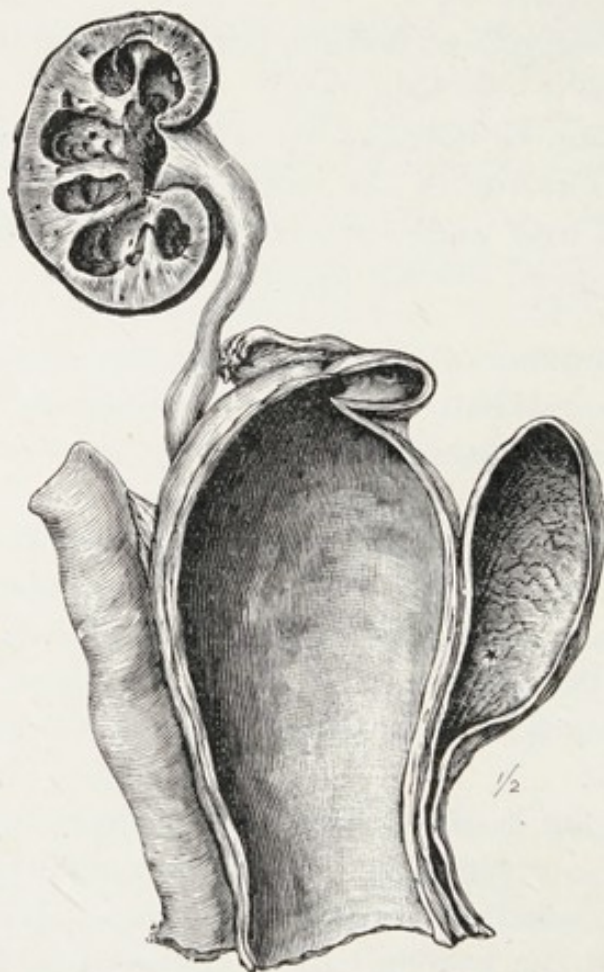


FIG. 28.—THE KIDNEY, UTERUS, VAGINA, AND BLADDER OF A NEW-BORN INFANT SHOWN IN SECTION. THE DISTENSION OF THE VAGINA AND UTERUS IS DUE TO ATRESIA OF THE VAGINA. (MUSEUM OF ST. BARTHOLOMEW'S HOSPITAL.)

if an intermediate portion in the continuity of the vagina is ever suppressed.

On careful examination of the uterus in the foetus at birth its cavity will be found to contain mucus, sometimes sufficiently abundant to dilate it. In cases of congenital atresia of the vagina this canal has been found dilated into a large cyst, its lower end bulging beyond the vulva, and so com-



pressing the urethra as to cause retention of urine in the new-born child. Thus in the specimen represented in Figs. 28 and 29 the pressure of the distended vagina had not only compressed the urethra, but had interfered with the ureters, and produced dilatation of the renal pelvis and its infundibula.

*Atresia of the Fallopian tube* has been referred to. It is



FIG. 29.—FROM THE SAME SPECIMEN AS THE PRECEDING FIGURE. IT SHOWS THE URETER COMPRESSED BY THE DISTENDED VAGINA.

not a true congenital—*i. e.* developmental—atresia, since it is the result of disease in the foetus.

In all forms of persistent septa, whether longitudinal or transverse, the patient is otherwise well developed as a general rule. Longitudinal septa are compatible with the performance of generative functions—menstruation, conception, and pregnancy. Atresia is a bar to conception, but menstruation may occur, although its products are retained.

(c) **Unilateral Atresia.**—In cases of double uterus



and vagina coalescence may fail to take place, not only longitudinally, but terminally, so that one vagina runs down as a blind sac by the side of its fellow, which opens externally in the usual way. Hence, while one half of the uterus and vagina may appear, clinically, to be normal, retention of menstrual products may occur in the other half. Similarly, in cases of double uterus with a single vagina, one half of the uterus may have no opening into the vagina; and if this half of the uterus menstruates, its products will be retained.

### III. MALFORMATIONS BY EXCESS OF DEVELOPMENT

**Hypertrophy of the Clitoris** may occur independently of the condition of pseudo-hermaphrodisim, to be described presently, and it may be difficult to distinguish this condition from a benign new growth.

**Hypertrophy of the Labia Minora.**—There are minor degrees of enlargement, which are in no sense congenital, and which are due in some cases to masturbation. Elongation may, however, be excessive, as is typically seen in the Bushwomen of South Africa, giving rise to the condition known as the Hottentot apron (Fig. 10).

**Congenital Elongation of the Cervix** affects the vaginal portion, which may attain a length of 2 to 3 inches, and even project through the vulvar orifice. This condition is seldom observed till puberty, so that it is difficult to say whether it is always present from the time of birth, or whether it is incidental to the general enlargement of the pelvic organs that takes place at puberty.

**Accessory Ostia Tubæ.**—The Fallopian tube is sometimes found with two or even three fimbriated openings. The condition has no clinical importance.

**A Third, Supernumerary or Accessory, Ovary** has been described, and some writers even state that it is a common occurrence. A careful consideration of the evidence makes it clear that small pedunculated bodies near the ovary are very frequent, but they are not accessory ovaries. Many of them are partially detached tubes of the parovarium,



stalked corpora fibrosa, or small myomata of the ovarian ligament. So far as the facts stand at present, a supernumerary ovary, so separated from the main gland as to form a distinct ovary, has yet to be described by a competent observer.

#### IV. MALFORMATION BY COMBINATION OF MALE AND FEMALE CHARACTERISTICS

**Pseudo-hermaphrodisism.**—It occasionally happens that children are born with malformed external genital organs, which make it difficult to determine whether the child is male or female. Even when the individual attains puberty the secondary sexual characters appear in such a form as to increase rather than diminish the doubts which were entertained at the child's nativity.

When doubt exists as to the sex of a child, it is often termed a **hermaphrodite**. This term is employed by naturalists to signify an animal possessing conjoined ovaries and testes—a combination occasionally occurring in vertebrata, and known as an ovotestis—or an ovary on one side and a testis on the other. Authentic cases of an ovotestis in a human individual have been recorded, and have been described as instances of true hermaphrodisism. Very few of them have survived their birth, but Uffreduzzi<sup>1</sup> recorded a case in a girl aged seven. In order to comply strictly with the term true hermaphrodisism, an individual should have glands which are ovary and testis functionally as well as anatomically; but such a case has never been known. Individuals to whom the term hermaphrodite is usually applied are those in which there is defective development of the external genitals, and the secondary sexual characters do not necessarily correspond to the actual sex. So far as the human family is concerned, individuals with malformed external genitals should be called **pseudo-hermaphrodites**. Two types of these individuals are found.

**Gynandry** is a condition in which the subject is a female, and possesses ovaries, but has also accessory organs resem-

<sup>1</sup> *Arch. per le Sci. Méd. Turin*, 1910, xxxiv, 210.



bling those of the male. The subject of such a malformation is called a *gynandroid*. The clitoris is large, resembling a small penis, and the labia majora fuse in the middle line, resembling a scrotum. The resemblance is all the more striking if the ovaries are herniated into the labia majora. In such a case the vagina, which is generally small, opens into the urethra at the root of the clitoris, like a hypospadiac male. The uterus may be fairly well developed. The woman may have a beard, and the breasts may be ill-developed. A typical case of this malformation is the now historical one of Madeline Lefort.

It is an interesting fact that gynandroids may suffer from ovarian tumours and uterine fibroids, like ordinary women. Tuffier and Lapointe<sup>1</sup> state that fourteen cases of ovarian tumours in pseudo-hermaphrodites have been published; and Auvray<sup>2</sup> records a case of a fibroid weighing 3½ lb. in a gynandroid aged seventy-two.

**Androgyny** is a condition in which the subject is a male, and possesses testicles, but has also accessory organs resembling those of the female. Such an individual is called an *androgynoid*.

The embryology of the genitalia makes it clear, so far as the external organs are concerned, that the male organs are more highly specialized than those of the female, and if the fusion of the parts concerned in forming the penile urethra be arrested, a condition more or less resembling the female is the consequence.

For example, the external genitals represented in Fig. 30 illustrate this very well. The erectile body is really an incomplete penis; the penile urethra is represented by a groove opening into a cul-de-sac which corresponds to an incomplete vulva. The two halves of the scrotum have failed to unite across the median line, and thus resemble labia majora. The right one contains a testis; the left testis was retained in the inguinal canal. This individual was a hypospadiac male, but to his misfortune was brought up as a girl.

Imperfections of this kind in the external genital organs

<sup>1</sup> *Rev. de Gyn. et de Chir. Abdom.*, March, 1911.

<sup>2</sup> *Ibid.*, April, 1912.



are associated with modifications of the secondary sexual characters. The distribution of hair on the pubes may resemble the female type; often it corresponds to that of a male. Menstruation depends on the coexistence of a uterus; of this more will be stated later on. The mammæ may be as large as those of a woman; more often they are



FIG. 30.—THE EXTERNAL GENITALS OF A HYPOSPADIAC MALE OR ANDROGYNOID.

of the male type. The hair on the head is no guide, for if an individual has been trained as a boy it is short; if a girl it will usually be long. The presence or absence of hair on the face varies. A pseudo-hermaphrodite may have an abundant beard and moustache. At puberty the voice usually changes to that of a man, and sexual inclination is manifested for women.

It is a significant fact that the condition of the external genitalia in pseudo-hermaphrodites affords no reliable



indication of the nature of the internal genital organs. In a typical case of androgyny reported by one of us <sup>1</sup> the patient, who was aged twenty-eight, had the outward appearances of a woman, and as such had been married ten years. The vulva was normal, and the breasts well developed. There was a short vagina with no trace of uterus. In the left groin was a swelling, thought to be a hernia. Operation and subsequent microscopical examination demonstrated that the solid body in the inguinal canal was a testis. An individual with such imperfections as are presented in

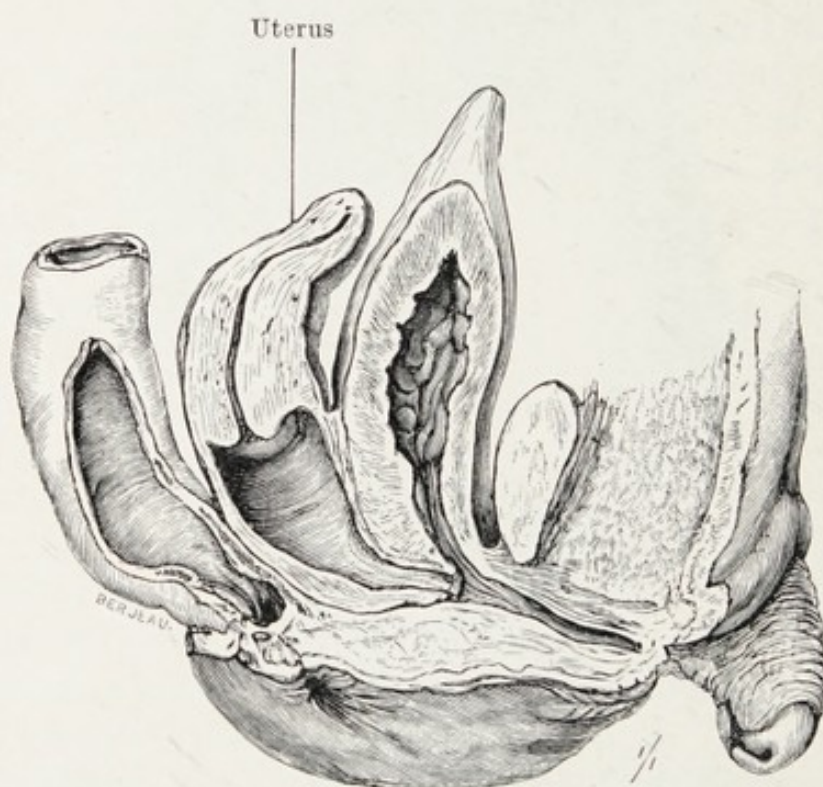


FIG. 31.—SAGITTAL SECTION OF THE PELVIC ORGANS OF A BOY WITH A WELL-DEVELOPED UTERUS. (MUSEUM OF MIDDLESEX HOSPITAL.)

Fig. 31 may or may not have a uterus and Fallopian tubes. On the other hand, a uterus may be associated with a perfect penis and testes. The presence of a uterus does not enable us to decide the sex in a doubtful case. In questionable cases of sex the only absolute test is the genital glands. The presence of ovaries is decisive proof of a female; testes indicate the male; and, as accurate discrimination between a testis and an ovary is only possible on

<sup>1</sup> A. E. Giles, "Malformations of the Female Genital Organs in their Clinical Aspects," *Brit. Med. Journ.*, September 30, 1911.



microscopic examination, it is only in exceptional circumstances that such a test can be applied.

It is impossible in an elementary work of this kind to describe the various defects of the reproductive organs which occur in pseudo-hermaphrodites, but in the majority of these unfortunate individuals the genital glands are testes, notwithstanding the fact that many of them have a uterus with Fallopian tubes.

The majority of pseudo-hermaphrodites are brought up



FIG. 32.—EXSTROPHY OF THE BLADDER IN A GIRL. (MUSEUM OF MIDDLESEX HOSPITAL.)

as girls; this is a misfortune, because at puberty (which may be greatly delayed) the supposed girl suddenly assumes the voice of a man, and begins to grow a beard.

When there is doubt as to the sex of a child it should be named, trained, and educated as a boy.

Exstrophy of the bladder has sometimes given rise to difficulty in determining the sex of a child (Fig. 32). Careful examination will dispel this difficulty, for on cleaning the pink vesical mucous membrane exposed at the pubes, urine will be seen to escape from the orifices of the ureters.

## CHAPTER V

### CLINICAL ASPECTS OF MALFORMATIONS OF THE REPRODUCTIVE ORGANS OF WOMEN

#### I.—SYMPTOMATOLOGY

It will be convenient to consider here the relation of the various malformations to the general bodily and mental development, to the secondary sexual characters, to menstruation, and to childbearing.

**General Development.**—Absence of the genitalia is only found, as we have said, in the case of monstrosities. With marked under-development of the uterus and ovaries—for instance, with rudimentary uterus and infantile ovaries—there are often found retarded physical growth and imperfect mental powers. Slight degrees of under-development are compatible with an otherwise well-formed body and a vigorous mind. The same may be said of malformations in the remaining groups—namely, doubling and atresia of the genital passages, and malformations of the vulva.

**Secondary Sexual Characters.**—The development of these maintains a fairly close parallel with that of the pelvic organs, so that when the latter are imperfectly formed we find the breasts flat, small, or even absent, the pubic hair scanty or absent, as in the case of a child, and the vulva small.

**Menstruation** is established late, or not at all, when the uterus is under-developed. A woman with a rudimentary or infantile uterus, or with imperfect ovaries, does not menstruate. Broadly speaking, the occurrence or otherwise of menstruation gives a fairly reliable indication of the degree of development, whilst its characters, where it does occur, also have their significance. If menstruation is normal it may be presumed that there is not any con-



siderable arrest of growth; if it is late in onset, scanty, and irregular, it can generally be assumed that some degree of under-development exists.

In the case of double uterus, menstruation has nearly always the normal characters, and even if one half be under-developed, as in the uterus unicornis, the other half is generally functional. In cases of atresia, the changes incidental to menstruation occur in the uterus, but the menstrual products are, of course, retained (**crypto-menorrhœa**).

The first symptoms of retained menses generally come on within the first year or two after puberty. The patient gives a history of having experienced periodical monthly molimina, without outward signs of menstruation. She may also complain of a swelling in the lower abdomen, which, although it gradually increases month by month, may get somewhat smaller in the monthly intervals. This gradual increase in size, coupled with amenorrhœa, sometimes raises in the minds of her friends a suspicion of pregnancy.

Pain is sometimes felt from the first; in other cases it occurs later, and increases month by month in severity and duration as distension proceeds, till it becomes continuous. Symptoms of pressure on surrounding organs may also be present.

In cases of unilateral atresia the symptoms may be misleading, because the retention of products in the occluded half of the vagina and uterus produces the characteristics just described, while menstruation is taking place apparently normally on the other side.

### **EFFECTS OF RETENTION OF MENSTRUAL PRODUCTS IN CASES OF ATRESIA**

According to the situation of the atresia and the duration of the symptoms, the following conditions may be met with, shown diagrammatically in Figs. 33 and 34.

**1. Atresia of the Vaginal Orifice.**—At first the menstrual blood collects in the vagina, which becomes



distended (A), and often bulges through the vulvar aperture—*hæmatocolpos*. Later, the cervix distends, and its walls are thinned, the body of the uterus not being at first affected (B)—*hæmatotrachelos*. By continued accumulation the body of the uterus is involved (C)—*hæmatometra*. Lastly, the Fallopian tubes may become distended (D)—*hæmatosalpinx*.

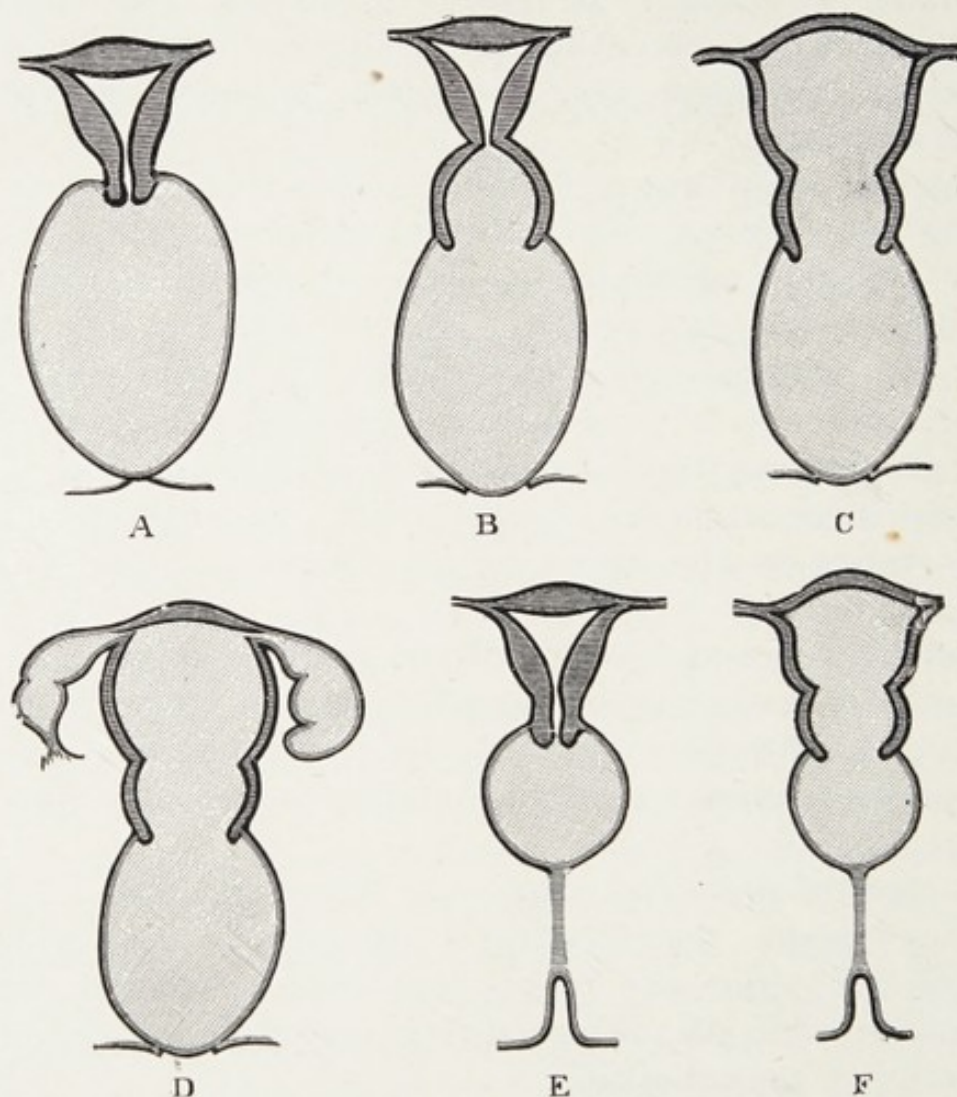


FIG. 33.—DIAGRAM ILLUSTRATING THE EFFECTS OF ATRESIA OF THE GENITAL PASSAGES.

**2. Absence of the Lower or Middle Portion of the Vagina.**—The distension occurs in the same order as above, first the vagina (E) and then the uterus (F) being affected. The lower portion of the vagina, if present, is patulous. As explained on p. 64, the occurrence of absence of the middle portion of the vagina is very doubtful.

**3. Atresia of the Os Externum.**—The vagina



remains normal, and hæmatotrachelos first occurs (G). It is probable that considerable distension may take place here without the body of the uterus sharing in it. Later, hæmatometra and hæmatosalpinx may follow.

**4. Atresia of the Os Internum.**—The cervix, as well as the vagina, remains free, and a pure hæmatometra is found (H). As a congenital condition, this is rare.

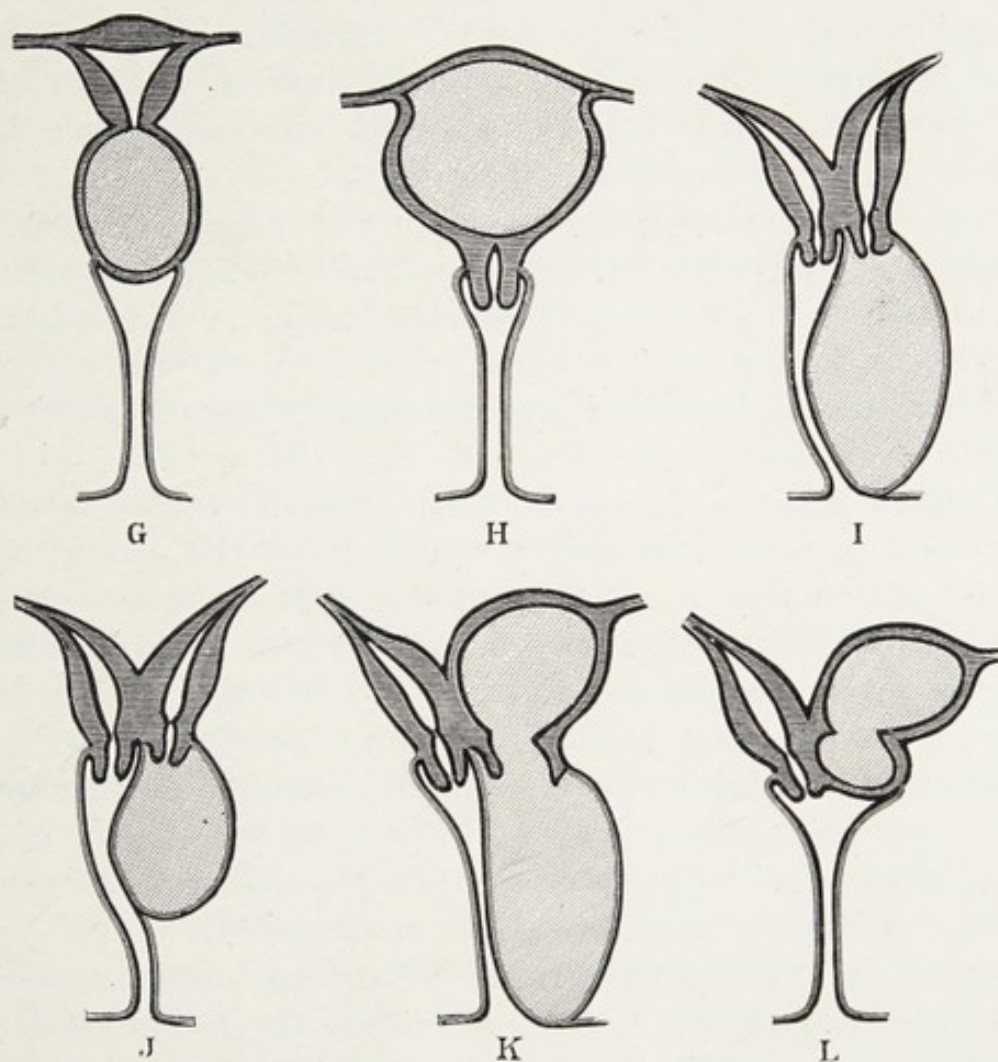


FIG. 34.—DIAGRAM ILLUSTRATING THE EFFECTS OF ATRESIA OF THE GENITAL PASSAGES.

**5. Atresia affecting One Half of a Double Uterus or Vagina.**—Changes occur in the same order as in the case of the undivided organs; when the atresia concerns the second vagina, hæmatocolpos is first found, the cystic swelling extending either down to the vulva (I) or only part of the way, by the side of the patent vagina (J). Hæmatometra follows (K), or it occurs alone if the atresia



affects the os externum (L). In the diagram the various forms of atresia in cases of double uterus are represented as affecting the uterus bicornis; but similar conditions are found in connection with uterus septus and uterus didelphys.

*Secondary Changes.*—The dilated walls of the vagina, uterus, or Fallopian tubes become thinned out; the contrast between healthy and distended walls is well seen in the uterus itself, where the endometrium suffers considerable atrophy, and the muscular coat is thinned. This thinning may be partly compensated, as in the case of an aneurysm, by the deposition of blood-clot on the internal surface and partial organization of the fibrin.

Suppuration may take place, either spontaneously or through a temporary fistulous aperture. When the atresia is secondary, this result is more common. The vagina, uterus, or Fallopian tubes may then become bags of pus, and the terms pyocolpos, pyometra, and pyosalpinx are applied.

*Physical Signs.*—On abdominal palpation a tense fluctuating swelling may often be felt rising out of the pelvis; and if the obstruction be at the vulva it may be seen bulging here also. Fluctuation may be obtained on pressing alternately on the abdominal and vulvar swellings. When the uterus itself is not involved, it may sometimes be felt through the abdomen as a solid projection at the summit of the cystic swelling.

We shall consider in succession the physical signs afforded by the different conditions above enumerated.

*Atresia of the Vaginal Orifice.*—The finger at once meets the resistance of the cystic swelling at the vulva, and no passage exists by the side of it. By combined rectal and abdominal examination it can be felt that the mass fills the pelvis; if seen early the fingers may meet above the swelling, or the undilated uterus can be made out. If hæmatometra also exists, the swelling is larger; but the degree to which the uterus is involved cannot usually be determined till the retained fluid has been evacuated. An irregularity of the summit of the swelling can often be felt by the abdomen when the Fallopian tubes are distended; but this is not always the case, because the tubes are apt



to be drawn into a position parallel with the uterus, just as when the uterus is enlarged by pregnancy or a fibroid.

*Absence of the Lower or Middle Part of the Vagina.*—The short cul-de-sac, when it exists, is patent for 2 or 5 centimetres, but nothing further can be made out by the vagina. On examining by the rectum, the finger will readily recognize a sound introduced through the urethra, there being but little tissue intervening. But, higher up, the finger meets the resistance of a cystic swelling, continuous with a similar swelling felt by the abdomen when the distension is considerable. If the vaginal deficiency extends to near the uterus, it may not be possible to reach the hæmatocolpos through the rectum; and an ill-defined abdominal fulness may be the only thing felt. But this, taken in conjunction with the history and symptoms, may serve for diagnosis.

*Atresia of the Os Externum.*—The cervix presents in the otherwise normal vagina as a smooth fluctuating swelling in which no aperture can be discovered. Bimanually the mass is felt to occupy the position of an enlarged uterus. The fundus may be felt as a smaller and harder projection at the summit of the elastic swelling.

*Atresia of the Os Internum.*—The cervix feels and appears normal; the body of the uterus is uniformly enlarged, and feels almost exactly like a pregnant uterus.

*Atresia of One Half of a Double Uterus or Vagina.*—The patent half of the vagina is narrow, but otherwise resembles the normal. The uterus appears to be pushed over to one side, and the sound passes in a lateral direction for a normal distance. On one side of the vagina is felt a fluctuating swelling, extending down to the vulva, or reaching only part of the way. It bulges toward the healthy side so as to narrow further the vaginal passage. By bimanual examination the swelling is felt to extend up to the side of the uterus, with which it is closely connected. When the vagina is undivided, and the atresia is situated at the external os of the second uterus, the upper part of the vagina is very wide. At one side is the normal cervix, through which a sound can be passed into the uterus, where it takes a lateral direction. The rest of the vaginal summit is occupied by a cystic swelling lying to the side of the



uterus and cervix, which it has displaced beyond the median line. The depression between the distended and the empty half of the uterus may be felt by abdominal palpation or by the bimanual method.

**Results of Atresia.**—If left untreated, the fluid gradually accumulates, the size of the swelling causing great discomfort as well as severe pain. Two grave complications threaten: suppuration may take place, and a large abscess form, which opens into the rectum or the peritoneal cavity, or points externally; or rupture of some part of the sac occurs. The dilated tubes are most likely to give way, because in them the greatest thinning of the walls takes place. From either complication death may result. It is important to remember that a hæmatocolpos or hæmato-trachelos may exercise injurious pressure on the ureters.

**Characters of Retained Menstrual Blood.**—This is of a dark chocolate colour, sometimes black. It is viscid, owing to partial absorption of the liquid portion of the blood, and flows slowly, like treacle or honey. It is mixed with mucus, and seldom contains coagula. Cholesterol crystals are sometimes found. Microscopical examination shows the presence of old and altered epithelial cells, and blood corpuscles in various stages of disintegration.

**Childbearing in Relation to Malformations.**—When the pelvic organs are under-developed, sexual desire and feeling are frequently absent, or only slightly present. Desire probably depends more upon the development of the ovaries than upon any other individual factor; but sexual feeling during intercourse will also vary according to the degree of development of the vagina and vulva. Childbearing does not depend, however, upon sexual inclination or sensation, but upon the production of healthy ova, the ability of the uterus to nourish a fertilized ovum, and the possibility of coitus taking place. Under-development of the ovaries leads to complete and permanent sterility. Under-development of the uterus has the same effect, both because it is usually associated with defective ovulation, and because the uterus is unfit for pregnancy. A woman with a double uterus is often fertile, and several pregnancies may take place without the malformation being



even suspected; but complications may occur during labour. Sexual intercourse is possible as long as the vagina is well enough developed, whatever be the condition of the internal organs. The conditions which prevent coitus are absence, atresia, and stenosis of the vagina.

In pseudo-hermaphroditism the vagina is usually small. If a case of atresia of the vagina be treated early, coitus can take place, and, theoretically at least, may be followed by conception; but if considerable changes have taken place in the uterus, owing to distension, before the obstruction is removed, it is doubtful whether the patient could conceive. We have not met with or heard of a case where a patient who had had atresia of the vagina became pregnant subsequently.

## II.—DIAGNOSIS

The diagnosis of malformation will depend in the first place on inspection, when any external abnormality will at once be discovered, and the patency or otherwise of the vaginal orifice determined. A digital vaginal examination will show whether the vagina is unduly narrow or short, or whether the cervix is normally developed. Two vaginæ may be thus discovered, each containing a cervix; or two cervices may be found in a single vagina. Bimanual examination will then be necessary to determine the degree of development of the uterus, tubes, and ovaries. This information can also be obtained, though less satisfactorily, by a recto-abdominal examination. The sound will lend assistance in ascertaining the length of the uterus, and may also enable one to demonstrate that the uterus has two cavities. The uterus may be found to be very small or rudimentary, and it may even be impossible to feel it at all bimanually. When the ovaries are small they are often difficult to feel, and it may not be possible to form any conclusion as to their development, except by inference.

A hæmatocolpos is usually readily diagnosed by the signs and symptoms above mentioned.

Hæmatometra must be diagnosed from pregnancy: the integrity of the hymen, the absence of vaginal pulsation and discoloration, and of the symptoms of pregnancy will serve



as a guide, as will also the condition of the cervix, which is elastic and smooth in the case of hæmatotrachelos, and does not present the softness characteristic of pregnancy when the obstruction is at the internal os. In case of doubt the patient may be kept under observation for some time; the swelling will increase, but not nearly so quickly as is the case in pregnancy. Hæmatotrachelos might be simulated also by a cyst in the upper part of the vagina; careful examination will discover the cervix beyond the cyst in the latter case. Other conditions which superficially resemble hæmatometra, such as inversion of the uterus or a large cervical polypus lying in the vagina, do not occur at the age at which hæmatometra is met with; and there should be no difficulty in the diagnosis.

Retention of menses in a second vagina or uterus leads to much greater difficulty in diagnosis. Thus lateral hæmatocolpos must be distinguished from abscess in the vaginal wall, pelvic abscess burrowing down by the side of the vagina, vaginal cysts, encysted collections of fluid bulging down in the recto-vaginal pouch, and, when the upper part of the vagina is principally involved, from ovarian or parovarian cysts and distended tubes. The latter would be recognized, principally by their shape, on recto-abdominal examination. The nature of lower vaginal swellings will probably not be made out till they are incised; whilst in the case of swellings higher up, the abdomen will most likely be opened, under the impression that the case is one of ovarian cyst.

Hæmatometra in a second uterus is often diagnosed as ovarian or tubal cystic disease, or as a dermoid. The only clue, in the absence of all trace of a second cervix or of a double vagina, lies in the close connection of the swelling with the uterus; but even this distinction may not be apparent, as the depression in the fundus in the case of uterus bicornis, or the almost complete separation of the two halves in the case of uterus didelphys, gives the impression that the swelling is extra-uterine. As a matter of fact, the nature of the case is rarely recognized until the abdomen has been opened in the operating theatre or the post-mortem room.



## III.—TREATMENT

The scope of treatment for malformations of the female genital organs is necessarily limited. When there is under-development of the uterus and ovaries, no treatment is of any avail; and in cases of doubling of the uterus and vagina no treatment is usually necessary. But if the vaginal septum interferes with intercourse, or obstructs labour, it should be divided; and, if possible, either a portion or the whole length of it should be excised. If the clitoris or labia are so enlarged as to cause discomfort, or if the cervix is much elongated, resection of the part is indicated.

A hæmatocolpos must be opened. The incision should be free, and the contents allowed to escape without any pressure. By too rapid evacuation, rupture of a hæmato-salpinx may be brought about; but the danger of this has probably been exaggerated. A more serious risk is that of septicæmia; on this account the strictest asepsis should be adopted. When the greater part of the fluid has been evacuated, gentle irrigation may be employed to clear out the residue and prevent decomposition changes from taking place. The principal difficulty in after-treatment lies in the tendency of the orifice to contract; for this reason the incision must be free, and, if necessary, a part of the wall should be dissected out. The passage of bougies may be required subsequently from time to time.

The treatment of atresia with absence of a part of the vagina is more difficult. An attempt should be made to dissect down to the deeper part of the vagina, so as to make a complete vagina; this is especially necessary in cases of retention. The first difficulty is in the actual dissection, which must be made between the urethra in front and the rectum behind: a distance of many centimetres may be traversed before the blind end of the vagina is reached. The second, and perhaps greater, difficulty is to maintain the patency of the vagina when formed. With this end in view various plastic operations have been devised, portions of skin being turned in. Repeated operations, extending over many months, have sometimes been required; but several ultimately successful cases have been reported.



Hæmatometra also requires incision. Sometimes the obstructing membrane is so thin that a probe or sound can readily be pushed through it; in other cases a knife is required. After incision, forceps should be introduced to secure a free aperture, and after evacuation the cervical canal is loosely packed with iodoform gauze; whilst later the tendency of the orifice to contract must be met by the use of dilators.

The great difficulty of maintaining the patency of the opening made for the evacuation of the retained blood in hæmatometra has induced several operators (Fenton, Bland-Sutton, and Herman) to remove the uterus by cœliotomy. The results are excellent, and it is probable that "conservative hysterectomy"—that is, removal of the uterus, with preservation of one or both ovaries—will become the recognized method of dealing with this very troublesome condition.

*Lateral hæmatocolpos* must be treated on the same principles as the above, but the vaginal septum should be freely removed, so as to make only one vagina, otherwise the opening will almost certainly close again, and, having once been opened, septic organisms may find their way in, and a pyocolpos be found the next time instead of a hæmatocolpos. Of this there are several instances on record.

In the case of lateral hæmatometra, vaginal incision should be practised when possible, and part of the uterine septum may be removed, to prevent reclosure. If the condition be discovered after opening the abdomen, vaginal incision should still be performed when the two halves of the uterus are closely connected; although, if at the same time there be vaginal deficiency, hysterectomy will probably be called for.

In cases of separation of the two halves of the uterus, as in marked instances of uterus bicornis or uterus didelphys, the occluded half may be removed by hysterectomy. There are several cases recorded in which this was done.

Hæmatosalpinx calls for removal of the distended tube.



## SECTION II

### CUTANEOUS DISEASES

#### CHAPTER VI

##### CUTANEOUS DISEASES—MORBID CONDITIONS OF THE HYMEN, CLITORIS, AND URETHRAL ORIFICE

#### CUTANEOUS DISEASES OF THE VULVA

THE vulva is liable to be affected by a number of cutaneous diseases, of which the most important are erythema, eczema, lichen ruber, tuberculosis, syphilis, condylomata, leukoplakia, elephantiasis, vulvitis pruriginosa, and kraurosis.

**Erythema** is usually a transient condition, but it may assume a more chronic form as the result of irritating discharges and want of cleanliness. In very stout people it may be due to intertrigo, when it becomes worse in hot weather.

Treatment consists of rest, cleanliness, and the use of dusting powders, such as oxide of zinc, calomel, or bismuth subnitrate mixed with starch or talc powder.

**Eczema** presents the same characters as in other parts of the body; the mucous surface is not usually involved, but the cutaneous surface shows the typical papules, which become vesicular and break. The escaping serous fluid forms crusts, and the condition is usually aggravated by scratching, which is almost unavoidable, owing to the intense irritation. It may be associated with constitutional conditions, such as rheumatism, gout, and diabetes; in other cases it is kept up, if not caused, by irritating discharges from the uterus, or by leakage of urine, as from weakness of the bladder sphincter or a vesico-vaginal fistula.

*Treatment.*—Any constitutional or local causes that may



be present should be treated. The importance of avoiding scratching should be insisted upon. In the dry forms a lotion of 2 per cent. formalin will be found useful, followed by an ointment such as hydrargyri ammoniatum 1 part in 32 parts of lanolin. In moist forms the crusts should be removed with a strong potash soap, and a dusting powder applied, composed of glutol 1 part, and talc powder 7 parts. In gouty cases mild applications of ichthyol will be found useful.

**Herpes of the Vulva.**—This is also a vesicular condition, but the vesicles are arranged in small groups, and the intervening erythema is less marked, or absent. The vesicles may run together, forming bullæ. Herpes is not infrequently associated with the menstrual periods, especially when these are characterized by dysmenorrhœa, and with pregnancy. If a herpetic patch ulcerates, it may resemble a chancre, especially if the inguinal glands are affected. Great irritation is the principal symptom. It usually runs a short course, if not aggravated by scratching.

*Treatment.*—This is similar to that recommended for eczema.

**Lichen ruber** occasionally attacks the vulva; in the course of disappearance it is apt to simulate kraurosis. It usually yields readily to the exhibition of arsenic internally.

**Syphilis.**—This disease may manifest itself on the vulva as a primary sore (chancre), or as mucous plaques and tubercles. Tertiary lesions and gummata are uncommon. In the late stages the opposed surfaces of the labia are liable to a change similar to that often seen on the tongue, and known as leukoplakia. In infancy congenital syphilis sometimes declares itself in the labia in the form of characteristic coppery-red spots. It is important to remember that a typical leukoplakia may occur on the vulva quite independently of syphilis, and that vulvar, like lingual, leukoplakia may ulcerate and become the precursor of squamous-celled carcinoma.

**Condylomata** of the vulva are sometimes syphilitic, but they are also, and indeed more frequently, seen in cases of gonorrhœa where there is no evidence of syphilitic infection. They appear as raised areas with a flattened surface on



which red points appear, which may merge into ulcerated patches. The whole vulva may be covered with condylomata, and they may extend backwards and surround the anus. The surface of the vulva is bathed in a muco-purulent discharge. The patient complains of great pain and soreness, which is bad when walking, and may be even worse when sitting down. This condition yields very rapidly to proper treatment, of which the first and most important principle is cleanliness. Rest should be enjoined as far as possible. The local treatment which we have found the most satisfactory is bathing the vulva several times a day with *lotio nigra*, and vaginal douching with 1 in 2000 of biniodide of mercury; this is followed by the application of mercurial ointment, and mercuric iodide is administered internally.

**Elephantiasis.**—This condition is due to chronic inflammation of the lymphatics, with dilatation of their canals, leading to hypertrophy of the cutaneous structures, and a pale thickened rugose condition of the surface, resembling the rind of an orange. In the more advanced stages thrombosis occurs in the lymphatic vessels, and later still the glands are affected. The parts principally involved are the labia majora, less frequently the clitoris and labia minora, whilst the affection may spread to the perineum and adjacent parts of the thighs. It is but rarely seen in temperate climates; in the tropics it is more common, and the negro races are the principal sufferers (Fig. 35). It is often associated with filaria in the blood. From rubbing against the thighs and clothes, superficial ulceration is apt to occur. When the enlargement is great, and much discomfort is caused by the heavy pendulous masses (which sometimes weigh many pounds), they should be removed with the scalpel or thermo-cautery.

**Vulvitis pruriginosa** is a dermatitis of the vulva in which the nerve-endings are largely involved, with the result that intense irritation occurs. The skin of the affected parts is red and hot at first; later the surface may become paler, and the epithelium appears thickened and sodden; usually marks of scratching are seen. It would appear that in some cases this condition is the precursor of kraurosis. The cause



of it is not clear; it is probably due generally to trophic nerve-disturbances. It is doubtful whether it can be brought on by the irritation of excessive secretions, though these may also lead to pruritus.

The treatment is similar to that of kraurosis.



FIG. 35.—ELEPHANTIASIS OF THE VULVA IN A NEGRESS.

**Kraurosis Vulvæ.**—This disease, to which Breisky, in 1885, gave the name kraurosis (*χραῦρος*, dry, withered), was first accurately described by Lawson Tait, in 1875, as an atrophic change affecting the nymphæ.

*Symptoms.*—The patient complains of irritation referred



to the vulva, excessive pain during sexual intercourse, and on passing water, and of a yellowish discharge. The irritation is worse when the patient is warm in bed, and commonly disturbs or prevents sleep. As a result, the general health is impaired, the appetite fails, and the face has a harassed look.

*Physical Signs.*—In the early stage the skin of the labia minora, vestibule, and clitoris is smooth and shiny; the urethral meatus presents a red, caruncular appearance, and along the margins of the carunculæ myrtiformes there are small patches as of subcutaneous hæmorrhage, which are often exceedingly tender to the touch. Later, the nymphæ diminish in size and finally diasppear, while the orifice of the vagina becomes so contracted that, even in a multipara, it will barely admit a finger. The pubic hair has a peculiar stubbly aspect, and near the labia majora may be coarse and broken. In the final stages the vulva is very pale, with a look as if it had been ironed, all folds and creases having been smoothed out.

The vagina, above the hymen, is not affected; the labia majora also generally escape, but in many patients kraurosis of the vulva is associated with marked atrophy of the uterus.

*Pathology.*—The disease occurs mostly after the age of forty; its cause is unknown. It is best described as a progressive atrophy of the vestibule and nymphæ.

Microscopically there is seen hypertrophy of the epidermis, and hyaline transformation of the outer portion of the corium, with entire absence of hair-follicles and sebaceous glands. In the subepithelial tissue there is sclerosis of elastic and muscular fibres, great development of fibrous tissue and small cell infiltration; and small localized hæmorrhages occur. The nerve-endings become compressed, and this probably accounts for the great irritation.

*Course and Prognosis.*—The disease, if left alone, runs a chronic course of five or six years. During this time there is great suffering and discomfort, but ultimately, when the atrophy is complete, the pain disappears. The parts remain friable. Even coitus may cause troublesome lacerations, and these are considerable if pregnancy and labour supervene.

*Treatment.*—In this condition, as in the preceding,



temporary relief may be afforded by sedative and cooling applications, such as evaporating lotions, glycerole of belladonna, or opium or cocaine ointment. A useful lotion is one composed of 1 ounce each of glycerine and dilute acetic acid, with 10 ounces of a 1 in 20 solution of carbolic acid. In more obstinate cases the affected parts may be painted over, under an anæsthetic, with a 20 per cent. solution of carbolic acid in glycerine; the resulting sore is treated with some sedative ointment. In very severe and intractable cases the diseased area must be freely excised; the cut margin of the skin is then sutured to the cut edge of the vaginal mucous membrane.

**Pruritus vulvæ** is a symptom which may be due to a variety of causes. These fall naturally into three groups—

- (i) Irritating discharges.
- (ii) Diseases of the vulva.
- (iii) Reflex irritation.

GROUP I. This will include diabetes, cystitis, and leucorrhœa.

(a) **Diabetes.**—The margins of the urethra and the vestibule are congested. The examination of the urine and the history of the case will establish the diagnosis. The irritation may be lessened by sedative applications to the vulva and urethra. Pruritus is often the first symptom which leads to the detection of diabetes.

(b) **Cystitis.**—The pruritus is generally a minor feature, and is usually relieved by washing out the bladder.

(c) **Leucorrhœa.**—In view of the number of instances in which leucorrhœa exists without pruritus, it seems doubtful whether this cause can act alone, without some predisposing or accessory condition. Nevertheless, the cure of the vaginitis or endometritis, as the case may be, will generally be followed by disappearance of the pruritus. In many cases the inflammation has started with gonorrhœa, and then the concurrent urethritis helps to keep up the irritation.

GROUP II. (a) **Congestion of the Vulva.**—This may be due to varicose veins caused by pressure in the pelvis, or to functional causes. In the former case the causal condition must be dealt with. The possible conditions are:



retroversion of the gravid uterus, simple pregnancy, a uterine or ovarian tumour blocking up the pelvis, pelvic cellulitis, or intra-abdominal pressure on the vena cava.

Functional congestion may be associated with the menstrual epochs, and the pruritus will then be periodic, or it may be due to masturbation. The latter is not infrequently associated with pruritus, but whether as cause or effect it would be difficult to decide.

(b) **Vulvitis and Kraurosis.**—These have been already described.

(c) **Pediculus Pubis.**—This is readily recognized on inspection. The pubes should be shaved and thoroughly cleansed with a solution of perchloride of mercury (1 in 1000).

GROUP III. REFLEX CAUSES.—(a) **From the Rectum.** Thread-worms may be responsible, or some unhealthy condition of the rectal mucous membrane, such as anal fissure, or a rectal polypus. Pruritus ani is generally added to pruritus vulvæ in these cases.

(b) **From the Bladder.**—In cases of vesical irritability with frequent micturition pruritus may be present as a reflected neurosis. Bladder sedatives, such as hyoscyamus and belladonna, are then indicated.

(c) **From the Uterus.**—Pregnancy sometimes is associated with pruritus, even when there is not marked leucorrhœa.

The treatment of pruritus will depend on the causal condition, and this should, therefore, be always carefully inquired into.

### MORBID CONDITIONS OF THE HYMEN, CLITORIS, AND URETHRAL ORIFICE

**The Hymen.**—Normally, the hymen, when stretched, forms a diaphragm with an eccentric perforation situated nearer the anterior than the posterior margin. It sometimes presents slight variations in the size and position of the aperture, which are unimportant. A condition has been described under the name *cribriform hymen*, in which there are several apertures instead of one.



*Variations in Structure.*—It may be very thin and easily torn, or dense and unyielding, requiring division before coitus can take place; or thick and fleshy. It may be unusually distensible and yielding, so that a finger or small speculum may be introduced, or coitus occur, without rupture. When the legs are separated, the hymen may become so tense that the finger cannot be introduced, whilst it may pass easily when the thighs are approximated (Brouardel).

This small structure has, therefore, an important medico-legal bearing. A permeable hymen, or one with a fringe-like margin, must not be taken as a certain indication that intercourse has taken place; and, on the other hand, an unruptured hymen is not positive proof of virginity.

*Treatment.*—A rigid or contracted hymen may require dilatation or division to allow of coitus.

**Carunculæ hymenales** result from the rupture of the hymen during coitus. They consist of portions of the hymen which are left between the radiating tears, and touch one another, so that in the undisturbed condition the hymen may still appear intact. When everted they resemble the petals of a daffodil.

**Carunculæ myrtiformes** are due to more extensive stretching, bruising, and occasionally sloughing of the intermediate portions of the hymen during childbirth. They appear as isolated nodules round the hymeneal margin.

**Cysts.**—Small cysts lined with epithelium sometimes form in the tissues of the hymen.

**Painful caruncles of the hymen** are a frequent source of vaginismus and dyspareunia. They appear as a series of congested spots, resembling small recent bruises, and exceedingly sensitive, situated at the hymeneal margin. They occur principally in cases of kraurosis vulvæ, and are often found associated with urethral caruncle. For treatment see Kraurosis.

**Imperforate hymen** is considered under the head of Atresia Vaginæ (p. 63).

**The rupture of the hymen** is generally attended by pain of short duration and slight bleeding. The latter may occasionally be so profuse as to demand surgical intervention, and may even be fatal.



**The Clitoris.**—*Inflammation.* This may form part of a general vulvitis, or it may be due to the development of a venereal sore or phagedenic ulcer. In other cases the prepuce becomes adherent to the glans of the clitoris, and the pent-up secretion (smegma) sets up irritation which may lead to ulceration or a small abscess. The treatment of this condition consists in separating the adherent margins of the prepuce, and keeping the parts clean and dry.

**Elephantiasis** is usually associated with elephantiasis vulvæ. Occasionally the clitoris is affected independently of the labia, and forms a tumour hanging down as a large mass in front of the vulva (Fig. 35).

**Carcinoma.**—This is a somewhat rare affection of the clitoris. The prognosis after removal is favourable, as the glands are affected very late, and there is but little tendency to deep or extensive spreading.

*Treatment.*—This consists in complete extirpation of the clitoris and its crura.

**Urethral Caruncle.**—This is a small red fleshy growth situated on the posterior aspect of the urethral meatus.

*Pathology.*—It usually occurs at or after middle life. It is often associated with kraurosis vulvæ, and in these cases it is probably due to the atrophic changes which characterize that condition; for there is often a striking similarity between some kinds of urethral caruncle and those red and tender spots round the hymeneal margin which occur so constantly in kraurosis.

In other cases, however, there is no accompanying kraurosis, and the caruncle is then usually larger and more prominent, and is due in all probability to changes taking place in Skene's ducts, two small recesses in the floor of the urethra. It is possible that these changes have an infective origin, but their pathology is not quite clear. In some cases the structure of the caruncle is suggestive of adenoma; in others the principal feature consists in the increase of thin-walled vessels like those seen in piles, and has suggested the name urethral hæmorrhoid. The view that a caruncle is due to changes occurring in the urethral ducts receives strong support from the fact that the caruncle is invariably situated on the floor of the urethra in the situation of the ducts.

*Symptoms and Signs.*—The patient complains as a rule of pain and tenderness at the meatus, with a burning sensation on passing water, and sometimes of frequency of micturition. Occasionally the caruncle gives rise to bleeding and pain on coitus. A caruncle is readily recognized on inspection, presenting the characters above described. It occasionally extends from one to two centimetres up the urethra.

*Treatment.*—The simplest plan is to remove the small growth with scissors, or to destroy it with the thermo-cautery under an anæsthetic.



## SECTION III

### INJURIES

## CHAPTER VII

### INJURIES OF THE REPRODUCTIVE ORGANS

#### I.—INJURIES OF THE VULVA

THESE occur in three ways : by accident, during sexual intercourse, and during parturition.

**Accidental injuries** are rare, but may result from a kick, a fall with the legs apart upon such a thing as the back of a chair, or the breaking of a chamber utensil when the patient is sitting upon it. Inasmuch as the vulva is very vascular, hæmorrhage may be very free. Such injuries require to be dealt with on ordinary surgical principles, according to the nature of the case.

**Injury during coitus** consists mainly in unusual tearing of the hymen. Bleeding from a tear of the hymen itself is always inconsiderable; but if the tear extend beyond the base of attachment of the hymen into the substance of the lateral wall of the vagina, bleeding may be free, and even alarming. Treatment will consist in clearing away clots, securing any bleeding vessel, and sewing up the tear. Oozing may require restraint with sterilized pads and pressure.

**Injury during parturition** nearly always consists of a rupture of the perineum; occasionally there may be tearing of the lateral walls of the vagina, extending into the vulva, but then the cause is usually to be found in careless instrumental delivery.

### THE PERINEUM

This term is applied to the cutaneous and subcutaneous tissues intervening between the fourchette and the anterior margin of the anus. Its centre corresponds to what is known in the male as the central point of the perineum. On section (Fig. 12) it is triangular, and marks the meeting of the sphincter of the anus, the transverse perineal and the rudimentary bulbo-cavernosus muscles. It also contains a strong meshwork of connective tissue, and fibres of elastic tissue intermingle with the confluent attachments of the muscles mentioned above.

**Ruptured Perineum.**—By this is meant a tear extending through the lower part of the posterior vaginal wall and the perineum; it may extend to the anus.

*Causes.*—It is almost invariably due to parturition, but occasionally it is produced by surgical procedures, such as the extraction of large uterine polypi or foreign bodies from the vagina.

When it occurs during labour, the predisposing circumstances are—

1. Disproportion between the size of the head and the genital passages.
2. Precipitate labour.
3. Want of care in the delivery of the head or shoulders.
4. Certain malpresentations, especially the unreduced occipito-posterior.
5. The use of instruments. The application of forceps does not, however, necessarily endanger the perineum; on the contrary, properly used, it may lessen the risk of injury by controlling and guiding the expulsion of the head.
6. Morbid conditions of the perineum: as undue softness and friability, which may be due to long-continued pressure of the child's head; undue rigidity; or diminution of elasticity as the result of chronic inflammation.
7. The risk is greater in primiparæ, and increases with the age of the primipara.

*Varieties.*—The following are met with—

1. *Partial.*—Little more than the fourchette may be



involved; or the perineum may be divided to a greater or less extent, but the sphincter ani remains intact. Within the vagina the tear nearly always occurs to one side or other of the posterior vaginal column. The thickness and firmness of this structure prevent a median split.

2. *Complete*.—The laceration is anteriorly the same as in the partial variety, but posteriorly it extends through the sphincter ani, and may pass for some distance up the anterior wall of the rectum.

3. *Central*.—In this kind, which is uncommon, the anterior part of the perineum remains intact, but a tear occurs at some place between the fourchette and the anus. It is due, as a rule, to long-continued pressure of the child's head, whereby the vitality of the thinned-out perineum is so impaired that it gives way at its most prominent point. Or perforation may occur later from gangrene, a vagino-perineal fistula thus resulting. Cases have also been recorded in which the central tear was so large that the child was born through it, passing out behind the posterior commissure of the vagina.

*Results of Ruptured Perineum*.—When the rupture is partial, there is a tendency to prolapse of the vaginal walls, especially the posterior; this may be followed by a more complete hernia of the pelvic floor. There is also inability to retain a pessary when this is indicated on account of prolapse or retroversion.

When the rupture is complete, in addition to the consequences mentioned above, there is diminution or loss of control over the rectum, causing incontinence of fæces and flatus.

*Treatment*.—When a perineum becomes torn during parturition it should always be repaired at once; two or three sutures will usually suffice; as a rule, union readily occurs, especially when the tear results from too rapid delivery, as it is consequently fairly clean. On the other hand, when the tear is due to long delay, rendering the perineum friable, the edges are swollen and bruised, and sloughing may occur instead of union. But whatever the nature of the tear, repair should always be attempted. When not seen till some time after, secondary perineorrhaphy is required.



## II.—INJURIES OF THE VAGINA

Serious and even fatal injuries of the vagina have followed rape on adult women as well as children; severe lacerations have been caused during willing coitus, due to unusual size of the penis, undue narrowness of the vagina, or even awkwardness on the part of the man. First coitus sometimes causes alarming and even perilous bleeding, especially when the laceration of the hymen extends to and involves the vulva or the vaginal wall.

Fatal peritonitis has followed the forcible introduction of foreign bodies. Women sometimes injure themselves fatally by introducing pointed instruments for the purpose of inducing abortion, or during fits of sexual frenzy.

The upper part of the vagina may be lacerated by the careless use of instruments in operations on the uterus and during instrumental delivery, or by the child's head in a long second stage of labour. In this way the broad ligament (mesometrium) may be opened up and pelvic cellulitis result. When free bleeding results, it may be erroneously thought to be derived from the cavity of the uterus. As a rule the bleeding stops readily under the influence of a hot vaginal douche (115° F.). If it persists, the lacerations may require to be repaired. A serious form of laceration sometimes occurs during labour, the recto-vaginal pouch being opened up. This may occur from violent uterine contractions in cases where the pelvis is narrow or there is other obstruction to delivery; it has also been produced during the introduction of the forceps, perforator, or cephalotribe. Coils of intestine may protrude through the gap, and even hang out from the vulva. The accident is generally fatal.

*Treatment.*—In recent injuries the blood-clot should be removed, and search made for bleeding vessels, which should be secured and ligatured. Capillary oozing is best restrained by careful packing with gauze.

**Foreign Bodies.**—The vagina, like the other accessible cavities of the body, is liable to have foreign bodies introduced into it. Little girls, from sheer curiosity, insert hairpins, pebbles, seeds, fruit-stones, pencils, etc. Older



girls introduce sponges, cotton-wool, and the like, with the hope of preventing conception from illicit intercourse.

Pomade-pots, pewter pots, cotton-reels or spools, candle-extinguishers, and small indiarubber balls have been removed from the vaginae of matrons; some of them were introduced to prevent pregnancy, others to act as supports to prolapsed wombs. Pessaries of extraordinary shape, size, and complexity have been introduced by obstetric physicians and forgotten till urinary fistulae or stinking discharges have led to examination. Brutal men when rioting with low drunken women have thrust into the vagina pipe-bowls, thimbles, clock-weights, or pieces of metal.

The vagina has served as a repository for stolen property—*e. g.* gems, bank-notes, jewellery, and pocket-books.

Among odd things the following deserve mention: A cockchafer beside a pomade-pot (Schroeder); a rose-bud; a small bust of Napoleon the Great; and cylinders of inverted pork-rind. A woman was admitted into the cancer ward of the Middlesex Hospital with a certificate of "stone cancer" of the uterus. Examination proved the alleged cancer to be a piece of brick. In the vagina of a feeble-minded patient of sixty the following articles were found: a large cork, a thimble, a rag, a needle-case, and a bootlace (Monod).

When a healthy young woman is found to be suffering from a stinking vaginal discharge, it is exceedingly probable that she has a foreign body in the vagina.

*Treatment.*—Foreign bodies should be removed as soon as discovered. When long retained it is usually necessary to obtain the advantage of an anæsthetic.

**Fistulae.**—As the vagina is placed between two hollow viscera, the bladder and rectum, it is not surprising that fistulous passages are occasionally formed between them. Fistulae are caused by sloughing of the vagina during protracted labour; injuries from obstetric implements; ulceration due to pessaries and other foreign bodies. They also occur in the late stages of carcinoma of the cervix uteri, vagina, and rectum. Occasionally they are due to ulceration of the bladder, set up by vesical calculi formed around foreign bodies introduced into the bladder.



Vaginal fistulæ, vesical, ureteral, and rectal, occasionally follow vaginal hysterectomy; usually, however, they are merely temporary.

Vaginal fistulæ are of four kinds: (1) Vesico-vaginal; (2) urethro-vaginal; (3) uretero-vaginal; (4) recto-vaginal. The names are sufficient to indicate their positions. Utero-vesical fistulæ may also be considered here.

*Symptoms.*—In the case of a vesico-vaginal fistula the patient complains that she cannot hold her water. Some urine may collect in the bladder and be voided periodically if the fistula is small; otherwise the urine escapes from the vagina as rapidly as it enters the bladder. The vulva and vagina are inflamed and excoriated by the constant wetting, and sometimes a phosphatic incrustation forms.

If the fistula be rectal, great discomfort and distress are caused by the passage of fæces and flatus by the vagina, though, if the fistula be small, the fæces may be prevented by their semi-solid consistence from entering the vagina.

*The Methods for the Detection of Vaginal Fistulæ.*—The persistent and involuntary escape of urine from the vagina is sufficient indication of the existence of a urinary fistula, but it is not always a simple matter to localize its precise position.

To determine this it is advisable to put the patient in the lithotomy position, and expose the parts with a duck-bill speculum introduced into the vagina in a good light. A vesico-vaginal or a urethro-vaginal fistula rarely gives rise to difficulty, and the pink everted edges surrounding its vaginal orifice soon lead to its detection. When there is difficulty in finding it, the vaginal mucous membrane should be cleared of mucus, and warm milk injected into the bladder through a catheter in the urethra; it will then dribble through the fistula.

Injections of milk are very serviceable for the detection of uretero-vaginal fistula. In this case, when milk is injected into the bladder, none escapes into the vagina; yet, during the course of the examination, urine has continued to escape into the vagina. This test is necessary even when the orifice of the fistula is clearly visible. In this form of fistula, if the urine which escapes involuntarily



from the vagina is collected, measured, and compared with that voided from the bladder, it will be found that the two quantities equal each other.

In the case of a utero-vesical fistula the urine will be seen escaping from the cervical canal of the uterus; when milk is injected into the bladder some of it escapes down the cervical canal; this is conclusive.

*Treatment.*—Persistent vaginal fistulæ of all kinds require operative treatment.

### III.—INJURIES OF THE UTERUS

Injuries of the uterus are by no means uncommon; they fall easily into four groups—

1. Gynæcological injuries.
2. Obstetric injuries.
3. Injuries to the pregnant uterus.
4. Injuries to the pregnant uterus in the course of abdominal operations (*see* Chap. LIX).

**Gynæcological Injuries.**—The simplest, and certainly the commonest, accident is the perforation of the uterus with a sound, dilator, or forceps in the operation of curetting. When the instruments are sterile, and the uterine cavity free from pathogenic micro-organisms, perforation by a sound is rarely attended with any untoward consequence. The greatest danger arises in those cases where the uterus is perforated, and the practitioner, ignorant of the fact, irrigates the uterine cavity with some poisonous solution, which leaks into the peritoneal cavity. Instances are known in which nurses in douching lying-in women have unconsciously perforated the wall of the uterus, and delivered the antiseptic solution direct into the patient's belly with fatal effects.

*One of the most serious complications of injury to the unimpregnated, as well as to the gravid, uterus is extrusion of the intestines through the rent.*

Several cases have been reported in which practitioners, in the course of dilating and curetting an unimpregnated uterus, have torn through its wall, and small intestine has protruded through the rent into the uterine cavity. The



operators, mistaking intestine for foetal membranes, have withdrawn several feet and cut the ends before realizing what had happened. In many cases the women died, but in a few instances surgical assistance has been obtained, the cut ends of the intestines have been united, and the patients recovered. Successful operations of this kind have been performed and reported by Bland-Sutton, Werelius, and Nixon Davis. Occasionally an experienced gynæcologist has ruptured the uterus during curetting, and, recognizing small intestine in the uterine cavity, has gently returned it into the abdomen, and the patient has suffered no ill consequence.

Although injuries of the uterus in the process of instrumental dilatation are rarely reported, Jakob in 1905 was able to collect 141 instances of perforation; of these, twenty-three died, the majority from septic peritonitis.

It should be borne in mind that instrumental perforations of the uterine wall have been followed by rupture of the uterus in a subsequent pregnancy.

The uterus is liable to be, and often is, torn in the operation known as vaginal myomectomy. Such an accident usually entails hysterectomy, and sometimes ends fatally. Some of the most remarkable and dangerous injuries inflicted on the uterus are the consequences of attempts to induce what is known as criminal abortion, especially when self-induced. Desperate measures are often adopted by single women who are pregnant, or imagine themselves to be pregnant. They sometimes thrust knitting-needles into the abdomen, catheters, sounds, sticks, penholders, or the like, through the vagina, and one desperate widow fired a revolver-bullet into the uterus during the fifth month of her pregnancy.

Many of these patients die in a few days from septic peritonitis, but some are rescued by a prompt cœliotomy.

A gravid uterus in the later months of pregnancy is a big organ, and, like the abdominal viscera generally, may be severely damaged by blows, falls, kicks from horses or brutal men, butts from animals such as calves and goats, horn-rips from cows and bulls, or the woman may be run over. The treatment of such conditions varies widely



with the circumstances. As a general rule, it may be stated that the most satisfactory mode of treatment is cœliotomy, as it permits a thorough examination of the uterus, and enables the surgeon to deal with any injury of the intestines. In the late stages of pregnancy accidents of this kind entail Cæsarean section.

**Obstetric Injuries.**—The uterus is liable during labour to be torn as a result of its own expulsive efforts, especially when the transit of the foetus is hindered or obstructed by narrowness of the pelvic outlet, tumours, or undue size of the child. This form of injury is called *spontaneous rupture*, to distinguish it from rupture due to instruments, such as midwifery-forceps, or cephalotribes; it is also liable to be torn in the obstetric manœuvre known as turning.

The literature relating to this accident is abundant, and the reports issued from lying-in hospitals deal with extensive figures, but unfortunately the reporters are not in harmony on the principles of treatment.

There are three methods of dealing with rupture of the uterus—

1. Treating the patient conservatively, which means at most lightly packing the part with antiseptic gauze.
2. Performing cœliotomy and stitching up the rent in the uterus.
3. Hysterectomy, preferably by the abdominal route, as this enables the peritoneal cavity to be cleared of clot.

The only point in which there is any semblance of agreement among obstetricians is this: In cases of complete rupture, in which the foetus and membranes are extruded from the uterus into the belly, cœliotomy is clearly indicated.

**Laceration of the Cervix.** *Causes.*—Laceration is sometimes produced by operations on the cervix, but in the vast majority of cases it occurs in childbirth. The immediate causes are precipitate labour, premature rupture of the membranes, a large or well-ossified foetal head, and the application of forceps before dilatation of the cervix is complete. A natural labour may result in laceration when the distensibility and elasticity of the cervix are impaired by disease, such as carcinoma and chronic inflammation.



*Results of Laceration.*—When a cervix is torn (as during labour) the raw surfaces become covered by granulation, and later by cicatricial tissue, but as a rule they do not unite. The resulting fissure does not necessarily give rise to symptoms, even if deep or bilateral, for the cervical mucous membrane may gradually acquire the characters of the vaginal epithelium. The external os retreats, as it were, toward the internal, while the anterior and posterior lips of the cervix become in reality lips, or lappets, which can be readily separated (Fig. 36).

But the lesion may take a less favourable course. The exposed cervical mucous membrane may become unhealthy,

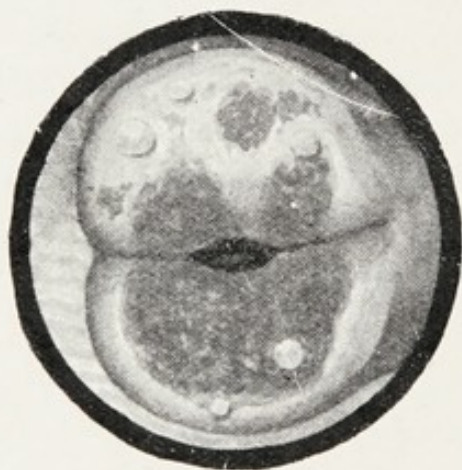


FIG. 36.—BILATERAL LACERATION OF THE CERVIX.

either alone or as part of a general endometritis; it then becomes congested, and, in consequence, the cervical flaps appear exaggerated. The tendency to separation is exaggerated if there be a marked coincident flexion of the uterus. The everted and thickened mucous membrane is then bathed in the unhealthy secretions (arising partly from the uterus) found in the vagina.

The congestion and œdema of the cervix commonly spread to the body of the uterus, which becomes heavy and enlarged, resembling the condition found in subinvolution. With the chronic endometritis and metritis so produced is frequently associated prolapse of the ovaries into the recto-vaginal pouch, especially when there is also retroflexion. The ovaries share in the congestion, and become unduly sensitive.

In the event of pregnancy, a deep bilateral laceration predisposes to abortion, and repeated abortions are sometimes due to this cause.

*Signs and Symptoms.*—A lacerated cervix does not, as such, give rise to symptoms, except, occasionally, bleeding in recent cases. Such symptoms as are present depend on the accompanying endometritis, and include leucorrhœa,



aching over the sacrum, a feeling of weight and "bearing down" in the pelvis, and dyspareunia.

From time to time lacerations have been held responsible for many reflex neuroses. We believe this to be entirely erroneous, for although such neuroses have disappeared after repair of the cervix, the improvement must be attributed to the simultaneous curing of the inflammatory condition.

A laceration is readily detected by digital examination, and may be seen by the use of the speculum. Lacerations vary in nature and extent. There may be a split limited

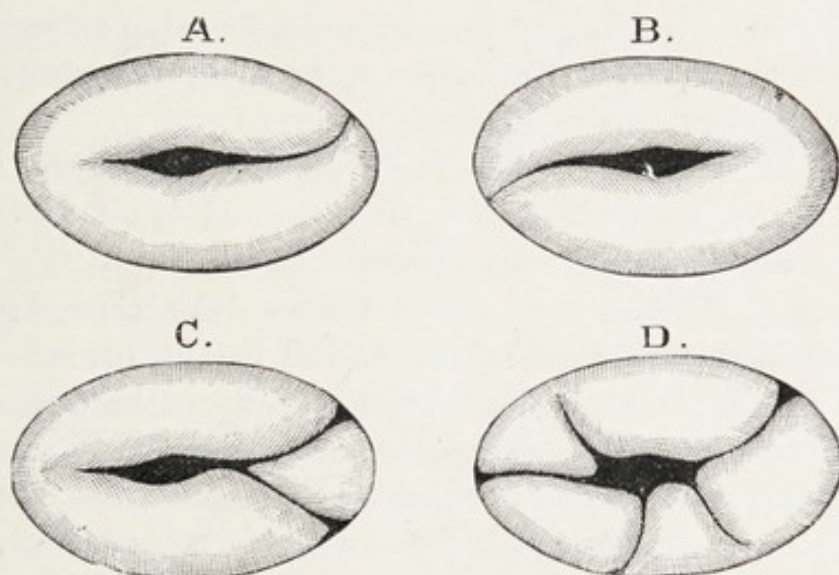


FIG. 37.—FOUR DIAGRAMS TO INDICATE THE POSITIONS OF CERVICAL LACERATIONS.

to one side, the cleft extending only a short distance from the external os, or reaching up to the junction of the cervix and vagina. It is more frequent on the left side, running a little forward (Fig. 37, A), and sometimes bifurcated externally (Fig. 37, C); this is attributed to the greater frequency of the left occipito-anterior position of the child during delivery. A right occipito-posterior position will cause a laceration of the posterior lip on the right side (Fig. 37, B). In other cases the split is bilateral, so that the cervix presents well-marked anterior and posterior flaps; or several fissures may be found, radiating from the external os (Fig. 37, D). A Fergusson's speculum somewhat masks the extent of laceration by holding the lips in



contact; a Neugebauer's or a Sims' speculum and a hook give, therefore, a better view. The presence of a complicating endometritis will be determined at the same time.

A bilateral laceration with considerable eversion of the mucous membrane may resemble adenomatous disease with but slight laceration, because the two lips cannot be brought together; on relieving the congestion by scarification the true condition will be recognized.

*Treatment.*—When no inflammatory conditions are present no treatment is required, except as a prophylactic measure. Inasmuch as laceration predisposes to endometritis and abortion, it may often be considered advisable to repair the rent with a view to diminishing the risk, especially when several abortions have already occurred.

When the laceration is followed by the more serious results above described, the operation of trachelorrhaphy, or repair of the cervix, is indicated.

**Foreign Bodies in the Uterus.**—Various kinds of foreign bodies are occasionally found in the uterus. They consist of fragments of a metal sound, catheters, sponge or laminaria tents, an electrode, or a piece of silk used to ligature the pedicle of a polypus. Even pessaries of various kinds have been removed from the cavity of the uterus. Portions of the foetal skeleton, such as a parietal bone, or the shaft of a femur have been left after craniotomy. Miscellaneous things have been introduced for the purpose of procuring abortion, such as hairpins, catheters, india-rubber tubing, knitting-needles, a goose-quill, etc.

*Symptoms.*—As a rule, the foreign body sets up irritation and suppuration; the profuse discharge of pus leads to an examination and detection of its cause.

*Treatment.*—The offending body should be removed as soon as possible. This is a proceeding which occasionally requires some ingenuity.



## SECTION IV DISPLACEMENTS

### CHAPTER VIII

#### DISPLACEMENTS OF THE REPRODUCTIVE ORGANS— FLEXIONS AND VERSIONS

DISPLACEMENTS of the reproductive organs are of six types—

1. Flexions of the uterus, in which the normal shape of the organ is altered.

2. Version of the uterus, when the normal direction of the longitudinal uterine axis is altered.

3. Downward displacement, which is due to a combination of relaxation of ligaments and weakness or injury of the pelvic floor. The downward displacement may affect the anterior vaginal wall (cystocele); the posterior vaginal wall (rectocele); or the uterus (prolapse of the uterus). Any one or two of these structures, or all three together, may be involved. When the downward displacement is excessive, so that the uterus protrudes beyond the vulva, it is spoken of as procidentia. The ovaries also are liable to prolapse, either alone, or in association with uterine displacements.

4. Downward displacement associated with hyperplasia of the cervix. This condition is essentially one of overgrowth of tissue, but in its ætiology and clinical symptoms it is allied so closely with downward displacement that this chapter is the most suitable place for its consideration.

5. Inversion of the uterus, in which this organ is turned inside out.

6. Hernia of the uterus and appendages.



### 1.—FLEXIONS OF THE UTERUS

Normally the body of the uterus is slightly flexed forwards on the cervix, as shown in Fig. 12 and Fig. 38, I. The angle formed between the two is about  $160^{\circ}$ . We may say, therefore, that normally the uterus is slightly ante-flexed. When this forward flexion is exaggerated it is abnormal; and when we speak of ante flexion of the uterus, an abnormal degree of flexion is implied.

When, on the other hand, the body of the uterus is bent backwards in relation to the cervix the condition is spoken of as a retroflexion.

**Anteflexion of the Uterus.**—In a marked case the angle between the body of the uterus and the cervix may be a right angle or even an acute angle.

*Causes.*—It is most often congenital. It has been stated that it may be due to parametritis involving the utero-sacral ligaments, and that the subsequent cicatricial contraction may draw the portion of the uterus to which these ligaments are attached backward, causing ante flexion. This explanation is theoretical, and the occurrence, if it takes place at all, is extremely rare.

*Symptoms.*—Even a considerable degree of ante flexion may exist without causing any trouble, especially in the young. When symptoms are present they are: (1) dysmenorrhœa; (2) sterility; (3) reflex nervous phenomena. The way in which dysmenorrhœa is produced is not quite plain. It has been attributed to obstruction to the outflow of blood by the projecting angle, but this is improbable, for in the first place the menstrual flow in these cases is always moderate, and even scanty, and the amount of blood passing at any one time is therefore small; and in the second place obstruction would necessarily cause accumulation behind the obstruction, and this never occurs. More probably the pain is caused by the contraction of the muscle fibres at a disadvantage, and by compression of a hyper-sensitive mucosa by the muscular contractions. The dysmenorrhœa generally comes on some years after the first establishment of menstruation, but in neurotic patients it may be present from the first.



Sterility is due partly to the fact that congenital ante-flexion is generally associated with under-development of the uterus, and a pinhole os; but it may also result from the tilting forward of the cervix, for when the canal is straightened, and the cervix is made to point backward, conception sometimes follows.

Reflex nervous phenomena are not uncommon; one of the most frequent is bladder disturbance.

On examination the fundus is felt like a knob just in front of the cervix, and between the two the tip of the finger rests in a well-defined angle. The sound is arrested at the internal os, and in order that it may pass to the fundus it may require to be sharply bent forward, for the canal of the cervix often makes a right angle with that of the body of the uterus. Two varieties of ante-flexion are found: in one, the fundus is in normal position, while the cervix is bent forward and upward (Fig. 38, II); in the other, the cervix is in its normal position, whilst the fundus is bent forward and downward (Fig. 38, III).

*Treatment.*—Vaginal pessaries are absolutely useless. Two courses are open: first, dilatation of the cervical canal; secondly, a plastic operation. The dilatation should be carried up to 12 millimetres. It has the effect of straightening the canal. It may be necessary to repeat the dilatation after a few months, or to pass a few smaller dilators from time to time. In virgins these repeated manipulations are a disadvantage. Plastic operations include the division of the cervix by a single median incision or bilaterally.

**Retroflexion of the Uterus.**—This occurs, rarely, as a congenital condition; more often it is acquired, and occurs as a complication of retroversion (Fig. 38, VI). In the former condition, if the fundus of the uterus be brought forward—for instance, by the sound—it springs back into the faulty position as soon as the sound is withdrawn. But when it is acquired, there is at first free hinge-like movement at the internal os, and the fundus, if replaced, remains in the new position. If it remain long retroflexed this mobility becomes impaired. The uterus sometimes becomes fixed in a position of retroflexion by pelvic cellulitis.

*Symptoms.*—(1) Dysmenorrhœa, produced in a manner



analogous to that resulting from ante flexion; (2) pain on defæcation and constipation, due to the pressure of the fundus on the rectum; (3) the patient is often, but not invariably, sterile.

On the other hand, retroflexion may be present without causing any symptoms, and it then requires no treatment.

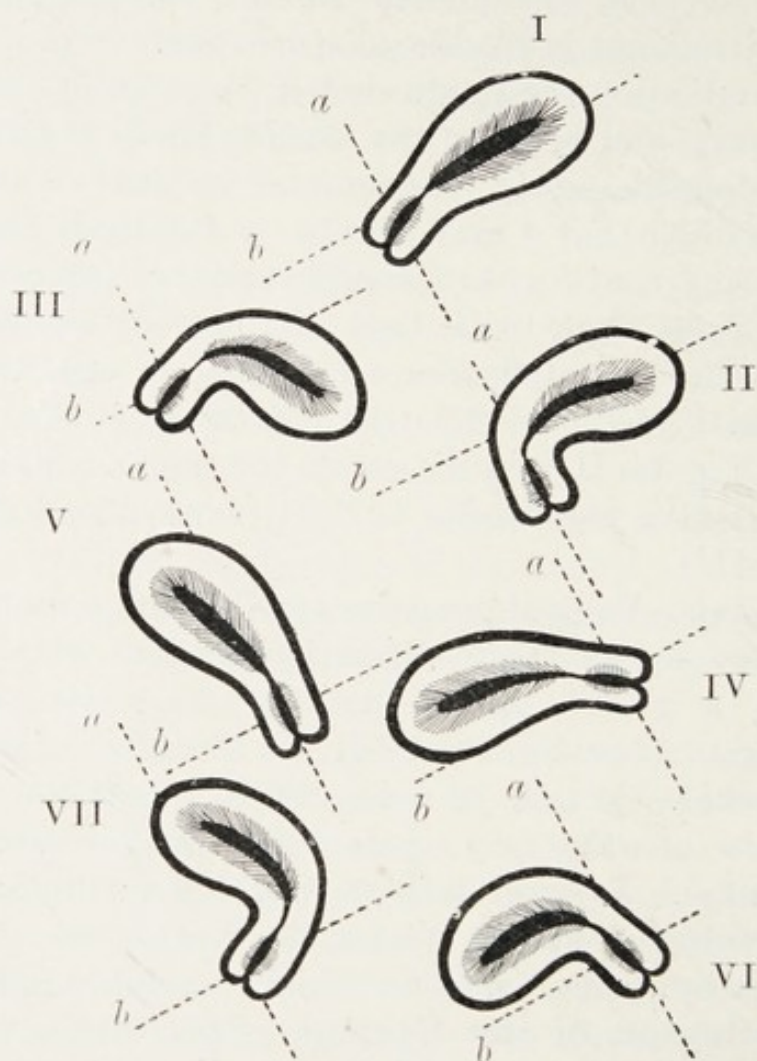


FIG. 38.—DIAGRAMS ILLUSTRATING FLEXIONS AND DISPLACEMENTS OF THE UTERUS: *a*, AXIS OF THE VAGINA; *b*, AXIS OF THE NORMAL UTERUS. I, NORMAL POSITION; II, ANTEFLEXION, FUNDUS IN NORMAL POSITION; III, ANTEFLEXION, CERVIX IN NORMAL POSITION; IV, RETROVERSION; V, PARTIAL RETROVERSION; VI, RETROVERSION WITH RETROFLEXION; VII, ANTEVERSION WITH RETROFLEXION.

*Treatment.*—If the uterus be freely movable, as indicated above, the flexion should be first corrected by digital manipulation, or failing this by the sound, and a Hodge pessary introduced. Special care must be taken lest the cervix be brought into a position of anteversion while the flexion



remains unreduced (Fig. 38, VII). The position of the cervix must accordingly not be taken as a guide, but the fundus must be felt bimanually in front of the cervix.

If the uterus be rigid, a Hodge pessary will not correct the flexion; dilatation of the cervix is then the proper treatment, and a Hodge pessary may be subsequently applied, or a plastic operation may be undertaken. Failing these measures, hysteropexy will be required.

## 2.—VERSION OF THE UTERUS

At one time it was customary to include anteversion (that is, a forward tilt) of the uterus as a pathological condition; but it is now recognized that anteversion is the normal direction. We have, therefore, only to consider posterior deviation of the uterine axis.

**Retroversion of the Uterus.**—Partial retroversion of a normal-sized uterus (Fig. 38, V) is, under certain circumstances, physiological—for instance, in a patient lying on her back with a full bladder. In such a case it is not an uncommon thing to find, on making a second examination a few days later, that the fundus is lying forward. The same thing may occur with a uterus that is slightly enlarged, as in early pregnancy, and during the early weeks after labour. These conditions, therefore, require no treatment. In other cases retroversion is a pathological condition (Fig. 38, IV).

*Causes.*—1. Relaxation of the uterine ligaments, as the result of repeated pregnancy. The utero-sacral, round and broad ligaments are all involved, for if any one pair of the three retained its normal tension, retroversion would be resisted.

2. Increased weight of the fundus, due to chronic congestion, subinvolution, pregnancy, or fibroids.

3. Cicatricial contraction following pelvic inflammation.

4. Pressure on the front of the uterus, due to an ovarian or other tumour, or to a frequently over-distended bladder. A wandering spleen lodged in the pelvis has been known to cause the same result.

5. Retroversion is in rare cases due to a fall or sudden



strain. It is a question whether this cause can operate without the predisposition indicated under paragraphs 1 and 2.

*Symptoms.*—These vary according as the retroversion is simple or complicated by pelvic inflammation or fixation. Among the symptoms caused by a movable retroverted uterus, there may be sudden pain, if the displacement has been accidentally produced; otherwise the patient complains of a feeling of ill-defined weight and fulness in the pelvis, due, probably, to congestion. From the position of the fundus there is often discomfort during action of the bowels, and constipation. Bladder disturbance is not common unless the uterus is enlarged, and then there may be enough pressure of the tilted cervix against the base of the bladder to cause frequent desire for micturition with dysuria, followed by complete retention of urine. If the fundus remains for some time low in the recto-vaginal (Douglas's) pouch, the tubes and ovaries are dragged upon, and one or both of the latter may become "prolapsed." In that case dyspareunia is generally complained of, as well as dysmenorrhœa, and sterility is usually present.

When complicated with pelvic inflammation, the chief symptoms are: pain, often excessive and continuous; severe dysmenorrhœa; irregular metrorrhagia, due to the fact that the uterus cannot contract properly; abundant leucorrhœa, caused by the pelvic congestion; general weakness, and secondary nervous disturbances.

The reflex nervous disorders consequent on retroversion and retroflexion (for the two conditions are frequently combined as in Fig. 38, VI) require some notice. A list of them would comprise all known functional disorders, and, while the association of some of these with displacement may be considered as a coincidence, there are many which must be regarded as directly due to the uterine condition, as is shown by those cases in which reposition of the uterus is followed by immediate cessation of symptoms, whilst these come on again at once if the displacement recurs. The most frequent reflex neuroses are: digestive disorders, especially vomiting; cardiac disturbances; frequency of micturition and incontinence of urine; headache and



neuralgia. In some cases of long standing, the restoration of the uterus to its proper position is not followed by improvement of the reflex disorders, although the first appearance of these may have coincided with the commencement of the uterine trouble.

*Complications.*—Among these we might reckon the nervous disturbances just referred to. The local complications include pelvic inflammation, prolapse of the ovaries and tubes, and hernia of the pelvic floor—namely, cystocele, rectocele, and prolapse of the uterus. As we shall point out in discussing prolapse, retroversion of the uterus is nearly always the first stage in the production of that condition.

*Treatment.*—The first thing is to replace the uterus, with the fingers alone if possible; with the sound if necessary.

*Digital Manipulation.*—Two fingers are introduced into the vagina and are made to press on the fundus, through the posterior vaginal fornix, in a direction forward and upward. If the uterus be fairly rigid the fundus can readily be tilted up by pressing backward on the front of the cervix. The fundus being raised by either method, the fingers of the other hand depress the abdominal wall above the uterus and bring the fundus forward, whilst the fingers in the vagina assist by pressing the cervix back. The manipulation may be assisted by placing the patient in the genupectoral position, and in difficult cases, when the use of the sound is contraindicated, this should be done.

*Replacement with the Sound.*—The sound is passed with the concavity of the curve pointing backward. When the point is at the fundus, the handle is brought round to the front with a wide sweep, so that its intra-uterine portion rotates on its longitudinal axis, but does not otherwise move. On no account should the semicircle described by the revolving portion be made by the point of the sound. The handle is then gently and slowly drawn backward, in the middle line, toward the perineum, until the fundus can be felt with the hand on the abdomen. While the sound is being withdrawn, the finger in the vagina should be pressed against the cervix, to keep it in position.

The uterus having been replaced, some form of Hodge pessary is introduced, paying attention to several points.



Thus the instrument must fit properly; it must be adapted to the width of the posterior fornix, and also to the length of the vagina. If too long, it is apt to press on the urethra, and cause difficulty in micturition; or it may press on the rectum, and produce a tendency to constipation. If the vaginal walls are lax and the fundus heavy, the instrument is likely to be tilted up anteriorly, and the retroversion is reproduced. If an ovary is lying in the recto-vaginal (Douglas's) pouch it may be pressed upon, and much pain will result. An instrument made of block-tin answers well; it is clean, and can be moulded to any desired shape. One or both of the posterior angles can be depressed to prevent pressure on the ovaries, and the anterior bar may be indented so as to form an arch over the urethra. The relation of the breadth to the length of the instrument can also be adjusted. As a rule the posterior bar should be made to project well forward and upward.

When adhesions are present, treatment must be different. Obviously, to put in a pessary is to add risk to inefficiency. The one thing needful is to restore the mobility of the uterus. If time be no object, this may sometimes be attained by a somewhat prolonged course of rest in bed, combined with a depletory treatment by means of vaginal irrigation and tampons of glycerin, with or without ichthyol (5 to 10 per cent.). During this treatment an occasional attempt must be made to raise up the uterus; for this purpose the sound may be used, but it requires to be employed with great care. After some time it will often be found that the uterus can be moved a little, and by degrees the normal position can be restored. When this occurs a Hodge pessary is introduced and kept in for some time.

If suppurative disease of the appendages be present, the above treatment will generally be futile, and until the organs offending be removed no permanent cure can be hoped for.

Sometimes the adhesions, by long neglect, have become so firm that they cannot be overcome by the above means. An operation then gives the only hope of cure—namely, opening the abdomen, freeing the adhesions, and suturing the fundus to the abdominal wall (hysteropexy). This



should not be lightly undertaken, but the risk attending it should be carefully weighed with the alternative of not operating, which may mean a life of chronic invalidism and impaired usefulness.

Even when there are no adhesions, pessaries may, after long trial, entirely fail to relieve the retroversion and the attendant symptoms, and here also operative interference may be required. Hysteropexy and the operation for shortening the round ligaments are the two principal methods of dealing with this condition, but we strongly prefer hysteropexy, as it is the more satisfactory operation and gives excellent results.

**Retroversion of the Gravid Uterus.**—This may be regarded as an obstetrical complication; but as it also comes often into the practice of the gynæcologist, it is proper to refer to it here.

*Causation.*—In the majority of cases, retroversion has existed before the occurrence of pregnancy; in the minority, the pregnant uterus has been in the right position at first, but some strain or accident has led to a backward displacement. For such an accident to be effective, it must take place before the end of the third month, because after that time the uterus is too large to turn over backwards through the pelvic brim.

*Varieties.*—The two principal varieties of this condition are: (1) *Retroversion*, with the whole uterus lying in the pelvis; (2) *Sacculation*, when a part of the uterus rises into the abdomen, whilst a sacculated portion of its posterior wall is impacted in the pelvis. The second variety is rare, and unless the sacculated portion is held by adhesions, spontaneous rectification is likely to occur. Some writers have drawn a distinction between retroversion and retroflexion of the gravid uterus. Theoretically, the distinction exists; practically it is of small importance; because the degree of difficulty attendant upon the replacement of the uterus depends upon the stage to which pregnancy has advanced and the size to which the uterus has attained much more than upon the question whether it is a retroversion or a retroflexion.

*Symptoms.*—Before the end of the second month there



may be no symptoms at all, or at most a sensation of discomfort, weight, fulness or downward pressure in the pelvis. But in the course of the third month the enlarging uterus begins to press upon the base of the bladder, causing some irritability of this organ, and frequency of micturition. By degrees the pressure becomes more pronounced, until one day the patient finds that she cannot pass water. The bladder becomes very distended, and this is usually the stage at which the patient seeks advice. On examination, a pear-shaped cystic tumour is found rising out of the pelvis into the abdomen; it may be of a considerable size. On vaginal examination the vagina is found pressed forwards by an elastic swelling bulging down in the pouch of Douglas and filling the pelvis; the cervix is usually drawn upwards and pressed against the pubes. On passing the catheter, a large quantity of urine is drawn off, it may vary from one to six pints, and the abdominal tumour will then be found to have disappeared.

*Diagnosis* is very easy. The history of three months amenorrhœa and of inability to pass water following on a period of frequent micturition; the abdominal and pelvic swellings, and the disappearance of the former on passing the catheter, form together a clinical picture which can hardly be mistaken. There is only one condition which may simulate it closely, namely, the occurrence of an extra-uterine pregnancy when the foetal sac lies in the pouch of Douglas. As a rule, in such cases, the swelling is partly made up by a hæmatocele from the ruptured tube; but in a case recorded by Munro Kerr, where the pregnancy had advanced almost to the fourth month, there does not appear to have been any hæmatocele. The principal points that would lead to a diagnosis of the extra-uterine pregnancy are: first, a history of laterally situated pain and blood-stained discharge; secondly, the fact that reposition cannot be effected, even under an anæsthetic; thirdly, the different sense of resistance to the fingers, for with the gravid uterus the feeling is of a tense elastic swelling, whereas with the extra-uterine condition, particularly with a hæmatocele, the sensation is rather that of a doughy swelling which can be pitted by the finger. In a case that



came under the notice of one of us (A. E. G.) the last-named feature was very noticeable.

*Results of Non-Interference.*—These may be very serious. The least so is that the patient miscarries. If this does not happen the bladder becomes increasingly distended, and its walls become markedly hypertrophied and then tend to slough; the bladder becomes septic, and this may be followed by an ascending infection of the ureters, leading to pyelitis and pyonephrosis. In other cases rupture of the bladder occurs; this accident always proves fatal. There is no doubt that in a certain number of cases of retroversion of the gravid uterus spontaneous rectification occurs; but it is equally certain that this happy termination is very rare after symptoms of incarceration have become manifest.

*Treatment.*—When called to a case of incarceration of the gravid uterus, the first thing is to empty the bladder by means of a catheter. If the patient can be kept under close observation, the experiment of letting the uterus right itself may be tried; the patient is directed to keep in bed and to adopt the knee-chest position frequently. Otherwise an attempt must be made to replace the uterus: for this purpose two fingers are introduced into the vagina, and with their palmar surface (not their tips) a steady pressure is made against the fundus, until it can be felt to move upwards. This manœuvre may be alternated with a backward pressure of the fingers against the front of the cervix. When the fundus can be felt in the abdomen the reposition is completed by bimanual manipulation. Sometimes the rectification of the displacement is facilitated by placing the patient in the knee-chest position. After the replacement, a large soft rubber ring should be introduced into the vagina, and kept in for a few weeks—that is, until the uterus is too large to be able to fall back again.

In cases where there is evidence that the uterus is held in its faulty position by adhesions or by the presence of a tumour, the proper course is to open the abdomen and free the adhesions or remove the tumour.

Miscarriage may follow the reposition of a retroverted

gravid uterus ; but usually when this happens the incarceration has existed for some time and the occurrence of miscarriage has already been foreshadowed by abdominal pains and a blood-stained discharge.

In early cases, when reposition is effected with due care and gentleness, miscarriage is not likely to occur.



## CHAPTER IX

### DISPLACEMENTS—DOWNWARD DISPLACEMENTS

#### 3.—DOWNWARD DISPLACEMENTS

As we stated at the beginning of this section, it is a common thing for prolapse of the vaginal walls to be associated with displacements of the uterus, the whole forming the typical "hernia of the pelvic floor"; but as the vagina may be affected principally, or alone, we shall begin by describing the two chief types of vaginal prolapse—viz., cystocele and rectocele.

**Cystocele.**—This is really a hernia of part of the bladder into the vagina, the vaginal mucous membrane forming its outer covering; or it may be expressed as a deflection of the vesico-vaginal septum toward the vagina. It forms a smooth, rounded swelling, which bulges through the vulvar aperture when the patient coughs or strains. If the lower part of the anterior vaginal wall is mainly affected, the swelling is more properly called a *urethrocele*. In this case it is smaller, and the thickened urethra can be felt as a median projection through the vaginal wall.

**Rectocele.**—This is a hernia of the rectum into the vagina, covered by the mucous membrane of the posterior vaginal wall. It forms a swelling resembling that produced by a cystocele, except that it is on the posterior aspect of the vagina. If the finger be introduced into the rectum it can be passed into the pouch in the vagina, and similarly a sound introduced into the bladder can be passed into a cystocele.

A rectocele is nearly always associated with a deficient perineum; and, further, cystocele and rectocele are often found together. When this is the case the vulvar outlet, when the patient strains, is occupied by two smooth



swellings placed one in front of the other; between them the finger can be passed up to the cervix (Fig. 39).

*Causes.*—The direct cause of these conditions is a relaxation of the tissues forming the vaginal walls. This, again, is brought about mainly by parturition. Women who have borne a great number of children are the principal sufferers, and most cases come under observation between the ages of

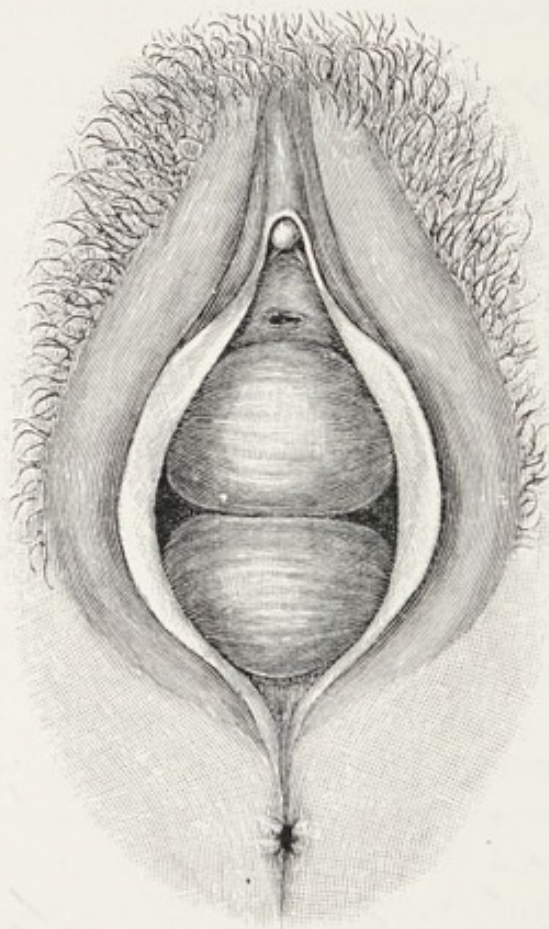


FIG. 39.—CYSTOCELE AND RECTOCELE.

thirty and forty-five. After the menopause the general tendency to atrophy of the genital passages counteracts in some measure the laxity of the vaginal walls.

The mechanism of the displacement differs slightly in the production of a cystocele and a rectocele.

**CYSTOCELE.**—It will be remembered that the anterior vaginal wall is attached more firmly below, opposite the pubes, than above; in the case of a tedious labour, when a large head presses for some time on the vaginal walls, the anterior wall is forced down, and its attachments to the pubes are loosened



and may even be separated. After a first confinement the parts may regain more or less their normal fixity. But after repeated labours, especially if difficult, the lower part of the anterior vaginal wall remains permanently loosened from its pubic attachment, and tends to prolapse whenever the intrapelvic pressure is increased, as when the bladder is full, when the patient strains at stool or coughs, and in some cases when she stands.

A cystocele may arise in another way. Owing to the fact that the principal attachment of the anterior vaginal wall is at its lower end, it follows that if the uterine supports be loosened, and the uterus comes to lie low in the pelvis, the upper and lower ends of the anterior vaginal wall are approximated. The intervening part bulges downward, especially when the bladder is full, and in this way also a cystocele is produced.

A third factor in the production of a cystocele is the condition of the levator ani. This muscle is perforated by the vagina, but in the virgin the edges of the muscle at the site of perforation lie fairly close up against the vaginal walls, and meet in front of the vagina, thus supporting the bladder. But when the muscle is relaxed by parturition the edges that embrace the vagina may become separated in such a way as to allow the bladder to bulge between them and protrude under the anterior vaginal wall.

**RECTOCELE.**—The posterior vaginal wall is mainly attached above, being held in place by the utero-sacral folds. When these are lengthened and rendered lax, as by the dragging of a heavy uterus or as the result of repeated labours, the posterior vaginal wall hangs lower, and may bulge in the form of a rectocele. The tendency to this is greatly increased if the perineum be torn, as the inferior support is then lost. Indeed, a slight degree of rectocele is possible when the perineum is torn, even if the utero-sacral folds remain at a normal tension, and the uterus is in its proper position. But it is evident that, as long as the superior attachment of the posterior wall remains firm, there can be no great prolapse of that wall, unless it has become elongated, as may occur after repeated deliveries.

In accordance with the above considerations we find, first,



that cystocele is more common, and usually more marked, than rectocele; secondly, that prolapse of the uterus strongly predisposes to prolapse of the vaginal walls.

*Symptoms.*—The patient complains principally of “bearing down,” and of something protruding from the vulva. In out-patient practice the statement made is often that “the womb comes down.” The feeling of weight and dragging is aggravated after long standing or walking, and during defæcation. With cystocele and urethrocele there is often frequency of desire to pass water. On making an examination, the vaginal outlet is seen to be occupied by one or two swellings according as one or both conditions exist. In recent cases the mucous membrane retains its normal character; in those of long standing it may be thickened and hard, approaching the appearance of the skin. The swelling is distinguished from a protruding cervix by the absence of the os externum and by the fact that it has an anterior (cystocele) or a posterior (rectocele) attachment. A finger passed through the anus into the posterior swelling, or a sound passed through the urethra into the anterior one, will confirm the diagnosis. The cervix uteri is generally met with low down in the vagina.

Cystocele may be simulated by a cyst in the lower part of the anterior vaginal wall, or by a peri-urethral abscess. These conditions are distinguished by the tense cystic feeling which they convey to the examining finger, and by the fact that the swelling is still felt when the anterior vaginal wall is pushed up.

*Treatment* is of two kinds—palliative and curative.

(a) *Palliative treatment* consists in the employment of pessaries; of these, the most useful is the rubber ring. When the perineum is much torn, it is often found that no ring will remain in position, unless so large as to cause harmful pressure. An instrument of the cup-and-stem type may be used, or a ring with a Y-shaped stem, the limbs of the Y being attached at the ends of a diameter of the ring. Perineal bands are fastened to the lower end of the stem. These plans are, at the best, faulty, and when a simple ring cannot be retained it is much better to resort to operation unless there be some contra-indication,



(b) *Curative or Radical Treatment*.—For rectocele, a perineorrhaphy may be performed, either alone or associated with posterior colporrhaphy (colpo-perineorrhaphy).

For cystocele many varieties of anterior colporrhaphy have been devised (*see Colporrhaphy*). In obstinate cases some more serious measure may be tried, such as vaginal or abdominal fixation (*see Hysteropexy*). For cystocele associated with retroversion of the uterus, vagino-fixation is said to answer well, for the two opposing tendencies—of the uterus to fall back, and of the vaginal wall to fall down—counteract one another (Edge).

**Vaginal Hernia** (*Enterocoele*).—A rare form of hernia sometimes occurs in which the uterus and the lower part of the vagina retain their proper position, whilst the peritoneal pouch behind the uterus bulges into the vagina and is occupied by coils of intestine. It is distinguished from rectocele by the following points : (1) The swelling is not continuous below with the margin of the vulva ; (2) the finger cannot be passed into the pouch through the anus ; (3) the cervix uteri is found high up.

A vaginal hernia has been mistaken for prolapse, polypus, and inversion of the uterus.

## PROLAPSE AND PROCIDENTIA

Downward displacement of the uterus is called prolapse or procidentia, the terms being applied to different degrees of the same condition ; when the uterus, though low down, lies entirely in the vagina, it is spoken of as prolapse ; when it protrudes through the vulva, as procidentia.

*Causes*.—All the causes of retroversion of the uterus, except cicatricial contraction due to pelvic inflammation, may be regarded as predisposing to prolapse, inasmuch as the former is the first stage of the latter. The exciting causes are—

1. Increased intra-abdominal pressure, either continuous, as in the case of ascites and abdominal tumours, or intermittent, as from frequent straining efforts or a chronic cough.



2. Weakening of the supporting structures of the pelvic floor, such as relaxation and thinning of the vaginal walls and laceration of the perineum. A very patulous condition of the vulva, such as is met with sometimes in multiparæ, may have the same effect as a damaged perineum.

3. Traction on the uterus from below, by the weight of an enlarged cervix, by a cervical tumour, or by repeated operative manipulations, whereby the uterus is drawn down.

*Pathology.*—It occasionally happens, when the pelvis is large and the vaginal walls are very lax, that the uterus becomes prolapsed in a position of anteversion; but this is rare. The uterine canal is normally at right angles to the vagina, and in the great majority of cases the uterus must come to lie in the axis of the pelvic outlet before prolapse can occur to any extent. As long as it lies in the axis of the pelvic inlet, deficiency of the pelvic floor has no appreciable effect, and intra-abdominal pressure simply presses the whole uterus backward against the posterior vaginal wall and the sacrum. But, once retroversion takes place, the lack of perineal support is felt, and increased pressure leads to descent of the uterus toward the vaginal orifice. The mechanism presents a close parallel to the delivery of the head during parturition in the unreduced occipito-posterior position: the long axis of the head does not conform to that of the pelvic outlet, and delivery is delayed; whilst as soon as rotation forward of the occiput places the long axis of the head in relation to that of the pelvic outlet, descent is easy.

As the uterus descends, it draws down with it the upper part of the vaginal walls, whereby the vaginal fornices are deepened. If the initial causes remain at work, and the vaginal orifice be large, either from stretching or from deficiency of the perineum, the cervix protrudes from the vulva (Fig. 40), and eventually the greater portion or the whole of the uterus comes to lie outside, covered by the vaginal walls reflected over it. In this way a mass the size of the closed fist may be found outside the vulva.

When the whole vaginal attachment is very lax, the lower portion of the vaginal walls may take part in the



protrusion, in the form of a cystocele and rectocele; whilst in exceptional cases the tubes and ovaries, the bladder, and a considerable portion of the intestines may come to lie in the hernial mass.

There is another mode of production of prolapse in which descent of the whole uterus is not the principal feature; but the first stage is elongation of the supravaginal portion of the cervix—*i. e.* the part situated between the internal os

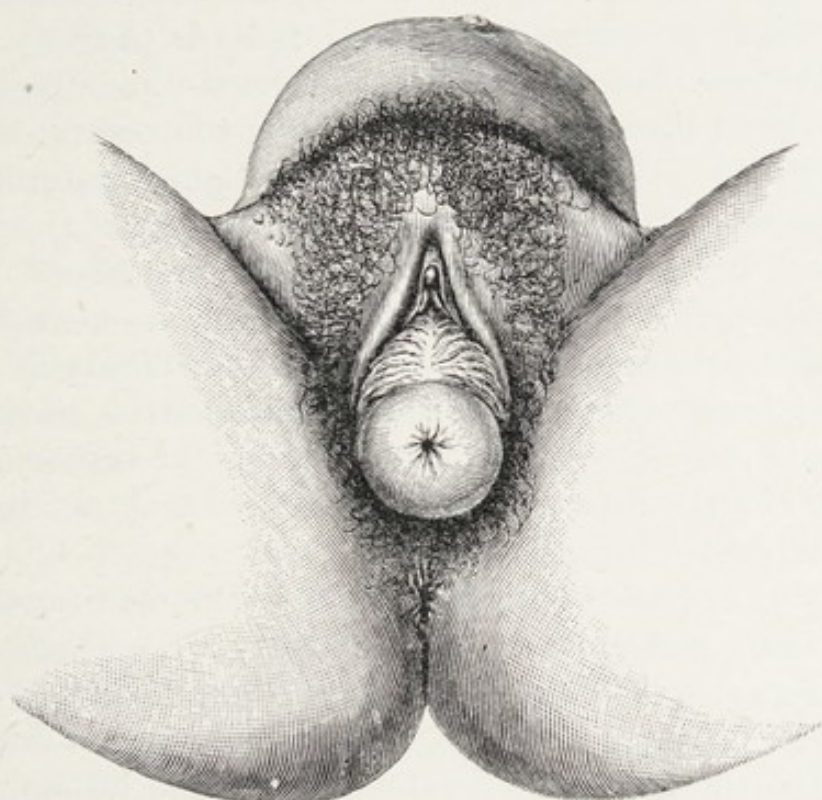


FIG. 40.—PROCIDENTIA OF UTERUS DUE TO THE PRESSURE OF TWO OVARIAN DERMIDS.

and the vaginal portion. In the course of the hyperplastic elongation, either the fundus must be pushed upward or the vaginal portion downward. The latter is the course of least resistance, and is consequently followed. In these cases the cervix may be low down, while the fundus is nearly in its normal position, and the uterine cavity is found to be greatly lengthened (Fig. 41). Later, the whole uterus may assume a lower position as the result of the increasing weight of the cervix. Authors differ in the relative influence which they ascribe to these two conditions, primary descent and hyperplasia, in the production



of prolapse; the difference is no doubt partly due to the fact that in cases of primary descent a certain degree of secondary hyperplasia generally occurs. We believe that primary descent is the more frequent condition.

According to some authorities, two clinical types of prolapse are found. In the utero-vaginal, the descent of the uterus is the principal factor, and as it descends it everts the anterior and posterior walls of the vagina almost equally. In the vagino-uterine type, the vaginal wall (usually the anterior, but sometimes the posterior) leads the way. This may be the result of subinvolution of the vagina after labour. As the vagina descends, it draws down the cervix, and the uterus with it. But if the utero-sacral ligaments are strong enough to resist the drawing down of the body of the uterus, the cervix becomes stretched out and lengthened (Gow). The result of this second type is the same as we have just described as resulting from a primary hyperplasia of the cervix, and we believe that the explanation we have given is the more probable, as it appears doubtful whether descent of the vaginal wall could make sufficient traction to cause elongation or hyperplasia of the cervix.

*Results of Prolapse and Procidentia.*—The continued retroversion leads to chronic congestion and hyperplasia of the whole uterus; but the effect is most marked in the cervix, which is less supported by surrounding structures and more exposed to the influences leading to chronic inflammation. We find, therefore, chronic cervical catarrh and cervical hyperplasia in the majority of cases, whilst adenomatous disease is frequent.

In cases of procidentia the cervix is greatly enlarged. By the rubbing of the clothes and exposure to the air the exposed surface of the vagina and cervix is hardened and thickened, so that it comes to resemble skin, and patches of ulceration are not uncommon. These may attain the size of a florin; they have a clean, punched-out appearance; the base and margins are smooth, and the latter are neither raised nor undermined. When the protrusion has been reduced and kept in position for some time, the hardened surface becomes moist and soft again, returning to its normal condition, and the ulcers rapidly heal.



*Signs and Symptoms.*—The patient complains of a feeling of “bearing down”; of trouble with micturition and defæcation; of pain and fatigue in walking; and of “falling of the womb.” When the uterus is low down, but still confined within the vagina, the symptoms are often more severe than in procidentia; indeed, it is not uncommon to meet with patients who have been going about their work for a considerable time with a large mass protruding from the vulva. The signs are generally obvious. In the milder cases the cervix is felt to be low down in the vagina—the uterus being in a position of retroversion. The sound shows that the uterine cavity is lengthened, and the amount of lengthening will afford information as to the degree of hyperplasia in the case. A rectal examination will complete the information, for when there is not much enlargement the level of the fundus will be easily reached by the finger, whilst in cases of considerable elongation the fundus may in this manner be felt to occupy nearly its normal position.

Procidentia is evident on inspection. The external os will be found usually on the most prominent part of the mass, and occasionally in front of or behind this point when the case is complicated by a large rectocele or cystocele.

*Diagnosis.*—This is easy; but procidentia may be simulated by inversion of the uterus. In the latter condition the surface is redder and softer, and instead of the central orifice of the external os the two lateral orifices of the Fallopian tubes are seen. A large polypus may at first sight be mistaken for procidentia, but the absence of an orifice and the presence of a pedicle leading up to the cervix will establish the diagnosis. It is important to determine whether the case is one of simple descent or of hyperplasia of the supravaginal cervix, as the treatment is different. This may be done as above mentioned under the head of physical signs. It should be ascertained also whether there is any cause for the prolapse beyond deficiency of the pelvic floor and relaxation of ligaments, so that, if found, this may be dealt with.

*Treatment.*—A prolapsed uterus must first be placed in proper position, or a procidentia reduced. In many cases the introduction of a rubber ring pessary will then suffice



to prevent recurrence. But it will often be found necessary to repair a torn perineum, removing at the same time redundant portions of the vaginal walls, before the ring will remain in the vagina. When such an operation is contraindicated, and the vaginal orifice is so wide that a ring cannot be kept in, some form of pessary with a vaginal stem and perineal bands will be required (*see* Chap. LII).

In cases of procidentia where the exposed surface is much ulcerated, the patient should be kept in bed, emollient applications made to the ulcers, and vaginal douches given. When the ulcers have healed, a pessary may be introduced. The congestion usually requires no special treatment, as it subsides when the uterus is maintained in a normal position.

Procidentia due to supravaginal elongation of the cervix must be dealt with differently: here complete reduction is not possible, as even when the fundus is in normal position the cervix is low down. Amputation of a portion of the cervix must, therefore, form the first step in the treatment, and it may be required also when the hyperplasia is secondary to descent. Cases of prolapse and procidentia which resist milder measures require further operative procedures, such as hysteropexy or the shortening of the round ligaments. It is in cases of this kind that hysteropexy has often given satisfactory results.

Alexander's operation succeeds, not by pulling up the uterus, but by maintaining the fundus in a position of anteversion. The first stage in prolapse, retroversion, being thus prevented, the prolapse itself is prevented. If the shortening be not sufficient to cause anteversion, it is useless, for the fundus is then able to move freely along an arc of a circle whose radius is determined by the length of the round ligaments, and whose centre is at the symphysis. The arc corresponds closely to the pelvic axis.

Total extirpation of the uterus has been advised and practised for the treatment of procidentia. The operation is easy enough, but it is not to be recommended; because experience has shown that after the removal of the uterus the tendency to prolapse of the vaginal walls persists, and consequently the symptoms are not relieved. It is much better to preserve the uterus, and utilize it by attaching it



to the anterior abdominal wall, so that it helps to pull up the vaginal walls.

**Prolapse of the Ovary.**—At puberty the ovaries lie parallel to, and on a level with, the brim of the pelvis. From this position they are liable to be disturbed by pregnancy, retroflexion of the uterus, and enlargement.

*Pregnancy.*—The alteration in the size of the uterus during pregnancy, and the stretching to which the pelvic peritoneum, Fallopian tubes, and ovarian ligaments are subjected, cause them, especially if pregnancy be frequently repeated, to become very lax. Under these conditions one or other ovary, instead of retaining its usual position at the brim of the true pelvis, may drop upon, or near, the floor of the recto-vaginal pouch. When the left ovary is thus displaced, it lies between the upper part of the vagina and the rectum.

An ovary thus displaced is said to be prolapsed, and not infrequently is a source of much pain and distress, for it becomes pressed upon during defæcation, and patients complain of the severe pain they experience during sexual congress (dyspareunia).

*Retroflexion of the Uterus.*—In this misplacement the ovaries are often drawn into the pelvis. When one or both ovaries lie on the floor of the recto-vaginal fossa, with the body of the uterus resting on them, they become painful; the rolling movement which the uterus exercises on the ovaries in this position will sometimes cause them to be covered with a thick layer of fibrous tissue, resembling the familiar white patch on the anterior surface of the heart.

*Enlarged Ovary.*—When an ovary is enlarged from the presence of a tumour of moderate dimensions its weight will lead to stretching of the ovarian ligament, and it will fall with the associated structures into the recto-vaginal pouch. A small parovarian cyst will act in a similar way.

*Diagnosis.*—On vaginal examination a small rounded or elongated body will be found low in the recto-vaginal fossa, and usually on the left side. The frequency with which prolapsed ovaries occupy this side is due to the fact that the fossa is deeper on the left than on the right side. On touching the ovary, the patient winces and complains of



pain. These painful sensations are most acute when the ovary is touched, but they are often evoked when the neck of the uterus is pressed, because the ovary is then squeezed between the uterus and the rectum.

*Treatment.*—When prolapse of the ovary depends on retroflexion of the uterus, it is usually relieved by rectifying the malposition of the fundus, and maintaining it in the normal position by a pessary. In troublesome cases it is better to perform hysteropexy. When the prolapse is due to the presence of a cyst or tumour, then ovariectomy is the most appropriate method of treatment.

#### 4.—DISPLACEMENTS ASSOCIATED WITH HYPERPLASIA OF THE CERVIX

This presents two varieties according as the supravaginal or vaginal portion of the cervix is affected.

**Hyperplasia of the Supravaginal Portion** (Figs. 41 and 42, A).—This may occur as a primary or secondary condition.

When **primary** it may in some cases be inflammatory in its origin, and some authors have supposed it to be so in every case. But we think it doubtful whether metritis often has this effect, and prefer to regard the origin as unexplained. Specimens examined after removal have sometimes presented the appearances of metritis, but this may have occurred as a secondary change. In other cases the structure has been that of the normal cervix.

The effect of this hyperplasia has been described in the section on Prolapse of the Uterus. The fundus remains in its normal position, while the cervix is found low down in the vagina or protruding from the vulva.

When **secondary** it is the result of prolapse (Fig. 41), and is most likely to occur when the latter is caused by traction from below while the fundus is partly anchored by adhesions; but the congestion of a prolapsed uterus no doubt plays a part in the production of hyperplasia.

Whether hyperplasia be primary or secondary, the resulting condition is the same. The cervical portion of the uterine canal is elongated. The vaginal portion of the cervix



retains its proper length, or may be slightly elongated; but a false appearance of great lengthening is produced by the dragging down of the vaginal fornices by the cervix as it descends (Fig. 42, A). For the same reason the vagina is always shortened.

The symptoms and physical signs are those of prolapse. The proper treatment is amputation of the cervix.

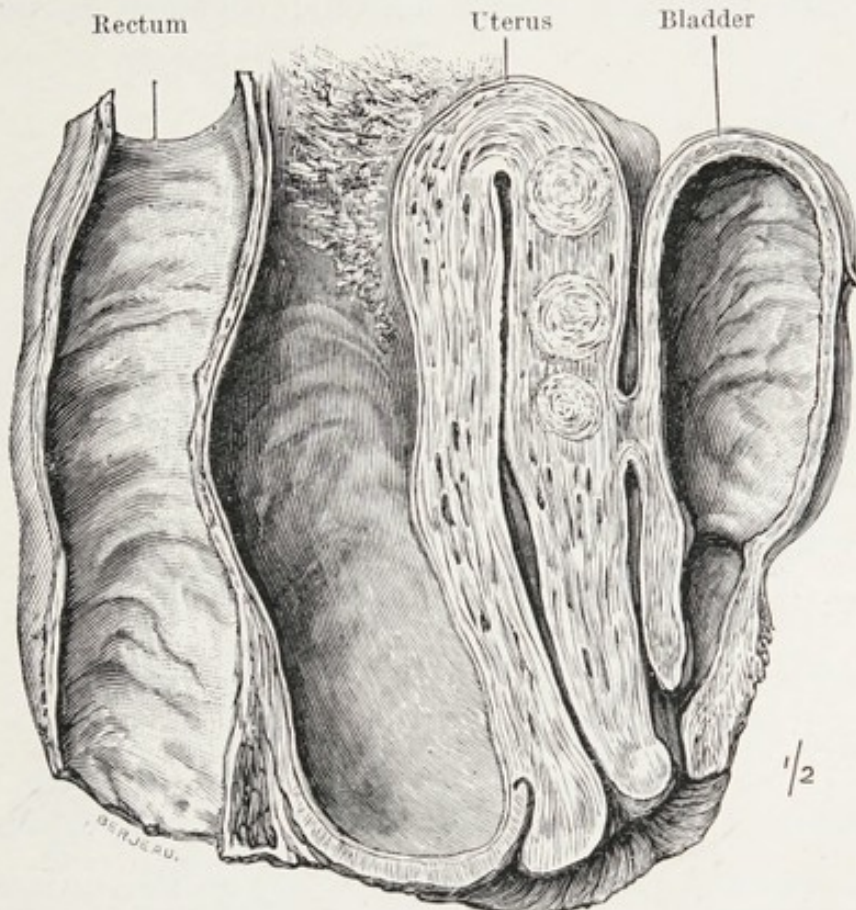


FIG. 41.—UTERUS, BLADDER, AND RECTUM IN SAGITTAL SECTION; FROM A CASE OF HYPERPLASIA OF THE SUPRAVAGINAL PORTION. (MUSEUM OF ROYAL COLLEGE OF SURGEONS.)

Owing to the close attachment of the bladder to the anterior surface of the uterus, it remains in front of the cervix as it lengthens, and a sound introduced into the bladder may be felt to pass down apparently in the substance of the anterior part of the cervix. Similarly, the peritoneum is closely connected with the posterior surface, and the recto-vaginal (Douglas's) fossa becomes deepened when the cervix lengthens, so that a process of peritoneum may be found under the vaginal reflection on the posterior surface of the cervix. These facts require to be borne in



mind in amputation of the cervix, lest the bladder be injured. The opening of the *cœlom* (peritoneal cavity) is less serious, and is perhaps in most cases unavoidable.

**Hyperplasia of the Vaginal Portion of the Cervix** (Figs. 42, B, and 43).—This is often spoken of as the *infravaginal* portion; the above term is more correct. A small degree of hyperplasia often occurs, as previously stated, in connection with chronic cervical catarrh and

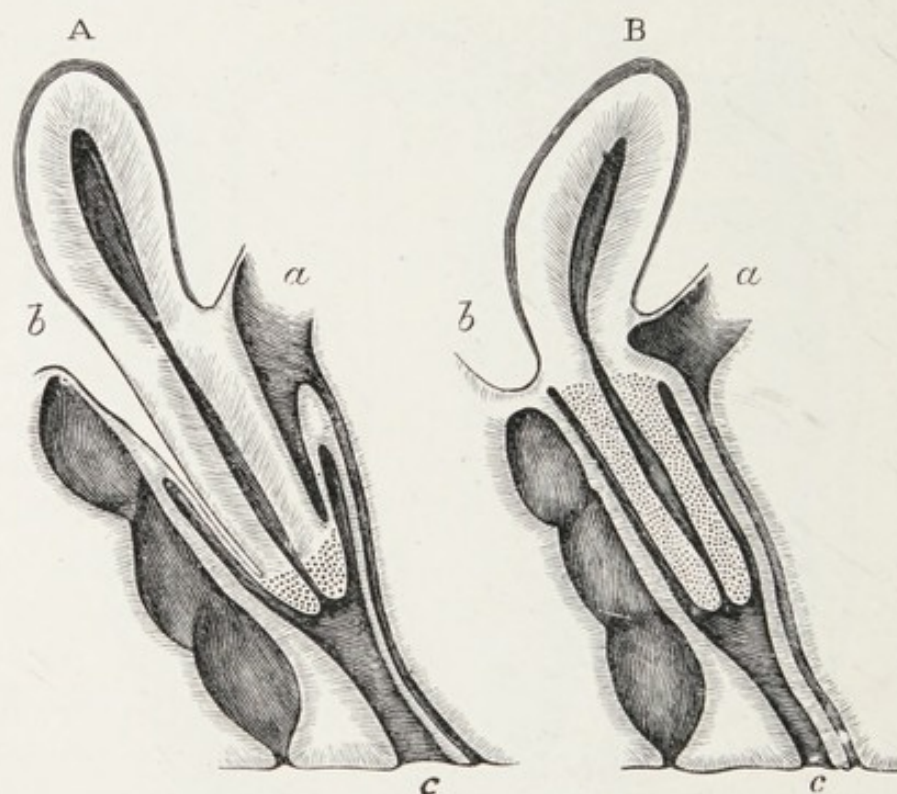


FIG. 42.—TWO DIAGRAMS ILLUSTRATING (A) HYPERPLASIA OF THE SUPRA-VAGINAL PORTION, AND (B) HYPERPLASIA OF THE VAGINAL PORTION OF THE CERVIX: *a*, BLADDER; *b*, RECTO-VAGINAL POUCH; *c*, VAGINA.

erosion; the enlargement is then, more strictly speaking, due to inflammatory infiltration, with thickening of the glandular tissues, and we need not dwell on it further.

Simple elongation of the cervix is a developmental or congenital condition, but it is described here instead of in the chapter on malformations for convenience, and for the sake of comparison with the previous condition. The growth takes place principally at the time of puberty, and nothing is known as to its causation. It is generally associated with stenosis of the external os, which presents the "pinhole" type. The elongation may be so great that



the cervix protrudes through the hymen. The vaginal reflection is attached to the base instead of near the apex of the hypertrophied portion, and consequently the length of the vagina is not diminished (Figs. 42, B, and 43). This serves as a striking distinguishing feature between this and the form of hyperplasia previously described. The bladder and recto-vaginal pouch retain their normal positions, and thus there is little risk of either being wounded during the operation of amputation.

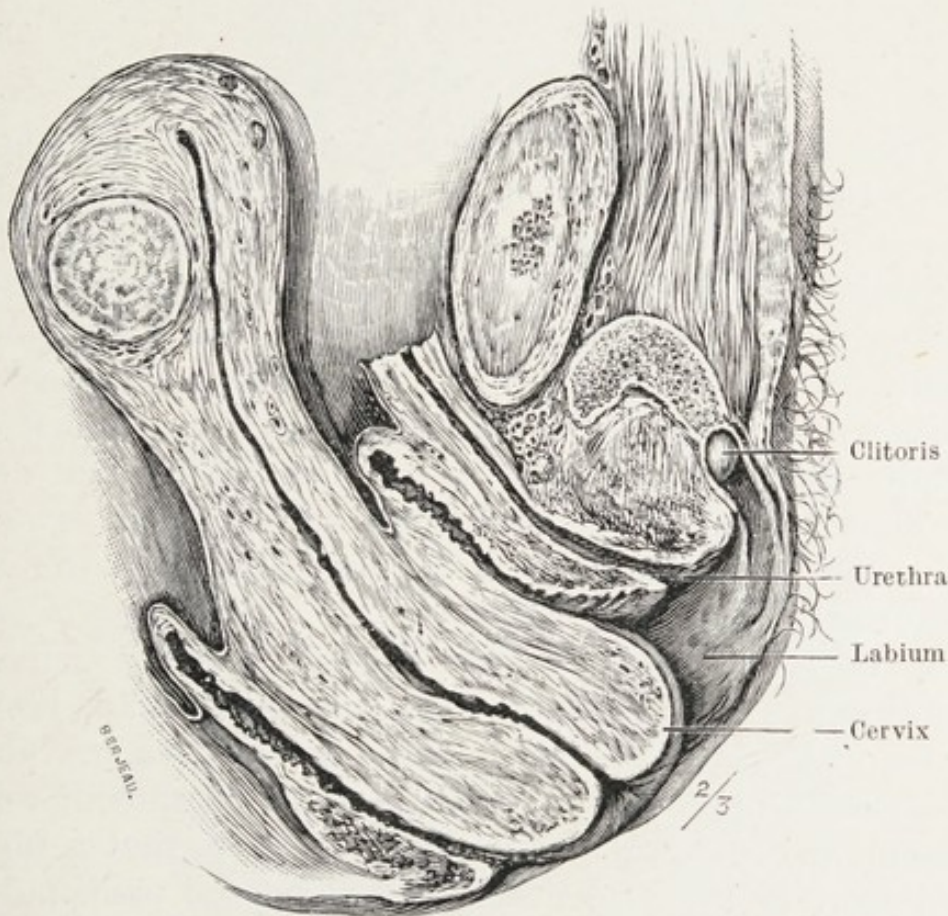


FIG. 43.—HYPERPLASIA OF THE VAGINAL PORTION OF THE CERVIX, ASSOCIATED WITH PROLAPSE.

The symptoms to which it gives rise are a sense of discomfort and the feeling of a foreign body in the vagina; sometimes it causes dysmenorrhœa, menorrhagia, and leucorrhœa. But in some cases, if the cervix remains within the vagina, no symptoms may be complained of till after marriage, when it gives rise to dyspareunia. The diagnosis is a matter of no difficulty when the length of the vagina has been ascertained. The only possible treatment is amputation of the cervix.



## CHAPTER X

### INVERSION OF THE UTERUS—HERNIA OF THE PELVIC ORGANS

#### 5.—INVERSION OF THE UTERUS

A UTERUS is inverted when it is turned inside out; this is true in two senses, for, as the organ inverts, its fundus passes into the vagina, and is protruded beyond the vulva.

Inversion of the uterus is only possible when its cavity is dilated—that is, after pregnancy, or when a polypus is present. In by far the greater proportion of cases the condition is a complication of delivery at term, and it has generally been attributed to an unskilled individual dragging upon the cord of a still adherent placenta. It may also occur during the delivery of the child when the cord is abnormally short. This may be the explanation of some of the cases of “spontaneous inversion” after delivery. According to Lombe Atthill,<sup>1</sup> there is another factor besides traction of the cord: he holds that if inversion were caused by traction on the funis or pressure on the fundus, it would be common instead of rare; and he suggests that a fundal attachment of the placenta is not alone the predisposing, but is also the only, cause of inversion occurring. Cases of inversion in which the position of the placenta has been noted support this view. He suggests, further, that when a fibroid tumour inside the uterus causes inversion, the tumour also has a fundal attachment: the case illustrated in Fig. 46 certainly conforms to this condition. Although inversion complicating delivery belongs to the province of obstetrics, it is necessary to review briefly its leading features.

The inversion may be partial, the fundus not extending

<sup>1</sup> *Brit. Med. Jour.*, May 23, 1908.



beyond the mouth of the uterus; it may extend through the os uteri into the vagina; or the inversion may be so complete that the uterus from mouth to fundus is turned

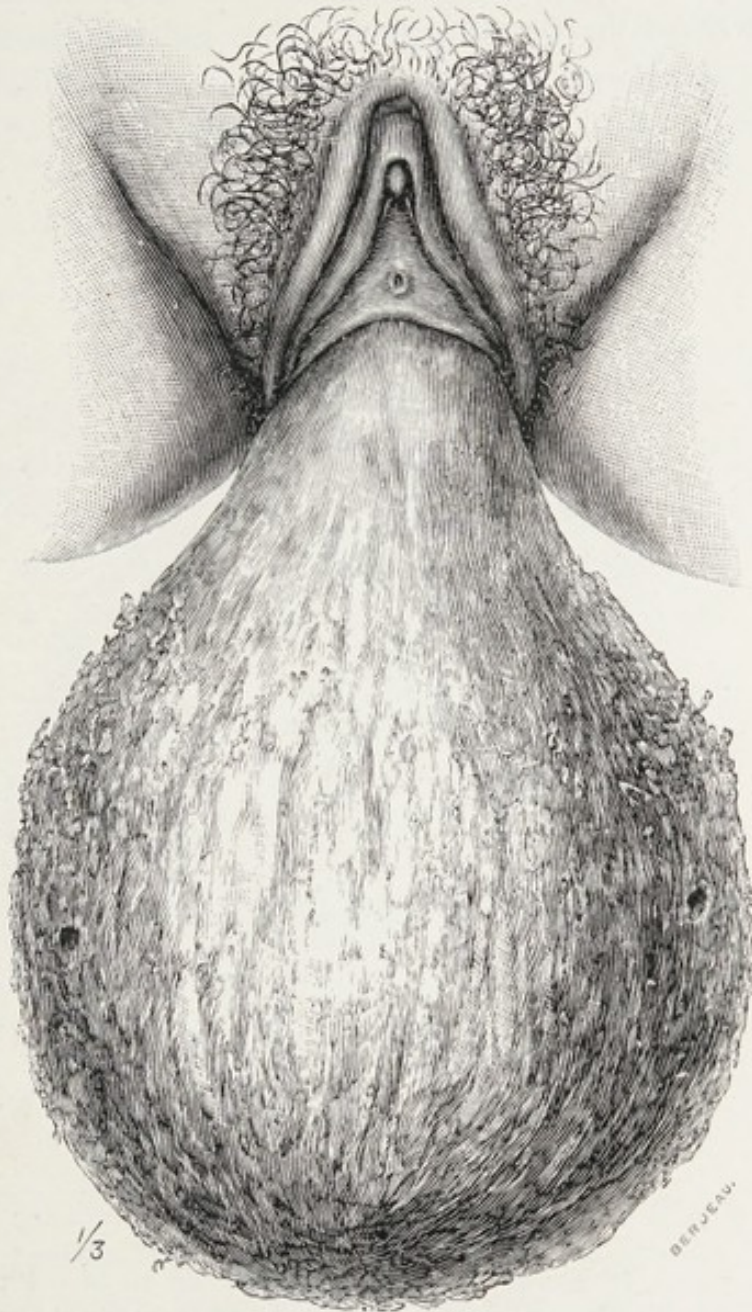


FIG. 44.—INVERSION OF THE UTERUS AND VAGINA. THE DARK SPOT ON EACH SIDE INDICATES THE ORIFICE OF THE FALLOPIAN TUBE. (MUSEUM OF MIDDLESEX HOSPITAL.)

inside out (Figs. 44 and 45). In a complete case of acute inversion, as it is called when it follows immediately on delivery, the outer surface is formed by the mucous membrane of the uterus, and is ragged, vascular, and bleeding, and the inner or uterine ostia of the Fallopian tubes are



visible. The interior of this large sac is lined with peritoneum, and contains the round ligaments of the uterus with the Fallopian tubes. The ovaries, as a rule, remain on the edges of the sac. In some instances small intestine and omentum drop into the cavity. The manner in which the tubes and ligaments are drawn into the sac is illustrated in the specimen of partial inversion represented in Fig. 46.

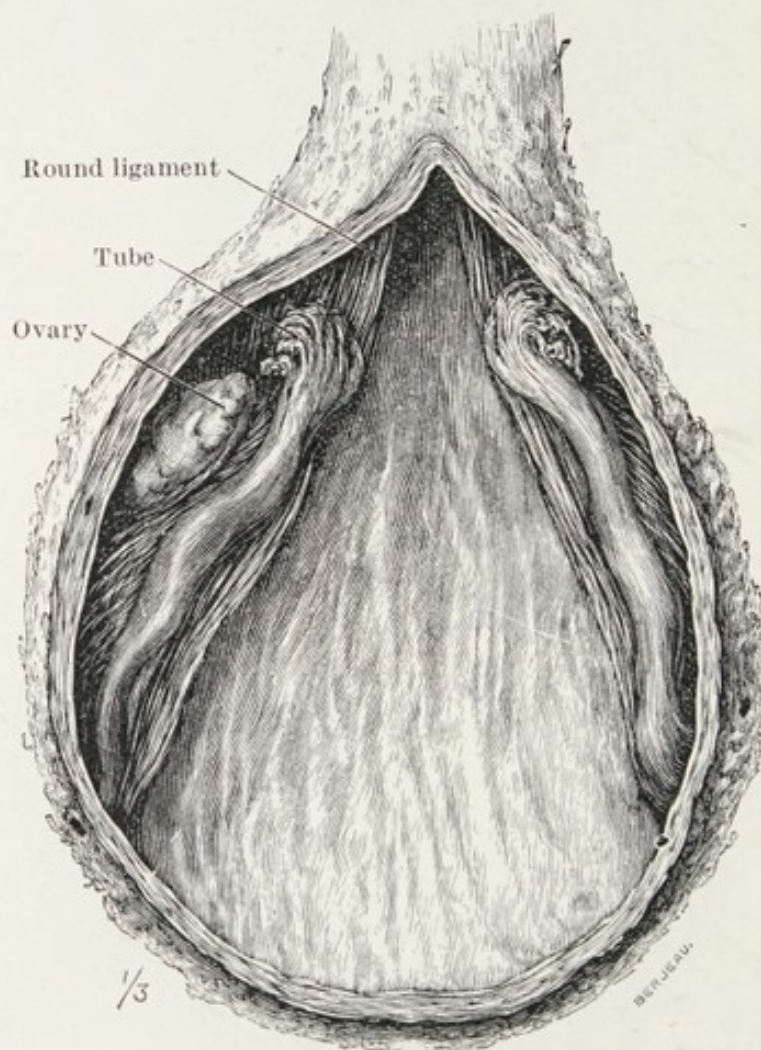


FIG. 45.—THE INVERTED UTERUS REPRESENTED IN THE PRECEDING FIGURE, OPENED FROM BEHIND.

It is common knowledge that when a body occupies the uterine cavity it stimulates the muscular walls to expulsive efforts. When the fundus is inverted, it is a solid body, which can be grasped and driven onward by the muscular efforts of the walls of the uterus, and this may continue until the uterus turns itself completely inside out.

This mechanism explains the method by which a sub-



mucous fibroid leads to inversion of the uterus. The presence of the tumour distends the cavity of the uterus, and the fibroid is pushed into the cervical canal by the muscular efforts of the uterus. This traction under favourable mechanical conditions produces inversion of the fundus; and finally the fibroid, with the inverted fundus, makes its appearance in the vagina or even protrudes beyond the vulva. When the inversion takes place gradually it is termed chronic.



FIG. 46.—PARTIAL INVERSION OF A UTERUS DUE TO A FIBROID.

Acute inversion of the uterus is always a grave accident; many patients die in a few hours from shock or loss of blood. In years gone by the inverted mass has been cut away by practitioners in ignorance of the nature of the accident. When the patient escapes the immediate danger, ulceration, sloughing, bleeding, and exhaustion destroy her in a few weeks or months.

Chronic inversion of the uterus has a different history. The patient suffers from menorrhagia, or metrorrhagia, leucorrhœa, and vesical troubles, which lead to an examination, and the tumour-like mass is detected in the vagina.



In many cases its nature is recognized, but this is not always a simple matter.

Care must be exercised—

1. *To distinguish between an inverted uterine fundus and a uterine fibroid.*

2. *To recognize a case in which a fibroid is responsible for the inversion of the uterus.*

A submucous fibroid protruding through the mouth of the womb often strikingly resembles a partially inverted fundus.

In cases of acute inversion there should be no difficulty in diagnosis, but when the inversion is of long standing the exposed surface becomes greyish-white like skin.

In partial inversion great caution in diagnosis is necessary, but with the help of the sound the difficulty is easily surmounted. When the sound is introduced through the mouth of the uterus, between the inverted fundus and the uterine wall, it is arrested at less than its normal length; in the case of a fibroid it will pass to the full length, or more often to a greater distance.

In some cases, especially when the patient has a thin belly-wall, a cup-like depression can be felt to replace the natural convexity of the uterine fundus. Sometimes this depression can be detected by a finger introduced through the rectum. In doubtful cases an examination under ether is desirable, and, if necessary, the urethra can be dilated and the condition of the uterus determined by a finger introduced into the bladder.

*Treatment.*—In recent cases reduction of the inversion may often be effected by taxis. The patient is placed under an anæsthetic and steady pressure made by the fingers on the walls of the uterus, near the cervix. The principle on which taxis is applied for this condition is the same as that in reducing a hernia—namely, the part last inverted should be returned first.

When inversion is chronic, there appears to be more risk and difficulty in immediate reduction, and it is customary to use an instrument called a repositor (Fig. 47). This instrument consists of a perforated cup-shaped disc fitted on a stem which may be straight or furnished with a



perineal and a pelvic curve. The lower end of the repositor permits of the attachment of elastic bands connected to a waist-belt supported by braces which pass over the shoulder. When in use the waist-belt is fitted to the patient and secured by the braces. The cup of the repositor is adjusted to the fundus of the inverted uterus, and the elastic bands fixed to the repositor and waist-belt maintain a continuous pressure. The patient is kept in bed, and, if

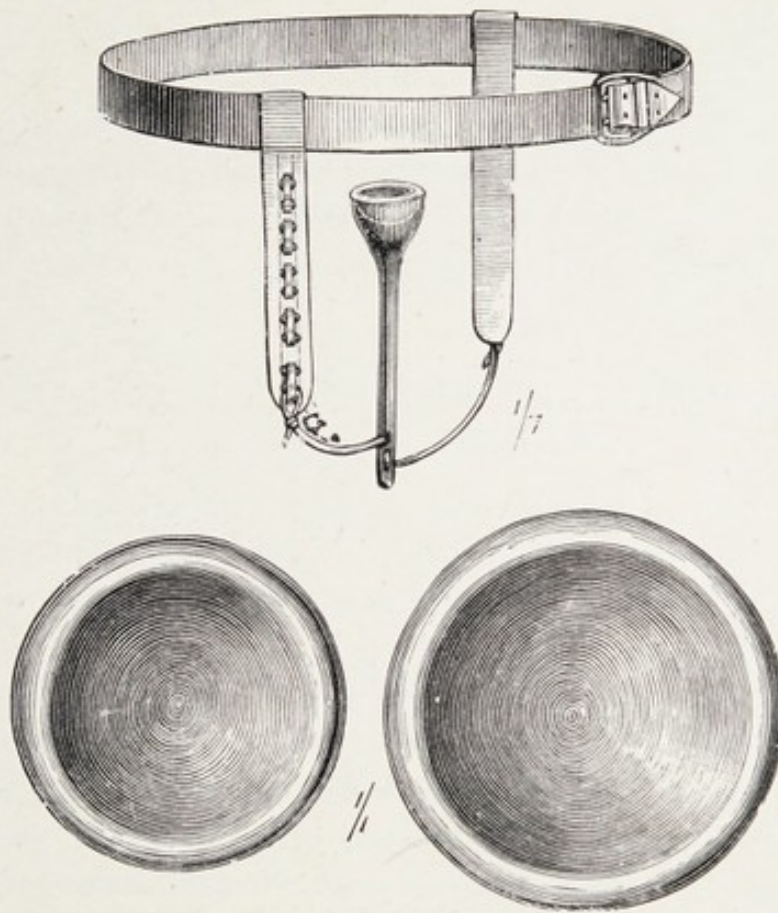


FIG. 47.—A UTERINE REPOSITOR.

the proceeding causes pain, morphia injections may be given. At intervals of a few hours the amount of progress is observed, and the bands are readjusted. As soon as the fundus is reduced to the level of the internal os, it is desirable to change the cup of the repositor for a smaller one, for, when reduction is complete, a large cup is imprisoned in the uterine cavity, and is sometimes so firmly held as to cause difficulty and anxiety in its extraction. It has been suggested that when the fundus has been reduced within the external os the use of repositors may be discontinued,



and the uterus will re-invert itself, like an indiarubber cup turned not quite half inside out (Johnstone<sup>1</sup>). By means of the repositor an inverted uterus may be reduced in twenty-four or forty-eight hours, even when the inversion has existed for some years. When inversion is due to a fibroid, the latter is excised before reduction is attempted.

In some very obstinate cases, especially those in which the inversion has existed for many months, it has been found necessary to perform cœliotomy and incise the edges of the slit formed by the inverted uterus to facilitate its reduction (Brennan, Haultain).

In some difficult cases the uterus has been amputated. Severe measures of this kind are rarely necessary, but operative measures are occasionally found expedient even in the hands of the most experienced gynæcologists.<sup>2</sup>

## 6.—HERNIA OF THE UTERUS AND ITS APPENDAGES

From time to time a case is met with in which the contents of an inguinal hernia are found to consist of the uterus, or of the tube and ovary of one side, or of the uterus tube and ovary.

**Hernia of the Uterus.**—This condition is not infrequently associated with some other form of malformation. In a case of left-sided hernia recorded by one of us (A. E. G.) the contents of the sac consisted of an infantile uterus; the left round ligament was very short and unusually stout, and it appeared to have played a part, analogous to the action of the gubernaculum testis in the male, in drawing the uterus into the inguinal canal. There was also in this patient a complete absence of the vagina.

Hernia of the uterus has also been recorded in the case of a pseudo-hermaphrodite male.

In other cases, the hernial sac contains also the tube and ovary of one or both sides; and perhaps omentum and intestine in addition.

*Treatment.*—The radical cure of the hernia is the only

<sup>1</sup> *Brit. Med. Jour.*, April 17, 1909.

<sup>2</sup> See Prof. J. W. Taylor, *Trans. Obstet. Soc., London*, 1902, p. 299.



possible treatment. In some cases the contents of the hernia can be freed and returned into the abdomen, and the hernial orifice closed. In the case above mentioned it was possible to return the uterus into the abdomen after division of the short round ligament.

In other cases the contents of the sac cannot be reduced, and they must be removed. In a case reported by Rushton

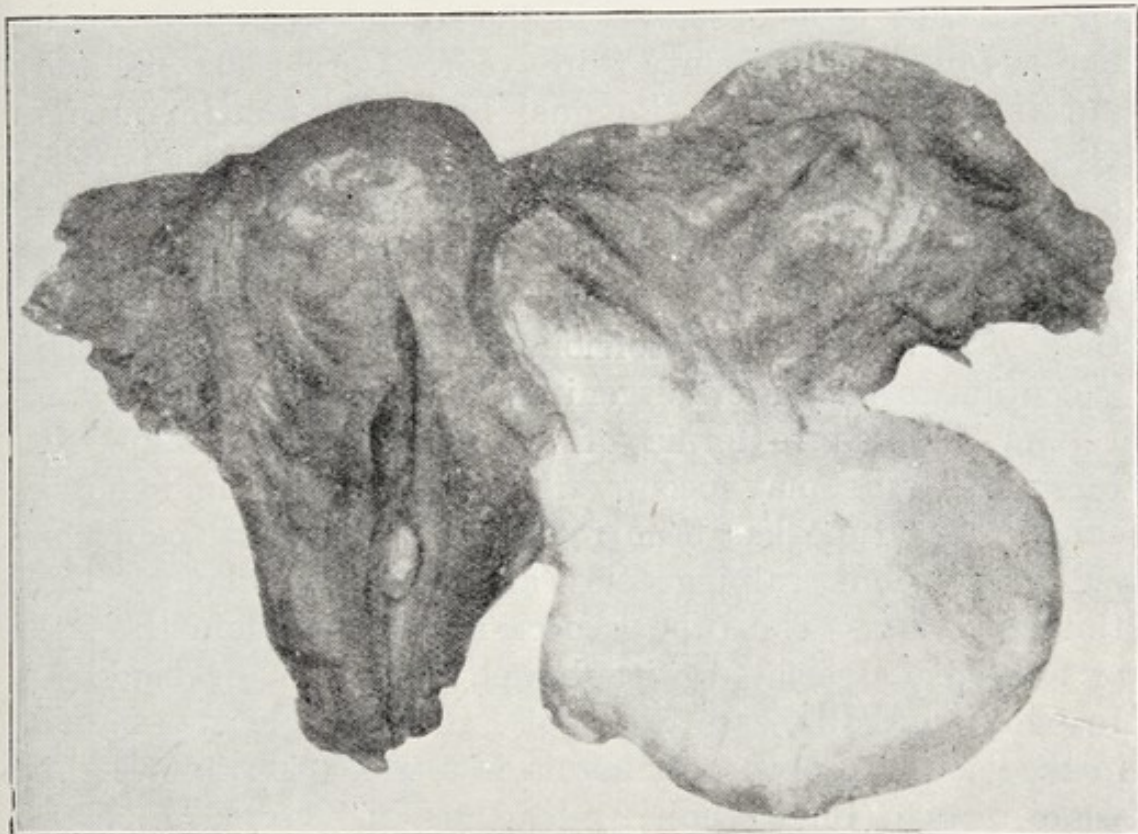


FIG. 48.—CONTENTS OF RIGHT INGUINAL HERNIA, CONSISTING OF SMALL UTERUS (WITH FIBROID IN CERVIX), RIGHT FALLOPIAN TUBE, BROAD LIGAMENT, AND OVARY FLATTENED OUT AND THINNED BY PRESSURE WHILE LYING UNDER OTHER SPECIMENS.

Photograph in water, after sixteen months in formol solution, by Fred. Halliday, Museum Attendant.—RUSHTON PARKER : *Brit. Med. Jour.*, April 17, 1909.

Parker, the hernia contained the right ovary, Fallopian tube, broad ligament, and a small elongated uterus, all of which had to be removed, as shown in Fig. 48.

**Hernia of the Ovary.**—An ovary may occupy a hernial sac either alone or in company with the Fallopian tube, omentum, intestine, etc.; most frequently it occupies a sac in the inguinal region, less frequently in the femoral. It



has been found herniated through the obturator foramen (Rogner-Gusenthal).

Following the method adopted with other varieties of hernia when the ovary alone occupies a hernial sac, it may be termed an *oöphorocele*; when accompanied by the tube a *salpingo-oöphorocele*; hernia of the tube alone is called a *salpingocele*.

**OÖPHOROCELE.**—Hernia of the ovary may occur at any age. It has been observed in the second week after birth and as late as the seventy-third year. Corner has pointed out that the sac of an inguinal hernia in female infants often contains some of the internal genitalia. Usually it is an ovary, and occasionally the tube and ovary. In exceptional cases the sac contains an ovary, tube, uterus, and a loop of bowel. When the ovary and tube are herniated they sometimes undergo torsion. In adult women it is the exception to find internal genitalia in a hernial sac.

**SALPINGOCELE.**—Hernia of the Fallopian tube alone is rare; the tube may occupy the inguinal or the femoral canal. The tube has been found in the inguinal canal of an infant, but salpingoceles are very rare before the thirtieth year. The tube is occasionally found in the sac of a hernia associated with bowel, omentum, or bladder. In one remarkable case the right Fallopian tube was found in the sac of an obturator hernia in a woman seventy-eight years of age (Gladstone).

In another, the middle part of the right Fallopian tube was found in an obturator hernial sac no larger than a hazel nut. About  $1\frac{1}{2}$  inches of the tube occupied the sac; the abdominal end closed by adhesions lay with the corresponding ovary in the pelvis outside the sac (Türschmid).

An *oöphorocele* or *salpingocele* gives rise to signs such as characterize *epiploceles* or *enteroceles*. The signs of strangulation sometimes depend on axial rotation (torsion) of the herniated ovary and tube. Kennedy<sup>1</sup> has recorded a case of acute strangulation of an *oöphorocele*, without signs of torsion, in an infant aged four months.

Several cases have been reported in which a pregnant

<sup>1</sup> F. W. KENNEDY: "Strangulated Hernia of the Ovary in an Infant," *Brit. Med. Jour.*, November 13, 1909.



uterus with its appendages has occupied a sac protruding through the inguinal canal, and the foetus has been extracted by Cæsarean section.

In all cases in which a supposed ovary is removed from the inguinal region its nature should be substantiated by the microscope; in many instances bodies excised in this way have on microscopic examination turned out to be testes, and the supposed women pseudo-hermaphrodites (*see p. 70*).

*Treatment.*—Herniated ovaries and tubes require removal when they are a source of pain, and in women who cannot wear a truss. The operation has been almost entirely confined to those who have to maintain themselves by hard work. The operation is performed as for inguinal hernia: the pedicle is secured with silk, the ovary and tube cut away, and the stump returned into the coelom. The sac is dissected out, and its neck secured with sterilized silk. When herniated ovaries or tubes become strangulated or undergo axial rotation (torsion) operation is the only choice, as the urgent symptoms are rarely likely to be differentiated from those which arise from strangulation of herniated intestine.



## SECTION V

### INFECTIONS

## CHAPTER XI

### INFECTIONS OF THE REPRODUCTIVE ORGANS— BACTERIOLOGY

FOR the better appreciation of the influence of infections on the genital tract, we must make some preliminary observations on the bacteriology of the normal vaginal and uterine secretions.

**The Normal Vaginal Secretion.** *Origin.*—The vagina contains no glands, and some observers have consequently inferred that the secretion found in the vagina is derived in every case either from the cervical or Bartholinian glands. This view is disproved by the following considerations: First, the cervical canal is normally occupied by a tenacious plug of mucus, which shuts off the cervical from the vaginal canal; secondly, the Bartholinian glands usually secrete very little fluid, and the ducts open on the outside of the hymen; thirdly, in closed vaginal cysts a typical vaginal secretion is found; fourthly, the cervical and vaginal secretions present markedly different characters.

The vaginal secretion is derived from the shedding of squamous epithelium together with the exudation of some lymph-serum. Normally, it forms a thin coating on the surface of the vagina.

*Characters.*—It is a rather thin opalescent fluid, devoid of viscosity, and sometimes, when abundant, forming a white flocculent and curdy matter. It gives a strongly acid reaction, due to the presence of lactic acid. Estimated quantitatively the acidity is equivalent to 0.4 per cent. of sulphuric acid, or 0.9 per cent. lactic acid. In the new-born the action



is neutral; in the healthy virgin it is acid; in normal pregnancy the acidity is greater; whilst in pathological conditions the reaction is feebly acid, neutral, or even alkaline. The acidity disappears during and for some days after menstruation, and for five or six weeks after normal labour. Examined microscopically, the vaginal secretion in the newborn contains only squamous epithelium. In the virgin and in normal pregnancy there is constantly found, in addition, the *vagina bacillus* (Fig. 49); whilst in a certain percentage of cases a fungus is found, the *Monilia candida*. The vagina bacillus and the fungus are invariably absent from pathological secretions.

The *vagina bacillus* belongs to the group of anaerobic bacilli. It may be cultivated on agar or gelatin, or in bouillon, blood-serum, or milk. It requires moisture and warmth equivalent to the body temperature. It occurs in the form of short straight rods. As the result of pure cultivations lactic acid is invariably produced, equivalent quantitatively to 0.5 per cent. sulphuric acid, which corresponds to 1.125 per cent. lactic acid.

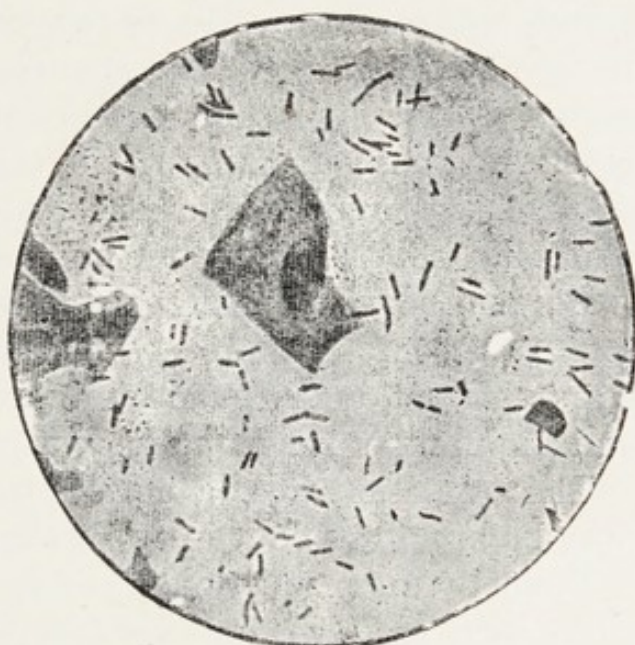


FIG. 49.—NORMAL SECRETION FROM THE VAGINA, SHOWING THE VAGINA BACILLUS. (DÖDERLEIN.)

*Rôle of the Vagina Bacillus.*—To this bacillus is due the presence of lactic acid in the vaginal secretion, as indicated by the fact that when the bacilli are absent, as in the newborn and during the puerperium, the reaction of the secretion is always neutral. In its presence saprophytes and pathogenic micrococci, such as the streptococcus and staphylococcus, are unable to develop, and before long perish. When the vagina bacillus is absent, as in the lochial secretion, both saprophytes and staphylococci are able to flourish. The



*monilia* is a harmless organism which can only grow in the presence of the vagina bacillus—that is, in the healthy vaginal section.

*The normal cervical secretion* consists almost entirely of mucus, in which are found entangled a few columnar cells derived in part from the surface epithelium and in part from that lining the glands. It is in consequence viscid and tenacious, so that a plug of it filling up the external os is often very difficult to dislodge. Its reaction is alkaline or neutral, and it contains no micro-organisms.

**Pathological Vaginal Secretion.**—This is thin, yellowish-white, or, if pus be mixed therewith, greenish. It may be so abundant as to flow spontaneously from the vagina, giving all the symptoms characteristic of leucorrhœa. Its reaction varies from faintly acid, through neutral, to strongly alkaline. Examined microscopically, it is found to contain epithelial debris, and often pus-cells.

Both in cover-glass preparations and by cultivation it is found to contain saprophytic bacilli and micrococci—viz. staphylococci, and often streptococci. The vagina bacillus and the *monilia* fungus are never present.

The transition from a normal to a pathological secretion may be brought about in two ways—

First, by mere functional increase in the amount of secretion, such as arises from sexual excesses. Thus in thirty prostitutes examined by Döderlein the secretion was not once found to be normal, even when there was no specific gonorrhœal infection. Masturbation, the wearing of rubber pessaries, frequent and purposeless vaginal irritations, and the introduction of alkaline substances, such as soap, may have the same effect.

Secondly, through pathological organic changes, such as are found in endometritis, adenomatous disease of the cervix, vaginitis, and cancer.

Besides the organisms of sepsis there is sometimes found a specific micro-organism, the gonococcus of Neisser (Fig. 50). It must be remembered, however, that, as Bumm has pointed out, the vagina often escapes gonorrhœal infection, owing to the resistance offered to the entrance of gonococci by the stratified squamous epithelium, whose superficial portion is



hard and horny. But the disease readily attacks the urethra and the delicate columnar epithelium of the cervix, as well as the ducts of the glands of Bartholin.

In cases of gonorrhœa the vaginal secretion is therefore usually altered indirectly by the admixture therewith of the unhealthy cervical secretion, which is abundant, alkaline, purulent, and consequently albuminous, and the vaginal secretion accordingly acquires these characters. The vagina bacillus perishes under these circumstances, and a favourable soil is provided for the development of the pathogenic germs previously described. The actual inoculation of these pathogenic germs may occur during menstruation, sexual intercourse, gynæcological manipulations, and parturition; in the latter case not only through vaginal examinations and operative procedures, but also through traumatism incident to labour.

The micro-organisms found in the vagina acquire a special importance from the point of view of the ætiology of puerperal infection. The vaginal dis-



FIG. 50.—GONOCOCCI.

charges of pregnant women have formed the subject of numerous observations, and the results have been very contradictory. One class of observers such as Gönner, Thomen, Samschin, Krönig, Menge, and Whitridge Williams, believe that pathogenic organisms are very rarely found; others regard them as relatively frequent. Thus, streptococci, staphylococci, and *bacilli coli* have been found in the following proportions of frequency: Burckardt, 4 per cent.; Steffek, 4 per cent.; Döderlein,  $4\frac{1}{2}$  per cent.; Burguburu,  $8\frac{1}{2}$  per cent.; Vahle, 10 per cent.; Witte,  $12\frac{1}{2}$  per cent.; Kottmann, 13 per cent.; Winter, 15 per cent.; Williams (earlier observations), 20 per cent.; and Walthard, 27 per cent. The difference in these results is explained by the supposition that the latter observers did not succeed in



avoiding contamination from the vulvar secretion, for many pyogenic organisms are frequently found there. Thus in twenty-five cases Williams found them in 76 per cent. in the vulvar secretion, in 12 per cent. in the vaginal secretion, as collected through a speculum; but not in one case when the vaginal secretion was obtained by means of a special tube, which avoided all contamination from the vulva. In 117 cases examined by the latter method, the streptococcus was not once present, and the staphylococcus only in two cases. Consequently the normal vaginal secretion of pregnant women must be regarded as practically free from pyogenic organisms.

An important practical deduction to be drawn from these considerations is, that in cases in which the vaginal secretion departs from the normal type special care should be taken to disinfect the vagina before resorting to any intra-uterine manipulations, even the passage of the sound, lest the uterine cavity, previously unaffected, be inoculated with septic organisms.

Having thus briefly reviewed the pathogenesis of vaginal infection, we may enumerate the principal morbid conditions which may result therefrom—viz. vaginitis; endometritis, of both cervix and body; salpingitis, catarrhal and purulent; septic peritonitis; pyocolpos and pyometra; and pelvic cellulitis. These results may follow either from sepsis alone, or from sepsis complicated by gonorrhœa.

In vulvo-vaginitis of young girls the gonococcus is frequently found in the vagina, the epithelium being at that age less resistant. In girls and in adults gonococci in the vagina diminish in number as the disease becomes more chronic.

In cases of puerperal infection, many pathogenic organisms have been found in the lochia and in the uterus—viz. the *streptococcus pyogenes*, *staphylococcus pyogenes aureus* and *albus*, *bacillus coli communis*, gonococcus, tetanus bacillus, Klebs-Loeffler bacillus of diphtheria, *bacillus typhosus*, *diplococcus pneumoniae* of Fränkel, *bacillus proteus*, and *bacillus aerogenes capsulatus*. These were found by Williams to be present in the following number of cases out of 40 cases of puerperal fever which he examined: streptococcus,



8 cases; staphylococcus, 3; *bacillus coli*, 6; diphtheria bacillus, 1; typhoid bacillus, 1; *bacillus aerogenes*, 1; anaerobic bacilli, 4; unidentified aerobic bacilli, 3; gonococcus, 2; bacteria present on slide but culture sterile, 4; whilst in 11 cases no organisms were present.

In that curious condition known as physometra, the *bacillus coli communis* and the *bacillus aerogenes capsulatus* have been found in the secretions. Altogether about thirty species of micro-organisms have been found in the genital passages. The following are the most notable—

*Streptococcus pyogenes.*  
*Staphylococcus pyogenes albus.*  
*Staphylococcus pyogenes aureus.*  
*Micrococcus tetragenus.*  
 Gonococcus of Neisser.  
*Diplococcus flavus lig. tardus* (of eczema).  
*Diplococcus albicans amplus.*  
*Diplococcus pneumoniae* of Fränkel.  
*Proteus vulgaris.*  
*Bacillus coli communis.*  
*Bacillus pyocyaneus.*  
*Bacillus tuberculosis.*  
*Bacillus typhosus.*  
 Bacillus of typhus.  
 Bacillus of diphtheria.  
 Bacillus of tetanus.  
 Bacillus of leprosy.  
*Bacillus aerogenes capsulatus.*  
 Actinomyces.  
*Monilia candida.*

In concluding these remarks on the secretions the following *résumé* of the different kinds of discharge found in the female genital passages may prove useful—

1. Normal vaginal discharge, of which the characters have been given above—viz. white, creamy or curdy, and so slight in quantity as not to attract the patient's attention.

2. A clear viscid discharge, composed principally of mucus. This is the normal cervical discharge, and is usually not seen



except on examining with the speculum; but it may be mixed with the vaginal discharges at the beginning and end of menstruation, and occasionally, when abundant, at other times.

3. A muco-purulent or purulent discharge, yellowish or greenish according to the proportion of pus. This is seen characteristically in acute gonorrhœa, and commonly results also from chronic endometritis. It is the variety most frequently spoken of as leucorrhœa, or "the whites," when containing but little pus. It stains and stiffens the linen.

4. Watery discharges may result from simple hyperæmia of the genital passages, and are sometimes so abundant as to lead to the suspicion that the fluid is furnished by a hydrosalpinx which periodically empties itself through the uterine orifice of the Fallopian tube. They are also found in cases of cancer, but then the discharge more often assumes the characters of the next variety.

5. Fœtid discharges occur as the result of ulceration, and the principal conditions which produce them are retained pessaries, sloughing fibro-myomata and polypi, decomposing products of conception, and, most frequently of all, cancer.

6. Bloody discharges, other than menstrual, may be due to cancer, endometritis, fibro-myomata, polypi, adenomatous disease of the cervix, and lacerations. The discharge is often pinkish in cancer, but in any of the above conditions it may vary from a very slight rose tint to the red of almost pure blood.

7. In the case of a tubal pregnancy which has become interrupted by rupture of the tube, or by the formation of tubal mole, a characteristic discharge is often present. It is scanty and of a brownish colour, and may continue for many weeks. It is due to disintegration of the decidua which forms in the uterus in cases of extra-uterine pregnancy. A similar discharge may result from the slow disintegration of a polypus or clot within the cavity of the uterus.



## CHAPTER XII

### INFECTIONS OF THE REPRODUCTIVE ORGANS

#### I.—INFECTION ALONG THE UNBROKEN GENITAL TRACT— GONORRHEA OF THE LOWER GENITAL TRACT

WE now pass on to consider the various forms of inflammation of the Reproductive Organs.

The common feature of all types of inflammation is that there must be a channel of infection; and in the case of the pelvic organs infection may be conveyed in several ways.

I. The most important, because it is the most frequent, is infection of the vulva and vagina, travelling up through the vagina, uterus, and tubes, to the peritoneum; as a consequence, vulvitis, vaginitis, endometritis, salpingitis, and peritonitis, are successively set up.

II. The second method is by injury to some part of the wall of the vagina or uterus, opening up the cellular tissue round these organs; infection derived from the outside, as in the previous case, travels up the vagina, and sometimes into the uterus, and, passing through the hole caused by the injury, reaches the cellular tissue and sets up pelvic cellulitis; this may go on to the formation of a pelvic abscess.

III. The third method is infection from some part of the bowel; for example, an ulceration in the rectum may perforate the bowel wall and open into the cellular tissue of the left broad ligament, causing a pelvic abscess; or a coil of bowel may become adherent to the uterus, tubes, or ovary, when the same series of events—ulceration, perforation, and abscess—takes place in the adherent structure. Sometimes an inflamed appendix becomes adherent to the right tube and ovary, causing inflammation there.

IV. The fourth method of infection is through the vascular system: this is probably the channel through which tuberculosis attacks the genital organs; and occasionally



a pyæmic focus may arise in these organs as the result of a distant primary infection. It may be noted that the vascular system may act as the channel of infection in a converse direction; thus, when inflammation is present in the uterus, tubes, and ovaries, infection may be carried by the veins or lymphatics of these organs and give rise to phlebitis or a septic thrombus in the uterine, iliac, or ovarian veins, or to sapræmia or septicæmia.

The different modes of infection are illustrated diagrammatically in Fig. 51; and we shall describe the consequences of each one in succession.

#### I.—INFECTION FROM WITHOUT INWARDS, CONVEYED ALONG THE UNBROKEN GENITAL TRACT

In this type of infection, gonorrhœa plays the most important part; and it will therefore be convenient to describe in their order the manifestations of this form of infection; and then to review the other varieties of inflammation conveyed along the unbroken genital tract.

#### GONORRHŒA OF THE FEMALE GENITAL ORGANS

*Ætiology.*—This disease is due to infection by the specific micro-organism known as the gonococcus. It is contracted by sexual intercourse with a man suffering from gonorrhœa or its latent effects. Women anxious to preserve their reputation for virtue have ascribed an attack of gonorrhœa to contamination from public closets; the scepticism with which the surgeon is apt to receive this explanation is usually justified, especially when he finds that the hymen is no longer intact. Nevertheless, it is a fact that a vaginitis, in which the gonococcus is demonstrated bacteriologically, may occur as the result of contact with linen or towels infected by gonorrhœal discharges, and it has been proved conclusively that cases of vulvovaginitis in children have been due to this cause. Theoretically, therefore, this may be the correct explanation in certain cases in adults, and if the hymen is found to be intact the patient should receive the benefit of the doubt.



*Course.*—It is probable that the point of inoculation is generally some abrasion or split in the mucosa in the region of the hymen and the vaginal orifice. The inflammation spreads rapidly within the vagina and over the vulva, and

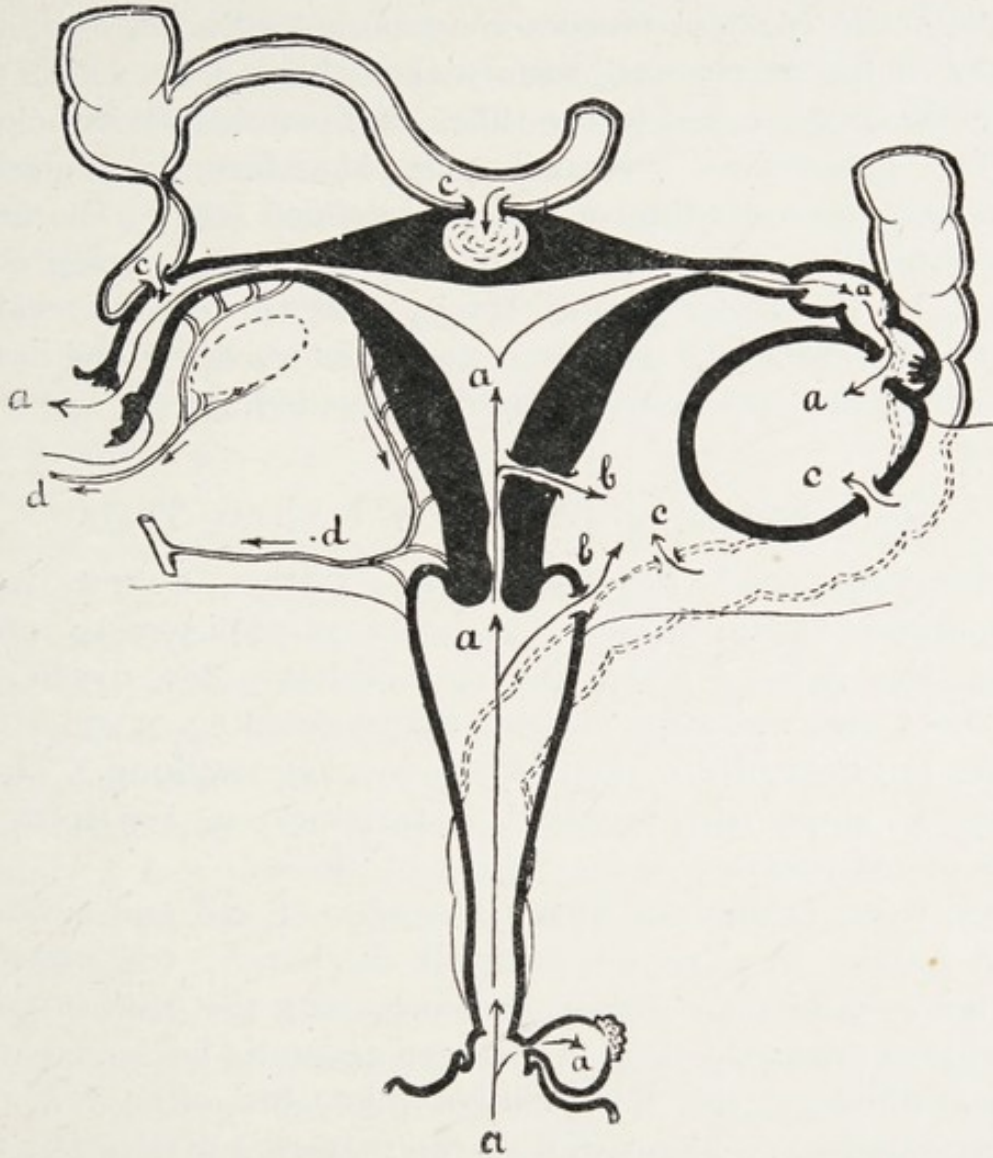


FIG. 51.—DIAGRAM TO ILLUSTRATE THE CHANNELS OF INFECTION OF THE REPRODUCTIVE ORGANS: *a*, INFECTION ALONG THE UNBROKEN GENITAL TRACT; *b*, INFECTION THROUGH LESIONS OF THE GENITAL TRACT; *c*, INFECTION FROM THE BOWEL; *d*, INFECTION THROUGH THE VASCULAR SYSTEM.

it nearly always extends into the urethra. Clinically, the condition is one of *urethritis*, *vulvitis*, and *vaginitis*. In favourable cases, which, happily, constitute the majority, the inflammatory process progresses no further inwards than the entrance to the cervix. In unfavourable cases it travels up through the uterus to the Fallopian tubes and



to the peritoneal cavity, setting up *salpingitis*, *pyosalpinx* and *peritonitis*. It is a remarkable fact that although a gonorrhœal endometritis has been assumed as a stage in the inward progress of the disease, this condition has not been demonstrated; and some authorities hold the view that though the cervical mucosa may be actually infected, the body of the uterus acts merely as a channel by which the infection is conveyed to the tubes, and is not itself attacked.

The gonorrhœal invasion may, therefore, be regarded clinically as consisting of two well-defined stages, the first, which is the more frequent and the less serious, being confined to the lower genital tract; and the second, which is fraught with the gravest consequences, being the stage in which the upper genital tract is invaded.

#### GONORRHOEA OF THE LOWER GENITAL TRACT

*Symptoms and Physical Signs.*—Within a few days, sometimes within twenty-four hours, of exposure to infection, the patient complains of a thick yellow discharge, of heat and irritation of the vulva, scalding or smarting pain on micturition, and soreness when walking. There may be some constitutional disturbance, in the form of rise of temperature and a feeling of illness.

On examination the vulva is congested, red and swollen, and bathed in a yellow purulent discharge; the urethral orifice is reddened, and on pressing along the urethra from within outwards, a drop of pus can generally be forced out. The orifices of the Bartholinian ducts are often red and unduly patent. As a result of the irritating discharges, the skin is often excoriated, not only over the vulva, but also over the contiguous part of the thighs and around the anus. The lymphatics of the vulva pass to the horizontal set of inguinal glands; in cases, therefore, where the vulva is severely affected by the gonorrhœal attack, these glands will be enlarged and tender. The vagina is hot, swollen, and very tender to the touch; on introducing a speculum, the vaginal walls appear very red, and this redness has a striking and characteristic punctiform distribution, bright red spots standing out conspicuously on a rather paler back-



ground. This appearance is seen, not only in the vagina itself, but also on the vaginal aspect of the cervix; and cervix and vagina alike are bathed in thick yellow pus. Sometimes, while this examination is being made, a drop of clear mucus can be seen exuding from the external os; this is to be regarded as a favourable sign, as it usually indicates that the infection is confined to the vagina. When the endometrium is also affected, any discharge coming through the external os is muco-purulent.

*Pathology.*—On microscopic examination, the vaginal epithelium is seen at first to be swollen, owing to infiltration of round cells in the papillæ, which are very vascular. The interpapillary spaces are filled up by exudation of cells and serum till the papillæ cease to be distinct. The epithelium then becomes thin and presents the appearance of granulations, which bleed readily (Ruge). The gonococcus is found in the pus-cells, but it is said that it is not able to penetrate the stratified vaginal epithelium (Bumm); the staphylococcus and streptococcus, however, are able to do so. It is thought that the rôle of the gonococcus is to set up inflammation and destroy the vaginal bacillus, which is regarded as the natural guardian of this canal, and the septic organisms are then able to effect an entry. It is certainly a fact that in a gonorrhœal vaginitis some septic organisms are nearly always found associated with the gonococcus.

Another point of interest is that according to some authorities primary gonorrhœal infection of the vagina is rare; the urethra becomes first affected, together with the cervical mucosa; and the vaginitis is secondary to the urethritis and cervical endometritis. The resisting character of the stratified epithelium of the vagina which, as has been pointed out, has the anatomical characters of skin rather than of mucous membrane, is said to account for this order of events. Other authorities, however, believe that a primary vaginal infection always occurs, but that it is transitory.

*Diagnosis.*—There is no difficulty in recognizing vaginitis, but the diagnosis of its nature is often as difficult as it is important. The question is whether, in a given case, the condition is gonorrhœal or not. On the answer much often



depends, such as questions of criminal assault and of unchastity. If the gonococcus be found in the pus, the existence of gonorrhœa is established; its absence, however, is no proof to the contrary. If the inflammation be non-purulent, if the urethra be unaffected, and if the Bartholinian ducts be not involved, the probability is strong that the case is not gonorrhœal; in the opposite conditions the probability is in favour of gonorrhœa. Some information may be derived from the existence of urethritis in the husband; if he have a marked purulent urethritis and the pus contains gonococci, the argument is in favour of gonorrhœa in the woman. When there is pus, it may be septic in origin, or it may come from the cervix uteri in cases of endometritis and carcinoma of the cervix, and not primarily from the vagina. A careful examination must, therefore, be made with the speculum, when, if the vagina be at fault, it will be seen to be reddened and injected, and studded over with brighter red points.

*Course and Complications.*—The infection of the urethra seldom causes any complications in women; stricture is very rare, and consequently the bladder, ureters, and kidneys commonly escape. At times, however, cystitis may be set up.

Infection of the ducts of Bartholin's glands leads to an abscess in this situation. Sometimes one side only is affected, but more often both sides are involved, either together or consecutively. The labia may suffer considerably with inflammation, œdema, or gangrene; but these complications are found more often when gonorrhœa is part of a mixed infection.

A very common complication of neglected gonorrhœa is a breaking out of condylomata over the vulva and adjacent parts of the thighs and round the anus. Want of cleanliness is here an important contributory cause. In the case both of simple gonorrhœa and of mixed infection the inguinal glands may suppurate and form a bubo.

Purulent ophthalmia is a frequent complication of gonorrhœal vulvo-vaginitis in children, the infection being conveyed directly by the patient's fingers or indirectly through linen and clothing. It is rare in adults. Gonorrhœal



rheumatism also occurs, but less frequently than among men.

The most important complication, of course, is the upward spreading of the infection, the ravages of which we shall consider when describing gonorrhœa of the upper genital tract.

Occasionally we are asked how soon after an attack of gonorrhœa it is safe for a woman to marry. The answer to this question is made difficult by the fact that after a gonorrhœal vaginitis is apparently cured there may remain some latent infection, the seat of which is probably in the cervix. As an approximation to a general rule we may say that a woman should not marry until at least three months after the vaginitis is apparently cured; and it is better to let six months elapse. During the interval a bacteriological examination of the vaginal secretion should be made from time to time: as long as the gonococcus can be discovered, the case cannot be regarded as cured.

*Treatment.*—The patient should be kept in bed if possible; if there be constitutional disturbance, this is essential. The parts must be kept thoroughly clean; a warm sitz-bath medicated with boracic acid, carbolic (1 in 60), or biniodide of mercury (1 in 6000), and repeated several times a day, will ensure cleanliness and relieve pain. After a bath or irrigation the vulva should be well dried, and dusted with oxide of zinc, and a pad of cotton wool applied. If there be suppuration on the surface, all discharge should be removed by irrigation, and the surface swabbed over with nitrate of silver solution (2 per cent.), chloride of zinc (5 per cent.), or carbolic (10 per cent. in glycerin). Fomentations wrung out of boracic acid may then be applied. When the inflammation is severe, the patient should lie with the knees supported on a pillow, and separated to prevent the contact of the tender surfaces. The vulvar affection is, of course, the least important part of an attack of gonorrhœa, and the main purpose of treatment is to reach the cervix and vagina. It must be remembered that, owing to the tendency to the upward spread of the infection, gonorrhœa is a more serious condition in women than in men. Nor does the danger stop here. Under the influence



of pregnancy a latent gonorrhœa may reawaken to virulent activity, in the vagina, the uterus, or the tubes; or the trouble may lie dormant till labour comes on, when a rapidly fatal form of puerperal septicæmia may develop, for which the medical attendant may incur undeserved responsibility. In other and perhaps more frequent cases sterility results from the sealing up of the fimbriated ends of the Fallopian tubes, which become converted into bags of pus. This is generally associated with a troublesome form of dysmenorrhœa. It is evident, therefore, that no effort should be spared to treat energetically and thoroughly every case of acute gonorrhœal vaginitis.

The following will be found to be an effective method: The patient is anæsthetized and placed in the lithotomy position; the vagina is then well irrigated with a solution of biniodide of mercury (1 in 2000), after which it is thoroughly swabbed out with a solution of carbolic acid in glycerin (1 in 10), nitrate of silver (10 grs. to ʒj), or chloride of zinc (10 grs. to ʒj). The cervix is similarly treated, and a uterine probe may be dipped into the solution and applied to the uterine cavity. The vagina is then again irrigated with biniodide of mercury or a saturated solution of boracic acid; iodoform tampons are placed in the vagina, and the patient is sent back to bed. The after-treatment consists of douches, morning and evening, with such antiseptics as biniodide of mercury (1 in 4000), sanitas sypol (ʒj to one pint), or chinosol (1 in 4000).

If this thorough treatment under an anæsthetic cannot be applied, douches should be ordered morning and evening. It is not advisable that much force should be used, lest toxic discharges be forced up into the cervical canal.

A milder method, often serviceable when there is much pain and tenderness, is a course of hot sitz-baths, twice daily, as previously described, using a special vaginal speculum, made of wire, which allows the lotion to penetrate into the vagina. In children it is advised that, in the acute stage, care should be taken that the child's head be not immersed in the bath, lest the eyes become contaminated by the discharges. After bathing or syringing, iodoform bougies may be placed in the vagina, each vaginal bougie



containing three grains of iodoform. For children smaller bougies are employed.

The exhibition of mercury internally often exerts a very favourable effect on the course of the disease. The urethral condition is best treated by diuretics and copious drinking of milk and barley-water; if it remains obstinate a dressed probe soaked in a two per cent. solution of nitrate of silver may be passed into the urethra. Diet should be light, and stimulants forbidden.



## CHAPTER XIII

### GONORRHOEA OF THE UPPER GENITAL TRACT— TUBAL INFLAMMATION

#### GONORRHOEA OF THE UPPER GENITAL TRACT

As has been said, there is considerable doubt whether the mucosa of the body of the uterus is appreciably affected by the gonorrhœal poison; it is probable that the cervical mucosa is involved in the first instance, and that some cases of recrudescence of vaginal infection may be due to the disease remaining latent in the cervix. But the body of the uterus appears to allow of the infection travelling up to the tubes, without suffering itself during the process.

Gonorrhœa of the upper genital tract resolves itself, therefore, mainly into a gonorrhœal infection of the tubes and adjacent pelvic peritoneum. Two principal types of infection are found. In the first (and rarer) type the infection is very acute and travels rapidly through the tube to the peritoneal cavity, setting up an acute peritonitis. This condition will be dealt with later, when describing septic infection of the pelvic peritoneum.

In the second type, the infection is less virulent, and before it has had time to reach the peritoneal cavity in a dangerous form, changes have been set up in the tubes which have, in fact, a protective effect, since they lead to closure of the abdominal ostium of the tube. In this second type there are further variations in the degree of acuteness of the inflammatory process, and we have now to consider the various forms and stages of inflammation of the Fallopian tubes, that is, of salpingitis.

About 95 per cent. of cases of salpingitis are due to gonorrhœa, and therefore what we have to say about salpingitis is tantamount to a description of gonorrhœa



of the upper genital tract. Tuberculous salpingitis, however, will be described separately, under the heading of Tuberculosis of the Female Genital Organs.

**Salpingitis** (*Inflammation of the Fallopian Tubes*).—This is nearly always secondary to septic infection of the genital tract. The chief causes are septic endometritis following labour or abortion; gangrene of a uterine polypus; gonorrhœa; tuberculosis; and cancer of the uterus. The micro-organisms most frequently associated with infective lesions of the Fallopian tubes are the gonococcus, streptococcus, staphylococcus, pneumococcus, *bacillus coli communis*, and *bacillus tuberculosis*. Salpingitis is a very common disease in hospitals, but unusual in private practice. This may be explained by the fact that harlots take less care of their genitals than courtesans; and poor women do not get the same careful obstetric nursing as the wives of the rich.

The changes produced in the tubes by septic endometritis and gonorrhœa are almost identical, and the effects produced may be studied under four headings: (1) The acute stage; (2) the occlusion of the tubal ostium; (3) pyosalpinx; (4) hydrosalpinx.

*The Acute Stage*.—When the infection extends from the mucous membrane of the uterus to that of the tubes, the tubal tissues become soft, succulent, swollen, and friable. The surface of the mucous membrane is covered with glutinous pus, which exudes from the abdominal ostium when the tube is squeezed. When this infective material escapes from the tubes into the pelvic section of the cœlom it sets up pelvic peritonitis, which is not infrequently rapidly fatal; when it supervenes on delivery or abortion it is commonly termed “puerperal peritonitis.” The occurrence of infective peritonitis in this way has been demonstrated on many occasions in the course of an operation. Acute gonorrhœal peritonitis sometimes occurs in the same way, though it is far less frequently fatal than that which follows septic endometritis, ensuing on labour or abortion. The gonococcus is not, as a rule, a general pyogenic organism; it is specific in that the effects it produces are mainly confined to the mucous membrane of the genital organs. In cases where cœliotomy has been necessary in gonorrhœal



peritonitis, pus has been seen escaping from the abdominal ostium of the tube, and the gonococcus has been demonstrated in the pus (Wertheim, Bland-Sutton, and Cushing). Foulerton succeeded in obtaining a pure culture of the *micrococcus gonorrhœæ* from a case of pelvic peritonitis secondary to gonorrhœal salpingitis (*Trans. Obstet. Soc. Lond.*, vol. xliii, p. 251).

The direct channels established by the Fallopian tubes between the cavity of the uterus and the cœlom (general peritoneal cavity) facilitate peritoneal infection. But its frequency is diminished in a very important manner by occlusion of the cœlomic ostia of the tubes—a pathological sequence of great value in so far as the saving of life is concerned.

*Gonorrhœal Salpingitis in Children.*—The pus associated with vulvo-vaginitis in little girls (p. 176) contains in many cases gonococci, and the infection sometimes extends to the uterus, and involves the Fallopian tubes. It may even establish a gonococcal peritonitis. This form of peritonitis in children occasionally assumes an acute form; in many instances it rapidly subsides.

*Occlusion of the Ostium.*—When inflammation extends from the tubal mucous membrane to the peritoneum adjacent to the ostium, it leads to the formation of adhesions in consequence of the organization of the exudation which leads to the matting together of the tubal fimbriæ; this also glues them to the ovary and posterior layer of the broad ligament, and occasionally to a coil of intestine. This mechanically seals the ostium.

There is another interesting and probably slower way in which these ostia become occluded. The fimbriæ are luxuriant protrusions of tubal mucous membrane beyond the ostium. When the tubes are inflamed the muscular and serous coats lengthen and bulge over the fimbriæ until each ostium appears as a rounded smooth orifice instead of being fringed; gradually the rounded margins contract, cohere, and occlude the opening. In the early stages, if the rounded end of the occluded tube be slit up, the fimbriæ will be found crowded inside the tube. This mode of occlusion is termed “salpingitic closure of the ostium”







discharged into the cœlom (general peritoneal cavity) and sets up fatal peritonitis. More frequently a pyosalpinx opens into the rectum and the pus escapes by the anus. This is one method of spontaneous cure. In rare instances a pyosalpinx will involve the anterior abdominal wall and the pus escape externally.

In severe cases of salpingitis, as has already been mentioned, the ovary is almost always implicated, and while the tube is undergoing conversion into a pyosalpinx an abscess forms in the ovary. The sacculated pus-containing



FIG. 53.—FALLOPIAN TUBE AND OVARY.

The cœlomic ostium and fimbriæ are enclosed by a capsule formed around an inflammatory exudation from the tube due to an acute gonorrhœal salpingitis.

tube and the abscess in the ovary may remain distinct, but very frequently the two fuse together and form what is known as a tubo-ovarian abscess (Fig. 54). A unilateral pyosalpinx sometimes complicates pregnancy; and an active pyosalpinx co-existing with a large uterine fibroid is a serious matter for the patient. Bilateral pyosalpinx is a common association of the late stages of cancer of the uterus (*see* p. 318).

**Hydrosalpinx** (*Sactosalpinx serosa*).—This may be defined as a Fallopian tube distended with serous fluid in consequence of inflammatory occlusion of its cœlomic ostium (Fig. 55).



Salpingitis does not always lead to occlusion of the abdominal ostia of the tubes. A mild attack may conveniently be described as "catarrh of the tubes," and, like a nasal or gastric catarrh, subsides and leaves no trace. When the inflammation has been sufficiently severe to seal the ostium the tube is permanently damaged. Such a tube becomes passively distended with fluid and converted into a legume-shaped cyst. The steps of this change are similar to those which occur in the gall-bladder and kidney, secon-

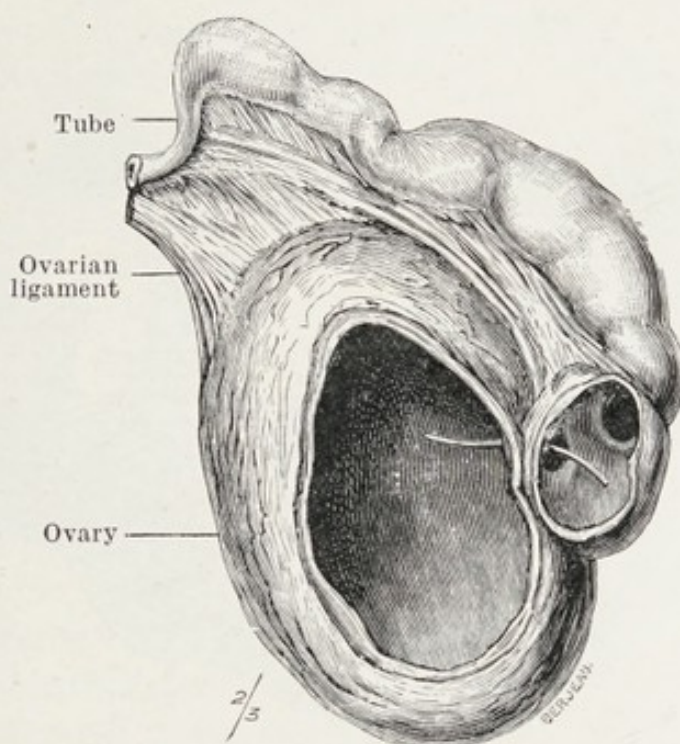


FIG. 54.—TUBO-OVARIAN ABSCESS.

dary to obstruction of the cystic duct or the ureter. Frequently the ampulla of the tube becomes greatly distended and the tube assumes the shape of a retort; and the part corresponding to the isthmus of the tube becomes elongated and tortuous.

A hydrosalpinx sometimes possesses walls so thin that it is translucent and devoid of adhesions. In other cases the wall is universally adherent. Many examples of hydrosalpinx are secondary to pyosalpinx, the purulent contents of which have become sterile. The inner walls of such sacs occasionally bear papillomata.

A hydrosalpinx does not often exceed the dimensions



of a turkey's egg, but occasionally it will form a swelling appreciable above the brim of the true pelvis; very large specimens are often erroneously termed tubo-ovarian cysts and ovarian hydroceles.

A hydrosalpinx sometimes undergoes axial rotation, and this leads to symptoms which in many instances have been mistaken for acute inflammation of the vermiform appendix. The premier example of this condition was recorded by one of us (Bland-Sutton) in 1891. In 1904 Bell was able to

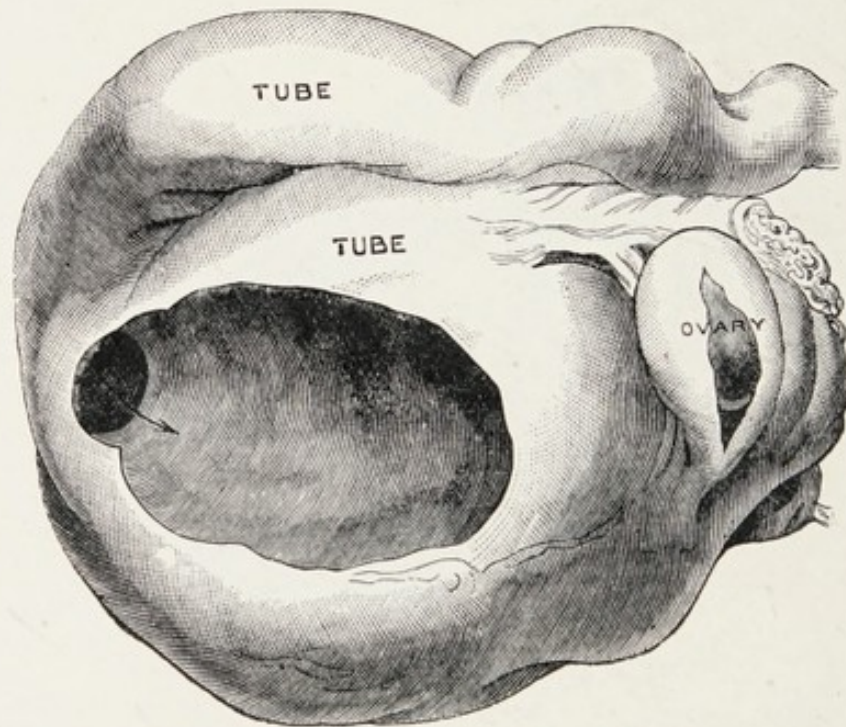


FIG. 55.—A LARGE HYDROSALPINX. (From Bland-Sutton: *Diseases of the Ovaries and Tubes*.)

collect the records of fifty additional cases (*Trans. Obstet. Soc. London*, vol. xlv.); and Michel has recorded an example of acute torsion of both tubes (1907).

*Intermitting Hydrosalpinx.*—It has been stated on clinical evidence that the fluid in a hydrosalpinx may escape through the uterus, the blockade at the uterine end of the Fallopian tube being raised. Such a condition is termed “hydrops tubæ profluens,” the escape of the fluid taking place at irregular intervals. Profuse discharges of pus and fluid occur in connection with pyosalpinx and hydrosalpinx, accompanied by a diminution in the size of the tumour, due to the formation of a fistula between the cyst and



the rectum or the vagina. We have never been able to satisfy ourselves that a hydro- or pyo-salpinx discharges itself into the uterus through the uterine orifice of the tube.

It is a fact of some interest that the uterine end of the Fallopian tube is rarely obliterated in salpingitis. Of course the tumidity of the mucous membrane would be sufficient in most cases to obstruct the passage of fluid from the tube into the uterus.

**Hæmatosalpinx** (*Sactosalpinx hæmorrhagica*).—This term is applied to a distended non-gravid Fallopian tube with an occluded cœlomic ostium. The cavity contains blood or blood-stained fluid.

Many museum specimens formerly catalogued as examples of hæmatosalpinx prove on careful examination to be gravid tubes. This matter is discussed in the section devoted to Tubal Pregnancy. *It is necessary to remember that bleeding from the Fallopian tubes occurs from other causes than tubal pregnancy, but mere hæmorrhage from a tube does not constitute hæmatosalpinx.*

*Sclerosis of the Tubes.*—Every Fallopian tube affected with chronic salpingitis is not converted into a pyosalpinx or a hydrosalpinx: it may become changed into a hard fibrous body traversed by an irregular canal.

In the early stages of salpingitis the tubal walls are infiltrated with inflammatory exudation; gradually this exudation organizes into fibrous tissue, and the true tubal structures atrophy. It is a very slow process, and probably six years are required for the conversion. The process is identical with that which leads to stricture of the male urethra. It is not unusual to find a hydrosalpinx on one side of the uterus and a sclerosed Fallopian tube on the other.

Sclerosed tubes are sometimes sources of danger, as small abscesses form in them, perforate the wall of the tube, and lead to adhesion of small intestine; occasionally this causes fatal intestinal obstruction. Sclerosis of the tubes may be regarded as Nature's method of curing salpingitis.

**Acute Salpingitis.**—The leading signs of this affection are not dependent on the tubes, but become manifest when



the infection extends from the tubes to the pelvic peritoneum. When this disease is secondary to septic endometritis the signs often come on with great suddenness. The discharges from the uterus are offensive; the patient may have a temperature of  $100^{\circ}$  F. Suddenly she is seized with a rigor; the temperature rises to  $103^{\circ}$  or  $104^{\circ}$ ; the belly quickly swells, and in twenty-four hours there is clear evidence of infective peritonitis. In some of these cases death follows in a few days; in others the patients slowly recover. When these signs supervene on delivery or abortion, the condition is often called "puerperal peritonitis."

Similar attacks are sometimes seen after operations upon the uterus, and may complicate a gangrenous submucous fibroid.

As a rule, slow accession of symptoms indicates gradual extension of infection from mucous and muscular to serous tissue. Sudden onset of the severe signs means actual leakage from the tube into the cœlom (general peritoneal cavity). In some cases acute infection of the peritoneum is indicated by profound collapse. The above signs may be interpreted thus: slow extension produces chronic changes; leakage, as a rule, leads to general infective peritonitis, and not infrequently to death.

It should also be borne in mind that sudden infection of the pelvic peritoneum during labour may arise from the bursting of a pyosalpinx, or a suppurating ovarian cyst of small size.

Acute pelvic peritonitis, sufficiently severe to endanger life, occasionally occurs in the early stage of gonorrhœa before the cœlomic (abdominal) ostia become sealed.

*Treatment.*—Acute salpingitis demands absolute rest in bed, and the routine use of mild vaginal injections. The bowels should be kept regular with saline purgatives. When the pelvic pain is very great, warm fomentations should be applied to the hypogastrium, and morphia or opium may be judiciously prescribed.

When the signs indicate extensive fouling of the peritoneum and the patient's life is imperilled, the surgeon may have to consider the advisability of performing cœliotomy. In all cases in discussing treatment the surgeon is



bound to remember that his diagnosis is not infallible, and though the signs may indicate leakage from an infected tube, it may be due to a rupture of an ovarian abscess, or an abscess connected with the vermiform appendix. In such cases cœliotomy is the only hopeful course.

**Chronic Salpingitis.**—This is a very common disease, and one that not infrequently imperils life; even in cases when life is not endangered, the pain and inconvenience these women suffer are often such as to render them chronic invalids.

The chief points are these : The patient is usually between twenty and thirty-five years of age, and furnishes a history of difficult labour or abortion, followed by a protracted illness, since which she has been sterile and suffered from excessive, prolonged, and often painful menstruation. Defæcation and sexual congress are sources of pain; some complain also of a vaginal discharge. Married women, and occasionally single women, furnish details of such a kind as lead us to believe that an attack of gonorrhœa marked the beginning of the trouble. In a large proportion of cases the trouble dates from septic complications following labour or a miscarriage.

The symptoms, briefly summarized, are menorrhagia, pain, and sterility.

Tuberculous salpingitis has wider age-limits, as it occurs in children from eighteen months onwards. In girls after puberty this variety of salpingitis is often associated with amenorrhœa, and in some cases with hydro-peritoneum.

On examining the abdomen, an irregular tender swelling may sometimes be detected in one or both flanks; more frequently there is an indefinite swelling, and in some, on palpation, a sense of resistance can be made out, but in very many cases no swelling can be detected.

On internal examination, there will be found lying on each side of or behind the uterus an elongated swelling, which usually gives rise to great pain when pressed by the examining finger. Not infrequently the uterus is acutely retroflexed, and then the uterine fundus with the enlarged tubes and ovaries forms a rounded ridge running transversely across the pelvic floor.



As a rule, a moderately distended tube can only be felt through the vagina or by the bimanual method.

Tactile judgment is a very important factor in the diagnosis of pelvic swellings. To estimate the size, consistence, fixity, or mobility of a tumour lying in close relationship with the uterus requires experience.

In a general way, it may be stated that it is impossible to diagnose accurately between the various forms of tubal disease, including gravid tubes previous to rupture or abortion, and the following forms of ovarian disease—

1. Tuberculous abscess of ovary ;
2. Apoplexy of the ovary, or ovarian pregnancy ;
3. Small ovarian cysts, tumours, or dermoids ;
4. Small parovarian cysts.

The following conditions are very liable to be mistaken for tubal disease—

Retroflexion of the uterus ;

Pelvic cellulitis ;

Fæcal accumulation in the rectum ;

A kidney in the hollow of the sacrum ;

A small uterine fibroid ;

Cancer of the sigmoid flexure of the colon ;

Abscess due to inflammation of the vermiform appendix burrowing into the mesometrium ;

Tumours of the sacrum or innominate bone ;

Tumours of the mesometrium, including echinococcus colonies.

When a Fallopian tube is so distended as to render it capable of being felt above the pelvic brim, it is liable to be, and often is, mistaken for an ovarian cyst. On the other hand, when ovarian and parovarian cysts are not large enough to be felt above the pelvic brim, they closely simulate pelvic cellulitis or distended tubes. *Distended Fallopian tubes simulate fibroids much more closely than ovarian tumours, and vice versa.*

*Treatment.*—When the tubal mucous membrane has become seriously damaged and the tubes fixed by adhesions to surrounding structures, then drugs are of little avail. When such persons are able to lead a life of ease they often become chronic invalids and try continental health resorts,



where they visit the springs and indulge in baths, especially the mud-baths of Bohemia. In poorer patients such treatment is out of the question, and in order to lead a useful life, as well as to escape from pain, they willingly submit to surgical measures.

The ordinary rules of surgery suggest that when the physical signs indicate that the Fallopian tubes are occluded and distended with pus or other fluid, producing pain and inconvenience, so as to cause the patient to lead the life of a chronic invalid, it is justifiable to remove them.

Removal of the Fallopian tubes and ovaries (oöphorectomy) is justifiable, and the only radical means of treatment in the following conditions : Pyosalpinx and tubo-ovarian abscess ; hydrosalpinx ; ovarian abscess ; tuberculous salpingitis.

In some cases where the uterus is greatly enlarged in association with bilateral pyosalpinx, it is a wise step to remove the uterus with the ovaries and tubes, because even after complete bilateral oöphorectomy the patient may suffer from severe irregular hæmorrhage from the infected endometrium.

In tuberculous salpingitis oöphorectomy should only be undertaken when there is no evidence of tubercle in other organs, such as lungs, bladder, or kidneys. When the Fallopian tubes are stuffed with tuberculous material, it is often possible to remove one, and sometimes both tubes without disturbing the ovary. Salpingectomy under such conditions is followed by good consequences, immediate and remote. It is by no means uncommon to find tuberculous disease strictly limited to the tubes.

The method of performing oöphorectomy is described in the section devoted to the description of operations.



## CHAPTER XIV

### NON-GONORRHOEAL INFECTIONS OF THE VULVA AND VAGINA

WE may now give a general review of those inflammatory conditions of the unbroken genital tract that are due to causes other than gonorrhœa, namely vulvitis, vaginitis, endometritis, oöphoritis, and peritonitis. Salpingitis has already been sufficiently dealt with.

#### INFLAMMATION OF THE VULVA

Vulvitis may be simple, infective, or of the nature of a dermato-neuritis.

**Simple Vulvitis** may be due to want of cleanliness, irritating discharges from the uterus, or excessive intercourse. In children it is said to result from thread-worms. It may also be a part of a trauma of the vulva. The symptoms are heat, pain, and throbbing in the vulva, aggravated by exercise. The vulva is congested, red, and swollen. The swelling may affect individual parts, such as the labia majora, nymphæ, or clitoris; or the whole vulva may be involved. If due to injury, bruising may be seen.

*Course and Complications.*—Under proper treatment, a simple vulvitis runs a short course to recovery. If neglected, or if septic from the first, the possible complications are urethritis, labial abscess, œdema and gangrene of the labia, infection and abscess of Bartholin's glands, inguinal bubo, vaginitis, endometritis, salpingitis, and peritonitis.

*Treatment.*—This should be on lines similar to those adopted for gonorrhœal vulvitis, but as a rule, it need not be so energetic. Intercourse must, of course, be avoided.



**Diphtheritic Vulvitis** is characterized by the formation of a membrane, which is composed of fibrin, and stains typically with Weigert's stain; the Klebs-Loeffler bacillus is found in it. It is important to remember that a membranous vulvitis may be non-diphtheritic; in that case the membrane, in contradistinction to the features above indicated, is composed of necrotic material, in which outlines of cells may still be made out, and containing little or no fibrin. The organism present is usually the streptococcus.

**Erysipelas of the Vulva.**—This generally follows labour, and occasionally wounds of the vulva. It behaves in the same way as when affecting the skin elsewhere; but owing to the laxity of the connective tissue of the labia there is much swelling. Since the use of antiseptics in midwifery it is less often seen, and should be regarded as a *preventable* disease, at any rate, when occurring as a complication of childbed.

It is seldom confined to the vulva, but spreads thence to the thighs, abdomen, and buttocks. The labia minora are apt to suffer severely, for their blood-supply is interfered with, and ulceration, perforation, or gangrene may follow. It is important that when this condition exists no internal examination should be made; otherwise the internal organs may be infected and septicæmia supervene.

The *treatment* is that of erysipelas in any other part of the body.

**Abscess of the Vulva.**—This is occasionally due to injury or to suppuration following on cellulitis, erysipelas, or hæmatoma. But in many cases it arises in the sebaceous glands of the labia and in the ducts of Bartholin's glands. As a rule, one side only is affected. As might be expected, gonorrhœa is the principal cause.

The signs are those of an abscess in other situations, local redness, swelling, heat, and pain, often accompanied with febrile symptoms.

*Treatment.*—This consists in a free incision to evacuate the pus, warm bathing followed by fomentations, and strict cleanliness.

Dermato-neuritis is considered under cutaneous affections.



It will be convenient to consider here the vascular disturbances of the vulva.

### VASCULAR DISTURBANCES OF THE VULVA

Under this heading we have to consider varicocele, hæmatoma, œdema, and gangrene.

**Varix.**—The vulva is well supplied with veins, and contains especially a good deal of erectile tissue. Obstruction to the venous circulation in the pelvis, abdomen, or thorax consequently readily causes the veins to assume a varicose condition. This is found very often during the later months of pregnancy, and in some cases the enlargement may be extreme, forming a swelling, on one or both sides, as large as a fist, involving principally the labia majora, and presenting to the touch the characteristic feeling of "worms in a bag," which is met with in varicocele of the scrotum. The dilated and tortuous veins can also be readily seen through the skin. The left side is more often affected than the right. The veins of the thigh are generally also involved, and on inspecting the vagina, similar venous plexuses may be seen, extending up a considerable distance under the mucous membrane. There is a great risk of rupture of these veins during delivery; either the surface veins may give way, giving rise to serious bleeding, or subcutaneous rupture may occur, producing a hæmatoma of the vulva.

*Treatment.*—Rest in the horizontal position diminishes the swelling; but when associated with pregnancy, no cure can be hoped for till after delivery. In severe cases it may be advisable to induce premature delivery in order to diminish its severity and duration, and, through the smaller size of the child's head, lessen the risk of rupture and thrombosis. When due to other varieties of backward pressure on the veins, the cause must be treated.

Slight cases are often associated with chronic constipation, and in these, as well as in severer cases, great improvement results from attention to the bowels. When a varix persists after delivery, or fails to improve under rest and general treatment, it is necessary to excise it. The



operation is usually attended by free bleeding, but when done with care it gives good results.

**Hæmatoma of the Vulva.**—This is due to subcutaneous rupture of veins in the labia majora, and is nearly always traumatic. A fall or blow may cause it, but it generally occurs during labour, especially when the child's head is large, and has rested long on the perineum. A varix during pregnancy greatly predisposes to this accident.

The condition is usually easily recognized from the history, and from the presence of a smooth, fluctuating swelling in the labium majus, which has formed quickly, and is irreducible. These points serve to distinguish it from hernia, and from abscess and cyst of the labium. It may not be easy to distinguish it from simple œdema; but this is unimportant, as the treatment is the same.

*Treatment.*—On no account should a hæmatoma be opened, unless it is enlarging quickly, when there is probably a large vessel ruptured; in this case a free incision should be made, the clots turned out, and the bleeding-point secured. Otherwise the extravasated blood tends to absorb readily, and generally subsides in two or three weeks.

Occasionally a hæmatoma suppurates and requires free incision, drainage, and strict cleanliness.

**Œdema of the Vulva.**—This may occur as the result of vulvitis, and is then commonly due to spreading of the inflammatory process to the deeper tissues, involving vessels and lymphatics. More often it depends upon pressure on the pelvic veins, by tumours, pelvic inflammation, or the pregnant uterus. It may also form part of a general anasarca, the consequence of cardiac or renal disease. The labia minora and prepuce clitoridis are specially apt to be affected; in other cases the œdema spreads over the labia majora and mons veneris. In extreme cases the swelling may form a mass the size of a foetal head.

The *treatment* consists in rest in bed, moderate purgation, and warm fomentations, if due to phlebitis and lymphatic obstruction. When due to pressure, the cause must, if possible, be dealt with—*e. g.* a tumour should be removed, pelvic inflammation should be treated as described under that heading; pregnancy may occasionally require to be



terminated prematurely. As a palliative measure, small punctures may be made with a narrow-bladed scalpel.

**Gangrene of the Vulva.**—This occurs under the following conditions—

1. As the result of injury, especially long-continued pressure of the head in the third stage of labour, or from the unskilful use of instruments.
2. Following œdema, cellulitis, or erysipelas of the vulva.
3. As a complication of some of the exanthemata, as small-pox, scarlet fever, measles, and typhus.
4. In underfed and dirty children, when it is analogous to noma or cancrum oris.
5. As a result of phagedenic ulceration.

Except in the last case, when the clitoris is apt to be involved, the nymphæ are most apt to suffer; they may be perforated, or the lower portion may slough off.

The *treatment* consists in supporting the patient's strength, in keeping the parts as clean as possible with antiseptic applications, and in relieving pain by hot fomentations, with opium internally, if necessary.

**Vaginitis.**—The chief causes of inflammation of the vagina are: (a) *Injuries*, such as result from obstetric operations, accident, foreign bodies, retained pessaries, immoderate coitus, and careless application of caustics to the uterus; (b) *Infections*, such as gonorrhœa, sepsis, and tuberculosis.

According to the age of the patient different types will be found. In children it may be simple, or due to thread-worms, gonorrhœa, and exceptionally to uterine tuberculosis. In adults it is nearly always gonorrhœal. Want of cleanliness and constitutional conditions are predisposing causes, as they favour the growth of pathogenic organisms (*see* Chap. XI).

The hyperæmia of pregnancy predisposes to vaginitis, whether due to injury or to infection, and it may also cause a latent gonorrhœa (allied to gleet in the male) to take on increased activity. It is, however, probable that when gonorrhœa remains latent, it is located, not in the vagina,



but in the cervix uteri. Beyond this predisposition, pregnancy does not give rise to any specific form of vaginitis, and it is not therefore necessary to describe it as a separate variety, as is sometimes done. The same may be said of senile vaginitis, which is simply a vaginitis occurring in later life from causes which are identical with those that are operative in younger women; but it is worthy of note that the discharge may be thin and sanious, leading one at first to suspect carcinoma of the cervix.

Vaginitis may occur also during the puerperium, as part of a puerperal infection, and it is then generally septic. The laceration or bruising of the vagina by the passage of a large head, or by instruments, favours inflammation; and, indeed, apart from infection, there is always some degree of traumatic inflammation in these cases.

*Pathology.*—As in inflammation elsewhere, the first condition is congestion, causing heat and redness of the mucous membrane. The discharge which is produced is known clinically as leucorrhœa, and consists at first of a watery fluid, with cast-off epithelial cells. If the latter are in great quantity the discharge is no longer clear, but white and turbid (hence the name). If pus forms, it imparts a yellow or green colour to the discharge, which is then conveniently described as xanthorrhœa.

In simple cases the inflammation soon subsides, without further change than more or less desquamation of the epithelium. In senile vaginitis atrophic changes follow: the epithelium is reduced in thickness, and fibrous changes ensue in the mucous membrane, which narrow the lumen of the passage. The same result may occur in places from the action of caustics, but here the epithelium may be deeply destroyed, and the contraction is sometimes marked (*see Complications*).

When vaginitis is due to a retained pessary, the granulations often become so exuberant as to surround and imbed the pessary (*see Retained Pessary*).

Under proper treatment, the granulations subside, and the epithelium gradually resumes its normal appearance. But when the inflammation has been very virulent, large patches of epithelium may be detached, mixed with coagulated



exudation ; and this condition has been described as diphtheritic, membranous, or desquamative vaginitis.

**Varieties.**—Clinically it is useful to distinguish the following varieties of vaginitis—

- (a) Simple Vaginitis.
- (b) Vulvo-vaginitis of Children.
- (c) Gonorrhœal Vaginitis of Adults.
- (d) Membranous Vaginitis.

(a) **SIMPLE VAGINITIS.**—This is nearly always due to injuries or to violence, including immoderate sexual intercourse. The symptoms are: heat and throbbing in the vagina, leucorrhœa, dyspareunia, and sometimes swelling of the external genitals, when it is complicated by vulvitis. If neglected, sepsis may become superadded, and the symptoms will then resemble those of gonorrhœal vaginitis, the most conspicuous feature being a purulent or muco-purulent discharge.

A simple vaginitis subsides rapidly under proper treatment. All that is required is to keep the patient in bed for a day or two, and to order vaginal douches of warm unirritating lotions, such as boracic acid or subacetate of lead. Sexual intercourse should, of course, be forbidden.

(b) **VULVO-VAGINITIS OF CHILDREN** acquires some of its importance from its medico-legal bearings. The question of criminal assault sometimes arises, and the medical attendant should bear in mind the following points : First, vulvo-vaginitis of simple character may occur when there has been no violence or external interference of any kind. It is then found mostly in weak and neglected children, as the result of dirt, or possibly of tuberculosis. Secondly, vulvo-vaginitis may be produced by indecent violence short of rape. Thirdly, gonorrhœal vulvo-vaginitis may occur, in epidemic form, in schools ; the starting-point may be an accidental contamination by the bed-clothes when children sleep with parents or elder brothers ; and infection may be spread with towels or other linen, or by the use of one bath for several children. Fourthly, the gonorrhœa may result from rape ; this is rare in proportion to the total number of cases.



In fifty-four cases of vulvo-vaginitis in children, Drummond Robinson found diplococci with the characters and staining reaction of the gonococcus in forty-one.

The symptoms are sometimes slight; with the exception of a mucous or purulent discharge they may be absent. But more often the child complains of pain, scalding micturition, or itching, and there may be some febrile disturbance. It has been shown that thread-worms may set up vaginitis in children by passing into the vagina from the rectum. The smallness of the hymeneal orifice in children, while it is in some measure a safeguard against infection, tends to aggravate the disease when once established, and is a difficulty in the way of cure, because it favours the retention of discharges.

*Symptoms.*—The patient complains of pain and burning in the vulva; smarting pain on passing water; dyspareunia and discharge. On examination, the vaginal walls are hot, red, and swollen, and acutely tender to the touch. The discharge, generally yellow or green, is found bathing the external genitals, as well as the vagina. In aggravated cases we may meet with some of the complications mentioned below.

*Course and Complications.*—If left untreated, a simple vaginitis does not give much trouble; but the results of septic vaginitis are far-reaching and serious. The most important is the spreading of the disease up the genital passages, producing successively endometritis, purulent salpingitis, and septic peritonitis, as described in the section on gonorrhœal infection.

In addition to these complications, the following have to be considered: *vesico-vaginal and recto-vaginal fistulæ*. These occur more often from other causes, but may result also from severe vaginitis attended with ulceration and sloughing (*see* Chap. VII).

*STENOSIS VAGINÆ.*—This is especially apt to occur when there has been extensive destruction of the epithelium, and is therefore often well marked when the vagina has been much injured by caustic applied to the cervix uteri. In such cases, if examined at a later date, the finger discovers the vagina to be contracted, usually a little below the level



of the external os. The contraction may be so great as barely to admit the finger-tip. But if this can be passed through the constriction, which is often annular, it enters an expanded part of the vagina, in which is found the cervix. The vagina may, in fact, be said to present an hour-glass contraction. The condition, if it occur in later middle age, about the time of the menopause, causes but little trouble; but in earlier adult life the contraction may go on to obliteration of the canal, and hæmatocolpos results. Similarly, but more rarely, the external os may become stenosed or occluded, giving rise at first to dysmenorrhœa, and later to hæmatometra.

*Prognosis.*—From the above it will be seen that when treatment is not thoroughly carried out, the prognosis is grave as regards the subsequent health. With proper care, however, in the early stages, the outlook is very satisfactory.

(c) GONORRHOËAL VAGINITIS OF ADULTS.—This has been dealt with fully in Chap. XII.

(d) MEMBRANOUS VAGINITIS.—Several conditions are included under this description, because membranous vaginitis may be due to traumatism, such as the introduction into the vagina, by accident or design, of strong caustics or corrosives; to acute septic infection, when the causal organism is generally the staphylococcus; or to diphtheria, when the Klebs-Loeffler bacillus will be found. In the latter case the "membrane" is chiefly composed of fibrin; in the other cases it consists of necrotic material in which the outlines of cells can be made out, but containing little or no fibrin. It is possible that vaginal tuberculosis may present a similar appearance.

The best *treatment* is thoroughly to disinfect the vagina with antiseptics, under an anæsthetic. In subacute cases this may be preceded by a light curettage, and the vagina should then be packed with iodoform gauze, the packing being repeated every few days. Special care in after-treatment is required to prevent cicatricial contraction and stenosis of the vagina, as this is very apt to result.



## CHAPTER XV

### NON-GONORRHOËAL INFECTIONS OF THE UTERUS, OVARIES, AND PERITONEUM

#### ENDOMETRITIS

THE mucous membrane lining the cavity and the cervical canal of the uterus is termed the *endometrium*. It differs from mucous membranes in general in having no sub-mucous layer. This is due to the fact that nearly the whole of the muscular tissue of the uterus is morphologically muscularis mucosæ. Comparative anatomy supports this view. The endometrium is peculiar in undergoing rhythmic changes during sexual life coincident with menstruation. When the uterus is occupied by an oöperm (fertilized ovum) the endometrium of the uterine cavity is changed into a thick membrane known as a *decidua*, which is incorporated with the placenta. Menstrual and decidual changes are entirely confined to the endometrium lining the uterine cavity. The mucous membrane lining the cervical canal is called the *cervical endometrium*. The endometrium of the uterine cavity has a smooth surface; it is soft, spongy, pale red, and covered with ciliated columnar epithelium. The glands which beset it are simple tubes lined with a single layer of columnar cells continuous with those on the surface; the cells near the orifices of the glands are ciliated. The glands dip obliquely into the stroma of the mucous membrane, and sometimes bifurcate at their extremities. The cervical endometrium is firm, and forms rugæ, giving rise to an appearance known as the *arbor vitæ*. The orifices of the racemose glands open on the surface in the pits between the rugæ. The epithelium in the upper half of the cervical canal is of the columnar ciliated variety; in



the lower half it is stratified. In addition to the glands, the mucous membrane of the lower part of the canal contains numerous vesicles visible to the naked eye, and known as the *ovules of Naboth*.

Endometritis may be *acute* or *chronic*.

**Acute Endometritis.**—The chief causes are sepsis (infection with micro-organisms) following labour or abortion, instrumental interference with the uterus, extension of vaginitis or gonorrhœa, or infection and gangrene of a uterine fibroid.

When inflamed, the endometrium presents the usual characters of an inflamed mucous membrane; it is swollen, and the surface is covered with a purulent exudation. On microscopic examination its tissues are found infiltrated with leucocytes, and if submitted to bacteriological examination the infiltrated tissues and discharges will occasionally furnish the micro-organism which initiated the disturbance. The great difficulty which besets the study of morbid states of the endometrium is the fact that in order to examine it the cervical canal must be dilated. Even then the information can only be acquired by the finger, or more directly from the study of fragments removed from it by means of the curette.

In recent years a good deal of useful work has been accomplished, and we know that acute endometritis following on labour and abortion—"puerperal endometritis," as it is called—is caused by the introduction of pathogenic micro-organisms, such as the streptococcus and staphylococcus, due to lack of scrupulous aseptic precautions on the part of doctor, midwife, or nurse. These minute bodies flourish in the discharges, and lead to decomposition of blood-clot or fragments of placenta which may be retained in the uterine cavity. The ultimate course and consequences of endometritis occurring during the puerperium, or as a sequence of operations on the uterus, or due to gangrene of a fibroid, or extension of gonorrhœa, are much the same.

In many cases, especially when the infection is of a mild type the inflammation subsides, and, like those conditions called catarrh, leaves no trace. In others the inflammatory changes may extend beyond the mucous membrane into the



muscular wall of the uterus, and even involve its serous covering. When endometritis involves the deeper parts of the uterus in this way it is sometimes called metritis (an unnecessary refinement). In severe, and especially in puerperal cases, a septic thrombosis is set up in the uterine veins, and thence the organisms or their products are distributed to the system generally, leading to septicæmia or pyæmia. When the infection is exceedingly virulent, it will lead to gangrene and sloughing of the endometrium.

Another serious consequence of the disease is due to its extension to the mucous membrane of the Fallopian tubes; then the infectious material finds its way directly into the pelvic section of the cœlom (peritoneal cavity), and in many instances with a fatal result. (This disaster is discussed in the chapter devoted to Salpingitis.)

*Symptoms.*—Constitutional disturbance is the rule. The temperature ranges from 99° or 100° to 105° F., and rigors are not uncommon. Apart from the febrile disturbance, the patient complains of pelvic pain and profuse, offensive, purulent, and sometimes blood-stained, discharges.

*Signs.*—On examination the vagina is hot, and before the stage of abundant discharge may be dry. The uterus feels heavy and bulky, and is tender to manipulation. Later it becomes fixed if pelvic cellulitis supervenes. The cervix is at first soft, but later it is hard and firm. Viewed through the speculum, the cervix appears red and thickened, and mucus, either viscid, muco-purulent, or sanious, is seen to exude from the external os.

*Diagnosis.*—The history and the febrile condition will point to the diagnosis, and lead to vaginal examination, when the above conditions will be found.

*Course and Prognosis.*—Acute endometritis of puerperal origin is the only variety which is at all frequently fatal, and then the fatal result depends more on general than on local conditions. In all other cases the tendency is to recovery after a more or less protracted convalescence. The most serious complications are pelvic peritonitis and cellulitis, pyosalpinx and sterility. Uncomplicated endometritis results usually in a chronic hyperplasia, which produces a feeling of aching and weight in the suprapubic



region, backache, and leucorrhœa, favours displacements, and may induce dysmenorrhœa and sometimes sterility.

*Treatment.*—The patient must be kept in bed, and the usual treatment of febrile conditions adopted. For the treatment of puerperal septicæmia the student is referred to text-books of obstetrics.

*Local Treatment.*—At the outset intra-uterine irrigation should be resorted to, using for this purpose solutions of bin-iodide of mercury (1 in 10,000), carbolic acid (1 in 40), nitrate of silver (1 in 500), or chloride of zinc (1 per cent.). The irrigation may be followed by the introduction of iodoform pencils into the uterine cavity, or by swabbing out the uterus with a stronger caustic, such as iodized phenol (iodine, 1 part; carbolic acid, 4 parts), liniment of iodine or chloride of zinc, 10 per cent., applied on an intra-uterine probe swathed with cotton-wool.

Some have strongly recommended curetting for gonorrhœal endometritis; there is, however, the risk of opening up fresh surfaces to infection; and the same objection applies to dilatation of the cervical canal for intra-uterine medication. The risk may be diminished if after the curetting the uterine cavity is thoroughly dabbed with iodized phenol.

As the vagina is often also affected, more especially in gonorrhœal cases, it must be treated at the same time, as previously described.

Much benefit is derived in the earlier stages from scarification of the cervix and the abstraction of blood. This answers better than leeches, which were formerly used for this purpose. It may require to be repeated several times, at intervals of a few days.

The after-treatment consists in the employment of hot vaginal douches of weak antiseptics twice daily. After each douche a glycerin tampon dusted over with iodoform may be introduced into the vagina.

In addition to, or in place of, the vaginal douches hot sitz-baths may be given. Pain is greatly relieved by fomentations applied to the lower part of the abdomen and to the perineum. In other cases morphia suppositories may be introduced into the rectum, or opium given by the mouth.



**Chronic Endometritis**—*Causes*.—(1) This disease may be a sequela of the acute form; (2) it may be due to gonorrhœa or sepsis, without a preliminary acute stage; (3) it may result from abortion or delivery at term, when it takes the form of subinvolution.

*Pathology*.—The changes found in the mucosa are similar to those that occur in acute endometritis, but they are less marked. Several varieties are described according to the structures principally affected, but they lack a pathological foundation.

The conditions described as *villous endometritis* and *senile endometritis* are in reality examples of primary cancer of the endometrium.

*Symptoms*.—These are due to the congestion and hyperplasia which are incidental to endometritis; the patient complains, as a rule, of three things: (1) *Pain*, usually in the form of backache, but sometimes distributed more generally and vaguely as pain and a feeling of heaviness in the lower abdomen and passing down to the thighs; (2) *Leucorrhœa*, when the discharge is a hypersecretion of mucus and appears thick and glairy, like raw white of egg, or more opaque from admixture of vaginal epithelium; or *xanthorrhœa*, when the discharge is yellowish, from admixture of pus cells, and is described as muco-purulent; (3) *Menorrhagia*, which is the direct result of the uterine congestion.

It is a striking characteristic of the endometrium that chronic inflammation of this portion of the uterus is almost always associated with hyperplasia of the glands; and often it is very difficult to say whether the condition should be described as inflammatory or as new-growth. When the latter feature is the more marked, it is usually spoken of as *adenomatous disease of the endometrium*, which will be described later.

The *treatment* of chronic endometritis consists of hot douches and the use of glycerin tampons; the glycerine may be plain, or combined with five per cent. of ichthyol. In obstinate cases, and when glandular hyperplasia is a marked feature, curetting is required.

**Abscess of the Uterus**.—A collection of pus in the walls of the uterus is very rare; it has been observed as a sequel of



gonorrhœa complicating the puerperium, and also in cases in which the bowel has become adherent to the uterine wall, as described in Chap. XVII. The symptoms are those characteristic of septic infections of the uterus with local infection of the peritoneum. The abscess may burst into the peritoneal cavity, the rectum, or the bladder. The prognosis is very grave, but a hysterectomy would offer the best chance of recovery.

We may conclude the account of the inflammation of the uterus by a reference to two rare conditions known as *pyometra* and *physometra*.

**Pyometra.**—This term denotes a uterus filled with pus, and the condition is usually encountered as a complication of uterine cancer. The cavity of the uterus enlarges as a consequence of the erosion and ulceration of its walls by the cancerous process, and in the late stages of this disease the organ becomes septic; when the cancerous material blocks the cervix the discharges are pent up in the uterine cavity and decompose. The retained fluid, which is often extremely foetid, sometimes escapes intermittently, or, as the patient describes it, “in gushes.” A cancerous pyometra is usually complicated with bilateral pyosalpinx.

Pyometra may occur independently of cancer. It has also been observed in one-half of a double uterus (uterus didelphys). It occurs, though rarely, as a secondary change in uteri distended with blood and fluid due to congenital atresia of the cervical canal or vagina (*see* p. 76).

In cases of pyometra complicating cancer the patient may be made comfortable by hysterectomy. If the condition is too advanced for radical treatment, the obstruction in the cervical canal may be removed with the curette, and the uterine cavity regularly irrigated with antiseptic solutions.

**Physometra.**—This term is applied to the uterus when it contains gas. It is a rare condition met with after miscarriage and labour at term, and caused by decomposition of retained fragments of conception, also in cancerous uteri; and it is occasionally associated with gangrenous submucous fibroids.

In cases which have been submitted to bacteriological examinations, the gas-forming *bacillus aerogenes capsulatus*



has been isolated. In a case reported by Whiteford, where the condition was due to a fibroid which complicated delivery and subsequently became gangrenous, the *bacillus coli communis* was found. The chief factors in the production of pyometra are septic infection of the uterus and occlusion of the cervical canal.

**Inflammation of the Ovary (OÖPHORITIS).**—Acute and chronic inflammatory diseases of the ovaries are so constantly associated with salpingitis, to which they are in nearly all cases secondary, that they were considered in Chap. XIII.

There are two conditions which it will be necessary to discuss here briefly. They are : (1) Oöphoritis secondary to parotitis (mumps); (2) abscess of the ovary.

1. *Oöphoritis and Parotitis.*—Girls and young women during an attack of mumps occasionally complain of pelvic pain. In a few cases, where the suffering had been sufficiently severe to warrant a vaginal examination, the ovaries have been found enlarged, tender, and painful. As a rule, the ovaries are affected during the subsidence of mumps. In a few exceptional cases the pelvic pain has preceded the parotid signs.

In this connection it is important to bear in mind that parotitis is not infrequently a sequel to injuries or operations upon abdominal and pelvic viscera, but in these conditions the gland often suppurates.

At present there is no explanation forthcoming of the relation of oöphoritis and orchitis as sequelæ of mumps: the whole of the evidence rests on clinical observation.

2. *Abscess of the Ovary.*—Suppuration in the ovary is in the majority of cases secondary to salpingitis. Abscess of the ovary, apart from tubal infection, may occur in patients with tuberculous lesions in other organs.

In one unusual case an ovarian abscess occurring in a woman twenty-one years of age contained a piece of sewing-needle two centimetres long (Haviland).

*Treatment.*—The clinical features of ovarian inflammation are so bound up with those of pyosalpinx and its complications that the details will be found in Chap. XIII.

**PERI-OÖPHORITIS.**—Chronic inflammation in the pelvis in



the immediate neighbourhood of the ovary is almost sure to involve this gland. Thus, after pelvic peritonitis and pelvic cellulitis the superficial parts of the ovary are infiltrated and adhere to surrounding structures. As the inflammatory products organize, the ovary becomes imbedded in tissue almost as dense as that of a cicatrix.

Peri-oöphoritis is said to occur as a sequel to typhoid fever, rheumatism, the exanthemata, and chronic alcoholism. It is occasionally seen as a consequence of ascites.

The most important results of peri-oöphoritis are painful menstruation (dysmenorrhœa) and sterility.

### PERITONITIS

The pelvic region of the cœlom in a woman differs from that of a man in that the peritoneal lining is more complexly arranged and invests more organs; in addition, two mucous canals—the Fallopian tubes—open directly into it. The frequency of peritonitis in women is out of all proportion to its occurrence in men, and the excessive liability of women to peritoneal infections is almost entirely due to this curious relationship of the pelvic portion of the cœlom to the Fallopian tubes.

**Septic Infection.**—In dealing with salpingitis, it was pointed out that septic infections of the uterus, whether arising primarily in the cavity of that organ, or extending to it from the vagina, are very liable to implicate the Fallopian tubes. In a fair proportion of cases the inflammatory process extends beyond the tubes, and directly infects the pelvic peritoneum. When the septic matter which thus escapes into the cœlom is very virulent, grave disturbances are set up, and death may ensue in a few days.

It was mentioned in Chap. XIII that in a large number of cases salpingitis is a result of septic endometritis following upon abortion or delivery at term; it is important also to appreciate the fact that when pelvic peritonitis occurs as a sequel to labour it is in very many cases called “puerperal fever” or “puerperal peritonitis.” As a matter of fact, observations are by no means wanting to demonstrate that



in many cases thus classed the disaster (causing in very many cases the death of the patient) was due to actual conveyance of septic matter from the uterine cavity into the recto-vaginal pouch.

*Serous Perimetritis.*—The essential features of this variety of pelvic peritonitis consist in a collection of inflammatory exudation in the recto-vaginal fossa, which floats up the adjacent intestines and omentum; these become matted together and to the uterus, so as to form a sort of spurious roof to the pelvis. Under these conditions, the fluid collected in the pelvis very closely simulates a retro-uterine cyst.

When inflammatory exudation collects in the utero-vesical pouch, and becomes, as it were, encysted by the intestines, the condition is sometimes called “anterior serous perimetritis.” The physical signs of such a collection of fluid have so deceived some surgeons as to lead them into the belief that they had to deal with an ovarian tumour.

From what has been said it will be understood that peritonitis is not a separate disease, but is the result of inflammation of the organs in the peritoneal cavity. In the sequence of events that we have been considering it is the final stage of an inflammatory process extending up the unbroken genital tract, and breaking out into the peritoneal cavity through the tubal ostia. Consequently the symptomatology, diagnosis, and treatment of peritonitis are those of the causal conditions; in this case, tubal inflammation.



## CHAPTER XVI

### II.—INFECTION FROM WITHOUT INWARDS CONVEYED THROUGH LESIONS OF THE GENITAL TRACT

THE genital canal is surrounded by connective tissue, and consequently any injury that causes a tear or perforation of the wall of the canal leads to inflammation of the connective tissue, that is, to cellulitis. If the infection is sufficiently severe, an abscess results.

The terms pelvic cellulitis and pelvic abscess are generally understood to mean inflammation or abscess in the connective tissue of the broad ligament, because this is by far the commonest situation for such inflammation. The reason for this is that the broad ligament is in immediate relation with the side of the uterus and the lower border of the Fallopian tube; and these are the places where are most likely to occur those injuries and perforations that lead to cellulitis. (Injuries and perforations in other parts of the uterus and tubes lead to peritonitis.)

The walls of the vagina, however, are also liable to injury as a result of which cellulitis is set up, which may be followed by an abscess. The most frequent cause of such injury is instrumental delivery during labour.

Thus, a tear of the posterior vaginal wall may lead to an abscess in the recto-vaginal septum. The condition is readily recognized on recto-vaginal examination; the vagina is bulged forwards and the rectum is pressed backwards; whilst the causal tear in the vagina is usually easily detected by the finger. Such an abscess may attain a considerable size.

Sometimes the inflammation spreads laterally; or a lateral cellulitis may occur as the direct result of an injury to the lateral vaginal wall. The tendency then is for the



cellulitic infiltration to spread up to the bony wall of the true pelvis, surrounding the rectum on the left side. Thence it may extend upwards, stripping the peritoneum from the wall and brim of the pelvis and passing into the iliac fossa, or pointing above Poupart's ligament.

We pass on to consider pelvic cellulitis and pelvic abscess in their more restricted sense.

**Pelvic Cellulitis (Parametritis).**—This signifies inflammation of the connective tissue between the folds of the broad ligament (mesometrium).

*Causes.*—It is usually a sequence of septic changes originating in the cervical canal and cavity of the uterus following abortion, delivery at term, especially instrumental delivery, and operations on the uterus; it is often associated with some injury opening up a communication between the uterine canal or vagina and the connective tissue tract of the mesometrium—for example, a deep laceration of the cervix. It occasionally complicates salpingitis.

Pathologically, pelvic cellulitis does not differ from septic inflammation of connective tissue in more superficial regions of the body. The change consists in the infiltration of the connective tissue of the mesometrium with inflammatory products, and the effects depend upon the extent of tissue involved and the nature of the infecting micro-organism.

The infiltration usually involves one broad ligament, displaces the uterus, and at the same time fixes it. When the left broad ligament is involved, the exudation may surround the rectum. When the infiltration is very extensive, it elevates the broad ligament above the level of the true pelvis, and the exudation extends into the subserous tissue of the anterior abdominal wall. Occasionally it infiltrates the connective tissue in the cave of Retzius, and forms a rounded swelling immediately above the pubes (Fig. 56); in a small proportion of cases the exudation extends into the tissue between the cervix uteri and bladder, raises up the peritoneum, and obliterates the utero-vesical pouch. Such exudations sometimes give rise to considerable hypogastric swellings, and cause extreme irritability of the bladder.



In many cases the exudation subsides in the course of a few weeks, and the patient recovers; in some it slowly extends into the subserous tissue, and converts the belly wall into a firm resisting mass. In such cases the illness

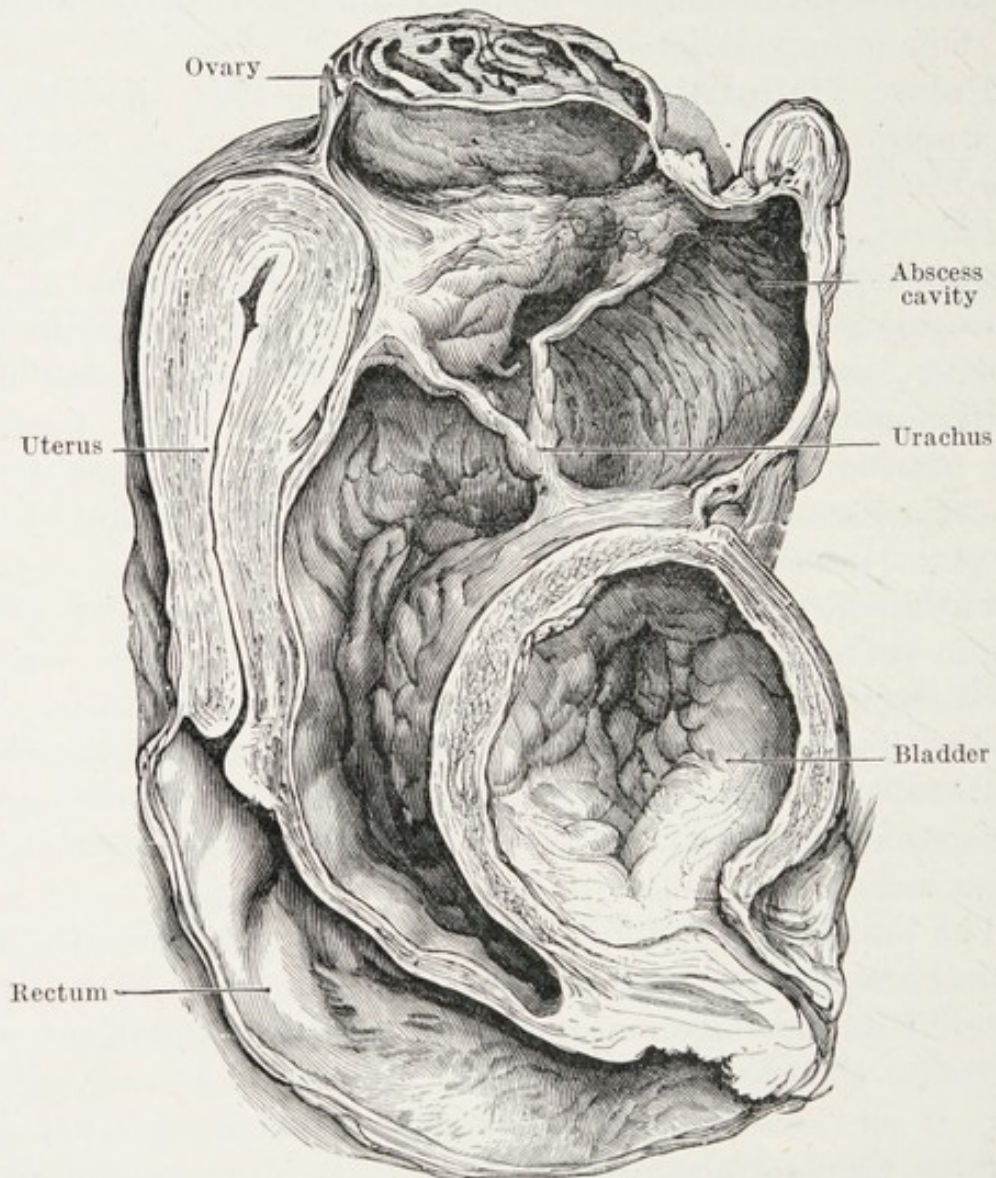


FIG. 56.—SAGITTAL SECTION OF THE PARTS INVOLVED IN PELVIC CELLULITIS (ANTERIOR PARAMETRITIS), IMPLICATING THE CAVE OF RETZIUS. (Museum of the Royal College of Surgeons, from Bland-Sutton's *Diseases of the Ovaries and Tubes*.)

may be prolonged for many weeks and even months. In a certain proportion of cases suppuration occurs, resulting in a pelvic abscess.

The common forms of pelvic cellulitis are rarely mistaken for other conditions, and should there be any doubt, a little



patience will, in most cases, enable a correct diagnosis to be made, for rest will promote absorption of the exudation.

**Pelvic Abscess.**—This term signifies a collection of pus between the layers of the mesometrium. Usually it is the sequel of an attack of pelvic cellulitis, but it is sometimes due to the presence of a sequestered extra-uterine foetus (lithopædion), decomposing blood-clot due to mesometric rupture of a gravid tube, echinococcus cyst, or pus from a pericæcal abscess burrowing under the peritoneum.

The pus in a pelvic abscess points and escapes in one of many situations. The abscess may open into the mucous canals of the pelvis—rectum, vagina, or even the bladder. It may point in the groin, immediately above or below Poupart's ligament; the pus will sometimes burrow beneath the fascia lata, and point in the middle of the thigh, usually on the outer side. Occasionally it travels by the side of the urachus and points at the navel; exceptionally it will burrow through the great sciatic notch and point in the buttock.

*Signs.*—The onset of pelvic cellulitis is usually marked by a rigor, followed by pain in one or both flanks; febrile symptoms supervene, and, as the exudation increases, troubles during micturition or defæcation are experienced. These signs are of greater significance when they follow within twenty-four or thirty-six hours an abortion, delivery, or an operation on the uterus.

*Diagnosis.*—On examining through the vagina, a hard mass will be found on one or both sides of the cervix; in many cases the hard masses are conjoined by a ring of hard tissue surrounding the neck of the uterus. When the whole extent of the ligaments is infiltrated the swelling is perceptible at the brim of the pelvis and in the hypogastrium.

When suppuration occurs, the temperature, pulse, and general condition of the patient are those accompanying large collections of pus. The local signs are as follows: the previously hard masses become softer, fluctuation is detected, or the overlying skin is œdematous and perhaps red. The abscess is then said to point.

The pus furnished by a pelvic abscess is often intensely



foetid; this is mainly due to contamination from the bowel. In the course of the formation of the abscess the peritoneum is stripped from the wall of the rectum, and its tissues, becoming softened, allow of the passage of intestinal contents loaded with pathogenic micro-organisms into the exudation, and putrefaction is established.

*Treatment.*—In the acute stages of pelvic cellulitis the patient is confined to bed, the bowels kept regular by means of saline purgatives, and warm vaginal douches should be frequently administered by a careful nurse. Glycerin tampons help to relieve the pelvic congestion. When there is much abdominal pain, warm fomentations to the hypogastrium give great relief.

When suppuration occurs and the pus can be localized, an incision should be made into it and the abscess drained. It is preferable to evacuate a pelvic abscess through the belly-wall rather than by an incision in the vagina. Should the abscess burst into the vagina, the aperture of communication is apt to close, and defective drainage leads to re-accumulation of pus; under these circumstances, it is advisable to dilate the opening to insure drainage. When the abscess is due to suppuration of a gestation sac the sinus should be enlarged, and all fragments of bone and other foetal tissues removed.

As in all cases of prolonged suppuration, the patient's strength must be supported by nutritious and easily digestible food; quinine and iron preparations are useful, and health is finally restored by change of air.



## CHAPTER XVII

### III.—INFECTION FROM THE BOWEL—THE VERMIFORM APPENDIX AS A PELVIC ORGAN

THERE are various positions in which an inflammatory tract of bowel may lead to infection of the pelvic organs. They can be summarized thus—

Infection from the small intestine.

Infection from the sigmoid and rectum.

Infection from the appendix vermiformis.

*Infection from the Small Intestine.*—The lesser bowel may become adherent to the uterus, tubes, ovaries, or bladder. In the rarer cases the adhesion is due to primary inflammation of the coat of the bowel caused by some focus of mischief, such as an ulcer in its mucous membrane. As the result of the inflammation of the serous surface lymph is formed, which readily causes the bowel to adhere to whatever organ is near to it. In the majority of cases, however, the primary inflammation is in the peritoneal cavity, due, it may be, to leakage from a pus-tube or ulceration through the wall of an ovarian cyst. The lymph acts in the same way as before, and leads to adhesion of the pelvic organs to adjacent coils of bowel.

The next step is an ulceration opening up a communication between the bowel and the organ attached to it, so that a bacillus coli infection of that organ is set up. When the organ is healthy, the process usually stops at the formation of adhesions; but if the ovary is cystic, if the tube is the seat of a hydrosalpinx or a tubal pregnancy, or if the uterus is the seat of a softening fibroid, the process is more likely to go on to definite infection and abscess formation. The commonest manifestation of this type of infection is



the conversion of an ovarian cyst into an ovarian abscess; the next to suffer, in order of frequency, is the tube. The uterus, on account of the relative hardness of its walls, is the least liable to be affected; nevertheless suppurating fibroids are met with, in which the infection comes from the bowel; and occasionally a septic focus occurs in the wall of an otherwise normal uterus. When a tubal pregnancy has taken place and has been overlooked, or for some other reason has not been operated upon, the patient having escaped the danger of severe internal hæmorrhage, the complication that is most likely to ensue is suppuration due to bowel infection.

The diagnosis of bowel infection of the pelvic organs is often difficult, and in many cases is only arrived at when the abdomen has been opened, and the bowel adhesions are discovered. But if evidences of acute pelvic inflammation present themselves in the case of a virgin or of a married woman who shows no signs of an ascending inflammation of the genital tract, and has had no lesions of the genital canal, then an infection from the bowel may be presumed with considerable certainty.

The only treatment in all these cases, whether the mode of infection has been diagnosed or not, is to open the abdomen, separate the adhesions, and remove the infected organ when this is possible. When the inflammatory matting is very extensive it is sometimes best to be content in the first instance with draining the abscess cavity: but this will nearly always involve the necessity of another operation later on, the difficulties of which will be greatly increased by the greater firmness of the adhesions.

When, in the course of separating the adhesions the cavity of the bowel is opened up, the operator will be guided by the size and nature of this opening in determining his mode of procedure: in some cases it is sufficient to suture the rent; in others a portion of bowel must be resected. No general rules can be laid down for these difficult and anxious cases: the experienced operator will act according to his judgment; and certainly none but an experienced operator should deliberately undertake such a case.



*Infection from the Sigmoid and Rectum.*—The only form of inflammation of the sigmoid that plays an important part in infection of the pelvic organs is that which is associated with carcinoma of this portion of the bowel with consequent ulceration. Nevertheless the healthy sigmoid may become adherent to an ovarian cyst or a diseased tube, owing to the occurrence of localized peritonitis; and adhesion may then be followed, as in the case of the small intestine, by ulceration and bacillus coli infection.

From the usual position of the sigmoid it will readily be understood that the left ovary and tube are involved in these infections with preponderating frequency. Sometimes, however, the sigmoid is in the form of a long loop which may lie behind the uterus and even behind the right appendages; these are, therefore, not immune from sigmoid infection.

Infection from the rectum commonly presents features markedly different from the forms of infection already considered, owing to the fact that a large part of the rectum is not covered by peritoneum, but lies in relation to the connective tissue of the pelvis, and especially the connective tissue of the left broad ligament. One feature is that such infection is nearly always due to conditions arising primarily in the rectum: the exception to this is in the case of an abscess in the broad ligament which opens into the rectum, when, in addition to the organism originally responsible for the abscess the bacillus coli adds its own type of infection.

The second important feature is that infection from the rectum leads to pelvic cellulitis with resultant abscess, and not to pelvic peritonitis.

The conditions in the rectum that lead to cellulitic infection are of two kinds. The first is carcinoma, when this has extended through the wall of the bowel. The second is injury of the rectum, such as may occur during childbirth or as the result of the perforation of the bowel by a fishbone. The possibility of this curious accident should not be overlooked in dealing with a pelvic abscess of doubtful origin in the left broad ligament.

The treatment of infections from the sigmoid will be on the same general lines as are required for infections from



the small intestine. The treatment of infections from the rectum will usually consist of drainage of the abscess in the position that seems most convenient.

A common feature of all bowel infections is the peculiarly repulsive odour of the resulting pus. Those who have come across it have no difficulty in recognizing it again.

*Infection from the Appendix Vermiformis.*—This is the most frequent and the most important of the types of bowel infection; and the subject of the vermiform appendix as a pelvic organ, therefore, deserves special consideration.

The position occupied by the tip of the vermiform appendix is only limited by the length of this tubular organ. The tip of the appendix is sometimes in contact with the gall-bladder when the latter is normal in size and position, but more often it may be found in the pelvis, resting on the rectum.

As a pelvic organ the vermiform appendix is as liable to infection and perforation as in any other position; in such circumstances, especially in women, it is responsible for many errors in diagnosis. An acute appendicitis when the tip of the appendix is free in the pelvis not only mimics pelvic cellulitis and abscess, tubal pregnancy and pyosalpinx, but it may actually set up salpingitis and oöphoritis. It is a fact that subacute and chronic diseases of the appendix may extend to and involve the right ovary and Fallopian tube. It is of importance to remember, when considering acute and chronic affections of the right half of the female pelvis, that the ovary, tube, and appendix are in such close proximity that it is difficult and often unwise to make a positive diagnosis between primary inflammatory disease of these three organs.

In girls the coëломic ostium of the tube is sometimes closed as a sequel of subacute salpingitis, and the appendix has been found lying in contact with the tubal fimbriæ; in acute appendicitis the ovary and tube have been found lying as sloughs in a pool of pus in the pelvis.

It is not uncommon to find the appendix adherent to the tube, but the most remarkable example of the propinquity of these structures which has come under our notice is represented in Fig. 57. In this instance the tip of the



appendix was firmly adherent to the coelomic ostium of the tube; it became inflamed, then burst, and discharged its contents into the lumen of the tube, producing salpingitis.

The most important occasion on which to keep in mind that the vermiform appendix often hangs free in the pelvis is when it perforates and discharges infective material directly into the pelvic cavity, converting it into a pool of stinking pus. It is necessary to emphasize this, because when called into consultation on such dangerous conditions it is so difficult to persuade practitioners that the illness is due to a perforated appendix, in the absence of pain or



FIG. 57.—AN OVARY WITH THE FALLOPIAN TUBE AND VERMIFORM APPENDIX SHOWN IN SECTION.

The tip of the appendix is perforated, and pus was discharged into the coelomic ostium of the tube, and produced salpingitis. \* Tubal fimbriae.

swelling over the cæcum. Another point they urge against immediate operation is the absence of rigors. The presence of abominably foetid fæcal-contaminated pus in large quantity due to perforation of the appendix is not indicated in the usual orthodox manner by rigors.

When called upon to deal with pelvic abscesses due to perforation of the appendix, bear in mind three things—

1. Operate immediately you have satisfied yourself of the nature of the case.
2. Make your incision in the middle line, not only because the classical "median sub-umbilical incision" affords the best access to the pelvic cavity and the appendix, but it is the direct route for drainage.
3. Remove the appendix.



A good deal of attention has been devoted lately to the effects of inflammation spreading from the appendix to the right tube and ovary. Some of the more important papers have been written by Lea, Handley, and Hartmann.

Many years ago one of us (Bland-Sutton) pointed out an intimate association between the vermiform appendix and ovarian tumour, and showed that in some instances the spread of inflammation from an appendix to the wall of an ovarian cyst led to the formation of very extensive and dense adhesions. In the early days of ovariectomy, before surgeons were aware of the close relations of the appendix to an ovarian cyst, the appendix has been cut or torn across in the course of the operation. When this accident has not been recognized, the patients have died in consequence from septic peritonitis.

Appendicitis—acute, subacute, and chronic—occasionally complicates uterine pregnancy in all its stages, even at the time of delivery and during the puerperium. An acute perforative appendicitis in the late months of pregnancy is a very serious condition. Operations for the removal of the vermiform appendix when the seat of subacute or chronic appendicitis during pregnancy are attended with results as favourable as in non-pregnant women. Finally, in operations on the internal pelvic organs of women the vermiform appendix should be carefully examined as a matter of routine, and removed when found obviously diseased. The number of instances in which it is to the patient's interest to have this organ removed in such circumstances is surprisingly large.

## LITERATURE

- BLAND-SUTTON, J.: "Appendicitis in Girls and Women." *Clinical Journal*, 1900, xv. 321.  
 "The Vermiform Appendix as a Pelvic Organ." *Ibid.*, 1908, xxxii. 177.  
 "Acute Salpingitis caused by an Inflamed Appendix bursting into the mouth of the Fallopian Tube." *Brit. Med. Journ.*, 1905, ii. 118.  
 HARTMANN, H.: "Appendicite et Annexite." *Annales de Gyn. et d'Obst.*, 1908, v. 65.  
 HANDLEY, W. S.: "On Invalidism in Women due to Chronic Appendicitis." *Clinical Journal*, 1908, xxxi. 378.  
 LEA, A.: "The Vermiform Appendix in Relation to Pelvic Inflammation." *Journ. Obst. and Gyn. of British Empire*, 1906, x. 133.



## CHAPTER XVIII

### IV.—INFECTION THROUGH THE VASCULAR SYSTEM—TUBERCULOSIS OF THE PELVIC ORGANS

IN cases of septicæmia, infective foci may be set up in places distant from the original lesion. The occurrence of such foci in the pelvic organs is doubtful; certainly we have not met with instances thereof either in practice or in gynæcological literature.

The converse process, namely, the setting up of a general septicæmia by infection conveyed through the vascular system from the pelvic organs, does occur from time to time. This, however, is a sequela or complication of pelvic inflammation, and has been referred to previously. We are not further concerned with it here.

### TUBERCULOSIS OF THE PELVIC ORGANS

The one form of infection of the pelvic organs which may be considered as conveyed through the vascular system is tuberculosis.

A good deal of discussion has taken place as to whether tuberculosis of the genital organs occurs as a primary condition. Some authorities hold that it does so occur; others deny this, and say that the primary foci are very apt to be overlooked, particularly when they are situated in the bones and in glands. It is, of course, very difficult for any one who claims to have met with a case of primary genital tuberculosis to prove that there was no other focus in the body. We shall content ourselves with stating that the disease is nearly always secondary in the pelvic organs.

With regard to the frequency with which the different



organs are affected, there is no doubt that the Fallopian tubes show an overwhelming preponderance. Martin found them involved in 66 per cent. of his cases of genital tuberculosis. Purefoy states that post-mortem examination shows that the genital organs are affected in 7 per cent. of all cases of tuberculosis, and the tubes in 90 per cent. of all these. The uterus comes next in order of frequency, then the ovary and the vulva; tuberculosis of the vagina is very rare, and probably occurs only in association with tuberculosis of the uterus.

Tuberculous peritonitis not infrequently complicates the disease in the tubes.

We shall now describe the main features of tuberculosis in the several organs affected.

**Tuberculosis of the Vulva** is somewhat difficult to distinguish from syphilitic nodules or ulceration. It may appear in the form of lupus, resembling that seen on the face, in which case it presents one of two forms, being mainly ulcerative or mainly hypertrophic and "tubercular." Histologically such an ulcer is composed of characteristic tubercular granulations, while typical tubercles are scattered through the deeper tissues. Tubercle bacilli may be demonstrated therein. Probably many distinct conditions have been described under the name of lupus, such as various syphilides when ulceration has occurred, gummata, and elephantiasis. The condition found in kraurosis, when there are small reddened sensitive patches, has been called lupus, and indeed the latter term has been loosely applied to almost any ulceration of the pudenda.

It is better to restrict the term "lupus" to tuberculous skin lesions; and in this sense lupus of the vulva is exceedingly rare.

The best treatment is to excise the affected parts.

**Tuberculous Disease of the Endometrium.**—Although tuberculosis may attack any part of the female genital tract, it rarely occurs as a primary affection of the endometrium. It is noteworthy that the disease may attack the cervical endometrium, or occur as a primary lesion in that lining the cavity of the uterus. In either situation it is apt to give rise to symptoms which simulate



very closely primary cancer of the uterus. The tubercle bacillus may reach the uterus through the blood-stream, but it is in some instances due to extension from the peritoneum by way of the Fallopian tubes. In children tuberculous infection of the uterus is usually associated with tuberculous lesions in the lungs and bones. Tuberculous infection of the cervical endometrium, though the rarer form, is of interest, because it resembles clinically cancer of the cervix, and in some instances pieces have been exsected and submitted to microscopic examination for diagnostic purpose, and this led to the detection of the nature of the disease. Infection of the cervical endometrium with tubercle is interesting on account of the view sometimes held, that a man with tuberculous epididymitis might directly infect any woman with whom he had sexual relations, but although much attention has been given to the question, very little that is trustworthy can be adduced to support such a contention.

The diagnosis of tuberculous disease of the cervix can only be substantiated by the microscope; the clinical signs are those common to cancer, such as ulceration, and a purulent discharge tinged with blood. The age of the patient does not help, for though the disease is most common between the twentieth and thirtieth years, it has been observed after the menopause.

Primary tuberculous infection of the corporeal endometrium is very rare. A remarkable example is represented in Fig. 58, which gave rise to profuse menorrhagia during two years and a half, and led to such enlargement of the uterus that the disease was regarded as a degenerated submucous fibroid. Hysterectomy was performed, and when the hyperplastic mass which filled the uterus was submitted to microscopic examination it furnished the usual features of tuberculous disease; tubercle bacilli were found in the tissue.

*Treatment.*—The disease is so rarely diagnosed that radical measures have not often been practised. An admirable summary of our knowledge regarding genital tuberculosis in the female is furnished by Comyns Berkeley.<sup>1</sup>

<sup>1</sup> *Journ. Obst. and Gyn. of British Empire*, Jan., 1903.



**Tuberculous Salpingitis.**—Purefoy describes three forms—

1. A tubercular perisalpingitis, in which the serosa only is the seat of granulations.
2. A miliary parenchymatous salpingitis, in which the mucosa and musculosa are both affected.
3. A tubercular endosalpingitis in which the mucosa alone is involved.

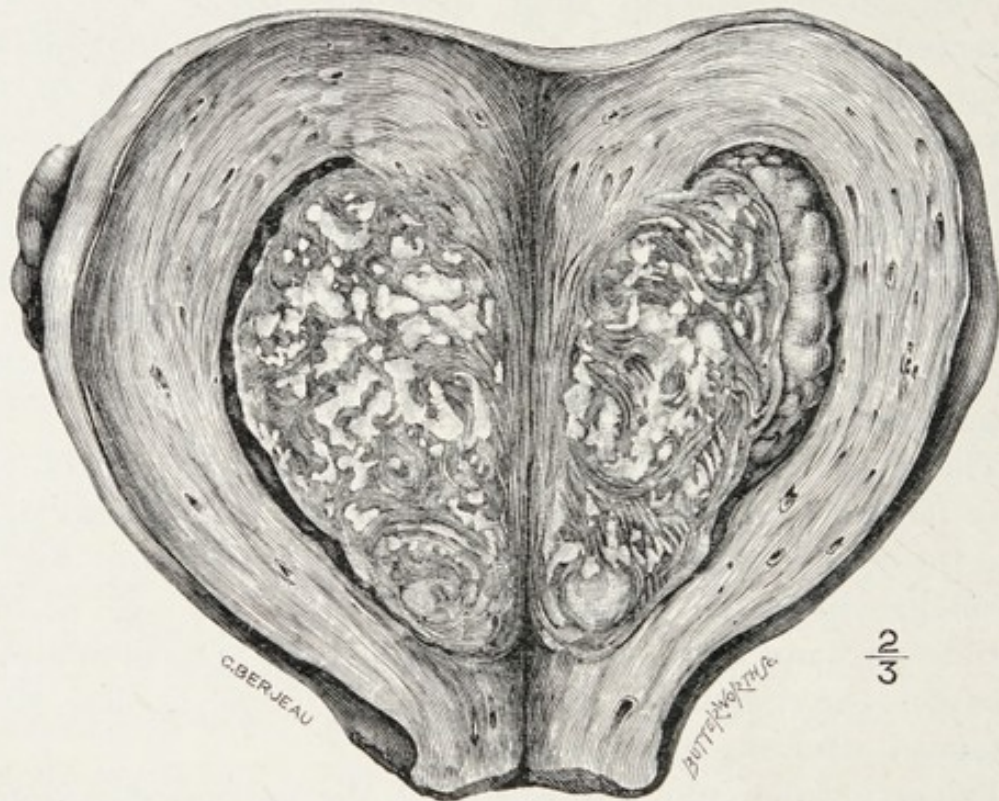


FIG. 58.—UTERUS OPENED BY A VERTICAL INCISION IN ITS POSTERIOR WALL.

The endometrium is occupied by an unencapsuled mass of caseous tuberculous tissue.

Some examples of this disease are secondary to tuberculosis of the endometrium. The naked-eye features of a tuberculous tube are often very characteristic, but it is sometimes impossible to distinguish it from a pyosalpinx. In many instances the cœlomic ostium is occluded and the tube tightly stuffed with caseous material (Fig. 59). On removing this material the mucous membrane presents the usual velvet-like appearance characteristic of the walls of a chronic abscess.

In many patients tuberculous lesions are found in other



parts of the body, so that it is difficult to decide which is the primary seat of the disease. The bacilli are often difficult of detection; however, when tubes are found distended with caseous pus and deposits containing tubercle bacilli are found in other organs, it may be used as evidence that the disease in the tubes is likewise tubercular. The only absolute test of tuberculous salpingitis is the detection of the tubercle bacilli in the contents or in the tissues of the Fallopian tube.

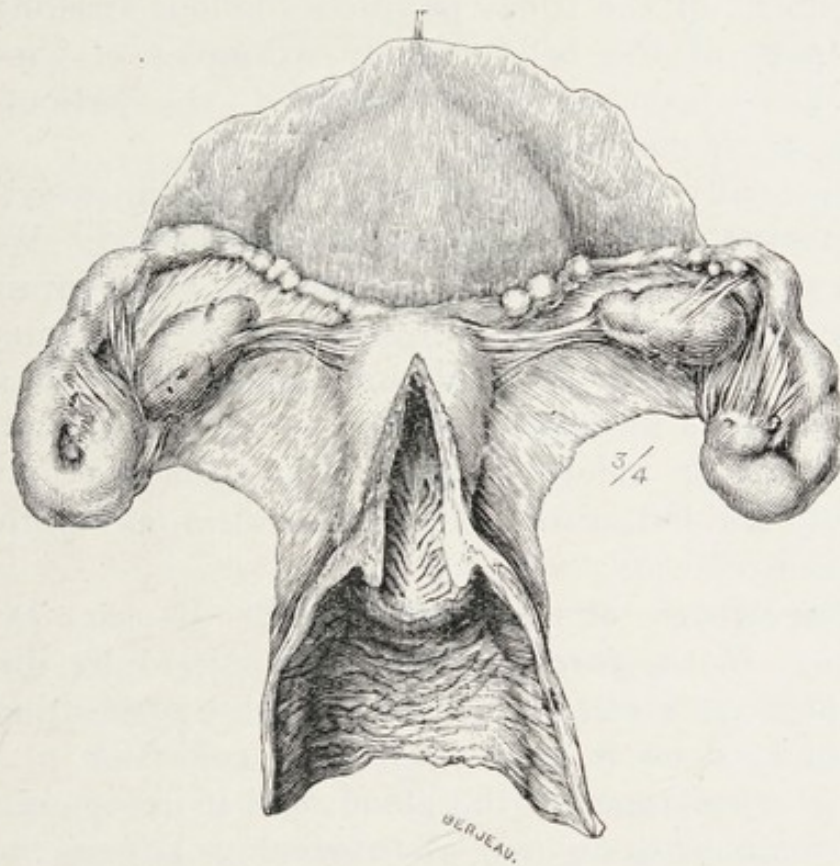


FIG. 59.—TUBERCULOUS SALPINGITIS FROM AN INFANT.

It is an important clinical fact that tuberculous peritonitis in infants, girls, and young women in many instances is due to infection from tuberculous tubes in consequence of the cœlomic ostia remaining unoccluded. Exceptionally infection of the peritoneum has resulted from perforation of the wall of a tuberculous tube with an occluded ostium. It is also probable that the tubes may sometimes be infected secondarily to tuberculous peritonitis, due to perforation of a tuberculous ulcer of the intestine.

In some cases tuberculous Fallopian tubes become



converted into huge banana-like or legume-shaped cysts, which not only appear above the pelvic brim, but may reach as high as the navel. The cœlomic ostia are usually completely occluded, but traces of the fimbriæ may be observed even in extreme cases. These dilated tubes contain pus, which is often viscid like old honey; occasionally it is of the consistence of putty. In some specimens the mucous membrane resembles wet chamois leather. This rare variety of tubal disease seldom causes inconvenience until the enlargement of the tubes produces obvious swelling of the lower part of the belly. Many examples of these large tubes have been carefully described, the patients being virgins, or, if married, sterile.

Occasionally the fluid effused from the unclosed ostium of a tuberculous tube may become encapsuled. When the encapsuled effusion is large, the physical signs furnished by it strongly resemble those furnished by an ovarian cyst. A remarkable case of this kind came under our care; the cyst was as big as a football, and the fringed ostia of both tubes opened into it independently. The cyst was universally adherent, and both tubes were stuffed with pus and furnished tubercle bacilli.

**Tuberculosis of the Ovary.**—This disease may attack the ovary in the form of small miliary nodules limited to its surface: as a rule, it is then part of a general peritoneal tuberculosis. Or it may occur as a collection of caseous pus in the substance of the gland, and it is then secondary to tuberculous salpingitis. A tuberculous abscess may arise in a corpus luteum.



## SECTION VI

### DISEASES RESULTING FROM GESTATION

## CHAPTER XIX

### DISEASES RESULTING FROM UTERINE GESTATION

IN general, the diseases resulting from gestation belong to the province of obstetrics; but there are certain conditions that are properly considered in a work on gynæcology. They fall under two categories—

1. Diseases arising from uterine gestation.
2. Extra-uterine gestation.

Under the first heading it is usual to include the following conditions: superinvolution; subinvolution; septic endometritis; and the troublesome sequelæ associated with retained pieces of placenta and other products of conception.

**Superinvolution.**—This signifies premature atrophy of the uterus following delivery. It is brought about by debilitating causes, such as multiple and frequent pregnancies, post-partum hæmorrhage, and prolonged lactation. Sometimes there is no apparent cause.

Superinvolution is often permanent, leading to a premature menopause. The only symptoms are diminution or cessation of menstruation and sterility. On physical examination the uterus is found to be small. The diminution affects the substance of the uterine walls rather than the length of the cavity; consequently the bimanual examination gives more reliable information than the passage of the sound, and for the same reason extra care is required in the use of the sound, as the thin and often softened walls are easily perforated.

*Treatment.*—We must rely principally on hygienic measures



and the administration of tonics; the prognosis, however, is not very favourable.

**Subinvolution.**—By this is meant a condition in which the return of the uterus to its proper size after delivery is arrested or delayed.

*Causes.*—Subinvolution may be due to—

1. Debility brought about by malnutrition, by a severe and lengthy labour, by post-partum hæmorrhage, or by too early resumption of active duties after delivery. Non-suckling probably predisposes to subinvolution.

2. Chronic endometritis preceding labour. Post-partum hæmorrhage is very likely to occur in such a case, and it must then be regarded, not as the cause of subinvolution, but as the result of conditions leading also to subinvolution. Indeed, it is possible that the relation of hæmorrhage and subinvolution should always be regarded in this way.

3. Puerperal (septic) endometritis.

4. Retained pieces of placenta.

*Pathology.*—Subinvolution presents two varieties, depending on its origin, whether inflammatory or trophic. In the trophic variety the muscle fibres are large and pale, and the inter-muscular tissue and mucosa are œdematous. The vessels and lymphatics are dilated from the want of proper muscular contraction. For the pathology of the inflammatory variety, see Chap. XV.

*Signs and Symptoms.*—Besides general weakness, the symptoms are: abundance and long duration of the lochia, irregular losses after the lochia proper have ceased, profuse leucorrhœa, a feeling of weight in the pelvis, and backache. On examination the vagina is bathed in discharge of a serous or sero-purulent character, sometimes tinged with blood. The uterus is large, heavy, and flabby, and not uncommonly retroverted.

The condition must be diagnosed from retention of products of conception; in the latter case bleeding is more marked, but otherwise the signs and symptoms are so similar that exploration of the interior of the uterus may be required to establish the diagnosis.

*Treatment.*—The general treatment should be tonic, with rest in bed. Hot intra-uterine and vaginal douches should



be given, as these induce uterine contractions, which play an important part in the process of involution. In more chronic conditions hydrotherapeutics and change of air are indicated. In the way of medicines ergot may be given in combination with iron.

**Retention of Products of Conception.**—A portion of placenta or of membranes may remain attached to the uterine wall, both after full-time delivery and after abortion. It is most frequent in the latter case. The principal symp-

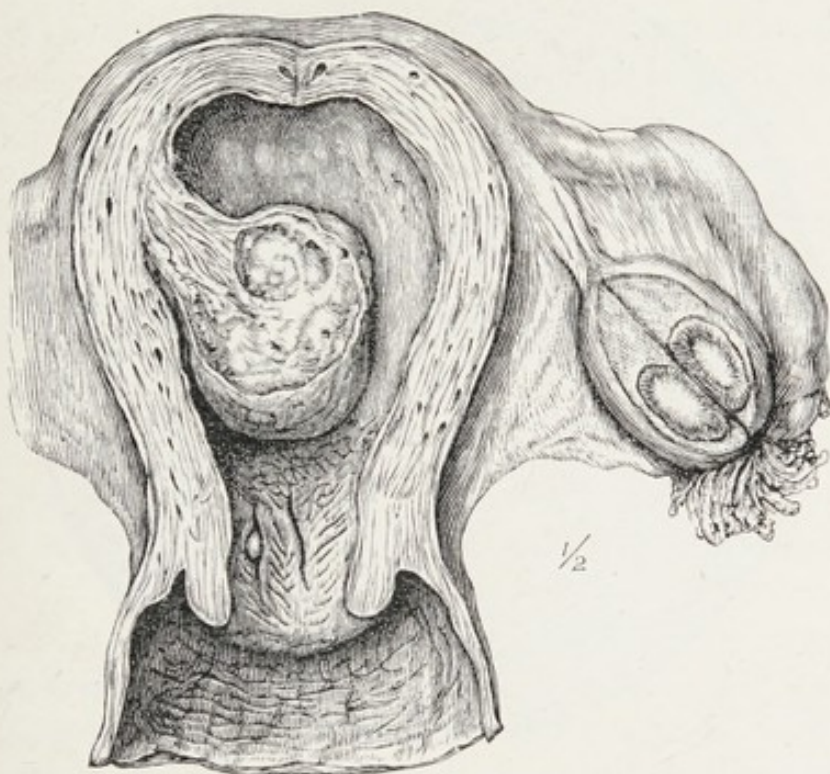


FIG. 60.—RETAINED FRAGMENT OF PLACENTA. (MUSEUM OF ROYAL COLLEGE OF SURGEONS.)

tom is irregular hæmorrhage, continued in some instances for many months. The other symptoms and the physical signs closely resemble those just described as resulting from subinvolution.

The diagnosis generally rests between retention of placental fragments, forming a *placental polypus* (Fig. 60), a small submucous fibroid, and sarcoma. In any case, the diagnosis cannot be made with certainty without exploration of the interior of the uterus. The microscopic characters of recent placental tissue are shown in Fig. 61.

*Treatment.*—When symptoms are not urgent, palliative



measures may be adopted, such as the administration of ergot and iron, and vaginal douches. But if there be reason to suppose, at the outset, that retained products are present, there is no object in delay, and the uterine cavity should be explored. Shortly after a labour or miscarriage the cervix may be sufficiently patulous to allow of this being done without dilatation. In other cases dilatation must precede exploration, which should be done by means of the finger in the



FIG. 61.—MICROSCOPIC APPEARANCE OF RECENT PLACENTAL TISSUE.

uterus. If placental fragments are found, a blunt curette should be used to remove all rough and protruding parts of the surface until the interior is quite smooth.

In using a blunt curette, or forceps, for the removal of retained pieces of placenta, great care must be exercised to avoid perforating the walls of the uterus, for the tissue of this organ is not only thin, but often extremely soft shortly after labour at term, or after a miscarriage.

**Septic Endometritis** is described in Chapter XV.



## CHAPTER XX

### EXTRA-UTERINE GESTATION

ONE of the greatest discoveries man ever made concerning himself was when Von Baer detected the human ovum and established the nature of the human ovary in 1827.

All intelligent individuals now know that the ovum, when mature, escapes from its follicle in the ovary and falls into the cœlomic (abdominal) ostium of the Fallopian tube, to be conveyed by the muscular action of that tube into the uterus; when the environment is favourable, somewhere in transit this ovum (or egg) is fertilized by a spermatozoon and converted into an oöperm (as the fertilized ovum is called), and retained within the uterus; under normal conditions it develops into a foetus, and is finally extruded as a living child.

There is, however, a great deal of uncertainty concerning the place where the ovum becomes fertilized, but it is now established that fertilization may occur whilst the ovum is in the follicle, for oösperms have been detected in the ovary and in the Fallopian tube, as well as in the cavity of the uterus. When an oöperm is formed in any part of the genital tract other than in the cavity of the uterus, it is said to be extra-uterine, and as this may occur in the ovary or in the Fallopian tube, the condition is termed ovarian and tubal pregnancy respectively. There are two anomalous conditions which it is convenient to include under the heading of extra-uterine—namely, pregnancy in the rudimentary cornu of a two-horned uterus (cornual pregnancy), and utero-abdominal pregnancy.

In this and the ensuing chapters, the pathology, the consequences, and the treatment of the varieties of extra-uterine pregnancy will be considered.



## OVARIAN PREGNANCY

Belief in ovarian pregnancy can be traced back for more than 200 years, but a critical examination of the recorded cases shows that in many instances the supposed ovarian foetus was in some instances a dermoid, in others an extra-uterine foetus sequestered in the broad ligament. In a few cases the accounts of the dissection are so careful and so circumstantial as to leave an impression on the mind that the development of an embryo in the ovary could not be denied. Capable observers like Velpeau and Farre, though they did not deny the possibility of gestation in the ovary, were satisfied that in none of the reported cases had the fact been proved. In recent years the discovery of the tubal mole has furnished us with a criterion of extra-uterine pregnancy and led active investigators to formulate a postulate on which the occurrence of ovarian pregnancy could be based; they urged, in order to satisfy their doubts, that *an early embryo in its membranes contained in a sac in the ovary* should be forthcoming. These conditions have been satisfied by a remarkable case published by Dr. Catherine van Tussenbroek, of Amsterdam, in 1899. It appears that Kouwer, of Haarlem, in 1893, performed coeliotomy upon a woman thirty-one years of age on account of signs indicating severe abdominal bleeding. The abdomen contained a large quantity of blood, and the source of the bleeding was a swelling the size of a nut in the right ovary. The diseased ovary and tube were removed, as well as the blood-clot, and the patient survived, although it required many months for her to recover from the severe loss of blood.

Van Tussenbroek preserved the specimen, and some years later made careful complete sections through the ovarian "swelling," and has demonstrated beyond any doubt the presence of an early embryo in a sac furnished with chorionic villi and contained in an ovarian follicle. There is a point of great importance noticed in the clinical account of this patient—namely, that a decidua had formed in the uterus, and a few days subsequently to the operation was discharged with the *douleurs d'accouchement*.

A score of carefully investigated examples of ovarian



pregnancy have been reported in Great Britain since Van Tussenbroek published her classical case (1899). The signs of an early ovarian pregnancy are those indicating a small ovarian cyst. When the gestation sac bursts the signs are indistinguishable from those declaring the rupture of a gravid tube (*see* p. 240), and the treatment is identical.

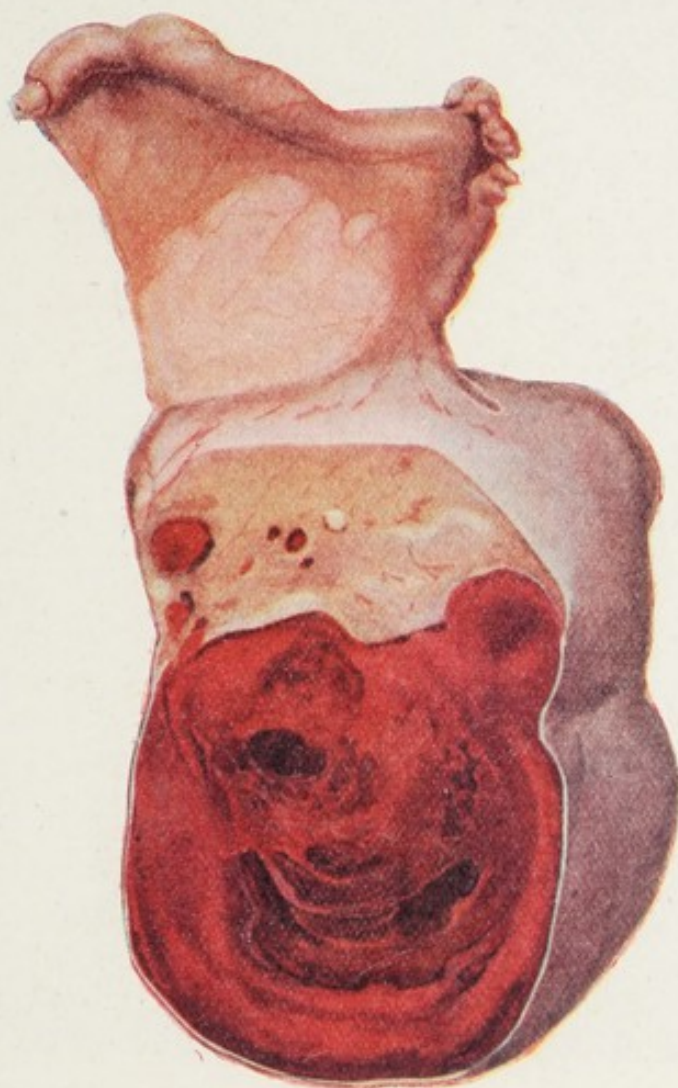


FIG. 62.—OVARIAN PREGNANCY. (REPRINTED FROM *Proc. Roy. Soc. Med.*)

Ovarian pregnancy sometimes co-exists with uterine pregnancy and both may go to term (*see* p 246).

In a case recorded recently by one of us,<sup>1</sup> the condition was not discovered until five months after its occurrence. The history was that of an extra-uterine pregnancy, but the

<sup>1</sup> "A Case of Ovarian Pregnancy," by Arthur E. Giles and Cuthbert Lockyer. *Proc. Roy. Soc. of Med.*, 1914. Vol. VIII. (Obst. and Gyn. Section, p. 2).



physical signs were those of an ovarian tumour. As shown in Fig. 62, the ovarian capsule had not ruptured; and this fact, in association with the presence of chorionic villi in the blood clot (Fig. 63) would prove conclusively



FIG. 63.—CHORIONIC VILLI FROM THE SPECIMEN SHOWN IN FIG. 62. It will be seen that these villi are near the ovarian capsule, but the latter is intact.

the possibility of the occurrence of ovarian pregnancy, even if no other case had ever been reported.

### TUBAL PREGNANCY

In order to reach the uterine cavity an ovum must traverse the Fallopian tube. When an oöperm (fertilized ovum) is



retained in the tube it develops and gives rise to the condition known as "tubal pregnancy."

Concerning the cause, or causes, of tubal pregnancy nothing is known, and this uncertainty will continue until reliable evidence is forthcoming in regard to the situation in the genital passages where ovum and spermatozoon normally meet. Obstruction to the transit of ova through the tube does not explain matters, for it is a fact that an oöperm is more often retained in the wide ampullary section of the tube than in its narrow uterine segment. Ill-development of the tube may account for some of the cases, but it is more likely that tubal pregnancy is the result of active rather than obstructive causes. It is probable that when an ovum is converted into an oöperm the latter penetrates, by means of its trophoblast, the subjacent mucous membrane, whether it be tubal or uterine, and embeds itself in the underlying muscular tissue.

Tubal pregnancy may happen as a first pregnancy in women who have been married eight, ten, or even twenty years. The Fallopian tubes may become gravid in any woman capable of conceiving. Tubal pregnancy is more frequent in women living in large towns than in those who live in villages. It is not common among women of the leisured class. The comparative rarity of tubal pregnancy among the rich, in contrast with its frequency among the poor is easily explained, when we reflect that the fecundity of plebeian women is often the envy of their patrician neighbours. A Fallopian tube may become gravid in the newly married or in the mother of a large family. Both tubes may, in very exceptional cases, be gravid concurrently, or one tube may become pregnant years after its fellow. Very rarely two oösperms are retained in the same Fallopian tube—*twin tubal pregnancy*. Tubal may complicate uterine pregnancy.

An analysis of a large number of cases establishes the fact that tubal pregnancy is very apt to occur in women who have been sterile many years, and has given colour to the suggestion that chronic salpingitis and loss of tubal epithelium may predispose to this accident; but careful inquiries have rendered this view untenable, especially when we remember



that in some of the specimens the inflammatory changes are the consequence rather than the cause of the accident; indeed, a series of investigations on an abundant supply of material teaches us that a *healthy Fallopian tube is more likely to become gravid than one which has been inflamed*.

Our ignorance of the cause of tubal pregnancy is due to the fact that we know nothing of the changes in the human oöperm in its early days. One of us (Bland-Sutton) has for many years urged that tubal pregnancy is the result of active changes, and Ballantyne's suggestion appeals to us. He writes: "The trophoblast is recognized as the means by which the oöperm attaches itself to the uterine wall. Should it be detained in the tube until the trophoblast be fully formed, or if the trophoblast be formed prematurely, it may effect a lodgment in the tubal mucosa."

The events which follow the retention of an oöperm in a Fallopian tube vary according to its position, thus—

When it lodges in the ampulla and isthmus it is called **tubal gestation**. But when an oöperm is retained in the portion traversing the uterine wall it is known as **tubo-uterine gestation**.

The stages of tubal pregnancy will be described in sections as follow—

Changes in the tube; the tubal mole; tubal abortion; tubal rupture; erosion of the tube.

**The Changes in the Tube.**—During the first month or six weeks following the lodgment of an oöperm the tubal tissues are swollen and turgid; occasionally at the site where the villi are implanted the tubal wall becomes very thin. This is due to the phagocytic activity of the trophoblast. The precise relation of the chorionic villi to the tubal tissues has been made the subject of careful investigation, which shows that the cells of the villi make their way through the mucosa, and become implanted in the muscular wall of the tube. This is known as the intramural embedding, or better, *intra-muscular implantation of the villi*. It has also been shown from an examination of some early specimens of tubal pregnancy that the oöperm may entirely encyst itself in the muscular wall of the tube. In many cases, especially when the oöperm is lodged in the ampulla of



the tube, the cœlomic ostium gradually closes by a process very analogous to that described as resulting from salpingitis (Fig. 64). Occlusion of the ostium is a slow process, and requires probably eight weeks for its completion. When the oöspERM is retained in the isthmus or in the uterine section of the tube the cœlomic ostium is rarely affected. There is as yet no good explanation forthcoming in regard to these two opposite conditions, but they exercise an important influence on the subsequent course of the preg-

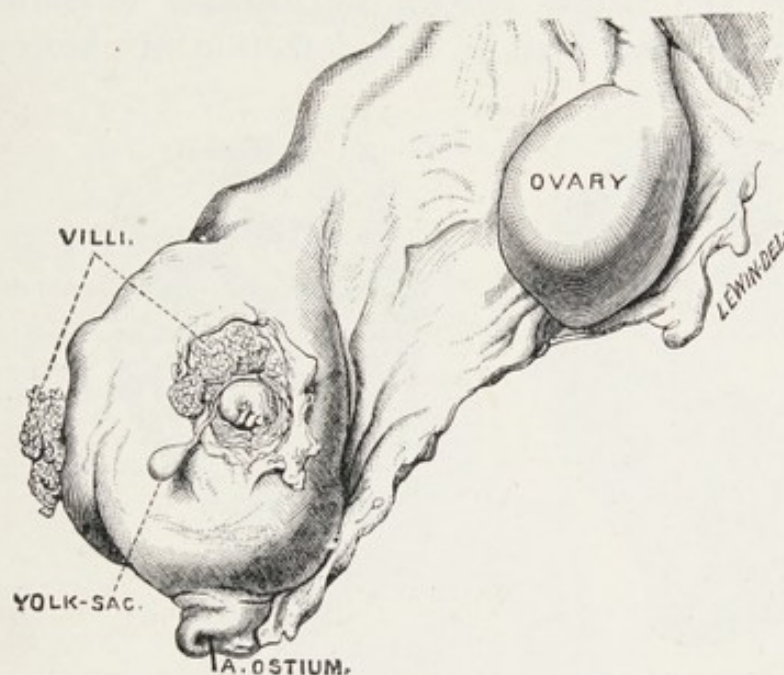


FIG. 64.—A GRAVID FALLOPIAN TUBE, SHOWING THE CŒLOMIC OSTIUM IN PROCESS OF OCCLUSION.

The tube burst, and the woman died in twelve hours. She had made a hearty supper of mussels, and when she was taken ill in the night the symptoms were thought to be due to poisoning.

nancy. Microscopic investigation of the uterine orifice of the tube serves to show that it is not obstructed when the tube is gravid. Mere investigation by means of a bristle or probe is too rough a method to be reliable.

**The Tubal Mole.**—The following account of the tubal mole is based upon a careful study of 130 specimens. The changes which occur in the oöspERM are the same whether it be lodged in a Fallopian tube or in the uterine cavity; in each situation it is extremely liable to become converted into what is known as a "mole." Such a body is an early embryo and its membranes into which blood has been extra-



vasated. Tubal moles vary greatly in size : some have been detected with a diameter of 1 centimetre ; others measure 5 or even 8 centimetres. Small tubal moles are globular, but after they attain a diameter of 3 centimetres they become ovoid. The amnionic cavity usually occupies an eccentric position ; occasionally the embryo is detected within it (Fig. 65). More often it escapes, or is destroyed by the original catastrophe which formed the mole. When an embryo, amnionic cavity, or chorionic villi cannot be detected by the naked eye, a microscopic examination of sections will often lead to the detection of chorionic villi.

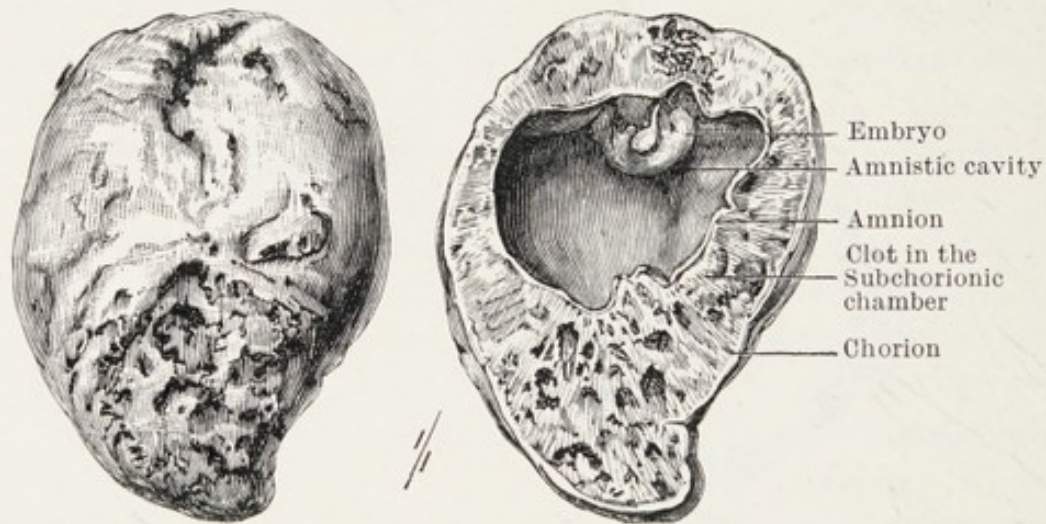


FIG. 65.—TUBAL MOLE, WHOLE AND IN SECTION.

They are characteristic structures, and as certain evidence of tubal pregnancy as the embryo itself. When examined under a low power of the microscope a chorionic villus presents an external layer of epithelium, and the central space is occupied by connective tissue cells (Fig. 66). Under a high power the so-called epithelium resembles more than anything else a large multinuclear cell enveloping the villus, its nuclei being arranged with great regularity. In large villi there are two rows of cells. The outer investing layer of the villus is called the syncytium, and has assumed great importance in relation to chorion-epithelioma (p. 329).

It is an interesting fact that the blood in a tubal mole lies between the chorion and the amnion in a temporary space known as the subchorionic chamber. This blood is derived



in part from the circulation of the embryo, and a large proportion of the red corpuscles are nucleated.

Tubal moles only arise in the first two months following



FIG. 66.—AN EARLY CHORIONIC VILLUS IN SECTION. MAGNIFIED. AT THIS STAGE IT IS DEVOID OF BLOODVESSELS.

fertilization. The laminated condition of the clot presented by some of these bodies indicates that a mole is sometimes formed by a succession of hæmorrhages.



FIG. 67.—EARLY TUBAL EMBRYO, SHOWING THE POLAR DISPOSITION OF THE VILLI. (NATURAL SIZE.)

From a case in which the tube burst.

Although tubal pregnancy is extremely common, it is very singular that in nearly every case of rupture or abortion before the twelfth week the products of conception are represented by a mole. In many scores of cases we found only two exceptions, and the specimen, Fig. 67, was one.

This shows that a Fallopian tube is by no means a favour-



able situation for the development of an oöperm; indeed, its detention in the tube is disastrous, and a German writer pithily sums it up thus : “ Das Ei gräbt in der Tube nicht nur ein Bett, sondern auch sein Grab.” With equal truth we add that it is an event which consigns many healthy women to an early grave.



## CHAPTER XXI

### TUBAL PREGNANCY (*continued*)

#### TUBAL ABORTION

THE presence of an oöperm in the ampulla of the tube may lead to occlusion of the cœlomic ostium; this event is commonly complete by the end of the sixth, but is sometimes delayed to the eighth, week. So long as this orifice remains open, the oöperm is in constant jeopardy of being extruded through it into the peritoneal cavity. To this accident the term **tubal abortion** is applied, for it is parallel to those early abortions occurring in uterine gestation before the end of the second month; and it further resembles them in the fact that the oöperm is nearly always converted into a mole. The conditions which conspire to produce this result are of great interest. In the preceding chapter it was pointed out that the activity of the trophoblast enables the oöperm to embed itself in the muscular tissue of the tubal wall, and when this is completely effected, the oöperm is surrounded by a muscular capsule; when from any cause its connections are disturbed, bleeding ensues, and the wall of the gestation sac bursts either through its peritoneal covering or into the connective tissue of the broad ligament. In many instances (and according to some observers it is the common event) the sac bursts through its mucous covering and allows the products of conception, accompanied by a variable quantity of blood, to be discharged into the lumen of the tube. As a rule, the mole is then expelled through the cœlomic ostium of the tube into the peritoneal cavity. Strictly, a tubal abortion is an internal rupture of the gestation sac, and the blood escapes into the cœlom (peritoneal cavity) through the ostium, accompanied with the usual signs of internal bleeding.



Death may occur early from the anæmia thus induced, or from shock. In such instances the mole, being very small, may escape recognition when the clot is examined, either at the operation or post mortem. Tubal abortion usually occurs during the first two months; when the ostium is occluded, the blood cannot escape without rupture of the sac. The quantity of blood which escapes from the tube into the belly may amount to a litre or more. Tubal abortion is a subject of much interest, inasmuch as it furnishes

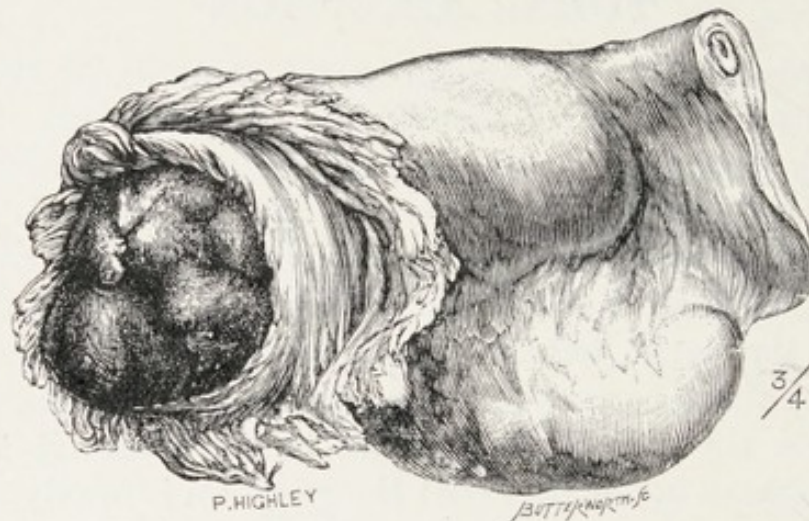


FIG. 68.—A GRAVID FALLOPIAN TUBE AND OVARY REMOVED FROM A SINGLE WOMAN TWENTY-THREE YEARS OF AGE.

At the time of the operation the mole was in process of extrusion from the tube. (Museum of the Royal College of Surgeons.)

many of the cases of pelvic hæmatocele which are ascribed to metrorrhagia, reflux of menstrual blood from the uterus, and hæmorrhage from the mucous membrane of the Fallopian tube. The reason for associating the hæmorrhage with metrorrhagia and menstruation is due to the fact that, whilst the embryo is growing in the tube, a decidua is forming in the uterus. When tubal abortion occurs, hæmorrhage takes place from the uterus consequent on the separation and expulsion of the decidua. Should this accident happen near the time when the patient expects to menstruate, the case is apt to be regarded as reflux of menstrual fluid into the cœlom. In some cases the blood discharged from the uterus is partly derived from the gravid tube; this especially happens in case of protracted tubal abortion. If it does not coincide with a menstrual period, it is then usually considered



to be of uterine origin. It will, therefore, be well, in searching blood removed in abdominal operations, to examine carefully any apparently organized ovoid clot, in order to ascertain if it possess an amnionic cavity, with or without an embryo, and also to determine the existence or otherwise of chorionic villi.

It is necessary to bear in mind that in early uterine abortion the mole often fails to become completely detached from the uterine wall; bleeding recurs so long as the mole is retained. In tubal pregnancy the same thing happens; the mole remains attached by its villi and is not ejected from the tube, and gives rise to recurrent hæmorrhage, or maintains a more or less continuous "blood-drip" into the pelvic cavity (Taylor). This may be described as *incomplete tubal abortion*, and is more common than the complete form.

A tube may expel a mole, with several ounces of blood, into the peritoneal cavity, and the patient complain of little more than cramp and a temporary feeling of faintness. Such a Fallopian tube could again become gravid.

**Chorionic Polypus.**—In some cases described as "incomplete tubal abortion," the small body found in the tube adherent to the mucous membrane does not represent the whole mole, but merely a small mass of chorionic villi at the site of implantation left after the expulsion of the main portion of the mole. Such a body becomes hard and rounded like a placental polypus in the uterus, and is as mischievous, inasmuch as it keeps up a persistent trickling.

When blood slowly trickles from the cœlomic ostium of the tube in cases of incomplete tubal abortion, it is apt to become encysted, and the outer surface of the clot is encased by a regular capsule. In many instances this capsule, or **peritubal hæmatocele**, is so perfect that it may be enucleated entire; and when the blood is carefully removed the capsule appears as a cyst at the extremity of the Fallopian tube, with the fringed ostium opening into it (Fig. 69). This condition was detected independently by Säger and Taylor. The essential factor in the formation of a peritubal hæmatocele seems to be the slow trickling or "blood-drip" from the gravid tube. Similar capsules form around



inflammatory exudations from the tube, in association with gonorrhœal and tuberculous salpingitis (*see* p. 161). *See also* Paratubal Hæmatoceles, p. 227.

It is important to remember that a gravid mole-containing tube will, after discharging the mole through its cœlomic

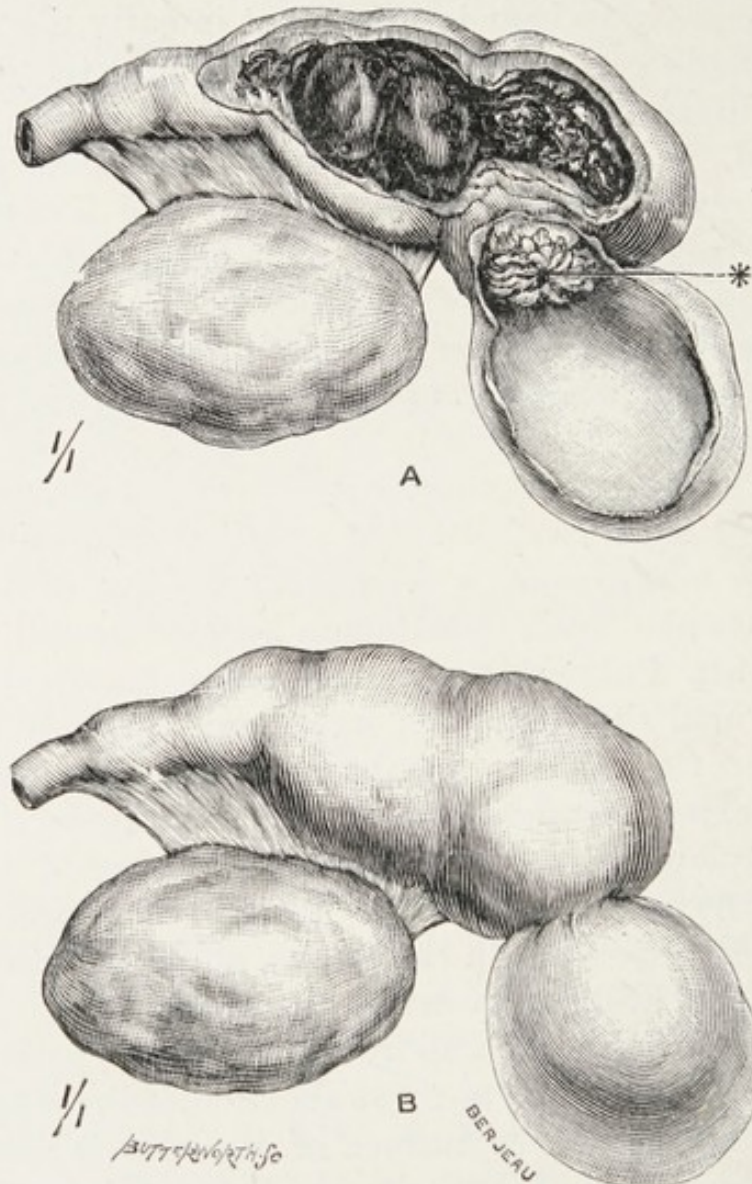


FIG. 69.—A GRAVID FALLOPIAN TUBE WITH A PSEUDO-CYST OR CAPSULE FORMED AROUND BLOOD EFFUSED THROUGH ITS CŒLOMIC OSTIUM.

A shows the capsule in section, and B entire. \* Tubal fimbriae.

ostium, return to its normal size exactly like the uterus after labour. In regard to this, the student should remember that if any one unacquainted with the remarkable properties of unstriped muscle were shown a foetus at term in the amnion, and the uterus in which it developed, an hour after



delivery, he would have his credulity sorely tried to be persuaded that the amnion and contents had been housed in the centre of the uterus. We make this observation because some thoughtful men, thoroughly familiar with the behaviour of the uterus, fail to comprehend that a similar state of things happens with the Fallopian tubes.

In some very rare cases of incomplete tubal abortion the blood accumulates and coagulates in the tube, and the clot is gradually discharged through the coelomic ostium into the pelvis, each "delivery" being accompanied by an attack of pain. These clots are uniform, contain no limiting organized membrane or internal cavity, and could only by the most inexperienced be mistaken for a tubal mole.

Tubal abortion has become a subject of importance. When attention was first drawn to the accident, many observers regarded its occurrence as questionable or of great rarity; now the condition is well recognized, and in the practice of some observers it is reported to be the most frequent mode by which tubal pregnancy terminates (Cullingworth and Taylor). In our very long series of cases the proportion of tubal abortion to rupture of the tube is as 1 to 4.

It has been assumed that tubal abortion only occurred in the early weeks, but a striking case has been described in which the embryo was retained in the tube until it attained the size of 10 centimetres; abortion occurred, and the whole of the foetus was discharged through the coelomic ostium of the tube, except its head, which was too large to pass (Cullingworth and Fairbairn).

It has also been proved that a tubal foetus may escape from the gestation sac into the belly, and sever its connections with the placenta without destroying its mother. Dr. Mendes de Leon has published a remarkable example; he removed a foetus of the sixth month tightly enclosed in its amnion, but adherent to the great omentum; it had no connection with any other abdominal viscus. At the operation he removed also an enlarged Fallopian tube which contained an atrophic placenta, clearly indicating the primary situation of the gestation.

Cullingworth has published an account of a very excep-



tional example of tubal pregnancy, which is useful as illustrating the manner in which a foetus is extruded from a tubal gestation sac. The specimen shown in section (Fig. 70) represents two compartments; the inner is occupied by the placenta, engorged with blood and clot, and the outer sac contains a foetus surrounded by a delicate membrane, probably amnion. In this instance the foetus was extruded

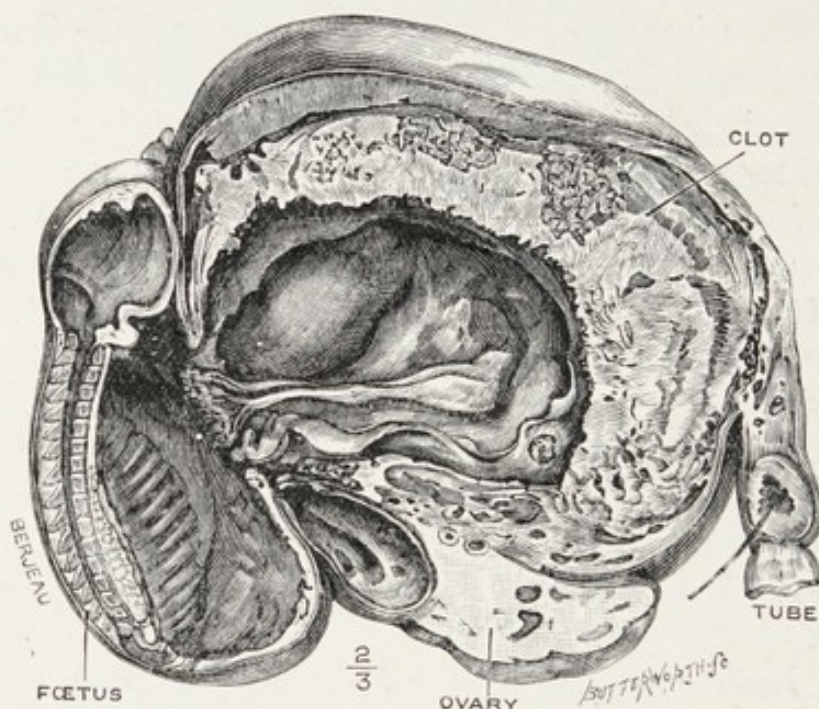


FIG. 70.—A GRAVID FALLOPIAN TUBE IN WHICH THE FŒTUS HAS BEEN SLOWLY EXTRUDED FROM THE TUBE.

Dr. Cullingworth's case. (Museum of St. Thomas's Hospital.)

either through a rent in the tube or perhaps through the cœlomic ostium, but retained its connection with the placenta. In Mendes de Leon's specimen the extrusion was complete. Pestalozza operated on a woman for secondary abdominal pregnancy, and found a foetus in the recto-vaginal pouch; the placenta occupied the ampulla of the tube, and the umbilical cord passed through the cœlomic ostium of the tube. According to a recent observation, it is possible for a foetus to go to full term in a Fallopian tube (Amos).



## CHAPTER XXII

### TUBAL PREGNANCY—(*continued*)

#### RUPTURE AND EROSION OF A GRAVID TUBE

As a rule, every gravid tube left to itself either aborts, bursts, or is eroded. When from any cause the pregnancy is disturbed before the coelomic ostium is occluded, the probability is in favour of abortion, but a gravid tube may rupture in spite of a patent ostium. When the pregnancy advances until the ostium is closed, then the tube usually bursts at some period between the sixth and tenth week following impregnation; this accident is rarely deferred till the twelfth week. In some exceptional cases tubal pregnancy has gone to the sixth month and even to term without rupture. In one very carefully observed case tubal pregnancy supervened on a single insemination. The tube burst on the fifteenth day, and the woman died in a few hours (Rumley Dawson). This is called primary rupture, and may be intraperitoneal or extraperitoneal. The determining causes of the rupture are of various kinds, such as jumping from a train, chair, or carriage; defæcation, sexual congress, examination of the uterus, etc. Occasionally no such influence is demonstrable. **Erosion** is a much rarer event in the course of tubal pregnancy than abortion or rupture, and will be considered separately. A gravid Fallopian tube may undergo axial rotation; instances of this rare accident have been recorded by Martin, Pozzi, and others.

The predisposing causes of rupture are the gradual attenuation of the walls of the gestation sac and the undue distension of the membranes by hæmorrhage. The tubal wall is particularly thin at the seat of implantation of the



villi, and this thinning is due to the aggressive action of the trophoblast.

The destructive power of the trophoblast is well shown in the specimen depicted in Fig. 71. In this instance the tube became gravid, and the cells of the villi eroded and perforated the wall of the gestation sac. Tufts of chorionic villi project into the general peritoneal cavity. The patient was in the seventh week of her tenth pregnancy when she was seized with abdominal pain, and died in ten hours

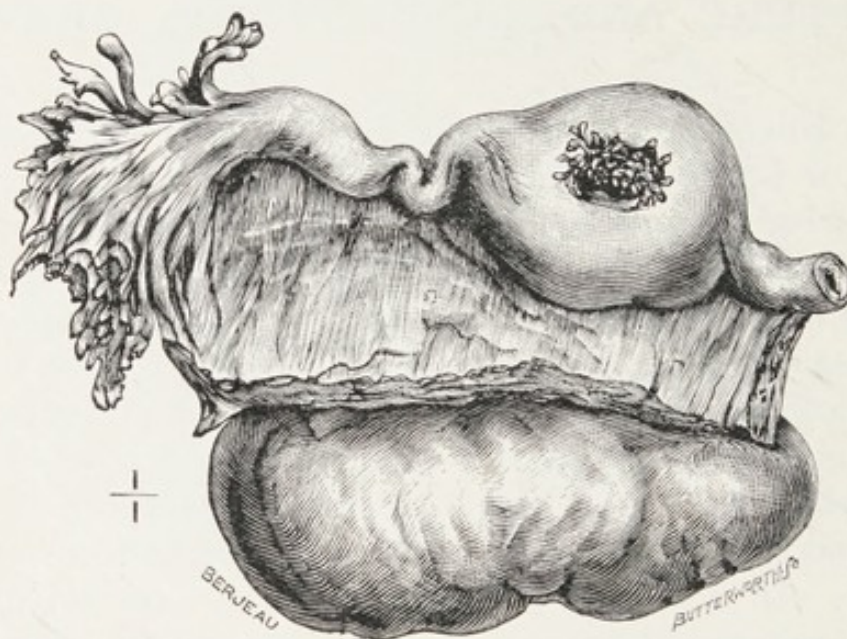


FIG. 71.—A GRAVID FALLOPIAN TUBE WITH A PERFORATION IN THE WALL OF THE GESTATION SAC DUE TO EROSION BY THE CELLS OF THE CHORIONIC VILLI: TUFTS OF VILLI PROJECT THROUGH THE HOLE.

from hæmorrhage. The specimen is preserved in the Museum of St. Bartholomew's Hospital.

**Primary Intraperitoneal Rupture.**—In this variety the rupture is so situated that the blood escapes into the cœlom and inundates the recto-vaginal fossa. The embryo or mole may escape through the rent or be detained in the tube.

The blood effused may amount to a litre, or even more. Extravasations of this kind were formerly called pelvic hæmatoceles. This term could, with advantage to the student, suffer obliteration.

The dangers of primary intraperitoneal rupture of a gravid tube are rapid death from hæmorrhage, or death



from repeated hæmorrhages. Women occasionally survive a limited hæmorrhage, and the effused blood slowly absorbs. When the bleeding is not excessive, the blood collects in the recto-vaginal fossa, and floats up the coils of intestines, and these, with the omentum, gradually form a covering to the fossa by adhering together, thus isolating the blood in the pelvis from the general peritoneal cavity. Handley has shown that when the blood slowly escapes through the rent in the tube it may occasionally be encapsuled, as so frequently happens in tubal abortion (*see* p. 221). He terms this condition a *paratubal hæmatocele*. In some instances when the gestation sac bursts the effused blood forces its way between the circular and longitudinal muscular layers of the tubes. An intramural tubal hæmatoma of this kind may burst through the peritoneal coat, or into the lumen of the tube, terminating in the latter case as a tubal abortion. In one specimen an extravasation of blood from a gestation sac, lodged at the junction of the isthmus and ampulla, forced its way along the tubal wall to the cœlomic end; it then burst through the mucous membrane near the ostium (Bonney).

**Primary Extraperitoneal Rupture.**—In a small proportion of cases the tube bursts in that portion of its circumference lying between the folds of the mesosalpinx. When this happens, the mole and a varying amount of blood are forced between the layers of the mesometrium. As a rule, the bleeding is arrested before it assumes dangerous proportions, in consequence of the resistance which occurs when the mesometric tissues become distended. This is fortunate, for the blood and mole are entombed in the mesometrium, and rarely cause subsequent trouble.

Rupture may take place, the embryo with its membranes remain uninjured, and the pregnancy continue; for, no longer confined within the narrow limits of the tube, it begins to avail itself of the additional space thus offered, and burrows, as it grows, between the layers of the mesometrium.

According to the manner in which this mode of rupture is sometimes described, it might be imagined that the tube splits and the products of gestation are suddenly discharged



from the tube into the mesometrium. This is not the case, or the pregnancy would in every instance come to an end from the dissociation of the foetal from the maternal structures. A careful study of the morbid anatomy of the accident indicates that the slow and gradual distension of the tube causes it to thin and gradually yield in that part of its circumference uncovered by peritoneum, until an opening forms, accompanied by sudden hæmorrhage, which produces collapse, the profundity and duration of which depend upon the amount of blood effused. This artificial opening is gradually extended by the growing embryo and placenta as they slowly occupy the new area of connective tissue thus opened up.

When the gestation continues in this way it is termed mesometric pregnancy, because the sac is formed in part by the expanded Fallopian tube, but mainly by the peritoneum forming the mesometrium (broad ligament).

**Erosion of the Tube.**—It occasionally happens that an oöperm developing in the tube will slowly distend it, and gradually erode the walls of the gestation sac until the amnion protrudes into the general peritoneal cavity without any of the striking signs indicating the yielding of the tube. Gestation under these conditions may continue, and the foetus go to term; it may then die, the amnionic fluid is absorbed, and the foetus, tightly girt in its amnion, becomes mummified, or even converted into a lithopædion without invading the mesometrium.

In rarer cases the foetus continues to live and grow; finally it emancipates itself from its amnionic prison, and moves freely about among the intestines and abdominal viscera, merely tethered by the umbilical cord (Fig. 72). In 1898, one of us removed a living extra-uterine boy which had escaped from the amnionic sac into the abdomen. When the child moved about in the upper part of the abdomen the mother uttered the most piercing yells and complained of awful pain. The child was delivered by coeliotomy, and during extraction he clutched the omentum so firmly that, in order to release it, the child's fingers had to be gently extended (*Clinical Journal*, March 4, 1914).

**The Decidua and Placenta.**—In tubal gestation the



placenta is liable to many vicissitudes which influence very seriously the life of the foetus, and are such grave sources of danger to the mother that they demand great consideration from the surgeon.

The tubal mucous membrane takes no share in the formation of a placenta when an oöperm embeds itself in the tubal wall and no decidua forms in the tube. The evidence

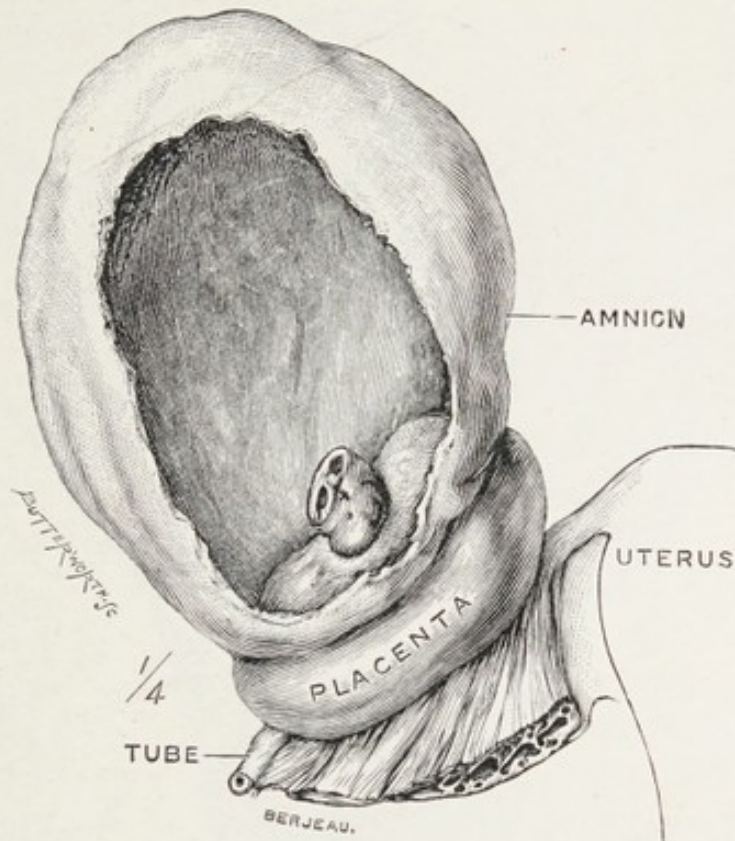


FIG. 72.—THE AMNION AND PLACENTA DUE TO AN OÖSPERM WHICH LODGED IN THE TUBAL ISTHMUS.

The amnion slowly eroded the tubal wall. At term the foetus escaped through a rent in the amnion, and disported itself among the intestines.

on which we state that in tubal pregnancy there is no decidua in the tube is based upon a careful microscopic examination of twenty-five gravid tubes in the very early stages (four to ten weeks). Our opinion is confirmed by the observation of several independent investigators.

**The Decidua.**—In all varieties of tubal and in ovarian pregnancy a decidua forms in the uterine cavity; it is rarely retained until term, unless there be concurrent uterine pregnancy; when it is, the membrane is thrown off during the false labour characteristic of that period. More



frequently the decidua is discharged in pieces during the period following rupture, or is expelled whole with signs of miscarriage. Deciduæ vary in thickness from 6 to 8 millimetres. They may be described as bags, resembling in outline an isosceles triangle (Fig. 73). The base corresponds to the fundus of the uterus, and the apex to the internal opening of the cervical canal. At each angle of the triangle there

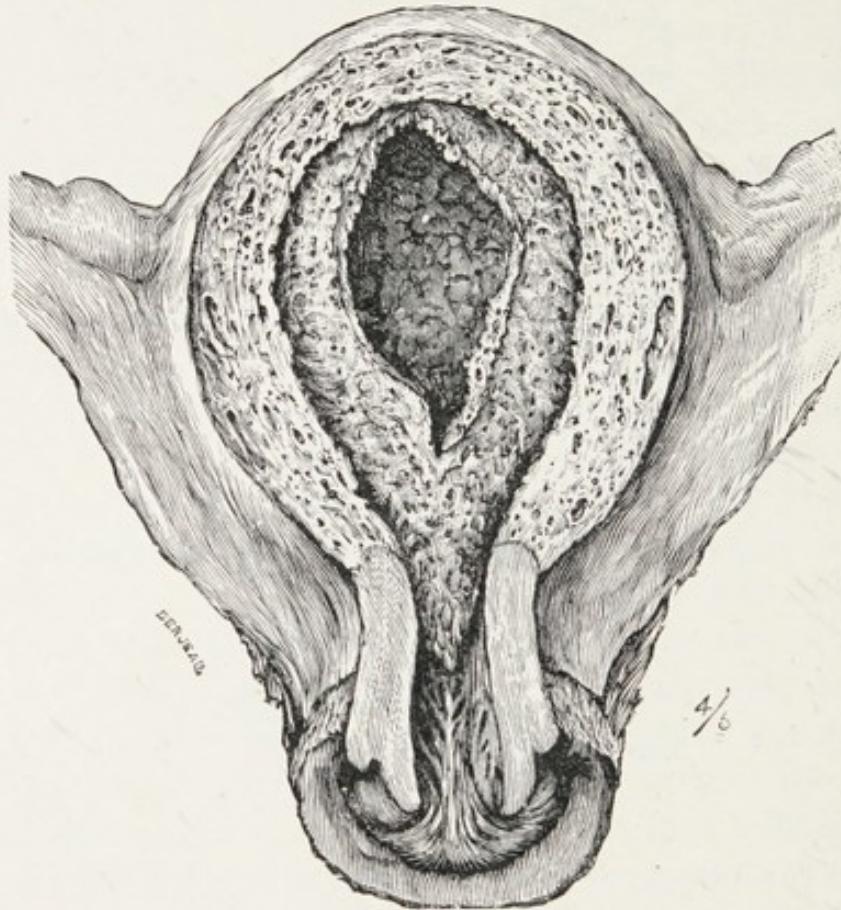


FIG. 73.—UTERUS WITH THE DECIDUA IN SITU.  
From a case of tubal pregnancy.

is an opening. Those at the basal angles correspond to the Fallopian tubes and are small; the apical orifice corresponds to the cervical canal and is often large. The outer aspect is shaggy, and the inner surface is dotted with the orifices of uterine glands.

The *histology* of a decidua is best studied in sections cut parallel to the surface. In this way the epithelium lining the ducts of the uterine glands is well shown. The spaces not lined with epithelium are bloodvessels.

It is useful, for clinical purposes, to be familiar with the



microscopic characters of deciduæ, because it happens that an early uterine abortion often simulates primary rupture of a gravid tube, and *vice versa*. On examining shreds which have escaped from the vagina, one is able to decide by means of the microscope whether they are fragments of decidua or chorionic villi from a uterine conception.

**Placenta.**—Up to the date of primary rupture the formation of the placenta has been proceeding in relation with the mucous membrane of the tube, but after this occurrence, if the disturbance is not severe enough to terminate the pregnancy, the course of events is modified in a remarkable manner, and the ultimate result is largely determined by the relative position of the foetus and placenta.

When the embryo is situated above the placenta the latter gradually grows and insinuates itself between the layers of the mesometrium (broad ligament) until it comes to rest upon the floor of the pelvis. Should the embryo lie below the placenta the foetus will ultimately come to rest on the pelvic floor, and the placenta will be pushed upwards by the growing foetus.

This gradual disturbance leads to disastrous changes, such as repeated hæmorrhages into the placenta, which impair its functions and lead to arrest of development and death of the foetus. A tubal foetus, even when it survives to term, is always an unsatisfactory individual. When rescued by the surgeon, these foetuses rarely live more than a few weeks or months. Many are ill-formed and present hydrocephalus, club-foot, ectopia of the viscera, and the like.

Should the foetus die early the placenta gradually atrophies, and in cases of lithopædion there is no trace of it.

**Secondary Rupture of the Sac.**—The constant tension to which the gestation sac is exposed may, if increased by a sudden hæmorrhage, lead to rupture and death. This is known as “secondary intraperitoneal rupture.” Occasionally the gestation continues to term; then symptoms of labour set in, and, as delivery by the natural channels is impossible, the sac may burst into the cœlom. Escaping this, the foetus dies, and, remaining quiescent, becomes mummified or is transformed into a lithopædion. Later the soft parts may become adipocere, or decompose. Adipocere



is a peculiar substance intermediate between fat and wax : usually it is white and, chemically, an ammoniacal soap. When the foetal tissues putrefy, then the pus bursts through the bladder, rectum, vagina, or through the abdominal wall, and fragments of foetal tissues and bones are discharged from time to time. A mass of such bones is shown in Fig. 74.

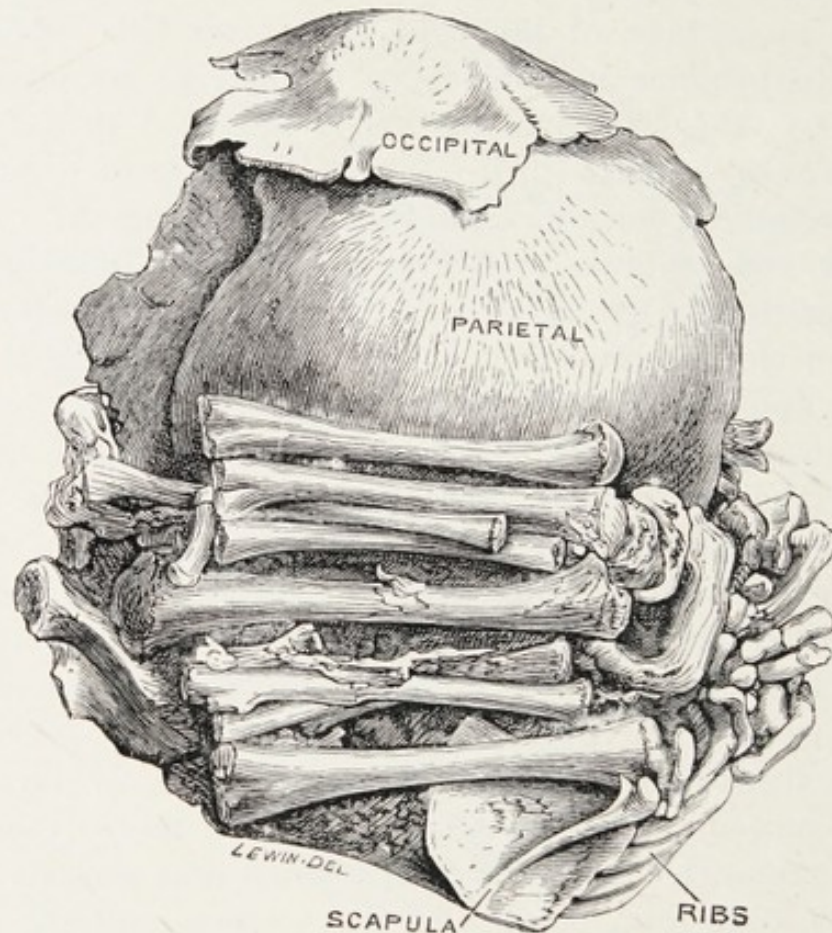


FIG. 74.—MASS OF FŒTAL BONES FROM A CASE OF TUBAL PREGNANCY.  
(MUSEUM OF THE MIDDLESEX HOSPITAL.)

The conditions of extra-uterine foetuses vary. The tissues of the foetus may become mummified, but the investing membranes are converted into a calcified shell. This is a *lithokelphos*. When the calcification involves the membranes and the superficial parts of the foetus the mass is a *lithokelphopædion*. A calcified foetus is a *lithopædion* (Fig. 75); but the membranes remain uncalcified. The first two terms were invented by Kückenmeister (1881) and are so cacophonous that they rang their own death knell.



A lithopædion may remain quiescent many months, or even fifty years, or it may never cause trouble. The mother, in the words of the prophet, becomes the grave of her child (Jer. xx. 17). An interned lithopædion is always a potential source of danger, for if pathogenic micro-



FIG. 75.—LITHOPÆDION. IT HAD BEEN RETAINED FOUR YEARS.  
(AFTER CLARK.)

organisms gain access to it, suppuration is the inevitable consequence. In a few rare instances an entire extra-uterine foetus has been extruded by sloughing through the abdominal wall in the neighbourhood of the umbilicus (navel delivery).

In many instances the delivery has been completed by



surgeons. In one instance the foetus was removed by a butcher; the woman recovered, and the account of this remarkable case concludes in this way: "She had a navel rupture owing to the ignorance of the man in not applying a proper bandage." This is a good instance of professional bias in the apportioning of blame (*Phil. Trans.*, abridged edition, vol. viii., p. 517).

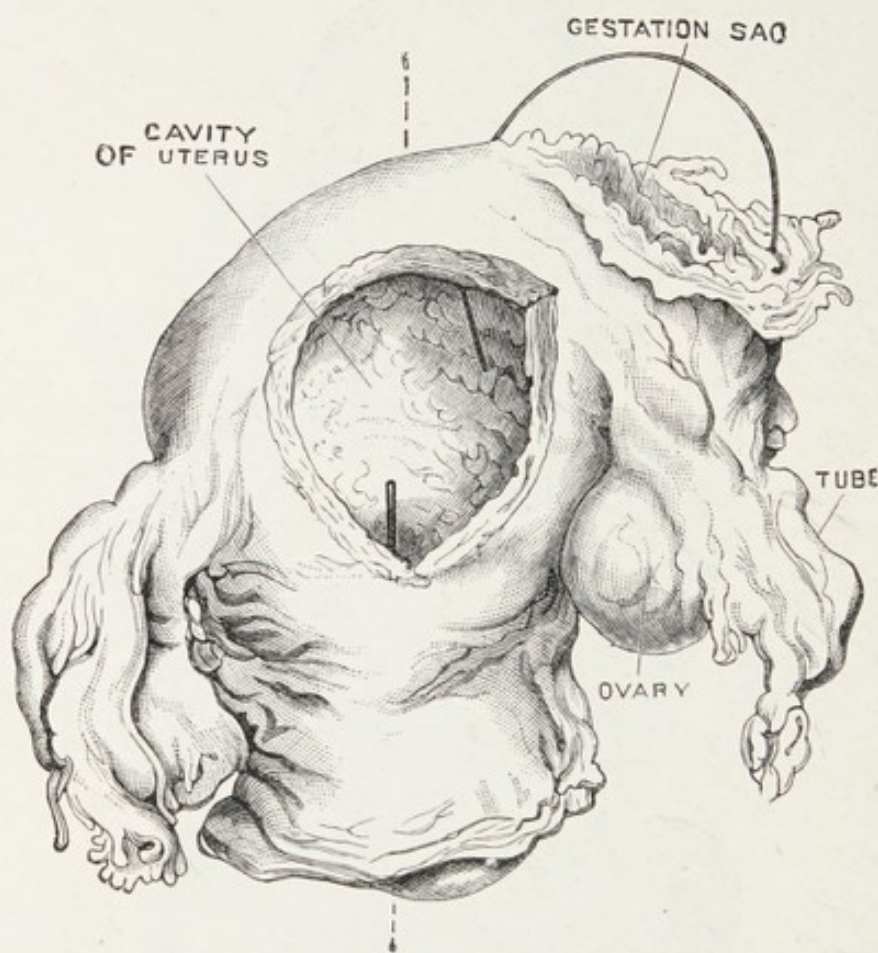


FIG. 76.—TUBO-UTERINE PREGNANCY.

The gestation sac ruptured at the end of the second month. (Museum of the Royal College of Surgeons.)

**Tubo-uterine Gestation.**—When an oöspERM lodges in that section of the tube which traverses the uterine wall it is termed tubo-uterine gestation (Fig. 76). It is rare, many specimens described under this name being examples of pregnancy in the rudimentary horn of a unicorn uterus.

This variety runs a somewhat different course from the common variety of tubal pregnancy. For example, primary rupture may be delayed to the sixteenth week. The sac may rupture in two directions. It may burst into the



cœlom, and is often rapidly fatal; or it may rupture into the uterine cavity and be discharged like a uterine embryo: this latter mode of termination has never been proved. A tubo-uterine gestation sac never ruptures into the mesometrium (broad ligament).

Although in many examples of tubo-uterine gestation primary rupture may be longer delayed than in purely tubal gestation, nevertheless the sac sometimes bursts very early; in such cases the patient may die within a few hours from hæmorrhage.

An examination of the clinical details of cases of undoubted tubo-uterine gestation indicates that intraperitoneal rupture of the sac is more rapidly fatal in the tubo-uterine than in the purely tubal form. This is due to the greater amount of hæmorrhage, because not only are the walls of the gestation sac thicker, but the rent often extends to, and involves, the wall of the uterus.

**Cornual Pregnancy.**—It is pointed out in Chap. IV that the uterus sometimes presents the bicornate condition characteristic of many mammals, such as cows, mares, and ewes. It is well established that a two-horned uterus in women may become gravid, the pregnancy go to term, and delivery terminate as happily as in an organ of normal shape. When one horn only is gravid—and this is the usual condition—the non-gravid cornu enlarges, and a decidua is developed within it. When a woman with a bicornate uterus comes under observation in the early stages of pregnancy, and is submitted to physical examination, there is great probability that the unilateral position of the enlarged cornu will lead to an erroneous diagnosis, and several cases have been recorded in which, under the supposition that the patient was suffering from an ovarian tumour, uterine fibroid, or tubal pregnancy, cœliotomy has been performed. In some instances the gravid half of the uterus has been amputated before the nature of the condition was appreciated.

There is, however, a variety of cornual gestation of deep interest to the surgeon. When an oöperm lodges in the rudimentary cornu of what is known as the “unicorn uterus” (Fig. 24, p. 57), gestation may proceed without



inconvenience for three or more months; but, as delivery by the natural passages is impossible, the ultimate results are similar to those of tubal pregnancy.

The clinical signs of gestation in the rudimentary horn of a unicorn uterus are those of tubal pregnancy, and in many instances even during post-mortem inspection the nature of the lesion is overlooked.

The relation of the round ligament to the gestation sac forms a ready means of distinction between a gravid Fallopian tube and a cornual pregnancy—

1. In a normal uterus the round ligament springs from the upper angle, immediately in front of the tube (Fig. 4, p. 7).

2. In tubal gestation the round ligament is attached to the body of the uterus on the uterine side of the gestation sac.

3. In cornual pregnancy the round ligament is situated on the outer side of the gestation sac.

Pregnancy in the rudimentary cornu of a unicorn uterus runs a different course from tubal pregnancy. In the case of the tube, rupture (or abortion) usually occurs before the twelfth week, whereas in the case of a rudimentary cornu the gestation may go on to full term, and then ineffectual labour leads to the death and subsequent mummification of the foetus (in rare cases the sac may become infected and suppurate, and eventually nothing but a sequestered collection of macerated bones be left); or the gestation sac may rupture at any period from the second to the ninth month.

There is another feature of great importance in the anatomy of these rudimentary cornua. A fair number of specimens have been reported since Kussmaul drew attention to the anomaly in his classical work (1859); the subject has also received the attention of such observers as Virchow and Turner, and in nearly all the recorded cases the gravid rudimentary cornu was attached to the well-developed cornu by a solid fleshy pedicle; even after a very minute and careful examination, the reporters have failed to detect a channel in this pedicle by means of which the gravid rudimentary cornu could communicate with the cervix of the well-formed uterine horn, or the vagina.



This, of course, brings into prominence the channel by which the ovum, gaining entrance into the cavity of the rudimentary cornu, becomes fertilized. The only available explanation is this:—the spermatozoa reach the recto-vaginal fossa by way of the Fallopian tube attached to the well-developed half of the uterus, and fertilize the ova furnished from the ovary belonging to the rudimentary cornu. Some writers on this subject suggest that an ovum from one side may find its way into the coelomic ostium of the opposite or rudimentary cornu, and seek to substantiate this on the ground that, in some of the cases where the rudimentary cornu was gravid, the corpus luteum of pregnancy was found in the ovary of the opposite side—that is, in the ovary corresponding to the well-developed tube.

When pregnancy occurs in one cornu of a two-horned uterus a decidua forms in the unimpregnated horn. Whether a decidua forms in the rudimentary horn under such conditions has not been determined.

The diagnosis of pregnancy in a rudimentary cornu is a matter of uncertainty. It is often mistaken for tubal pregnancy and for a uterine fibroid. As a matter of fact, the nature of the case has been overlooked, even when the parts removed from the body were submitted to dissection.

Cornual pregnancy is interesting from another point of view. A careful search through veterinary literature shows that there is no specimen or description of a case of tubal pregnancy in a mammal other than the human female that will bear criticism. The cases published as extra-uterine gestation are examples of rupture of one of the long gravid uterine cornua, or of the uterus itself; it is a curious fact that in the hare, which has a pair of long uterine cornua, two carefully described cases are known in which a gravid cornu underwent axial rotation (Hutchinson, Dohrn).

There is also good ground for the belief that a gravid rudimentary uterine cornu in the human subject has twisted its pedicle.

**Utero-abdominal Pregnancy.**—Among the anomalous varieties of gestation it is necessary to draw attention to one of great interest as well as rarity described by Leopold in 1896. A woman, when near the mid-period of pregnancy,



injured herself by slipping down the cellar steps. When she arrived at what she reckoned to be "term," extra-uterine pregnancy was diagnosed and cœliotomy performed. A foetus of about the fourth month of gestation, enclosed in a thin amniotic sac, was found in the abdomen, and its umbilical cord passed through a rent in the back of the uterus. Subsequently the uterus with the placenta was removed with success. In this instance the uterus was injured, and the foetus in its amnion was slowly extruded through the rent in the posterior uterine wall into the belly.

Ehrendorfer has described a similar case in which the foetus escaped into the abdomen through a rent in the anterior wall of the uterus.



## CHAPTER XXIII

### TUBAL PREGNANCY—(*continued*)

#### DIAGNOSIS

THE signs of tubal pregnancy vary according to the stage of the gestation; they will, therefore, be dealt with in sections, thus—

1. Before primary rupture or abortion;
2. At the time of primary rupture or abortion;
3. From the date of primary rupture to term;
4. At and after term.

**1. Before Rupture or Abortion.**—Since the pathology of the early stages of tubal pregnancy has been carefully investigated, and a clear distinction recognized between a gravid tube and a hæmatosalpinx, many cases have been recorded in which a correct diagnosis was made before the operation was undertaken. This is very gratifying, and it is a matter of great importance for the patient, as it spares her the awful peril which attends rupture of the tube.

The patient usually gives a definite history of a missed menstrual period after having been previously regular; following on this event, she begins to experience pelvic pain which induces her to seek advice. On examination, an enlarged Fallopian tube is detected. When there is no history of old tubal disease, or any fact in the history of the patient suggesting septic endometritis or gonorrhœa, then presumption favours a gravid tube.

**2. At the time of Primary Rupture or Abortion.**—The tube bursts or abortion usually occurs at some period before the twelfth week. The effect upon the patient depends upon the seat of rupture. When it takes place between the layers of the mesometrium (broad ligament), the symptoms will, as a rule, be less severe than when the



tube bursts into the belly, because the pressure exercised by the blood extravasated into the tissues of the mesometrium tends to check hæmorrhage; whereas the belly will hold all the blood the patient possesses, and yet produce no hæmostatic effect in the form of pressure.

The *symptoms of intraperitoneal rupture* are those characteristic of internal hæmorrhage. The patient complains of a sudden feeling "as if something had given way"; this is followed by general pallor and faintness; the voice is reduced to a mere whisper; sighing respiration; depression of temperature; rapid and feeble pulse; usually vomiting; and in some cases death ensues in a few hours. Should the patient recover from the shock, she will sometimes state that she suspected herself to be pregnant.

The symptoms of rupture are often accompanied by hæmorrhage from the vagina, and shreds of decidua will be passed, so that the case resembles in many points, and is occasionally mistaken for, early uterine abortion. Error in such circumstances may be avoided by examining the shreds discharged from the uterus; if they are chorionic villi, the pregnancy is clearly uterine.

The rapidity with which the rupture of a gravid tube will sometimes destroy life has caused more than one writer to describe this accident as "one of the most dreadful calamities to which women can be subjected"; indeed, it may be so rapidly fatal that many cases have been recorded in which death has been attributed to poisoning until dissection, instituted in many instances by the coroner, has revealed the cause of death (Fig. 64, p. 215).

*In extraperitoneal rupture*—that is, when the tube bursts so that the blood is extravasated between the layers of the mesometrium—the symptoms resemble intraperitoneal rupture, but, as a rule, are not so severe, and the signs of shock pass off quicker. On examining by the vagina, a round, ill-defined swelling will be detected on one side of the uterus; when the effused blood is large in amount the uterus will be pushed to the opposite side. When the bleeding takes place into the left mesometrium (broad ligament), it will sometimes extend backward under the peritoneum, and invade the connective tissue around the



rectum, so that when the exploring finger is introduced into the rectum a semicircle—sometimes a ring—of swollen tissue will be found encircling the gut.

The escape of decidual membrane from the uterus accompanied by blood is also an important and fairly constant sign. Occasionally it will be necessary to pass a sound into the uterus; when the tube is gravid, the cavity of this organ will be found slightly enlarged, and the os invariably patulous.

The greatest difficulty in these cases is to be sure that the rupture is purely extraperitoneal. In a few cases the rupture may involve the peritoneal as well as the mesometric segment of the tube.

Abortion or rupture of a gravid tube is often simulated by lesions of other abdominal organs; for example—

Perforation of stomach or intestine;

Sloughing of the vermiform appendix;

Bursting of a pyosalpinx;

Intestinal obstruction (acute);

Renal colic;

Biliary colic;

Axial rotation of an ovarian tumour (acute);

Strangulated hernia. The embryo from a tubal pregnancy which had burst has been found in the sac of an inguinal hernia.

**3. From the Date of Rupture to Term.**—Not infrequently after primary extraperitoneal rupture the symptoms of shock pass off, and the embryo continues its development; in many instances the patients believe themselves pregnant, and the hæmorrhages from which they suffer and the signs indicative of the primary rupture may merely cause temporary inconvenience. As the embryo increases in size, the abdomen enlarges, but differs at first from ordinary uterine gestation in that the enlargement is lateral instead of median.

From the third month onward the leading signs of tubal gestation may be summarized thus—

(a) Amenorrhœa is occasionally found; frequently there is hæmorrhage from the uterus occurring at irregular intervals, accompanied by the escape of decidual mem-



brane. This last is a valuable diagnostic sign. It is even more valuable if the patient has missed one or two periods.

(b) There may or may not be milk in the breasts. Its presence is a valuable indication. From its absence nothing can be inferred.

(c) The uterus is slightly enlarged; the cervix usually soft, as in normal pregnancy, and the os patulous.

(d) A large and gradually increasing swelling to one side and behind the uterus. Occasionally the foetal heart can be heard, and in advanced cases the outlines of the foetus may be distinguished.

(e) When a woman in whom the existence of tubal gestation is suspected is suddenly seized with collapse and all the signs of internal bleeding, it is indicative of rupture of the gestation sac.

(f) Tubal pregnancy is very apt to occur after long intervals of sterility, and may occur as a first pregnancy even in the recently married.

**4. At Term.**—In spite of all the risks besetting the life of an extra-uterine child and that of its mother, the pregnancy may go to term. Then a remarkable series of events ensue—

(a) Paroxysmal pains come on, resembling those of natural labour, accompanied by a discharge of blood and mucus, and dilatation of the os.

(b) This unavailing labour may last for hours or weeks.

(c) The mammae may secrete milk for several weeks.

These signs sometimes pass away, and as the amniotic fluid is absorbed the abdominal swelling subsides. Months or years later suppuration takes place in the sac, and foetal tissues may be discharged through the belly-wall, rectum, vagina, bladder, etc., and give a clue to the character of the abscess.

Various conditions may complicate the diagnosis of tubal pregnancy, thus—

1. Uterine and tubal pregnancy are sometimes concurrent;
2. Uterine sometimes follows tubal pregnancy;



3. Tubal pregnancy may be bilateral;
4. Tubal pregnancy may be repeated.

The remainder of this chapter is devoted to the consideration of these four complications.

It is also important to bear in mind that tubal pregnancy may be simulated by a variety of conditions—

1. Uterine pregnancy, especially where the walls of the pregnant uterus are unusually thin, allowing the foetus to be felt with uncommon distinctness;
2. Pregnancy in a bicorned uterus;
3. Retroversion of the gravid uterus. On the other hand, an extra-uterine pregnancy, which has advanced to the third or fourth month, has often been mistaken for a retroverted gravid uterus. In some instances the error has been attended with disastrous consequences to the patient.
4. Spurious pregnancy;
5. Ovarian tumours;
6. Tumours of the mesometrium;
7. Uterine fibroids;
8. Fæces in the rectum;
9. Tubal pregnancy and fibroids.
10. Tubal pregnancy with ovarian or parovarian cysts is not an uncommon combination;
11. *A gravid Fallopian tube often simulates a uterine fibroid;*
12. Pregnancy in a rudimentary uterine cornu often simulates a fibroid.

**Differential Diagnosis.**—The diagnosis of extra-uterine pregnancy is nearly always beset with anxiety, and this especially is intensified when complications exist; and some of the most important as well as the most peculiarly puzzling conditions are those due to variations in pregnancy, whether in the tubes or in the uterus, or in both situations at the same time. Successful uterine pregnancy subsequent to tubal gestation is by no means rare. It is, therefore, well to remember the following sets of conditions—

1. Tubal pregnancy may be repeated;
2. Tubal pregnancy may be bilateral;
3. Uterine and tubal pregnancy may be concurrent;



4. Ovarian and uterine pregnancy may complicate each other;
5. Pregnancy may ensue on the sequestration of a full-grown extra-uterine foetus.

**Repeated Tubal Pregnancy.**—In 1885 Lawson Tait operated on a woman twenty-five years of age and removed a gestation sac with the foetus and placenta from the right side of the pelvis. This woman recovered, and eighteen months later was confined at term. Fifteen months after delivery she again conceived, and when, according to her reckoning, she had advanced to the fourth month, she was seized with severe abdominal pain and died in five hours. At the post-mortem examination a tubo-uterine gestation was found on the left side. Since this date a number of examples of this double accident have been recorded, and on evidence equally secure. It is also remarkable that in some of the patients the second tube became pregnant within a few weeks of their recovery from the operation necessitated by the conception in its fellow.

With our present knowledge it may be stated that the period of liability to repeated tubal pregnancy may vary from seven weeks to nine years, but the greater proportion of the cases fall within a limit of four years from the date of the first tube becoming gravid. This conclusion is well borne out by a study of Vassmer's painstaking analysis of 132 cases of repeated tubal pregnancy. From a careful study of available records we think the liability to repeated tubal pregnancy may be estimated at 5 per cent.

It seems also probable, but it has by no means been established as a fact, that a woman may conceive in a Fallopian tube and abortion occur at an early date without causing the patient much distress, and she may subsequently conceive in the same tube.

**Bilateral Tubal Pregnancy.**—In the preceding section it was shown that pregnancy may occur in one tube and at a subsequent date in the other. This is in a sense bilateral tubal pregnancy, but it is better to limit the term to the condition where a tubal pregnancy is progressing in both tubes at the same time.

There is no indisputable example of this on record, but



a number of cases have been reported in which two gravid tubes have been removed from a patient at the same operation, but a critical examination has shown them to be of different dates, and that one of them is progressing, whereas the other is old and quiescent. Such are, as a matter of fact, examples of repeated tubal pregnancy.

The question of bilateral simultaneous tubal conception will remain unsettled in many minds until a case is found in which the two embryos are living and of the same age. It is probably the rarest of all varieties or combinations of tubal pregnancy.

**Concurrent Uterine and Tubal Pregnancy.**—This condition requires consideration in three sections—

(a) A tubal and a uterine pregnancy occur simultaneously—the complication is recognized in the early months, and terminated by surgical intervention.

(b) Intra- and extra-uterine pregnancy with living foetuses run concurrently to term (compound pregnancy).

(c) Cases in which uterine pregnancy is complicated by the presence in the pelvis of a quiescent (sequestered) extra-uterine foetus.

*Tubal and uterine pregnancy co-exist, but the complication is recognized in the early stages.*

It is now established by many carefully recorded cases that pregnancy may co-exist in the Fallopian tube and uterus, but the tubal oöperm becomes converted into a mole; and whilst the uterine oöperm continues its normal development, its tubal companion may cause trouble by inducing rupture of the tube or tubal abortion. The period at which these accidents arise in the course of the pregnancy varies greatly. In some of the cases the catastrophe to the tubal pregnancy arises so early after fertilization that the intra-uterine pregnancy is not recognized at first, the enlargement of the uterus being attributed to the coincident formation of the decidua. The true condition is revealed in the subsequent course of the case, or is discovered at the operation (Boyd, Zincke, Simpson, Strauss, etc.). In some instances the conversion of the tubal oöperm into a mole has occurred so quietly that its presence has not been suspected until after miscarriage of



the uterine pregnancy, then a swelling has been recognized in the pelvis, and its nature determined in the course of an operation (Phillips).

*Uterine and extra-uterine pregnancy running concurrently to term.*

It is too true that uterine and tubal pregnancy may run concurrently and both go to term; this may be described as the most dangerous combination to which childbearing women are liable.

*Pregnancy and Sequestered Extra-uterine Fœtus.*—In this combination a woman has had an extra-uterine pregnancy which progressed to term; the fœtus died and remained sequestered in the pelvis. The nature of the case is forgotten, and the woman may subsequently conceive in the uterus. Even in these circumstances there is reason to believe that the child has been safely delivered, and repeated pregnancies have followed (Leopold). In some instances, however, the sequestered fœtus constituted a dangerous barrier. In one instructive case the entombed extra-uterine fœtus was extracted by cœliotomy and the mother recovered (Worrall).

**Concurrent Ovarian and Uterine Pregnancy.**—Menge has recently reported a case of this rare combination. The patient was supposed to have an ovarian tumour complicating her pregnancy. When the tumour was removed it contained a living nearly full-time fœtus. In due course the uterine child was born, and when Menge reported the case the mother was suckling both children.

Munro Kerr operated for an ovarian pregnancy which ruptured. He suspected the presence of an intra-uterine pregnancy. His suspicions were confirmed, for 218 days later the woman was delivered of a living child.



## CHAPTER XXIV

### TUBAL PREGNANCY—(*continued*)

#### TREATMENT

THE treatment of extra-uterine gestation is of two kinds, expectant and operative.

**Expectant Treatment.**—This is only possible in the early stages of tubal pregnancy, and is a survival of the period when collections of blood in the female pelvis were commonly called hæmatoceles, and their causes ill-understood; it was then the custom to keep women with intra-pelvic hæmorrhage at rest in bed for many weeks, in some cases many months, till the blood was absorbed. In some patients suppuration occurred, and the pus discharged itself through the rectum, vagina, bladder, or slowly through the abdominal wall, the final evacuation being occasionally hastened by the scalpel. Some practitioners advocate this mode of treatment at the present time. It is undeniable that with absolute rest in bed a very large effusion of blood will be slowly absorbed; at the same time no one will deny that acute symptoms, indicated by rapidity of pulse, a high temperature, and occasionally by toxic symptoms, arise from the absorption of liquefying non-septic clot. Many cases, too, have been reported to show that a deliquescent mole in a Fallopian tube is apt to be a very troublesome body quite apart from its tendency to provoke recurrent bleeding from the tube. Further, many patients who have been treated on the expectant plan, and who have been regarded as cured, have subsequently come under the care of surgeons for operative treatment. In some of these a liquefying mole has been found, and in others a large encysted collection of sanguineous fluid.



On the whole, it may be fairly stated that probably many gravid tubes rupture or abort, especially the latter, and cause the patient no more than a moderate amount of disturbance, which rest will cure. There remains, however, a very large number in which operation is directly needed to save the patient from bleeding to death. In a fair proportion of cases it can be said that though life was not directly imperilled, operative interference was nevertheless directly serviceable in reducing convalescence from several months to a few weeks.

**Operative Treatment.**—The risks and difficulties of operations for tubal pregnancy depend mainly on the stage at which they are required—

**1. Before Primary Rupture or Abortion.**—In this stage the operation required is practically that of oöphorectomy.

**2. At the Time of Primary Rupture or Abortion.**—When the symptoms of hæmorrhage are unmistakable and the patient's life is in grave danger, cœliotomy should be performed without delay, unless there is good evidence that the rupture is extraperitoneal. The employment of this method is in strict accordance with the canon of surgery valid in other regions of the body—viz., arrest hæmorrhage at the earliest possible moment.

There are few accidents that test the skill, nerve, and resource of a surgeon more than cœliotomy for a suspected intraperitoneal rupture of a gravid tube, and few operations are followed by such brilliant results.

The method of performing the operation before, and at the time of, primary rupture is identical with oöphorectomy.

Occasionally the rent in the tube will involve the fundus of the uterus, especially when the embryo is lodged near the uterus. Such rents should be carefully sutured with silk.

**3. Subsequent to Primary Rupture.**—The majority of cases are submitted to operation at periods varying from a few days to weeks, or even months, after the tube has ruptured. (It has been already pointed out that in an exceedingly large proportion of cases the tube is occupied by a mole.)



When the tube ruptures, the hæmorrhage may not be so profuse as to induce death; and the woman, recovering from the shock, does not manifest such grave symptoms as to demand surgical aid. The consequence is that the patient remains for several weeks under palliative treatment (unless a renewal of bleeding kills her), and at last she seeks surgical advice. Appreciation of the true nature of the case leads to operation.

In such cases, when the abdomen is opened, the free blood in the abdominal cavity is easily removed by sterilized dabs of absorbent material. The damaged tube and ovary are removed as in öophorectomy. When there is much free blood care must be taken that no clots are left in the iliac fossæ. When the blood has remained in the pelvis for several weeks after rupture, it is judicious to insert a thin rubber drain for a few days.

In operations for the removal of a gravid Fallopian tube it has been suggested that the opposite tube should be removed in order to protect the patient against the recurrence of the accident; but men of sound judgment and ripe experience are averse to such a proceeding, for it is an established fact that uterine pregnancy is not uncommon after unilateral tubal pregnancy. Our experience is in harmony with this.

**Colpotomy.**—Quite a large number of successful cases have been recorded in which the mole and clot have been removed from the pelvis by posterior colpotomy. The recovery is usually speedy, and avoids the risk of a yielding abdominal scar.

**4. Mesometric Gestation.**—When a Fallopian tube bursts, and a mole is displaced between the layers of the mesometrium, operative interference is rarely necessary. Occasionally repeated hæmorrhage renders it imperative to incise the abdominal wall, open the mesometrium, and turn out the clot, and, after stitching the sac to the edges of the wound, allow it to close gradually.

In those cases where the embryo survives the primary rupture and continues to grow an operation may be necessary at any moment on account of secondary rupture. When gestation has not advanced beyond the fourth month,



it may be possible to remove the embryo, tube, ovary, and adjacent portion of the mesometrium with the placenta, and to clear away thoroughly all clots. When it has advanced beyond the fourth month, the placenta is too large to be treated in such a summary manner. Certainly after the fifth month operative measures for tubal gestation require consideration under two headings—

1. The treatment of the sac ;
2. The treatment of the placenta.

**1. The Treatment of the Sac.**—The gestation sac in the last stages of tubal pregnancy consists of the remnants of the expanded tube and the mesometrium, which may be thickened in some parts and expanded in others. To the walls of the sac coils of intestine and omentum usually adhere.

Experience has decided clearly enough that the safest plan is to incise the sac, remove the foetus, and stitch the edges of the sac to the abdominal wound, precisely as in the plan recommended after enucleating large cysts and tumours from between the layers of the mesometrium.

In those rare cases where the amnion erodes the tube and invades the belly (ventral pregnancy), the gestation sac, with its contents, has been successfully removed by merely transfixing its base with silk ligatures.

**2. The Treatment of the Placenta.**—The rules for the treatment of the placenta may be formulated thus—

(1) When the placenta is situated above the foetus, it is good practice to attempt its removal.

(2) In some instances the placenta becomes detached in the course of the operation, and leaves no choice.

(3) When the placenta is below the foetus, it may be left.

(4) Should the placenta be left, the sac closed, and symptoms of suppuration occur, then the wound must be reopened and the placenta removed.

(5) If the foetus dies some weeks before the operation is attempted, the placenta can be removed with little risk of hæmorrhage.

The great risk of violent hæmorrhage renders an operation for tubal pregnancy with a quick placenta, between



the fifth and ninth months of gestation, the most dangerous in the whole range of surgery. About two-thirds of the patients die. There are three great dangers—hæmorrhage, shock, and peritonitis, due to decomposition of the placenta when it has been left to slough; hence it cannot be urged with too much force that when it is fairly evident that a woman has a tubal pregnancy it should be dealt with by operation without delay, and our experience of the operation leads us to believe that it is a wise plan to remove the placenta at the primary operation.

**After Death of the Fœtus at or near Term.**—Operations after the death of the fœtus are less complicated than when it is alive, and the placental circulation in full vigour. Not only is the proceeding from the operative point of view simplified, but the results, in so far as the mother is concerned, are much more satisfactory. Even when the fœtus is dead, we have no precise facts to guide us in determining when the placental circulation ceases. In some cases it has been found active when the fœtus has probably been dead six weeks.

When the operation is undertaken in cases where the fœtus is in the condition of lithopædion the procedure is very simple, because the placenta in most cases has completely disappeared. There is, however, a reported case in which a lithopædion caused intestinal obstruction. The fœtus had been retained nearly sixteen years. The placenta was represented by a calcified encapsuled ball with an average diameter of six centimetres (J. W. Smith). When the fœtus is converted into adipocere, the foetal tissues adhere to the walls of the sac and render the process of removal tedious.

**After Decomposition of the Fœtus and Suppuration of the Sac.**—After death and decomposition of the fœtus, sinuses form by which pus, accompanied by fragments of foetal tissue and bones, finds an exit, either through the rectum, vagina, bladder, or uterus, or at some spot in the anterior abdominal wall below the umbilicus. The treatment in such cases is simplicity itself. The sinuses should be dilated and all fragments removed from the cavity in which they lie. When this is thoroughly done,



the sinuses rapidly granulate and close. Partial operations are useless; if only a portion of a bone is allowed to remain, a troublesome sinus persists.

The difficulties and grave dangers which surround surgical intervention in the late stages of tubal pregnancy make it clear that the interests of a patient are best served when the surgeon removes a gravid tube as soon as it is clearly recognized.

*Hysterectomy in Cases of Extra-uterine Pregnancy.*—It is occasionally necessary in operating for the various forms of extra-uterine gestation to remove the uterus in order to control the hæmorrhage. This severe measure has been performed in dealing with interstitial and with cornual pregnancy. In the tubal variety it may be necessary when the tissues in the mesometrium have been extensively torn up by hæmorrhage.

**Results of Operative Treatment.**—In order to afford some notion of the risks attending the surgical treatment of extra-uterine gestation, as well as to give an idea of its relative frequency in hospital practice, the following figures will serve. From 1896 to 1905, both years inclusive, 116 operations for this condition were performed in the Chelsea Hospital for Women. During these ten years all the varieties of tubal pregnancy were met with (ampullary, isthmial, and tubo-uterine), including the rare condition of a living foetus free among the intestines, and the more uncommon condition of a full-time cornual pregnancy. Of these 116 patients, 4 died from the operation, 1 in 1897, another in 1902, and 2 in 1905. Death in the fatal cases was due to pulmonary embolism, peritonitis, and in 2 to heart failure.

*Note.*—In Chapter LXII are given the results at the same Hospital for the ten years 1905–14, namely 108 cases with 3 deaths. In the year 1905, which occurs in both lists, there were 13 cases with 2 deaths; we have therefore, for the nine years, 1906–14, the figures 95 cases with 1 death, and for the nineteen years, 1896–1914, we have 221 cases with 5 deaths, a mortality of 2·2 per cent.



## SECTION VII

### TUMOURS AND CYSTS OF THE REPRODUCTIVE ORGANS

INASMUCH as all the primitive germinal layers of the embryo—epiblast, mesoblast, and hypoblast—are represented in the generative organs, we find that nearly every kind of tumour known in the body may be met with in gynæcological cases; in addition, there is one kind of tumour associated with the female pelvic organs that is not found elsewhere except as a metastatic growth, namely, chorion-epithelioma.

Tumours arise as the result of the morbid proliferation of cell-elements already present.

Cysts are due to accumulation of fluid as the result of the pathological retention of normal secretions or the distension of potential embryonic cavities.

The types of tumours and cysts found in connection with the reproductive organs may be summarized as follow—

#### A. Epithelial Tumours.

*Papilloma*, in the vulva and ovary.

*Squamous-celled carcinoma* in the vulva, vagina, and cervix.

#### B. Glandular Tumours.

*Adenoma* in the uterus, Fallopian tube, and ovary.

*Glandular carcinoma* in the vulva, uterus, Fallopian tube, and ovary.

#### C. Connective Tissue Tumours.

*Lipoma* in the vulva and broad ligament.

*Fibroma* in the vulva, uterus, and ovary.

*Myoma* in the uterus and broad ligament.

*Myxoma* in the vulva.

*Angeioma* in the vulva.

*Endothelioma* in the ovary.



*Sarcoma* in the vulva, vagina, uterus, ovary, and broad ligament.

**D. Embryonic Tumours.**

*Embryoma (dermoid)* in the ovary.

**E. Tumours derived from the Growing Ovum.**

*Chorion-epithelioma* in the uterus and Fallopian tube.

**F. Cysts.**

*Retention cysts* in the vulva and ovary.

*Cysts in potential embryonic cavities* in the vagina, ovary, and broad ligament.

**G. Parasitic Cysts, namely, echinococcus colonies.**

It will be convenient to consider the tumours and cysts of the reproductive organs in the several situations in which they are found: vulva, vagina, uterus, Fallopian tubes, ovaries, pelvic peritoneum, and pelvic connective tissue (parametrium).

## CHAPTER XXV

### TUMOURS AND CYSTS OF THE VULVA AND VAGINA

**I. Tumours.**—The following are met with in the vulva: lipoma, fibroma, myxoma, angioma, papilloma, sarcoma, and carcinoma.

**Lipomas** arise in the labia majora, and sometimes in the mons veneris. They are usually sessile, and seldom attain a large size. They can be left alone unless they cause discomfort, and then they should be enucleated.

**Fibromas** are rare, and seldom large; but occasionally a fibroma may form a large pedunculated tumour, causing dragging pain by its weight. These tumours are easily removed.

**Myxomas** form soft pedunculated masses, arising generally from the labium majus (Figs. 77 and 78). Such a tumour is sometimes called a molluscum fibrosum. A rare form of multiple myxomas affecting the vestibule and urethra is here shown (Fig. 79). The pedicle is nearly always narrow. Sometimes the skin covering them is



deeply pigmented. They can be removed if they produce discomfort.

**Angeiomas** are sometimes seen as nævi, mostly in



FIG. 77.—A PEDUNCULATED MYXOMA OF THE LABIUM MAJUS.  
(FROM A PHOTOGRAPH.)

children ; more rarely a plexiform angeioma occurs. A nævus seldom requires to be interfered with. A plexiform angeioma is best treated by electrolysis.

**Papillomas**, or warts, are common ; the ordinary simple wart may be present, but more often papillomas are



associated with irritating discharges in cases of gonorrhœa. They are usually pedunculated, but may be sessile, and a considerable area may be covered by them.

*Treatment.*—Gonorrhœa, if present, must be energetically treated, and the vulva must be kept scrupulously clean. Considerable improvement may usually be effected by the use of mercurial lotion and ointment. If the papillomas

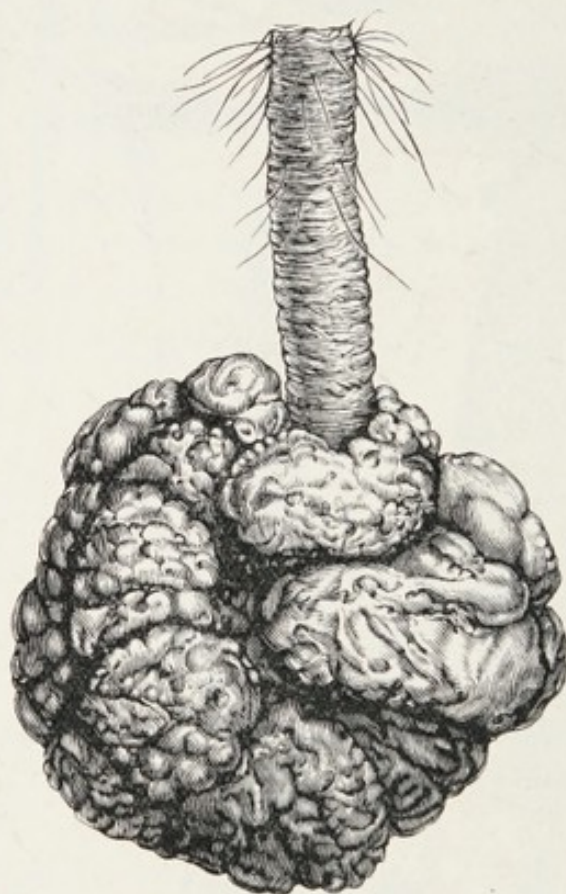


FIG. 78.—A PEDUNCULATED MOLLUSCUM FIBROSUM.

From the labium majus of a woman 50 years of age. It had existed many years.

persist they should be snipped off, and their bases touched with nitric acid or solid nitrate of silver.

**Sarcoma** is only rarely met with in the vulva, and it usually takes the pigmented form (melanoma). As a rule the growth is disseminated over other parts of the body, and the outlook is very unfavourable. A localized solitary sarcoma should be freely removed.

**Carcinoma** of the vulva generally attacks the clitoris or one of the labia majora, and is of the squamous-celled species. When the clitoris is involved this structure



becomes replaced by a mass which may attain the size of a small egg. The surface is usually ulcerated in parts. On the labia majora carcinoma commences as a wart-like structure which enlarges rapidly and soon breaks down on the surface, forming an ulcerating mass discharging a foetid secretion. Carcinoma has been known to arise in a vulva affected with kraurosis, and we have met with an example. The glands in the inguinal region become affected, though they may remain free for a relatively long time. Once they are involved the swelling in the groins rapidly increases, and spreads to the interior of the pelvis. Death comes about

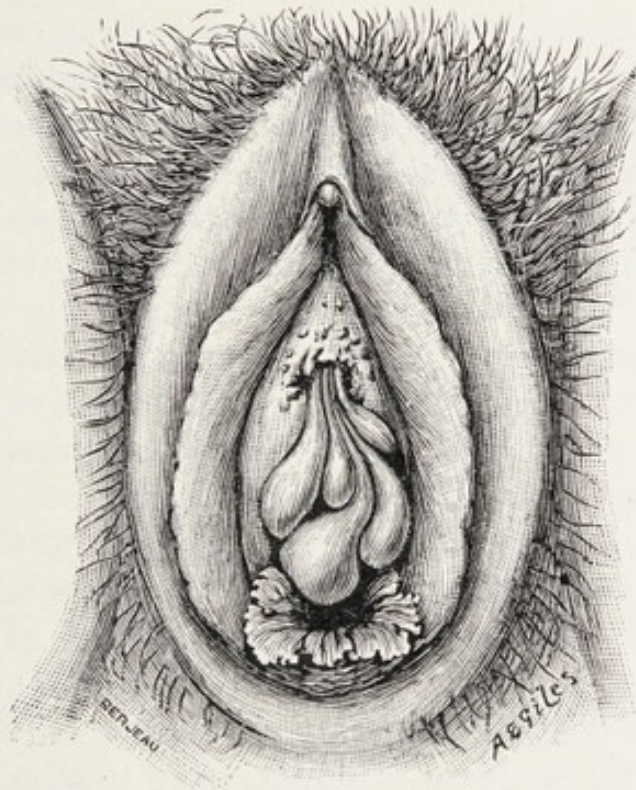


FIG. 79.—MULTIPLE MYXOMAS OF THE VESTIBULE.

from exhaustion and distress induced by pain, frequent bleedings, and mental anguish. Sometimes a large vessel is opened by ulceration, and rapid death from bleeding ensues.

*Diagnosis.*—This is usually easy. The conditions most likely to be mistaken for it are—

- (a) Papilloma, especially if inflamed or ulcerating.
- (b) Hard chancre. This forms a single ulcer, with hard base, and no tendency to spread. The inguinal glands are small, separate, and amygdaloid.



(c) Soft chancres. These are multiple; there is no induration, and they heal rapidly under proper treatment.

(d) Lupus, which is distinguished by alternations of tubercular masses, ulcers with bluish undermined edges, and contracting cicatrices. There may also be tracts of healthy skin between the ulcers, whilst the cancerous ulcer is compact and shows no tendency to heal.

(e) Sloughing phagedena. This appears as a breaking-down abscess with gangrenous walls and free secretion of pus. There is no induration, and the history of venereal infection points to its true character.

*Treatment.*—If seen early enough free excision is the proper treatment, and the prognosis is generally good. When practicable the cut edges of the vagina should be sutured to the skin at the margin of the wound; the urethral mucous membrane should be similarly treated when the growth surrounds the urethral meatus. When the clitoris is alone affected, complete extirpation of this organ is necessary.

If the growth has extended deeply into the vagina, or has spread extensively, palliative treatment is alone possible. The discomfort may be relieved by frequent antiseptic irrigations and dressings smeared with eucalyptus and vaseline; anodynes, of which morphia subcutaneously administered is the best, are usually required to relieve pain.

**Glandular Carcinoma.**—This is a very rare affection of the vulva; it arises in Bartholin's gland and involves the labial tissues, infects the lymph-glands, disseminates and recurs after removal. Structurally it mimics the acini of the gland.

**II. Cysts of the Vulva.**—These are of four species: mucous, sebaceous, cysts of Bartholin's glands, and hydrocele of the canal of Nuck.

**Mucous Cysts** are found principally on the inner surface of the labia minora, and seldom attain a large size. They should be opened, and if they recur the cyst-wall should be dissected out.

**Sebaceous Cysts** resemble similar cysts in other regions. The small black spot marking the orifice of the duct will generally give the clue to their origin. They are liable to



be infected by vaginal discharges, and then usually suppurate. An abscess in a sebaceous gland requires free incision; an enlarged gland requires excision.

**Cysts of Bartholin's Gland** usually arise in the duct, but in chronic cases the gland may enlarge. Sometimes occlusion is not complete; the duct may then become dilated for a day or two, and this is followed by a sudden discharge of mucous fluid. In the case of complete retention the fluid may be watery or viscid; occasionally it resembles the contents of a ranula.

*Symptoms and Course.*—The patient complains chiefly of discomfort, sometimes of pain. The inconvenience may be felt in walking or sitting, whilst the pain may be a constant aching due to distension, or take the form of dyspareunia.

An inflammatory condition may be present from the first as a complication of gonorrhœa. Pus is then found exuding in small drops from the duct orifice; later this tends to close up, and an abscess results.

A simple cyst is fairly well differentiated from the surrounding structures; but if suppuration sets in, the cyst-walls become thickened and infiltrated, and the distinction between them and surrounding tissues is obscure. When an intermitting cyst is examined during its stages of collapse, the gland itself may be felt, between the finger in the vagina and the thumb outside, as a little mass the size of a pea or small bean.

*Diagnosis.*—The cyst presents a characteristic pear-shaped swelling, occupying the most dependent part of the labium majus, the narrow end of the swelling being uppermost. It is only when it gets large that it involves the upper part of the labium. In chronic cases the orifice is readily seen as a small pit in the angle between the hymen and the labium minus (Fig. 11). The lesser lip is not affected when the cyst is small; when large, it is stretched and flattened over the swelling. Suppuration is readily recognized by the much greater pain, the redness of the skin and mucous membrane, and the heat of the part.

Three conditions require to be differentiated from a Bartholinian cyst or abscess—

(a) *Hæmatoma.*—The swelling is more uniform through the



labium majus; it feels more doughy, and there is commonly a history of injury or recent parturition. A hæmatoma may affect the lesser lip alone.

(b) *Inguinal Hernia*.—This appears at the upper end of the greater lip, and tends to disappear when the patient is lying down; there is an impulse on coughing, and it may be resonant. In any case, there is not a free flattened space between the swelling and the inguinal opening.

(c) *Hydrocele of the Canal of Nuck*.—In this case the swelling occupies the upper or middle part of the labium, the lower end being free.

*Treatment*.—The only satisfactory way of dealing with a Bartholinian cyst is to dissect it out.

**Hydrocele of the Canal of Nuck**.—This condition is analogous to encysted hydrocele of the cord in the male, and is similarly produced. That is, the funicular pouch of peritoneum, instead of becoming obliterated, remains patulous, although its abdominal end is sealed, and the resulting cavity becomes distended with fluid. The swelling occupies much the same position as an inguinal hernia. There is no impulse on straining or coughing, nor is the swelling affected by the position of the patient. It is often difficult, and sometimes impossible, to distinguish between hydrocele of the canal of Nuck and hydrocele of an old hernial sac. This is a matter of trifling importance, for the treatment is the same in both conditions.

*Treatment*.—When a hydrocele of the canal of Nuck causes inconvenience, it should be removed by operation.

## TUMOURS AND CYSTS OF THE VAGINA

The vagina is rarely the seat of tumours; they belong to four genera: lipoma, myoma, sarcoma, and carcinoma. Lipoma and myoma are very rare.

**Sarcoma**.—Examples of this genus occur in adults; it appears that they are rare before forty years of age. They are sessile, ulcerate early, and bleeding is the first sign which attracts attention (Gow). In children they have a tendency to be polypoid. They cause death by interfering with the bladder or rectum (D'Arcy Power).



**Carcinoma.**—This disease may arise in any part of the vaginal mucous membrane, but it is more liable to begin at the junction of the vulva and vagina, or on that portion which is reflected over the cervix uteri. When carcinoma attacks the vulvar end of the vagina, it is very apt to begin near the urethral orifice. In such cases the inguinal lymph-glands are early infected; the ulceration quickly involves and perforates the vesico-vaginal septum, and leads to a fistula. When the posterior wall is attacked, ulceration leads to a recto-vaginal fistula.

It is a very extraordinary thing that the early stages of this fatal disease cause so very little inconvenience that patients rarely seek advice until the disease has long passed the limits of justifiable surgery.

**Cysts.**—The vagina is liable to the following species: mucous, Gartnerian, and peri-urethral cysts, and echinococcus colonies.

**Mucous Cysts.**—These are small and resemble retention cysts, but their nature is doubtful. Some observers consider them as retention cysts of vaginal glands; others deny the existence of such glands, and explain these cysts as due to obliteration of the mouths of crypts in the vaginal wall. By others, again, they are regarded as due to dilatation of lymphatic spaces, and are described as associated with gaseous bullæ in the condition called emphysematous vaginitis.

They occur not infrequently in cases of vaginitis and endometritis, resembling superficially the Nabothian follicles seen on the cervix.

**Gartnerian Cysts.**—The pathology of these cysts is described in connection with the parovarium (p. 348).

Cysts arising in the terminal segment of this duct project as soft fluctuating swellings in the upper part of the vagina; sometimes two distinct cysts arise in connection with one duct. They vary greatly in size; some do not measure more than two centimetres in diameter, others may exceed these dimensions three or four times. The inner wall of the cysts is lined with either cubical or stratified epithelium.

**Peri-urethral Cysts.**—Small cysts are sometimes found in the anterior vaginal wall near the urethra; sometimes



they bulge into the urethra. Skene is of opinion that these cysts arise in the ducts, which he detected and described, in the floor of the urethra near the meatus.

**Echinococcus Colonies** (*Hydatids*).—These are very rare, and are generally due to echinococcus colonies in the mesometrium burrowing in the recto-vaginal septum.

*Treatment*.—This is the same as that employed for tumours and cysts in other regions of the body—namely, removal—but in the case of sarcoma and carcinoma it is rare for the disease to come under observation before it has so deeply involved the rectal and vesical walls that interference with it only anticipates the complications which ensue in the natural course of the disease—rectal and vesical fistulæ. Cysts, when small, are readily enucleated, and the proceeding is safe if the operator keeps close to the cyst-wall. In the case of large Gartnerian cysts which burrow from the vagina into the mesometrium, unless great care is exercised the ureter may easily be damaged, and a troublesome fistula result. When there is difficulty or anxiety in enucleating vaginal cysts, the surgeon may freely incise them, evacuate the contents, and stuff the cavity with gauze; the cyst is then slowly obliterated by granulation. This method, however, though safe, is rarely certain, for the rent in the wall may close and the cyst reform. Enucleation of the whole of the cyst-wall is the only sure method of treatment.



## CHAPTER XXVI

### TUMOURS OF THE UTERUS: ADENOMA OF THE UTERUS

**Adenomatous Disease** (formerly called *Erosion*) of the **Cervical Endometrium**.—The mucous membrane covering the neck of the uterus consists of two portions: one lines the cervical canal—the *cervical endometrium*; the other covers the vaginal portion of the cervix and belongs to the vagina. The two portions meet at the external os. “The mucous membrane covering the vaginal aspect of the cervix is really a cup of stratified epithelium, resembling a tailor’s thimble, which fits on the lower end of the uterus.” It contains a few simple glandular crypts. The cervical endometrium in its lower segment is beset with racemose glands and the ovules of Naboth. The glands of the cervical endometrium are very apt to enlarge and multiply, forming a soft, velvety, pink mass which extends beyond the normal limit of the external os and invades the tissue of the vaginal portion of the cervix, forming an areola, in colour like a ripe strawberry, minutely dotted with spots of a brighter pink, and usually covered with tenacious mucus. The condition was formerly erroneously called ulceration (Fig. 80, A).

This pink tissue is composed of glandular acini lined with columnar epithelium. In cases of bilateral laceration of the cervix the whole of the exposed surface is generally tumid with overgrown glandular tissue.

Occasionally the glandular overgrowth projects as a pedunculated process from the mouth of the uterus, and is then termed a mucous polypus; two or more may be present. They are dotted with minute pores indicating the orifices of the glands, and are soft. They usually spring from the endometrium near the os, which is generally



patulous when these pedunculated adenomatous bodies are present (Fig. 81). Histologically, they are composed of an axis of fibrous and muscular tissue covered with mucous membrane. As long as the bodies remain in the cervical canal, the mucous membrane covering them possesses a single layer of columnar epithelium, but when the polypus projects into the vagina the mucous membrane of the protruding portion loses its glands, or they become mere crypts, and the epithelium becomes stratified.

In some instances the pink tissue is small in quantity and is dotted with numerous cystic bodies of the size of

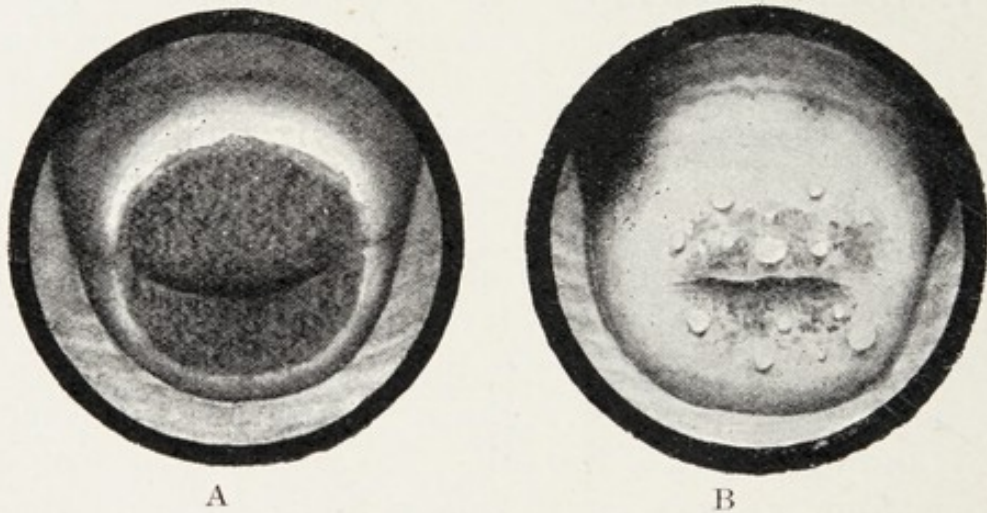


FIG. 80.—A, ADENOMATOUS DISEASE OF THE CERVIX. B, CERVIX WITH DISTENDED FOLLICLES.

coriander seeds; these are enlarged ovules of Naboth, and are probably due to distension of the acini of the cervical glands. When the adenomatous surface is extensive and the follicles are numerous, the white dots on a pink ground produce a characteristic appearance (Fig. 80, B).

In very rare cases a group of follicles will hang as a grape-like mass in the vagina. These may be called **racemose adenomas**.

*Causes.*—Nothing is known concerning the cause of this affection. It occurs in virgins and in mothers; extensive adenomatous patches are often associated with lacerations of the cervix, and the disease is more common in women who have had children than in nulliparæ.

*Symptoms.*—Adenomatous disease of the cervix gives rise



to vaginal discharge, indefinite sacral pain, and general weakness.

The discharge is commonly known as "the whites"; technically it is termed *leucorrhœa*. The normal secretion is clear and viscid like the white of an egg, but in marked cases of adenomatous disease it may be yellow or green. Pain usually assumes the form of backache; often it is referred to the submammary region, and occasionally to the perineum. Pruritus is sometimes present. The continual discharge weakens the patient and leads to many subjective symptoms, such as nausea, headache, giddiness, sleeplessness, and similar disturbances, often attributed to hysteria and vaguely classed as neuroses.

*Diagnosis.*—On inspecting the vulva, traces of the discharge are usually visible externally. On examining with the finger, the cervix may feel enlarged and softer than usual; the uterus may be bulky. On introducing a speculum, tenacious secretion will be seen covering the exposed surface or issuing from the cervical canal. This is removed by a cotton-wool dab, and the presence, extent, and character of the adenomatous tissue determined, as well as the existence and degree of any co-existing laceration. The condition most likely to be confounded with this disease is carcinoma of the cervix.

*Treatment.*—When the disease is of small extent it is easily dealt with in the following manner: The parts are well exposed by means of a Fergusson's speculum, and the mucus removed by means of cotton-wool dabs on sponge-holders or speculum-forceps. Iodized phenol (iodine 1 part, carbolic acid 4 parts) is then freely applied to the diseased surface by means of cotton-wool wound on a uterine probe; it is useful to apply some of the caustic for a short distance up the cervical canal by means of the probe. If there be

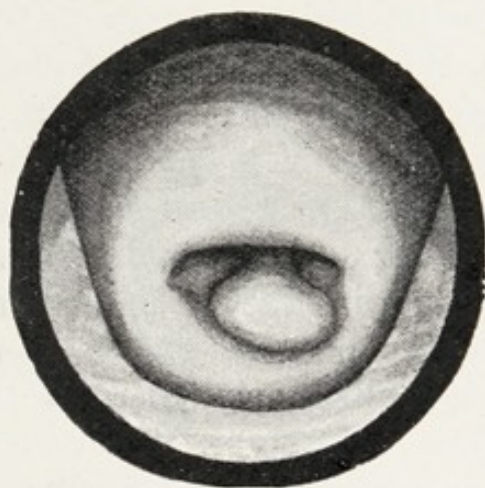


FIG. 81.—MUCOUS POLYPUS OF THE CERVICAL ENDOMETRIUM.



any conspicuous follicles they should be punctured. A tampon is then introduced, and the patient directed to take it out next morning, and then to douche the vagina daily, to keep the bowels open by means of simple purges, and to abstain from alcohol. When the disease is extensive, it may require several applications at intervals of four or five days; but in severe cases better results are obtained by placing the patient under ether and thoroughly scraping away the adenomatous tissue with a curette, taking care to deal with the whole length of the cervical canal, and then applying iodized phenol, or any suitable caustic to the denuded surface. Radical treatment of this kind entails rest in bed for a week or ten days.

When adenomatous disease is associated with bilateral laceration and is clearly a source of suffering, the performance of trachelorrhaphy is indicated.

**Adenomatous Disease of the Corporeal Endometrium.**—The endometrium lining the cavity of the uterus is beset with tubular glands, which, like the glands of the cervical endometrium, may undergo local enlargement and form sessile or pedunculated processes known as mucous polypi. They possess a covering of columnar epithelium and a framework of connective tissue containing glands identical with the tubular glands of the endometrium. Sometimes there is a general adenomatous condition of the endometrium without any definite polypoidal formation.

This disease has also been described as villous or polypoid endometritis; or, when menorrhagia and metrorrhagia are prominent symptoms, as hæmorrhagic endometritis.

*Symptoms.*—These consist of a uterine discharge, which may be mucoid, muco-purulent, or blood-stained. In many cases there is a distinct history of menorrhagia.

*Diagnosis.*—On examination the uterus is usually enlarged, and the introduction of the sound is followed by a slight loss of blood.

In many cases the only way of actually determining the nature of the case is to anæsthetize the patient, dilate the cervical canal, and explore the endometrium with the finger. Should any polypi be detected, they are easily detached by means of the curette.



*Treatment.*—This turns upon the diagnosis, and is usually carried out at the time the uterus is dilated; it consists in completely removing the polypus or polypi, and curetting the whole endometrium and applying iodized phenol.

**Villous Tumour (Papilloma) of the Endometrium.**

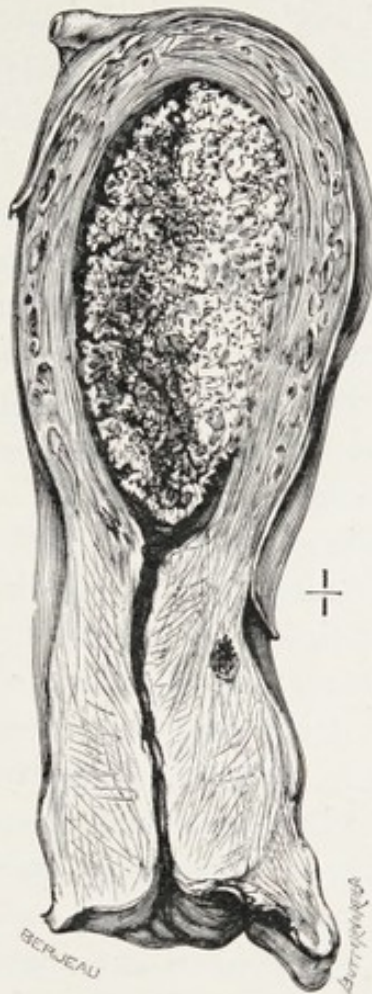


FIG. 82.—A UTERUS IN SAGITTAL SECTION.

The cavity is dilated and occupied by a villous tumour growing from the posterior wall. From a multipara, aged eighty-four years. She was alive and in good health three years after the operation.

Tumours occur in the uterus identical in structure with the well-known villous tumour of the bladder. The villi have a delicate axis of vascular connective tissue, covered with a single layer of columnar epithelium (Fig. 82). The clinical signs are irregular hæmorrhages. The disease simulates cancer of the body of the uterus. It is very rare.



## CHAPTER XXVII

### FIBROSIS UTERI

UNDER this term one of us (Bland-Sutton) described in 1899 a morbid condition of the uterus, of which the leading clinical feature is uncontrollable menorrhagia. The regular abundant loss of blood is not merely uncontrollable by drugs, prolonged rest in bed, and local applications, but it is also resistant to curetting, repeated curettings, and local applications of electricity.

This disease, which is chiefly met with in multiparæ between the thirty-fifth and forty-fifth years of life, is associated with striking structural changes in the uterus. The organ may be larger than normal; in some exceptional examples the walls of the uterus were six centimetres thick, and extremely tough. When a fibrotic uterus is bisected, the divided arteries in the uterine tissue stand out prominently, exposing their thickened walls. As a rule, the endometrium is thin and atrophic; occasionally it is thick and spongy, but in the typical cases it is thin, so that when these fibrotic uteri are submitted to curetting the curette makes a harsh, scraping sound on the uterine wall, and brings very little tissue away.

On microscopic examination the muscular tissue of the uterus is seen to be replaced by an abnormal growth of fibrous tissue. The abnormal thickening of the uterine arteries is due to an increase of the outer and middle coats, and is quite different in character to those changes in the walls of arteries affected with what is known as atheroma and arterio-sclerosis. The arterial changes are similar to those presented by the uterine arteries several years after the normal menopause. The replacement of the normal tissue of the uterus by dense fibrous tissue is, in advanced



stages of the disease, so marked that when the uterus is exposed in the course of an operation it is buff-coloured instead of red, the normal colour of the uterus in a healthy woman of forty-five years. As a matter of fact, the essential anatomical feature of the disease is the replacement of the unstriated muscle fibres of the uterus with dense, tough, fibrous tissue, and this change involves the endometrium, and the branches of the uterine artery as well as its main trunk. All who have devoted close attention to the microscopic characters of these fibrotic uteri are unanimous concerning the histological changes in the uterine tissues, and this is reflected in the terms under which the condition has been described—for example, *Arterio-sclerosis of the uterus* (Palmer Findley), *Chronic metritis and arterio-sclerotic uteri* (Gardner and Goodall). We have had a number of fibrotic uteri submitted to careful bacteriological examination, but in every instance with negative results. In our early observations on this disease we thought that syphilis might be responsible for the changes, for the condition of the uterine walls, in well-marked examples, is similar to the fibrotic changes which occur in the walls of the cardiac ventricles as a sequel of this infection. On the whole it seems probable that the fibrotic changes in the uterus are a remote consequence of septic endometritis. We know that slow chronic inflammatory (septic) changes in the Fallopian tubes gradually convert them into tough fibrous structureless cords; similar degenerative changes also occur in the infective diseases of the mucous membrane of the urethra of the male, producing stricture.

The greatest difficulty met with in the interpretation of the uterine changes in fibrotic uteri arises from the fact that under normal conditions the uterus becomes slowly converted into a fibrous organ, and its arteries suffer obliteration by overgrowth of the middle and outer coats after the establishment of the menopause. In fibrosis uteri, however, these changes are premature, inasmuch as they precede the menopause. On the whole, the results of our observation on the tissue changes which take place in uteri known to have been infected with the gonococcus support the view that premature fibrotic changes in the uterus are, in some instances at



least, the end-results of septic endometritis, sometimes due to puerperal infection, and sometimes the sequel of gonorrhœa. There are cases, however, in which such an explanation fails.

The clinical signs of this disease are uncontrollable menorrhagia and profound anæmia, associated with enlargement of the uterus. In severe cases the menstrual periods last ten, twelve, or even sixteen days, so that some of these women are scarcely free from loss for more than two weeks. Occasionally the menorrhagia assumes the form of an almost constant exudation of a thin sanguineous fluid. The uterus is enlarged, and in some women it is so big as to reach above the brim of the pelvis. Occasionally the intense hardness of the cervix and adjacent parts of the body of the uterus is a striking feature revealed to digital examination. There are three conditions simulated by these fibrotic uteri: (a) A small submucous fibroid (polypus), (b) the interesting condition known as diffuse adenomyoma of the uterus (p. 272), and (c) cancer of the corporeal endometrium. In regard to the last disease it is of interest to mention that in several instances a fibrotic uterus has been removed under the belief that it was cancerous.

*Treatment.*—The only treatment of any avail in dealing with fibrosis uteri in severe cases is hysterectomy. Bilateral oöphorectomy is unavailing. When the uterus is only moderately enlarged and the vagina large, vaginal hysterectomy may be performed; otherwise abdominal hysterectomy is preferable, with conservation of one ovary when this gland and the corresponding tube are healthy. It is a matter of no moment whether total or subtotal hysterectomy be performed; but if the latter operation be selected, the surgeon must take every care to remove the whole of what is known as the *menstrual area* of the uterus. This includes all that portion of the endometrium which bleeds during menstruation. This area is precisely that which is concerned in the formation of the decidua, and is delimited in Fig. 73. In order to show the importance of ablating the whole of this area, it may be mentioned that cases have been observed in which the upper third of the cervix uteri had been allowed to remain after removal of the body of the uterus, and the



patients had such severe recurrent monthly losses that it became necessary to exsect the cervical stump. In spite of such experience a few gynæcologists advocate the removal of a cuneiform segment of the uterine cavity in order to reduce the endometrium. The object of this operation is to limit the area of tissue concerned in menstruation. Utriculo-plasty, as this operation is called, has been a miserable failure: the bleeding recurs so severely that it has been necessary to remove the uterus. A more serious condemnation is the danger of missing a small focus of cancer in the endometrium. A patient supposed to be suffering from fibrosis uteri was submitted to utriculo-plasty. The bleeding recurred, and a few months later the uterus was removed: the endometrium contained an extensive deposit of cancer. The results of hysterectomy for this disease of the uterus are admirable. The remote results of the operation are remarkably good.

Since attention was drawn to *fibrosis uteri* in 1899, several excellent contributions have been made to the literature concerning it. These are summarized in an admirable manner by Drs. William Gardner and James R. Goodall in the *British Medical Journal*, 1906, vol. ii., p. 1176.



## CHAPTER XXVIII

### ADENOMYOMA OF THE UTERUS

THIS term is applied to a pathological condition of the uterus which, in its clinical features, resembles very strongly those associated with a submucous fibroid, and with the disease known as fibrosis uteri. The changes which diffuse adenomyoma produces in the walls of the uterus when the disease is localized to a particular area resemble very closely those presented by a submucous fibroid, but it lacks the feature which is so typical of a fibroid—namely, encapsulation. When the disease involves the whole of the uterus, the uniformly thickened walls present a striking appearance (Fig. 83). There are certain exceptional cases in which it simulates carcinoma of the corporeal endometrium.

Adenomyoma of the uterus usually occurs between the twentieth and fiftieth years; it causes obvious enlargement of the uterus, and leads to prolonged profuse and often painful menstruation. When the uterus is removed and divided longitudinally, its walls will be found greatly thickened, and in well-marked cases of the disease they may exceed five centimetres in width. This increase is due to the formation of new tissue between the outer wall of the uterus and the superficial layer of the endometrium. When the disease affects the uterus uniformly, this organ, though enlarged, will maintain a normal contour. Occasionally only one wall is implicated, and it will be bulged as though it contained an interstitial or a submucous fibroid. In rare instances the adenomatous change will be so restricted that the new tissue forms a prominence on the mucous or the peritoneal surface of the uterus, and resembles a submucous or subserous fibroid. In many cases the common fibroid is associated with diffuse adenomyoma of the uterus.

The new tissue consists mainly of plain muscular tissue,



which, instead of forming vortices, as is so common in the hard fibroid, is disposed in an irregular manner, and the spaces between the bundles of muscle tissue are filled with the peculiar stroma of the uterine mucosa, and contain gland tubules lined with columnar epithelium, and of the same type as the normal tubular glands of the endometrium. The glandular elements are irregularly distributed in the



FIG. 83.—UTERUS IN SAGITTAL SECTION, SHOWING ADENOMYOMATOUS DISEASE OF THE ENDOMETRIUM.

Removed from a spinster, forty-three years of age, on account of rebellious menorrhagia.

adventitious tissue, and can be detected up to the limits of the thin muscular stratum underlying the peritoneal coat of the uterus. The amount of the glandular element varies widely in different specimens.

In some instances the glands become dilated in the cystic spaces, and these are occasionally large enough to be obvious to the naked eye on the cut surface of the mass (Fig. 84). In rare instances this diffuse adenomatous tissue becomes carcinomatous.



This disease has been particularly studied by Cullen, and he admirably summarized its leading features in the following terms : “ It is diffuse in character, situated in the middle layer of the uterine wall, and is dependent on the uterine mucosa for its glandular elements.” Its pathological peculiarities are well expressed in its name—*adenomyoma uteri diffusum benignum*.

Clinically the disease is liable to be mistaken for sub-



FIG. 84.—A UTERUS IN SAGITTAL SECTION, SHOWING DIFFUSE ADENOMYOMA, FROM A SPINSTER THIRTY-TWO YEARS OF AGE.

The gland spaces were cystic, and filled with gelatinous material.

mucous or interstitial fibroids, for cancer of the body of the uterus, and for fibrosis uteri. Even after operation it requires the use of the microscope for identifying it, and some rare cases of primary tuberculosis of the coporeal endometrium simulate its clinical and naked-eye features very closely. Some cases have been reported in which adenomyomatous uteri have become infected with tubercle (see Fig. 58). This lends probability to the view that the epithelial overgrowth, which is the characteristic histological



feature of adenomyoma, depends on the action of micro-organisms.

As the presence of diffuse adenomyoma in the uterus can only be proved on a microscopical examination, and the signs and symptoms connected with it are common to some other diseases of the uterus, it is not to be expected that the condition admits of accurate diagnosis. Nevertheless, the existence of this change can be suspected in some of the patients, and in exceptional instances diffuse adenomyoma of the uterus has been accurately diagnosed.

Although we know nothing concerning the cause of the change, it is significant that a diffuse adenomyoma is associated frequently with chronic infective lesions of the Fallopian tubes. It occurs in spinsters as well as in women who have borne children.

*Treatment.*—When the patient's health is undermined, from the prolonged and excessive bleeding, the uterus should be removed. Vaginal as well as abdominal hysterectomy, with conservation of one ovary, gives admirable results, immediate and remote, in this disease. In many cases in which the uterus has been removed for so-called adeno-carcinoma and the patients remained free from recurrence, the disease was probably adenomyoma.



## CHAPTER XXIX

### UTERINE FIBROIDS

THE tumours of the uterus known as fibroids, myomas, or fibro-myomas, are extremely common, and on account of the difficulties and dangers which arise from them, directly and indirectly, their pathological and clinical aspects have been studied with very great care. Before minutely describing the structural peculiarities of fibroids, it will be of some advantage to study their topography and gross anatomy. Though fibroids arise in every part of the uterus, including the round ligament, they are more common in the body of the organ than in its neck. Those which arise in the cervix offer peculiar features, and demand separate consideration. Fibroids occur in malformed uteri, and a bifid uterus is more liable to fibroids than one of normal shape.

**Fibroids of the Body of the Uterus.**—These tumours arise in the body of the uterus in three situations: (1) In the true uterine tissue; such are said to be intramural or interstitial. (2) In the endometrium; these are called submucous. (3) In the subperitoneal layer; these are termed subserous. Fibroids may arise in, and remain confined to, any one of these layers, or they may occur in all three situations in the same individual, and there is no limit to their number (Fig. 85).

1. *Intramural Fibroids.*—These, when small, resemble knots in wood; they possess distinct capsules, and are hard to the touch. The bundles of muscle fibres are usually interwoven in such a manner that they present on section a peculiar whorled arrangement. There is no limit to their growth, and they sometimes attain huge proportions. An intramural fibroid in addition to its capsule is completely invested by the muscular tissue of the uterine wall. A



common condition is the presence of a fibroid in the posterior and another in the anterior wall of the uterus (Fig. 93 p. 291). The slow simultaneous growth of twin fibroids of this kind leads to misplacement of the uterus in its efforts to find accommodation in the pelvis. When two fibroids occupy the uterus in this way the fibroid in the posterior wall will drag the uterus backwards, and as it grows will gradually lead to impaction. The tumour in the anterior wall forms

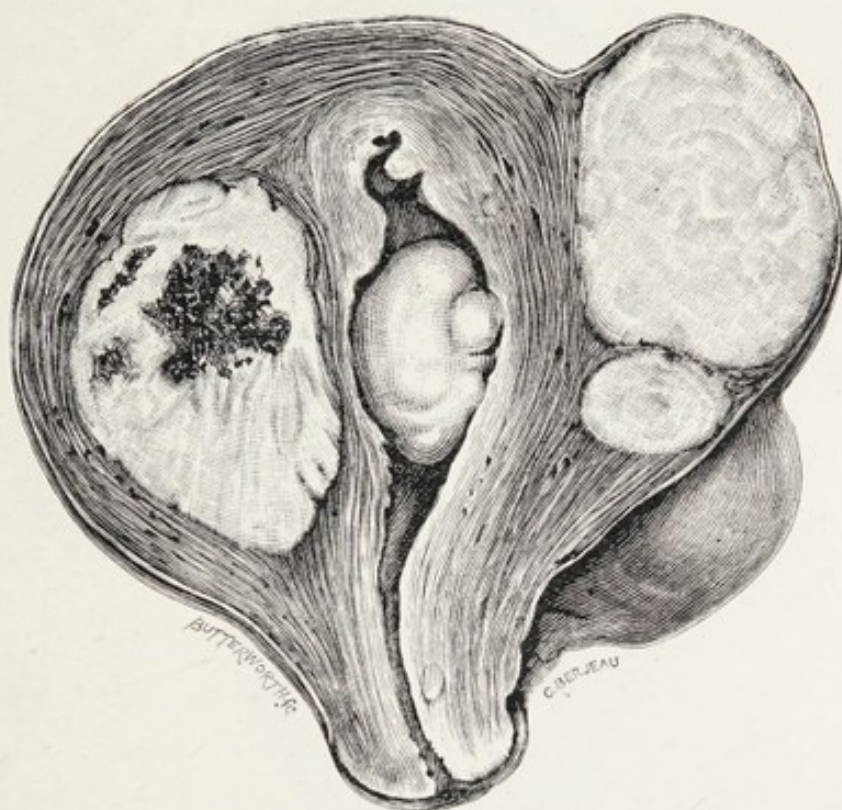


FIG. 85.—UTERUS IN SAGITTAL SECTION, SHOWING SUBMUCOUS, INTRA-MURAL AND SUBSEROUS FIBROIDS.

a prominence in the hypogastrium. The tumour will continue to increase in size until the available space in the pelvis is utilized and the bladder interfered with, then retention of urine leads to the discovery of the tumour. A dumb-bell-shaped uterus with twin fibroids (see Fig. 93) is sometimes discovered in a dramatic fashion, when it becomes pregnant (see Chap. XXXI). Intramural fibroids are very liable to red degeneration.

Sometimes a fibroid confined to one wall of the uterus will appear simple, but on section it will be found to consist of two or more tumours, each possessing its own capsule



(conglomerate fibroid). A large solitary intramural fibroid sometimes occupies the fundus of the uterus (Fig. 86). Such a tumour is liable to get hitched under the sacral promontory and lead to retention of urine.

2. *Submucous Fibroids*.—These arise in the deep layers of the endometrium, and, as soon as they attain an appreciable size, project into the uterine cavity. Many of them

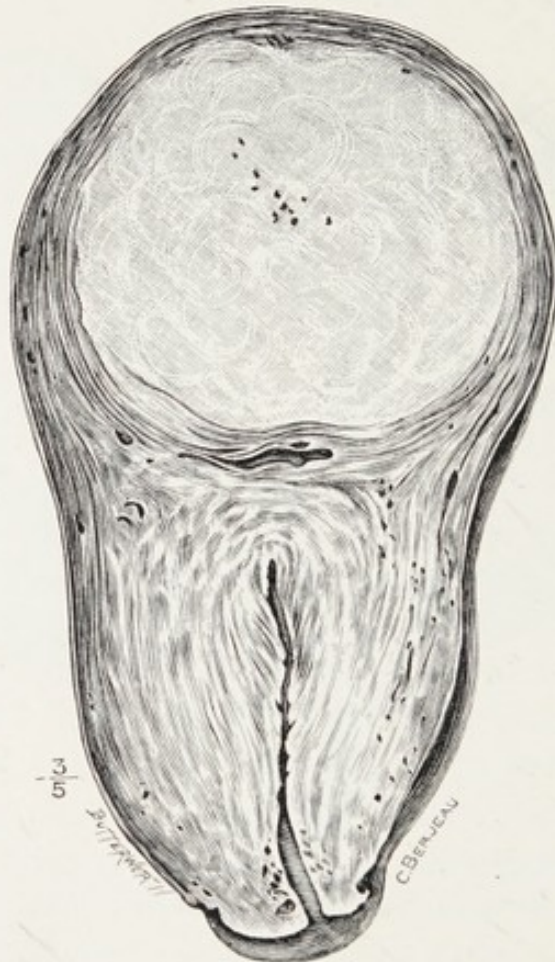


FIG. 86.—UTERUS IN SECTION, SHOWING A GLOBULAR INTRAMURAL FIBROID IN ITS FUNDUS.

From a nulliparous woman aged forty-five in whom it became frequently impacted and caused retention of urine.

remain sessile, but the majority tend to become stalked, and are then termed polypi. Whether sessile or stalked, they are invested by endometrium. A fibroid in the wall of the uterus or projecting into its cavity leads to great thickening of the uterine wall, accompanied by increased vascularity, which is often manifested by menorrhagia and intermenstrual hæmorrhage—metrorrhagia.



The pedicle of a submucous fibroid may be long enough to allow the tumour to be extruded into the vagina, and it may project beyond the vulva. When this happens an interesting change takes place in the character of the epithelium of the extruded part. So long as the tumour remains within the cavity of the uterus, the epithelium covering it is indistinguishable from that lining the cavity of the uterus. When the tumour enters the vagina the cells covering the extruded portion become stratified on all those portions subject to pressure, but the epithelium in the glandular recesses remains columnar and ciliated.

The extrusion of a fibroid through the cervical outlet sometimes ends in its complete detachment; this is of course curative. More often the extrusion leads to secondary changes inimical to life. When a stalked fibroid escapes from the cervical canal, its pedicle is firmly grasped by the cervix; this interferes with the circulation in the tumour, leading to œdema and gangrene of the fibroid; the dead mass becomes infected with putrefactive organisms, decomposes, and sets up septic changes in the uterus, leading to sloughing of the endometrium, salpingitis, peritonitis, and death.

3. *Subserous Fibroids*.—Like the submucous variety, these tend to become pedunculated. As many as fifteen or twenty of these bodies may be counted on the peritoneal surface of the uterus, varying in size from a pea to a walnut. The small tumours rarely cause inconvenience.

Any of the varieties of fibroids may occur together in the same uterus; indeed, it is usual to find the subserous and intramural varieties associated. Intramural fibroids are often solitary, but it is by no means rare to find a moderately large tumour in the uterine wall accompanied by a small submucous fibroid, and the latter is far more frequently the source of dangerous bleeding than its large companion. Pedunculated as well as sessile subserous fibroids may attain large dimensions; some we have removed have been as big as a football.

**Fibroids of the Neck (Cervix) of the Uterus.**  
Two topographical varieties of fibroids occur in the neck of the uterus. Those which invade the cervical canal are



called intracervical or submucous (Fig. 87); the fibroids which grow from the periphery of the cervix and do not invade the canal, but burrow under the peritoneum on the anterior or the posterior aspect of the uterus, are known as subserous cervical fibroids (Figs. 88 and 89).

A submucous cervical fibroid is ovoid, and the uterus perched upon its summit is sometimes carried out of the pelvis, and may reach as high as the navel. We have removed a large cervical fibroid of this kind which weighed

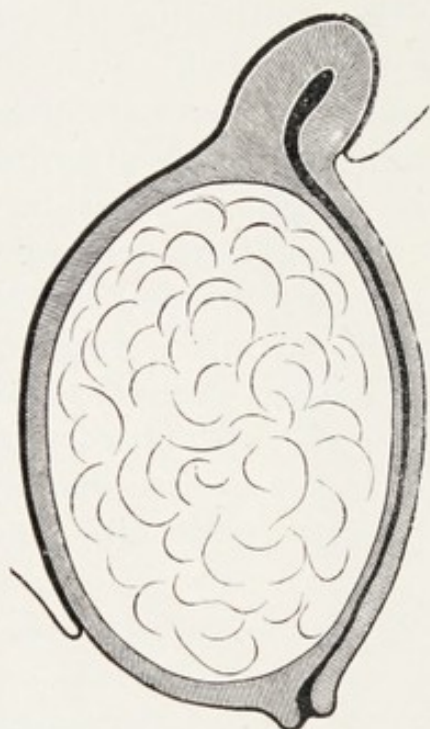


FIG. 87.—A DIAGRAM TO SHOW THE RELATION OF AN INTRACERVICAL FIBROID TO THE CERVICAL CANAL.



FIG. 88.—DIAGRAM OF A FIBROID GROWING FROM THE POSTERIOR WALL OF THE CERVIX TO SHOW ITS RELATIONSHIP TO THE PERITONEUM.

thirteen pounds. The topography of cervix fibroids is best displayed when the parts are sectioned, for when large enough to fill the true pelvis they display a very characteristic elliptic outline.

The submucous variety of cervical fibroids is surrounded by the expanded and attenuated walls of the cervix.

The ovoid shape of cervix fibroids is determined by the osseous boundaries of the true pelvis. In a woman with an average pelvis, the pelvic diameters at the level of the middle of the cervix measure with the soft parts in position about 10 centimetres (4 inches); hence a cervical fibroid with this



diameter, whether intracervical or subserous, will completely occupy the true pelvis and exert injurious pressure on the ureters, but more especially on the urethra.

It is difficult to state the relative proportions which fibroids in the cervix bear to those in the body of the uterus. Our own observations fix the proportion of cervix fibroids at five per cent.

**Latent Fibroids.**—If a number of uteri be examined from women between the twenty-fifth and fiftieth years of life by the simple means of sectioning them with a knife, in a large proportion of them a number of small rounded bodies resembling knots in wood will appear, their white-

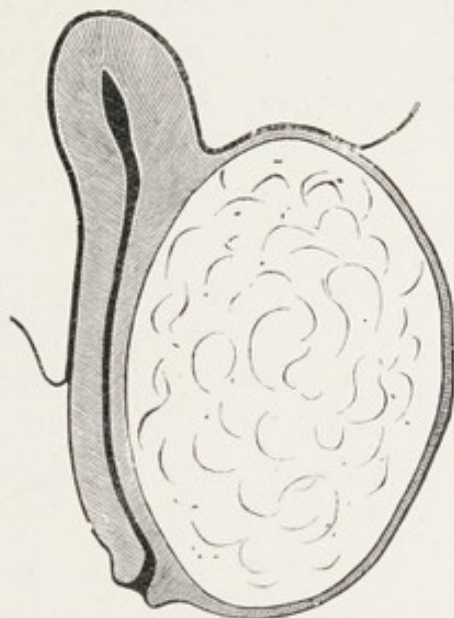


FIG. 89.—DIAGRAM OF A FIBROID GROWING FROM THE ANTERIOR ASPECT OF THE CERVIX TO SHOW ITS RELATIONSHIP TO THE PERITONEUM AS IT PASSES FROM THE ANTERIOR WALL OF THE UTERUS TO THE BLADDER.

ness being in strong contrast with the redness of the surrounding muscle tissue. These discrete bodies, in many instances no larger than mustard-seed, are fibroids, and are in histologic structure identical with the fully grown tumours. A uterus may contain ten or more of these small bodies without the least distortion of contour or alteration in its size. These seedling fibroids may never cause trouble, may never pass beyond the stage, and often calcify in old age, but they may at any time grow and become formidable tumours.

A careful consideration of the great frequency of seedling



fibroids, and their multiplicity when compared with the number of fibroids which attain a size sufficient to render them clinically appreciable, makes it undeniable that a large proportion of them remain latent. They may be compared to latent buds in trees (knors) and plants, on the ground that they may remain quiescent a number of years, and then assume active growth without any known cause.

Latent fibroids have an important practical bearing; it is not an uncommon experience for an operator to dilate the uterine canal and abstract two or more submucous fibroids. However carefully the procedure may be conducted, and no matter the thoroughness with which the walls of the cavity are examined for minute fibroids, no honest assurance can be given to the patient that other fibroids will not grow.

**The Structure and Secondary Changes of Fibroids.**—Uterine fibroids differ much in texture; some are as hard as cartilage, others as soft and succulent as an orange; between these extremes every degree of hardness or softness occurs. Hard tumours are yellowish-white on section; soft specimens approach the normal colour of the uterus. As a rule, soft fibroids grow rapidly and are very vascular; the softest tumours are those which have undergone secondary changes (myxomatous degeneration). It is by no means uncommon to find a uterus beset with fibroids, some of which are very hard; one or more may be calcified, others are as soft as the uterine wall, whilst one or more may be diffuent in the centre, and perhaps the biggest one among them is necrotic or even gangrenous. Indeed, the only structural feature that such fibroids have in common is a well-marked capsule of fibrous tissue, which completely isolates the tumour from the surrounding uterine tissue. Even in completely calcified fibroids a thin capsule can be demonstrated, and occasionally the only solid representative of a fibroid is the capsule.

The minute structure of a fibroid is best studied in small, moderately soft specimens or in the seedling tumours (Fig. 90).

Concerning the cause of fibroids, we are in absolute ignorance, and it is strange that they should arise so frequently in the uterus, yet be so rare in other hollow muscles, such as



the bladder, œsophagus, stomach, intestine, and heart. A closer study of the facts only leaves us to wonder why they should be so common in the body and neck of the uterus, whilst they are unknown in the Fallopian tubes. But, strangest of all, these tumours are almost peculiar to women (and though so common in white races, are more frequent

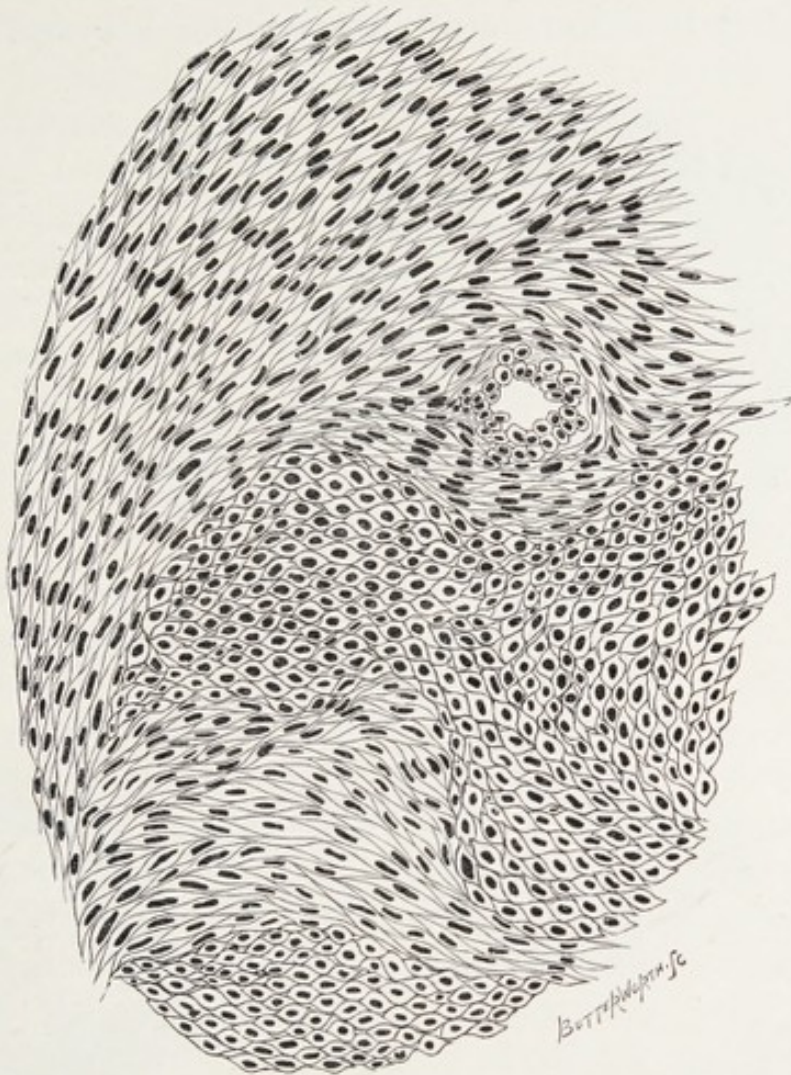


FIG. 90.—THE MINUTE STRUCTURE OF A UTERINE FIBROID.

The circular cells are spindles cut at right angles. The figure represents a complete section through the equator of a seedling fibroid the size of a mustard-seed.

in the black women of North America), for very few cases have been described by reliable observers in the uteri of lower mammals, either domesticated or wild.

Although much careful investigation has been devoted to the minute structure of fibroids, no satisfactory explanation has been advanced to explain their origin.



Fibroids are often associated with the disease of the endometrium known as diffuse adenomyoma (*see* p. 272).

**Secondary Changes in Fibroids.**—The chief are: mucoid degeneration; red degeneration; calcification and septic infection.

*Mucoid Degeneration.*—Large fibroids are especially prone to soften, whereby large tracts of tissue are converted into mucin, and the tumour often resembles a cyst (Fig. 91).



FIG. 91.—A SESSILE SUBSEROUS UTERINE FIBROID WHICH HAS UNDERGONE EXTENSIVE MUCOID DEGENERATION.

From a sterile married woman thirty-seven years of age.

The actual conversion of the tumour substance is preceded by œdema of the connective tissue, and the cells assume the spider-like shape of myxomatous tissue; then it becomes as structureless as vitreous humour. Fibroids liquefied in this way are often referred to as fibrocysts. Pregnancy



exerts some influence in causing fibroids to degenerate in this manner (*see* p. 297).

It is a significant fact that gelatinous fibroids are most frequent in young women, and in some of these cases it is quite open to question whether this is a degenerate change. It is also important that some of these myxomatous fibroids recur after enucleation, and are thus locally malignant, a clinical fact which serves to link fibroids with the less malignant varieties of the spindle-celled sarcoma.

*Fatty Metamorphosis.*—This change is rarer than the preceding. A localized collection of fat has been found in the centre of a pedunculated submucous fibroid, and occasionally a fibroid consists almost entirely of fat—lipomatous fibroids.

*Calcification.*—Old uterine fibroids, large and small, are liable to become infiltrated with lime-salts. The deposit does not take place in an irregular manner in the fibres of the tumour, but corresponds to the disposition of its fibres. On examining the sawn surface of a completely calcified fibroid, the whorled arrangement of the fibres is so completely reproduced as to leave no doubt as to the nature of the mass. When these calcified tumours are macerated, and the decayed tissues washed away, the calcareous matter remains as a coherent skeleton of the tumour. Such changes have actually taken place whilst the tumour remained in the living uterus; they were formerly termed “uterine calculi,” and when found in coffins in old burying-grounds are sometimes imagined to be very large vesical calculi. A common name for them is womb-stones.

A subserous fibroid is very prone to calcify, and, if its stalk be thin, is apt to be twisted, and the tumour, becoming detached, falls into the cœlom and finds its way into all sorts of queer recesses. A detached nodule of this sort may tumble into a hernial sac.

Calcified fibroids are sometimes impacted in the pelvis, and give rise to retention of urine. Calcifications in a fibroid can be detected by the use of the X-rays.

**Malignancy.**—It is currently believed that a sarcomatous change may supervene in uterine fibroids. The matter has been considered very carefully by competent writers.



A critical examination of the evidence makes it clear that a very large proportion of cases, described as "sarcomatous degeneration of a fibroid," were examples of infected fibroids. In all future records, if they are published as evidence in this direction, they will need to be sustained by the report of a microscopic examination conducted by a competent pathologist.

The great defect in the history of nearly all the cases of so-called sarcomatous degeneration of uterine fibroids is the absence of the complete history of the cases; sarcomas are so prone to give rise to secondary deposits that any case which had run its natural course to a fatal issue would be expected to yield secondary nodules in the lung at least. Nothing would be more convincing to those who are sceptic.

In relation with this question, it is necessary to mention that the term fibroid is of generic value only. Many tumours are truly myomas, others with equal truth merit the name of fibro-myomas. There is also the gelatinous uterine tumour met with most commonly in the interval from the twenty-fifth to the thirty-fifth year, associated with profuse metrorrhagia, profound anæmia (toxic), which on section after removal resembles a mass of trembling jelly (myxoma); this tumour, so often described as a degenerate fibroid, is not so in fact; it is a primary condition, and serves to bridge the interval between the true fibro-myoma and sarcoma of the uterus. Many tumours described as fibroids, which had undergone malignant change, were in all probability sarcomas from the beginning.

There is a rare variety of sarcoma in which the spindle cells are transversely striated. This is called a **myosarcoma**, and may occur in the uterus at any age. The physical signs are indistinguishable from those associated with an infected fibroid. Myosarcoma of the uterus is especially malignant, and the operative removal of the tumour is attended with unusual risk, and in the case of those who survive operation, life is rarely prolonged more than two years.



## CHAPTER XXX

### THE MODES IN WHICH FIBROIDS IMPERIL LIFE

It is too true that fibroids are the commonest of all the species of tumours to which women, whether married or single, fruitful or barren, are liable. It is also a fact that the uterus may contain one fibroid or many, and cause neither inconvenience nor suffering; indeed, the individual owning them is ignorant of the existence of a tumour in her womb; but it is equally true that they are often the source of much suffering, and occasionally cause death in insidious ways. The inconveniences and perils which are associated with many fibroids depend very largely on their environment; indeed, there is no organ in which the baleful effects of environment of innocent tumours can be studied in so many aspects as in the uterus.

**Hæmorrhage.**—This is the commonest of all the inconveniences which fibroids cause, but it is confined to those which implicate the endometrium. The bleeding occurs under two conditions; most commonly it takes the form of excessive loss at the normal menstrual periods (menorrhagia). The more serious hæmorrhages are associated with septic fibroids. It is a fact of some importance that a small sub-mucous fibroid will induce such profuse bleedings at the menstrual period as to place life in imminent peril, whilst a large interstitial tumour, even though it project into the uterine cavity, may scarcely influence the loss.

When a woman with a fibroid bleeds excessively between, as well as at, the normal menstrual periods, it often indicates that the tumour has become septic, and this explains the almost continuous bleeding associated with a partially extruded and gangrenous fibroid (polypus).

**Septic Infection.**—This is, perhaps, the most serious



complication of a fibroid; and, even when it does not cause death, is always attended with dangerous consequences. Infection may arise in a variety of ways—*e. g.* the extrusion of a submucous tumour into the vagina exposes it to injury, and micro-organisms gain access to the tumour through abrasions in its capsule. Infection may be due to injury from the uterine sound or dirty dilators, or septic changes supervening on labour or miscarriage; occasionally it is due to intestinal gases when bowel adheres to the tumour. An infected fibroid is a soft, dark-coloured, stinking mass, which bleeds freely when touched. In the early stages of the infection it is oedematous, and exhales a sickly odour. On microscopic examination, the muscle cells are separated by multitudes of inflammatory cells, and colonies of pathogenic micro-organisms can by special methods be demonstrated among the inflammatory cells.

When a large fibroid becomes septic it gives rise to severe constitutional disturbance (septicæmia), like gangrene of other organs, and will, unless promptly removed, inevitably destroy life.

Small fibroids, when septic, though they give rise to serious trouble, do not so urgently threaten life, but they work great mischief, for the infection extends from the tumour to the adjacent endometrium, and in due course involves the tubal mucous membrane, which in mild cases ultimately leads to occlusion of the cœlomic (abdominal) ostium of one or both tubes—an event which is occasionally followed by pyosalpinx. In very acute (fulminating) cases the septic material infects the peritoneum, often fatally. Occluded, distended, and pus-containing tubes are not infrequent concomitants of a small troublesome submucous fibroid.

In an analysis of the complications present in 580 consecutive cases of uterine fibroids operated upon by abdominal section, one of us (Giles) found that the tubal complications were as follows: Salpingitis, 47 cases; Hydrosalpinx, 16 cases; Pyosalpinx, 18 cases; Hæmatosalpinx, 2 cases; total 83 cases. Thus 14 per cent. of all the cases of fibroids were associated with tubal inflammatory disease.

Pyosalpinx, as a complication of uterine fibroids, has not received the full attention it deserves. We have met with it



in several cases, in which there was reason to believe that the pain and suffering which induced the patients to seek relief and submit to operation were caused by the occluded and distended Fallopian tubes. It is possible that the occlusion of the cœlomic ostia of the tubes is, in some instances, responsible for the barrenness of the patients.

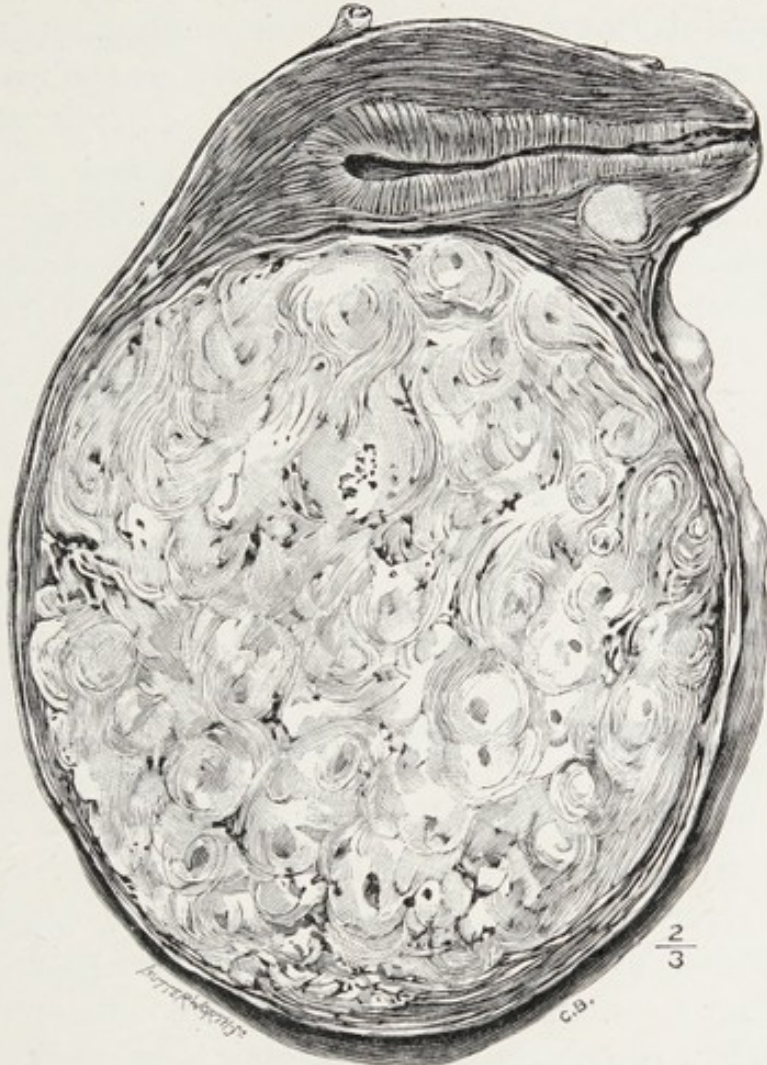


FIG. 92.—IMPACTED INTRAMURAL FIBROID IN THE POSTERIOR WALL OF THE UTERUS. IT PRODUCED RETROFLEXION OF THE UTERUS.

**Retroflexion of the Uterus.**—When a fibroid occupies the posterior wall of the uterus it may produce retroflexion of the organ, and cause the cavity of the uterus to lie at nearly a right angle with the cervical canal. When the uterus is distorted and displaced in this manner, the fibroid in the posterior wall will slowly grow and occupy all the available space in the true pelvis, and become so firmly impacted that it will often require a considerable effort on



the part of the operator to extract it in the course of an abdominal hysterectomy (Fig. 92).

**Impaction.**—A fibroid is said to be impacted when it fits the true pelvis so tightly that the tumour cannot rise upwards into the belly. All varieties of fibroids may become impacted, and as the complication is of great clinical importance, it needs detailed consideration.

A solitary intramural fibroid may be small enough to rest in the true pelvis without pressing unduly on the urethra or ureters. Presently, it increases to such a point that the turgescence which precedes the menstrual flow will cause it to elongate and constrict the urethra, producing retention of urine. When menstruation occurs the turgidity of the tumour subsides and the urethra is set free. Frequent recurrence of this pressure permanently damages the bladder and kidneys. Very vascular fibroids yield a loud murmur or hum on auscultation, a sign of very great value in differential diagnosis. In many cases it is possible to demonstrate the existence of a loud murmur for a few days before menstruation, but it disappears with the flow of blood, and remains in abeyance until a few days before the succeeding period. When pregnancy complicates a fibroid, impaction is a frequent consequence (see Chap. XXXI).

The most insidious, and therefore the most dangerous, variety of impaction is that complicating cervical fibroids. It has already been mentioned that when a cervix fibroid attains an average transverse diameter of 10 centimetres (4 inches) it has practically used up the spare pelvic space, and necessarily exerts injurious pressure on rectum or bladder. Most commonly it stretches the neck of the bladder and causes retention, leading to frequent and painful micturition, causing the patient to seek advice; and this leads to the detection of the tumour. It is one of the most striking features of the cervical fibroids that they do not cause bleeding except when they extrude from the mouth of the uterus and become infected, and rarely cause inconvenience until they interfere with the bladder. Herein lies the danger, as grave injury is often wrought on the pelvis of one or both kidneys before the existence of the tumour is even so much as suspected. It is an important fact to



remember that *when a woman between thirty-five and forty-five seeks relief because she suffers from retention of urine for a few days preceding each menstrual period, it is almost a certainty that she has a fibroid in her uterus.*

It sometimes happens that a fibroid—large enough to rest above the pelvis without causing distress—may at the menopause shrink, and gradually fall into the true pelvis and become impacted. This is a dangerous and insidious variety of impaction, but happily of rare occurrence.

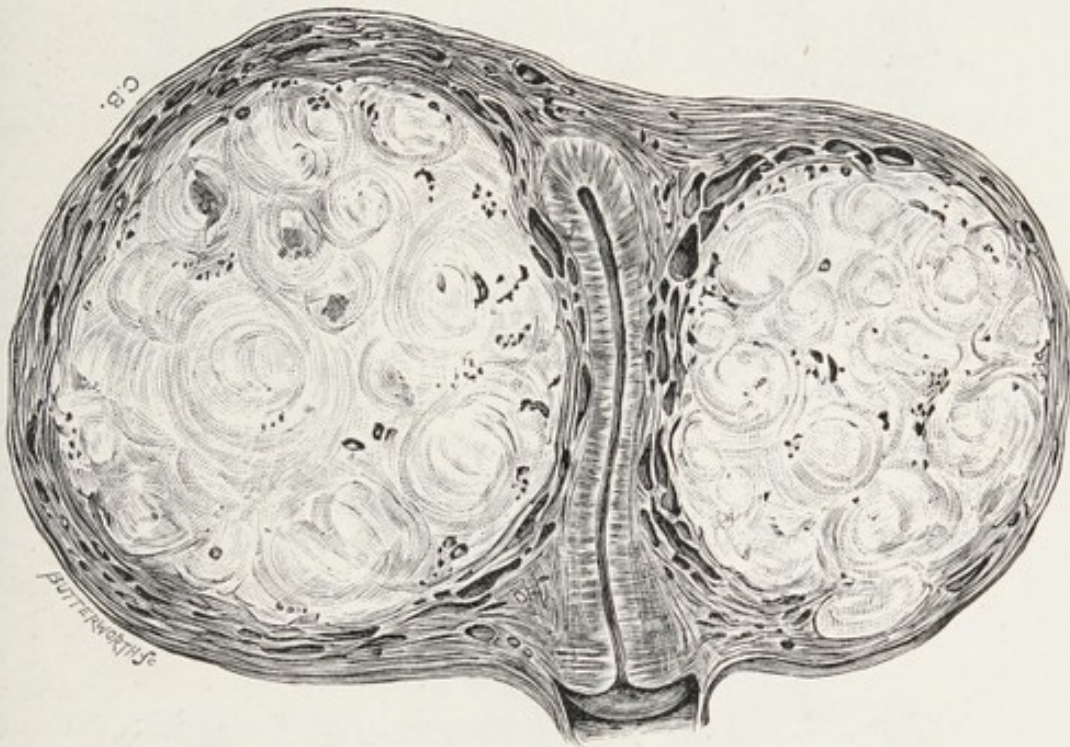


FIG. 93.—UTERUS CONTAINING TWIN FIBROIDS. THE UTERINE CAVITY LIES AT A RIGHT ANGLE TO ITS NORMAL POSITION. THE ENDOMETRIUM IS VERY THICK.

**Incarceration.**—Impaction and incarceration of fibroids are terms often used as if they are interchangeable. This is not the case. Incarceration can only occur with stalked fibroids. For example, a woman has a subserous fibroid attached to the posterior surface of the uterus: the uterus being enlarged, either by a fibroid or by pregnancy, presses the tumour into the pelvis and it can be felt as a lump in the pelvis on vaginal examination. Sometimes a stalked tumour of this kind, lying above the pelvis, slips below the brim in consequence of a jolt or a fall and gets below the uterus enlarged by a fibroid, or pregnancy, and is jammed



between the enlarged organ and the pelvic wall. Such an accident sometimes causes acute symptoms.

**Axial Rotation.**—A subserous fibroid with a long and slender stalk is liable to rotate and twist its pedicle, a move-



FIG. 94.—A SESSILE SUBMUCOUS FIBROID THAT HAD UNDERGONE AXIAL ROTATION. THE UTERUS AND APPENDAGES ARE INVOLVED IN THE TWIST.

From a spinster aged sixty-seven.

ment which causes very great pain. Some small calcified pedunculated nodules may be so twisted that they become detached.

Although it is unusual to meet with subserous fibroids possessing stalks so slender as to render axial rotation a



factor of clinical importance, it is nevertheless an event to bear in mind in estimating the value of pain in diagnosis.

Rotation may occur with a sessile subserous fibroid or with a submucous fibroid, when the neck of the uterus is long and narrow. In such a case the uterus is involved in the twist (Fig. 94). Axial rotation of a uterine fibroid is a rare accident.

**Intestinal Obstruction.**—Uterine fibroids may obstruct the intestines in three ways; thus—

A pedunculated subserous fibroid, especially if its stalk be long and narrow, may entangle a loop of small intestine and lead to fatal obstruction. This may happen with small as well as with large tumours.

A very large fibroid rising high in the abdomen may rest upon the pelvic brim in such a way as to obstruct the sigmoid flexure.

Lastly, an impacted tumour may press upon the rectum and lead to obstinate constipation and chronic obstruction, with all its inconveniences and evils.

In a very exceptional case, recorded by James M. Arnott, in 1840, a maiden lady seventy-two years of age was knocked down by a large dog, and fell forward on the pavement. She was seized with severe pain in the belly, and died in thirty-four hours. At the autopsy, a circular hole was found in the ileum, which lay between the anterior abdominal wall and a calcified uterine fibroid as large as a child's head. The calcified tumour is preserved in the Museum of the Middlesex Hospital.



## CHAPTER XXXI

### FIBROIDS IN RELATION TO MENSTRUATION, PREGNANCY, PUERPERY AND THE MENOPAUSE

THE perils are many which beset a patient when, with her uterus occupied by a large fibroid, she is unfortunate enough to conceive. This is a matter of deep importance, and as a preliminary it will be necessary to review briefly the relationship of menstruation and uterine fibroids.

**Fibroids and Menstruation.**—There is nothing in oncology better established than the fact that *all uterine fibroids arise during the menstrual period of life.*

In Great Britain menstrual life covers an average of thirty years, from the fifteenth to the forty-fifth year. There are few reliable records of fibroids between the fifteenth and twentieth years. Submucous fibroids have been removed from girls aged eighteen years (Scharlieb and Madden); they cause severe menorrhagia and metrorrhagia. Many examples have been observed between the twentieth and twenty-fifth years. Between the twenty-fifth and thirtieth years they are common, but the maximum of frequency is attained between the thirtieth and fiftieth years.

The interval between the twenty-fifth and thirty-fifth years of a woman's life may be regarded as the great child-bearing period, with an average length of twelve years (Matthews Duncan).

The menstrual epoch of a woman's life may be divided into three periods in relation to pregnancy and fibroids, thus—

1. From fifteen to twenty-five, in which, assuming the environment to be favourable, a woman is infinitely more liable to conceive than to grow a fibroid in the uterus.

2. From twenty-five to thirty-five; during this period her



liability to pregnancy is greater than in the preceding period, but her liability to fibroids is also greater.

3. From thirty-five to forty-five; in this the liability to conception is greatly diminished, but that to fibroids is immensely increased.

**Fibroids and Pregnancy.**—Assuming that the interval from twenty-five to thirty-five is the great childbearing period of a woman's life, it follows as a corollary to the three deductions in the preceding section that when pregnancy and fibroids co-exist the subjects of such a combination should be women past thirty, and these should, as a rule, be those who have either married late in life, or, if married early, remained many years sterile. The two facts may be stated with a fair amount of accuracy thus—

(1) When the uterus of a parous woman begins to grow a fibroid, she usually ceases to conceive.

(2) When a woman whose uterus contains a fibroid conceives, this event is often preceded by a long period of unfruitful wedlock.

An exception must be made of the solitary subserous fibroid, especially when pedunculated.

Women with fibroids in their uterus often conceive, and when large fibroids co-exist it is often a malicious combination. A few fibroids the size of acorns or of a golf-ball in the wall of the uterus are in no way inimical to successful pregnancy, but when a tumour the size of a fist occupies the cervix or the lower segment of the uterus it is a different matter.

When pregnancy is complicated with large fibroids, either of the submucous or the pedunculated kind, the child is occasionally safely delivered; but in some cases these tumours predispose to abortion, and, when pedunculated, they sometimes become impacted, and the pedicle may undergo torsion. Large cervix fibroids often are a serious and impassable barrier to delivery (Fig. 95).

Even in cases where the child is safely delivered, the mother's risks are by no means at an end, for the fibroid may, and often does, become septic and destroys her life. In some instances a sloughing submucous fibroid has been extruded subsequent to the delivery of the child. The



complete extrusion of a fibroid in this way usually requires from four to six weeks. The peril to life in such conditions is so great that many women who fall into such straits die unless the aid of surgery be enlisted.



FIG. 95.—A GRAVID UTERUS IN SAGITTAL SECTION.

The patient miscarried at the seventh month, and the arm presented. Delivery being impossible on account of a large cervical fibroid, the uterus and its cervix were removed.

Pregnancy not only exerts a quickening influence on fibroids, but is prone to induce softening of the tumours accompanied by a peculiar alteration in colour (Fig. 96).

The common colour of a fibroid is dirty white or very pale yellow; in many degenerating fibroids the yellow deepens.



In pregnancy the fibroid usually assumes a deep red or a mahogany tint. In the early stages the tumour exhibits this colour in streaks, but as the pregnancy advances the whole tumour becomes affected; in many the tissue softens and forms a spurious cyst. This change, often referred to as **red degeneration**, although very commonly associated with pregnancy, is by no means peculiar to it.



FIG. 96.—A GRAVID UTERUS IN SECTION.

The pregnancy was complicated by a large cervix fibroid. It is in the condition known as Red Degeneration, or Aseptic Necrobiosis.

Red degeneration (*aseptic necrobiosis*) has the remarkable effect of rendering fibroids in a gravid uterus painful, and when this sign is very marked it usually leads to error in diagnosis. The pain may come on so suddenly and so acutely that it is mistaken for impending abortion, rupture of a gravid Fallopian, or appendicitis, but more often for axial rotation of an ovarian tumour.



*Treatment.*—When pregnancy is complicated with fibroids, the method which commends itself most to obstetricians consists in keeping the woman under observation until the child is viable. If trouble arise, then the child may be delivered by Cæsarean section, followed by subtotal or total hysterectomy, according to the bias of the surgeon into whose hands she falls. Unfortunately, many women come to grief whilst waiting for the foetus to become viable.

**Fibroids and the Menopause.**—It was formerly taught and believed that uterine fibroids cease to be troublesome with the cessation of menstruation. It is quite certain that this opinion requires reconsideration. Uterine fibroids stand alone among tumours in the peculiarity of their age distribution, for, as has already been mentioned, they only arise during menstrual life (fifteen to forty-five), but they stand absolutely alone among tumours in possessing another remarkable character: as a rule, they cease to grow after the menopause, and in some instances they undergo a marked diminution in size. Some writers are of opinion that they may disappear. This must be a very exceptional phenomenon, hard to prove, and very difficult to believe.

Though fibroids, as a rule, cease to grow after the menopause, it must not be forgotten that they *sometimes take on unusually rapid growth at this period*; and, apart from this, they are often sources of great peril to life, not only by co-existing with other serious diseases of the uterus, tubes, and ovaries, but the very fact that they are apt to diminish in size is occasionally a source of danger. Apart, however, from these considerations, the fibroids are themselves sources of trouble on account of the degenerate and septic changes to which they are liable. It is also very essential to bear in mind that the existence of a fibroid in the uterus has, in a very large proportion of cases, a malicious influence in delaying the menopause. The uterus has often been removed from patients between the fiftieth and sixtieth years in whom monthly fluxes of blood were as regular, but much more profuse, than in women of twenty years.

The most frequent and dangerous alterations in fibroids after the menopause are necrotic and septic changes. During menstrual life fibroids generally enjoy an abundant



blood-supply, and in some instances they are almost as vascular as *nævi*. On the occurrence of the menopause, the cessation of the menstruation is accompanied by a remarkable abatement in the blood-supply, and the tumour not only ceases to grow, or even shrinks, but the very fact that its nutritive irrigation, so to speak, is arrested leads to degenerative changes, and the fibroid becomes in many instances a dead, sequestered body, and so long as septic organisms are denied access it will remain inert. When from various causes putrefactive organisms gain access to these essentially dead tumours, the results are often dire in the extreme.

It is far easier to prove that putrefactive organisms obtain access to dead or dying fibroids than to tell how they get to them. There is, however, one mode of access which is undeniable. The fibroids which give rise to most trouble after the menopause are those of the submucous variety, and there seems a strong tendency, when the uterus passes into its resting stage and the fibroid is shrinking and dying, for the organ to attempt the extrusion of the tumour. A careful study of the cases which have come under our observation teaches us that a fair proportion of troublesome post-menopause fibroids have undergone partial extrusion, or the mouth of the womb is widely dilated and facilitates the ingress of germs.

It has already been pointed out that one of the greatest perils which can happen to a woman with a fibroid in her uterus is to become pregnant, but after the forty-fifth year she is beset with a danger of quite another kind—namely, cancer of the corporeal endometrium (*see* p. 325).



## CHAPTER XXXII

### THE CLINICAL CHARACTERS, DIAGNOSIS, AND TREATMENT OF FIBROIDS

**Clinical Characters.**—Uterine fibroids, the commonest genus of innocent tumours to which women are liable, are unknown before puberty (*see* p. 294), and rarely attract attention until the twenty-fifth year; from this age they increase in frequency, and are most common between the thirtieth and fiftieth years. The subjoined table of 100 consecutive cases in which an operation was performed, and the nature of the tumours clearly established, shows the age distribution—

20-24	.	.	.	.	.	.	.	1
25-29	.	.	.	.	.	.	.	4
30-39	.	.	.	.	.	.	.	42
40-49	.	.	.	.	.	.	.	44
50-60	.	.	.	.	.	.	.	9
								100

Of this number thirty-six were single women and sixty-four married; of the latter seventeen were mothers; one of them had a family of eight children.

*Symptoms.*—In a very large proportion of cases the earliest indication of a fibroid in the uterus is excessive menstruation (menorrhagia), and this may be complicated by uterine bleeding between the menstrual periods (metro-rhagia). These hæmorrhages are often the only symptom which leads the patient to seek advice, and on examination a large pelvic tumour may be detected. In many cases there is no obvious enlargement of the uterus, and the existence of a small submucous fibroid (polypus) is a matter of presumption founded on clinical experience, only proved or disproved by dilating the cervical canal and exploring



the cavity of the uterus. In many cases when the patient seeks advice the tumour is actually presenting at the mouth of the uterus.

When the fibroid is so large as to rise out of the pelvis it usually occupies the hypogastric region, but if pedunculated it may lie in the flanks and simulate an ovarian tumour. To palpation it may be smooth, but when the surface is tuberoso it is a valuable sign. Auscultation sometimes furnishes useful evidence, for a soft, rapidly growing fibroid often yields a loud venous hum synchronous with the pulse and indistinguishable from the uterine murmur heard in pregnancy. This murmur may be present a few days before the onset of menstruation, and disappear as soon as the flow occurs, to reappear immediately before the next menstrual period.

On vaginal examination, the tumour will be found closely associated with the uterus. The body and cervix may form part of a globular mass, the mouth of the womb being indicated by a small dimple.

The chief conditions which complicate the diagnosis of large uterine fibroids are pregnancy and ovarian tumours. In some cases the detection of these tumours is simple and certain; in others the wisest and most experienced find great difficulties in the way of exact diagnosis.

It is important to remember that in ordinary circumstances fibroids are painless tumours, hence it may be taken as an axiom that *when a fibroid becomes painful it signifies that the tumour is undergoing red degeneration, or that some complication has arisen in the pelvis* (see p. 297).

#### **Differential Diagnosis of Pregnancy and Fibroids.**

Tumours of the internal genital organs of women are most frequent during the sexual period of life—from the fifteenth to the forty-fifth year; and, as many genera of tumours (so far as rate of growth and size are concerned) simulate pregnancy, and *vice versa*, it naturally behoves every surgeon to make himself familiar with the signs, not only of normal gestation, but of the abnormal forms as well. It is also important to remember that his professional reputation may be wrecked, and a single woman's social position may be ruined, by such a blunder as attributing



the enlargement of her belly to a gravid uterus when it is due to an ovarian or a uterine tumour.

It will be convenient to discuss the diagnosis of pregnancy under the following headings: Normal Pregnancy; Hydramnion; Retroversion of the Gravid Uterus; Cornual Pregnancy (Chap. XXII); and Extra-uterine Pregnancy (Chap. XXIII).

**1. Normal Pregnancy.**—In the case of a married woman at the childbearing period of life, under usual circumstances there is little danger of error; but a married woman with a rapidly growing uterine or ovarian tumour may imagine herself pregnant, and even arrange for the advent of the baby, and have the nurse ready to receive it.

The following constitute a group of signs of pregnancy, which, if carefully sought for, rarely mislead—

1. Suppression of menstruation.
2. Morning sickness, one to two months.
3. Fullness of the breasts, and the presence of a mucoid secretion.
4. Pigmentation of the mammary areolæ.
5. A soft tumour in the hypogastrium, which hardens and softens under firm continued pressure of the palm.
6. Movements of the foetus.
7. Ballottement, at the end of the fourth month.
8. Softness of the cervix.
9. Uterine souffle, end of fourth month.
10. Foetal heart-sounds, fifth month.

The cases which give rise to difficulty are those in which individuals have motives for concealing their pregnancy, or cases in which there is some abnormal condition of the foetus or its membranes, or tumour in addition to pregnancy. In the first set of cases it is easy to recall instances in illustration of "the pertinacity and apparent innocence" with which unmarried women will sometimes deny the possibility of pregnancy even when they are actually in labour.

In cases of unmarried women the greatest caution is necessary before expressing an opinion that the case is one



of pregnancy; by a little waiting the case settles itself, and in doubtful conditions nothing is to be gained by giving an opinion straight away. Two rules should be observed in dealing with cases of suspected pregnancy: (1) When in doubt, defer expressing an opinion, and see the patient again after a few weeks' interval. (2) *Never pass a sound where there is even a suspicion of pregnancy.*

A critical study of errors made in the differential diagnosis of fibroids and pregnancy shows that the majority are committed before the beating of the foetal heart is audible.

**2. Hydramnion.**—This complication of pregnancy has many times been mistaken for a large rapidly growing ovarian cyst. The trouble consists in the accumulation of an excessive quantity of amniotic fluid. Usually the gestation proceeds normally to the fourth or fifth months; then the belly increases in size in a rapid manner, and causes great inconvenience and distress. Clinically the enlargement furnishes the signs of a very large ovarian cyst.

Should there be any difficulty in the diagnosis as between hydramnion and a pelvic tumour, the employment of the uterine sound will settle the difficulty. It will probably terminate the pregnancy, but this is preferable to an abdominal section made under the supposition that the patient has a tumour. The amount of fluid present in cases of hydramnion is sometimes almost incredible, and may amount to many litres. Hydramnion is usually associated with twins, and the pregnancy terminates, as a rule, about the seventh month. Ballottement is easily obtained, and unusually distinct.

**3. Retroversion of the Gravid Uterus.**—This means that the fundus of the uterus is lodged in the hollow of the sacrum, and is prevented from rising on account of the sacral promontory. As the uterus enlarges, the cervix is raised and pushed forward, compresses the urethra, and causes retention, often accompanied by incontinence. The clinical signs of a gravid uterus in this condition are very decisive. First, there is the presence of an oval hypogastric tumour (the over-full bladder); the signs and symptoms of pregnancy between the third and fourth months; and on examination a rounded elastic



swelling (the body of the uterus) occupying the hollow of the sacrum will be felt, whilst the cervix lies behind the pubes, and sometimes so high that the finger can hardly reach it. On passing a catheter, and emptying the bladder, the hypogastric tumour disappears. On examining the abdomen bimanually, the fundus of the uterus cannot be detected anteriorly. These facts serve to distinguish an incarcerated uterus from a uterine fibroid, tubal pregnancy, or ovarian tumour. The diagnosis is usually verified by rectifying the position of the uterus. After emptying the bladder, upward pressure on the uterus through the vagina or the rectum will cause it to ascend. Sometimes it will be necessary to administer an anæsthetic in order to effect the replacement.

There is a condition of the pregnant uterus in primiparæ which is occasionally a source of uncertainty in diagnosis, especially in the early months. The patient complains of pelvic pain, and on examination a globular body is felt which strongly resembles an ovarian cyst or a softened fibroid. The cervix retains its virgin shape and hardness, and a deep sulcus can be made out by the finger between it and the globular body. When this condition occurs in an unmarried woman who asserts that menstruation is normal, doubts arise, and if the practitioner is incautious and passes the sound, it will be arrested at the top of the lengthened cervix, and give the impression that the uterus is of normal length, and, as it will not lead to abortion, brings about an erroneous judgment. In patients who are married and admit the arrested menstruation, the condition is apt to be mistaken for extra-uterine gestation. In doubtful cases a little deliberate waiting and watching will clear up matters.

#### **Some Points in Differential Diagnosis of Fibroids.**

When a woman has a tumour suspected to be a fibroid, and there is reason to believe that it is rapidly increasing, it is worth while to remember—

1. *That she may have conceived, and the enlargement is due to the progress of the pregnancy.*
2. *The tumour may have become septic, or secondary changes have led to the formation of cyst-like spaces.*



3. *The diagnosis may be erroneous, and the suspected fibroid is an ovarian tumour ; or diffuse adenomyoma of the uterus.*

4. *Ovarian tumours and uterine fibroids often co-exist.*

5. *Hydrosalpinx, pyosalpinx, and even tubal pregnancy, sometimes complicate, as well as simulate, fibroids.*

6. *An over-distended bladder has many times been mistaken for a rapidly growing pelvic tumour.*

Among rarer conditions mistaken for fibroids may be mentioned : a kidney in the hollow of the sacrum ; an enlarged spleen occupying the pelvic cavity ; sarcoma growing from the walls of the pelvis ; cancer of the pelvic colon ; echinococcus cysts (hydatids) growing under the serous coat of the uterus or in the connective tissue of the broad ligament ; a sequestered extra-uterine foetus (lithopædion).

**Treatment.**—All attempts to cure uterine fibroids by medical and electrical methods have been conspicuous failures, so that patients whose lives are threatened by these tumours are obliged to seek the aid of surgery.

It is true that fibroids often occupy the uterus for years and cause no trouble, but many give rise to menorrhagia and metrorrhagia so severe as to place life in great jeopardy. Indeed, recurrent hæmorrhage is the most common condition which leads women with fibroids to seek medical aid. Pelvic pain, due to pressure of the tumour on urethra, bladder, or bowel, is common, and is of course inimical to health directly and indirectly. Inflammation (infection) and gangrene are dangerous conditions. Fibroids complicated with tubal and ovarian diseases and with pregnancy demand careful attention.

The chief indications for surgical interference may be enumerated thus—

Severe recurrent hæmorrhage ; pain ; rapid increase in size ; impaction ; intestinal obstruction ; gangrene ; necrosis ; the co-existence of tubal and ovarian disease.

Bleeding in many cases can be temporarily controlled by rest, the administration of styptics, and by rest and tampons.

It is a noteworthy fact that those who have made a careful and prolonged study of tumours, from the pathological as well as the clinical aspect, are unanimously of opinion that the most effectual method of treatment is



*thorough removal of the tumour whenever this is practicable at the earliest possible moment.*

The indications for surgical treatment may be summarized thus—

(1) Stalked tumours protruding at the mouth of the womb are readily detached by seizing the tumour with a volsella and twisting it off; or the pedicle may be divided with scissors—*vaginal myomectomy*.

(2) Often the presence of a submucous fibroid is conjectural; then the cervical canal is dilated and the interior of the uterus explored with the finger. Small fibroids thus discovered are easily removed. Large sessile fibroids require more deliberate treatment—*vaginal enucleation*.

(3) Fibroids with a greater diameter than five or six centimetres often require hysterectomy, and as this is a serious matter operative treatment is frequently postponed.

The following indications may serve as guides in advising hysterectomy—

1. A fibroid (too large to be removed by the vagina) which is the cause of serious and repeated bleeding, producing profound anæmia, the bleeding being uninfluenced by rest and the administration of drugs.

2. A fibroid of moderate size in a woman between thirty and forty-five becoming impacted and causing retention of urine at each menstrual period.

3. A fibroid rapidly increasing in size and extending high above the pelvic brim and pressing on the colon, so as to cause intestinal obstruction.

4. A fibroid rapidly enlarging after the menopause.

5. A fibro-cystic tumour.

6. A fibroid that has given little trouble suddenly begins to enlarge rapidly, accompanied by rapid pulse, high temperature, and signs of septicæmia. These signs indicate septic infection of the tumour; it should be removed without delay. Occasionally a gangrenous fibroid is too large to be removed through the vagina, and requires abdominal hysterectomy.

7. The large pedunculated fibroids which simulate ovarian tumours may be easily dealt with by transfixion and ligature of their pedicles (abdominal myomectomy). When sessile



and of moderate size, subserous fibro-myomas may be shelled out of their capsules, the edges of which are then carefully sutured (abdominal enucleation). Many interstitial and submucous fibroids may be successfully treated by enucleation, but this operation is attended with more risk than hysterectomy.

The details of the operations known as abdominal myomectomy and hysterectomy are described in Chap. LX. At the present time the operation which finds most favour with surgeons is that known as **subtotal hysterectomy**. In this operation the body of the uterus and the adjacent half of the cervix is removed. When the ovaries are healthy, and especially if the patient is under forty years, only one should be removed with the uterus.

Some surgeons are of opinion that the complete removal of the uterus and its neck (*total hysterectomy*) is the ideal operation for fibroids, because in a few instances it has been shown that the cervical stump left after the subtotal operation has been attacked by cancer. A critical examination of the reported cases shows that in some of them an unsuspected cancer existed at the time of the primary operation.

Experience teaches that subtotal hysterectomy in spinsters or barren married women, when the neck of the uterus is long and the cervical canal undilated, is as safe as any major operation in surgery. Total hysterectomy should, as a rule, be reserved for women who have had children, in whom the cervical canal is patulous, perhaps septic, and in many cases large and hard, or large and spongy. If there be the least suspicion of malignancy associated with the tumour or the endometrium, then complete removal of the uterus is imperative.

*The Remote Results of Hysterectomy.*—Careful observations have been made on women who have submitted to hysterectomy, and they prove that the operation is followed by a remarkable improvement in the general health of the patients; and it is clearly established that a wombless woman can enter into all the pleasures of life and enjoy them as well as those who have not had the misfortune to develop large tumours in the uterus. A fibroid, even



when it does not drain patients by oft-recurring menorrhagia, impairs their vitality and induces a condition which they express by the phrase "never feeling quite well." After extirpation of the tumour the restoration to health is accompanied by increased vigour, which is to them a revelation. It is also amply proved and admitted by gynæcologists that the conservation of a healthy ovary is of the greatest value in warding off the severity of an artificial menopause.

*Mortality of Hysterectomy for Fibroids.*—Since the introduction of subtotal hysterectomy for troublesome fibroids the risks of the operation have greatly diminished. In some of the hospitals of London it has fallen under two per cent (*see* Chapter LXII).

*Radiology.*—The use of Röntgen rays, radium and mesothorium, for relieving the hæmorrhage and reducing the size of uterine fibroids has attracted great attention; in many instances such treatment has been successful. The method of applying radium to fibroids varies with the age of the patients and the character of the tumour. The method in which the rays act when introduced into the body are not well understood. Experimental observations on animals like guinea-pigs and bitches suggest that the changes induced in fibroids may be in part due to the sterilizing effects of the rays on the ovaries as well as to their direct effects on the tissues of the tumour.

The employment of radium in cases of recurrence after the removal of sarcomatous fibroids is sometimes followed by remarkable consequences. The rays relieve the pain that is such a marked feature of the disease and the recurrent mass shrivels. At present it is sufficient to state these facts, but on the question whether radium permanently cures fibroids it would be premature to make positive statements.



## CHAPTER XXXIII

### SARCOMA OF THE UTERUS

THE uterus, like other organs containing unstriped muscle tissue, is occasionally the seat of sarcomas, both of the round-celled and spindle-celled species; but, unlike other hollow muscular organs, it has a thick and richly cellular lining—the endometrium—which theoretically would predispose it to become attacked by sarcomatous disease.

The uterus is liable to sarcomas of two varieties, which are distinct in structure as well as in topography. For example, sarcomas may arise in the body of the uterus or in its neck.

**Sarcomas of the Body of the Uterus.**—It would be correct to speak of such tumours as sarcomatous fibroids. Sarcomas, especially of the spindle-celled species, also arise in the connective tissue of the broad ligament, and quickly implicate the uterus, so that it is impossible to be sure on physical examination whether the tumour is of uterine origin or not. Even in the course of an operation, an encapsuled sarcoma arising in the wall of the uterus so simulates in its smooth contour the naked-eye features of a benign fibroid that the most experienced surgeons have been deceived. Occasionally, on exposing the uterus in the course of an operation, its surface will present here and there small soft “buds,” or sessile prominences, which means that the growth is eroding its investments. This at once indicates to the surgeon the malignant nature of the tumour.

An encapsuled sarcoma, in the guise of an innocent fibroid, is the most insidious and dangerous tumour which grows in the body of the uterus, because clinically it resembles the common fibroid so closely that in many instances the uterus has been extirpated, under the impression that the patient



had a rapidly growing fibroid; in the course of a few months she returns with recurrence in her pelvis, and, as a rule, quickly dies from the effects of the disease.

It is facts of this kind which make us reiterate the statement made in Chap. XXIX that in many of the cases described as fibroids undergoing malignant changes, the tumours were in all probability sarcomas from the beginning.

**Myosarcoma.**—This variety contains spindle cells which are transversely striated. It was supposed to be a rare form of uterine tumour. Blair Bell and Glynn have collected seventeen recorded cases. It may occur at any age, for a myosarcoma has been observed in girls at two and a half years and in a woman of seventy-five. The social state of the patient seems to have no influence. The physical signs are indistinguishable from those associated with an infected fibroid. The nature of the tumour can only be determined by a microscopic examination and the transverse striation is not easy to demonstrate.

Myosarcomatous fibroids are very malignant and the operative removal of such tumours is attended with unusual risk; and in those who survive, life is rarely prolonged more than two years.

*Diagnosis.*—It is rarely possible to distinguish in the early stages between a benign fibroid and a sarcomatous fibroid of the body of the uterus, and in the late stages it is very difficult to distinguish between a sarcoma, a carcinoma, or primary tuberculosis of the corporeal endometrium (Fig. 58), or a septic fibroid.

**Racemose (Grape-like) Sarcoma of the Neck of the Uterus.**—This is a rare but distinctive form of sarcoma of the uterus which has been observed chiefly in girls and young nulliparous women. Typical examples of this form of tumour have been observed in women of fifty years of age. It arises in the cervical endometrium, and in its typical form hangs in the vagina (Fig. 97) like a bunch of grapes or a cluster of bodies resembling the hydatidiform mole (chorion-epithelioma benignum).

In structure racemose sarcomas are made up of spindle cells, and the grape-like bodies consist of oat-shaped cells, the grape being covered with columnar epithelium. In the



specimen described by Pernice (Fig. 98) gland-like spaces lined with cubical epithelium existed in the basal parts of the tumour. These were derived from the glands in the cervical endometrium. In many of the specimens the bulk of the grape-like bodies consists of œdematous spindle- and round-celled tissue. This tumour was also peculiar in pos-



FIG. 97.—RACEMOSE (GRAPE-LIKE) SARCOMA OF THE NECK OF THE UTERUS.  
(PERNICE.)

sessing spindle cells with a cross striation indistinguishable from that of striped (voluntary) muscle. The tumour was removed, but it quickly recurred, infiltrated the uterus, and quickly destroyed the patient. On microscopic examination the recurrent mass exhibited the usual features of a spindle-celled sarcoma.

Striped spindles are not constant in racemose sarcomatous tumours of the uterine neck. An example removed by



Hellier and examined by Stewart was found to be a myxosarcoma. In this instance the patient survived operation eight months. She died from recurrence in the abdomen.

*Treatment.*—The only method which affords any hope for

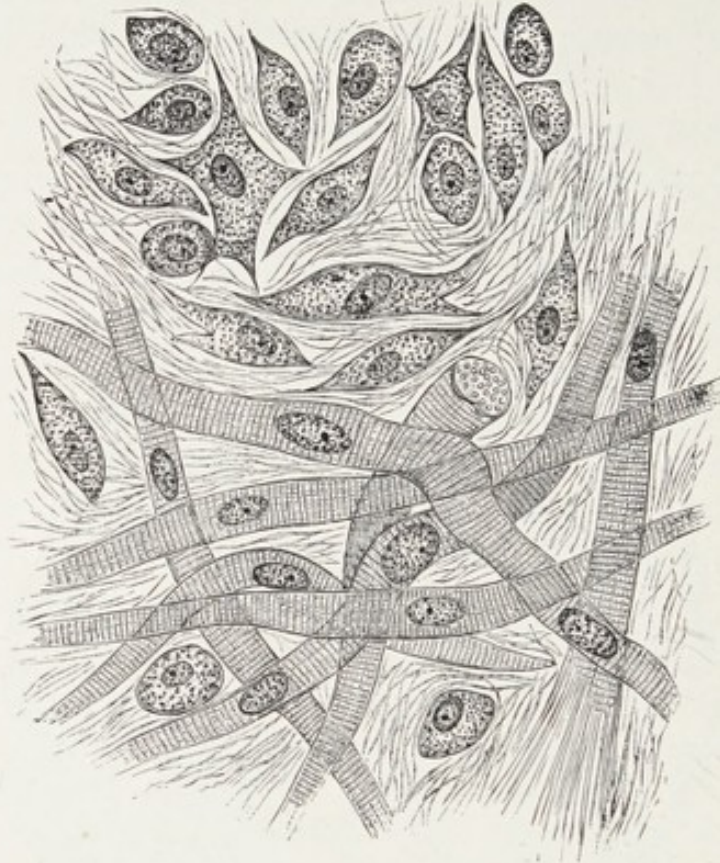


FIG. 98.—MICROSCOPIC FEATURES OF A SPINDLE-CELLED RACEMOSE SARCOMA OF THE NECK OF THE UTERUS. (PERNICE.)

Some of the spindles have a cross striation.

patients with uterine sarcoma of any kind is hysterectomy, but the results are not very encouraging. The removal of the uterus is invariably followed by rapid recurrence. Hysterectomy for a racemose sarcoma has been performed on an infant a year old, but not with success (Curtis).



## CHAPTER XXXIV

### CANCER OF THE UTERUS

CANCER in the strictest pathologic sense is a disease of epithelium, and its minute structure is modified by the character of the epithelium in which it arises. This is well illustrated in the case of the uterus. Cancer arising on the vaginal aspect of the cervix is of the squamous-cell species, and that which arises in the endometrium of the cervical canal or the cavity of the uterus is of the columnar-cell species.

#### CANCER (CARCINOMA) OF THE NECK OF THE UTERUS

This part of the uterus is liable to two kinds of cancer, the squamous-cell species (sometimes called epithelioma), which arises on the vaginal aspect of the cervix, and the columnar-cell species, arising in the epithelium of the cervical canal. Squamous-celled cancer of the cervix is very common, but the columnar-celled variety is uncommon.

*Squamous-celled Cancer.*—This disease arises in the cap of stratified epithelium which covers the vaginal aspect of the neck of the uterus (Fig. 99), and is directly continuous with the epithelial investment of the vagina, and ends abruptly at the margin of the external orifice of the uterus.

Cancer may arise on any part of this area of stratified epithelium, but it begins most frequently near the extremity of the cervix. It appears as an ulcer with thick hard margins deeply eroding the cervix, or it may appear as a raised, hard, irregular, warty mass.

Microscopically, the structure of the growth is the same as in other regions of the body, and consists of epithelial cones invading the underlying tissues. The disease gradually extends from the cervix to the vaginal wall and involves



the connective tissue of the mesometrium, the rectum, and bladder. The ultimate results are the same as those due to cancer of the cervical endometrium. When the disease is well advanced it is impossible to decide on clinical grounds whether it arose from the vaginal surface of the cervix or from the endometrium of the cervical canal.

*Columnar-celled Cancer.*—The endometrium of the cervical canal is lined with columnar epithelium and beset with racemose glands. The columnar epithelium and the distribution of the glands end below at the external orifice (os) of the uterus; above, the epithelium of the canal is directly

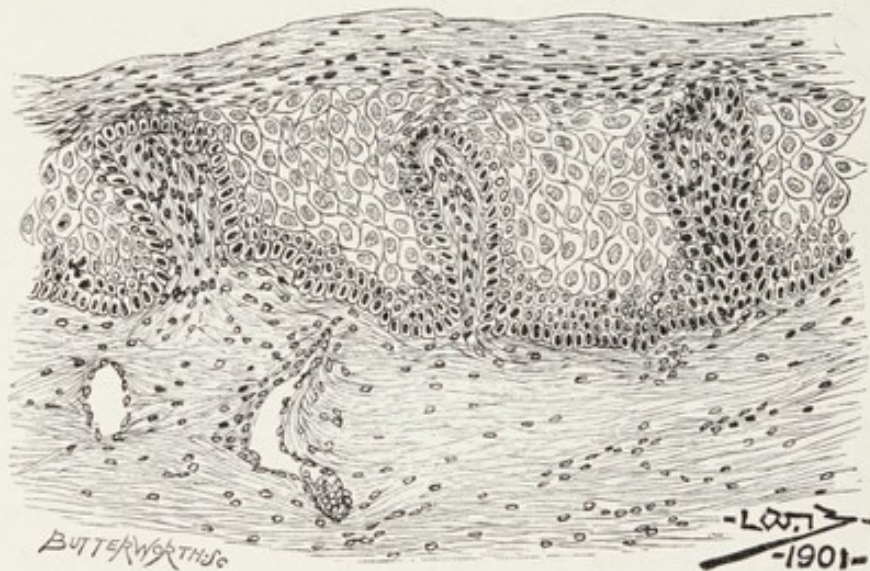


FIG. 99.—THE MICROSCOPIC CHARACTERS OF THE EPITHELIUM COVERING THE VAGINAL ASPECT OF THE NECK OF THE UTERUS.

continuous with that lining the cavity of the uterus. The epithelial cells of the cervical endometrium and its glands are narrower than those of the endometrium proper (Fig. 100).

Microscopically, cancer of the cervical endometrium consists of spaces filled with columnar epithelium (Fig. 101). This depends on the fact that the invasion of the tissues is due to columns of epithelium; in the sections these columns are cut at right angles.

Cancer arises in the epithelium in any part of the cervical canal, but it appears to be more liable to attack the lower than the upper half of the canal. It begins either as a deeply eroding ulcer or as a fungating cauliflower-like outgrowth. For a time it remains restricted to the cervix,



and after infiltrating adjacent tissues spreads into the mesometrium and implicates the vaginal wall; it destroys the cervix and involves the body of the uterus (Fig. 102), and in the last stages of the disease this organ becomes eroded

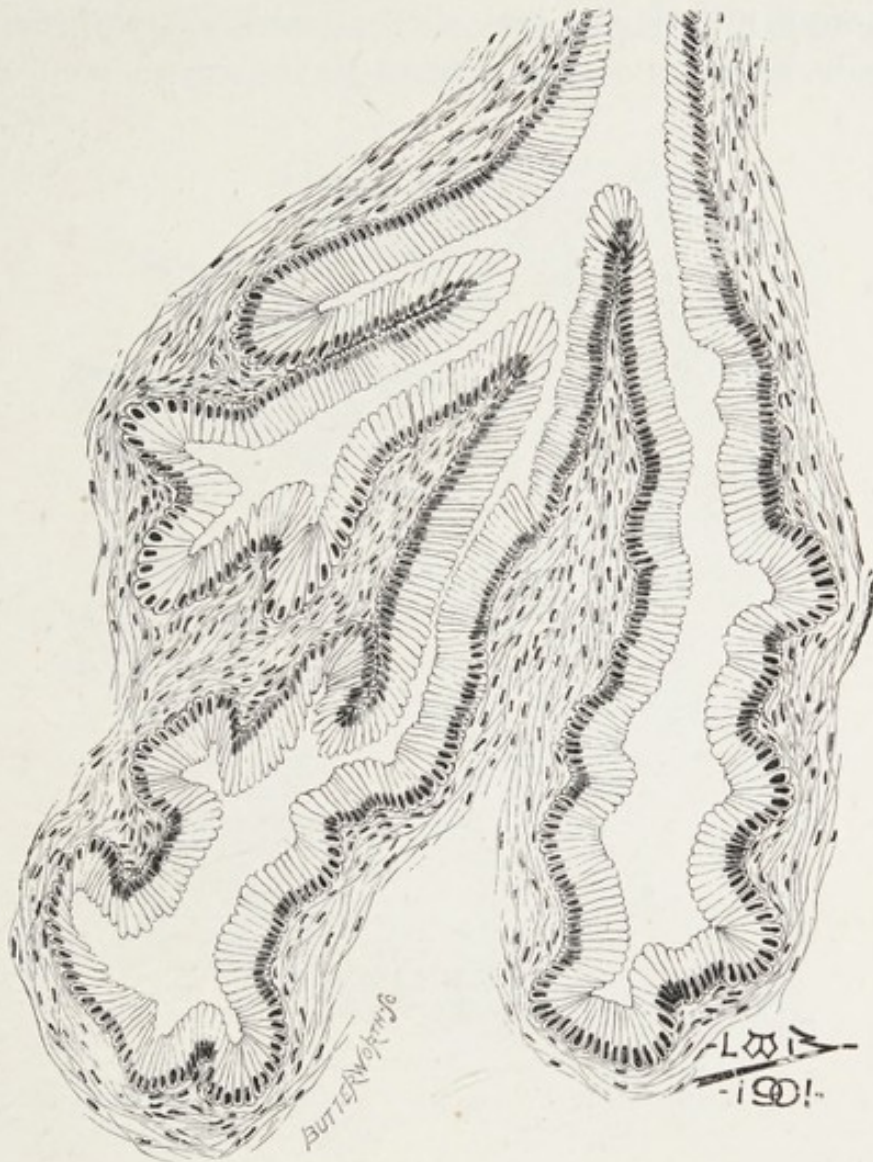


FIG. 100.—THE MICROSCOPIC CHARACTERS OF A GLAND FROM THE CERVICAL ENDOMETRIUM.

until nothing but a thin shell remains. When the uterus is hollowed out in this way and its cervical canal is obstructed by the growth, the cavity of the uterus becomes distended with pus; this condition is termed **Pyometra**. The pus sometimes escapes intermittently, or, as it is often described by the patient, “in gushes.” Pyometra occurs independently of cancer (*see* p. 184).



The lymph nodes in the course of the iliac vessels are soon infected, and finally those of the lumbar set. Dissemination happens, and secondary deposits occur in the lungs, liver, and occasionally in bones, but as in squamous-celled cancer arising in other parts of the body, it is uncommon.

Although in writings and clinical work sharp distinctions are made between cancer arising in the cervix and cancer



FIG. 101.—MICROSCOPIC CHARACTERS OF CANCER OF THE CERVIX.

originating in the "body of the uterus," yet cases occasionally come under observation where it would be difficult to state with certainty whether the disease began in the lower part of the body of the uterus or in the upper part of its neck, and this uncertainty is not dispelled by a microscopic examination of the parts.

*Symptoms.*—Cancer of the neck of the uterus is very common between the ages of thirty and sixty. It occurs as early as the twenty-third year, but it is unusual before the thirtieth year of life. *It is almost exclusively confined to*



women who have been pregnant, and it is not easy to determine whether this predisposition depends on injury to the cervix during delivery, or traumatism associated with coitus.

The signs of cancer are bleeding, offensive vaginal discharge and sometimes pain. The first two are the signs which usually lead women to seek advice, and they depend on the invasion of the cancer by pathogenic micro-organisms (*see p. 320*).

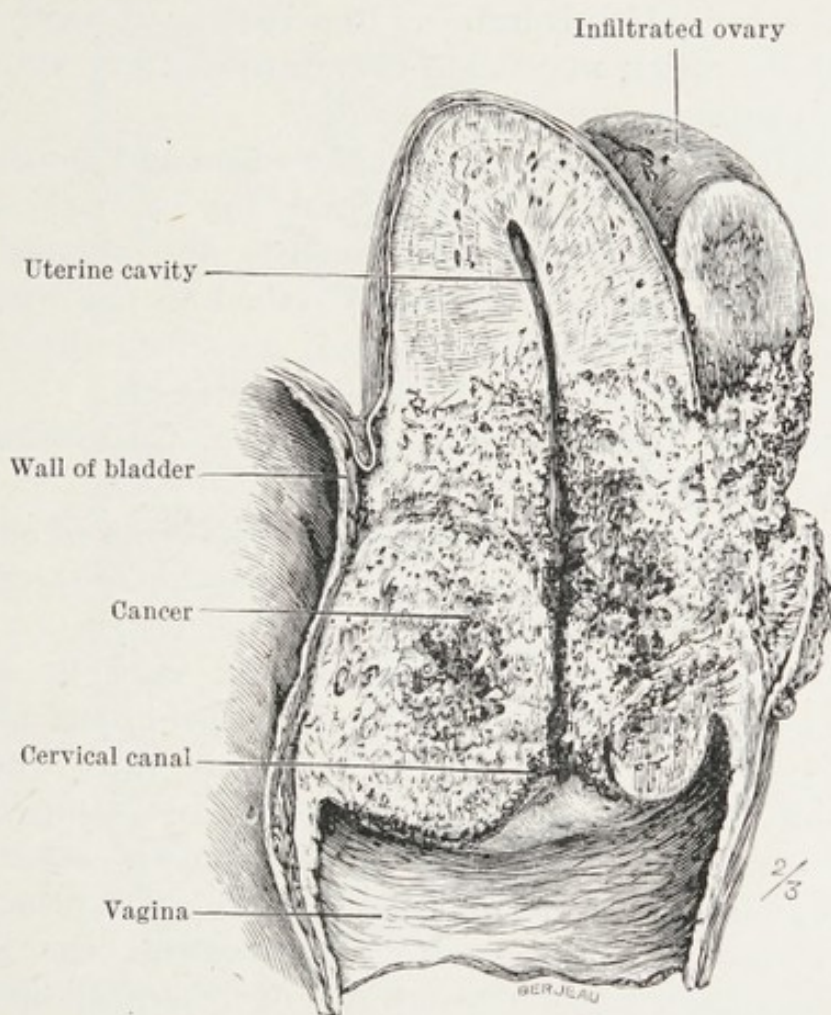


FIG. 102.—UTERUS IN SAGITTAL SECTION WITH ADVANCED CARCINOMA OF THE CERVIX.

On examination, if the disease is in an early stage, the margins of the cervix are everted and a fungous mass protrudes from the canal and bleeds on the slightest touch. In some cases the conditions are such as to preclude a positive diagnosis, but bleeding on gentle examination is always a suspicious sign, and especially when the patient complains that coitus is followed by bleeding. In cases of doubt an



accurate diagnosis is of the greatest importance for the welfare of the patient, and a portion of the suspected tissue should be removed and submitted to microscopic examination. Conditions likely to be mistaken are adenomatous disease of the cervix or a sloughing cervical fibroid.

In the late stages, when the cervix is destroyed and an ulcerating cancerous mass replaces it, there is no difficulty in recognizing its nature.

A fatal termination is induced in a variety of ways—

1. The ulceration may open the uterine artery and cause fatal hæmorrhage.

2. Repeated bleedings lead to exhaustion and death.

3. Implication of the bladder and one or both ureters (Fig. 103) causes cystitis, septic pyelitis, and uræmia.

4. Septic changes in the uterus extend to the Fallopian tubes and cause pyosalpinx; or pus may leak through an unoccluded ostium and set up septic peritonitis.

5. Peritonitis may be due to rupture or perforation of a pus-containing Fallopian tube.

6. Intestinal obstruction may follow adhesion of small or large intestine to the uterus, or direct extension of the growth to the rectum.

7. Hydroperitoneum and hydrothorax may be due to secondary nodules of cancer on the peritoneum and pleura.

8. Secondary deposits in the brain are rare, but they occasionally induce fatal coma and sometimes acute mania.

*Treatment.*—The only treatment available for cancer of the neck of the uterus is that adopted for cancer in other parts of the body—namely, thorough removal at the earliest possible moment. The first object in a radical operation for the relief of cancer in any part of the body is a wide removal of the infected part, and this is rendered difficult in the case of the cervix by the proximity of the bladder, ureters, and rectum. When the patient comes early under observation, and especially when the cancer is limited to the cervical canal, the performance of vaginal hysterectomy is followed by satisfactory consequences immediate and remote; but when the disease has overrun the cervix and implicates the vaginal wall it is impossible to make a free removal of infected tissue without imperilling the integrity



of the bladder and ureters, and thus anticipating some of the most distressing effects of the disease. Quite apart from the limitations which the anatomical environment imposes on surgical efforts in the treatment of this disease, there is, unfortunately, the insidious character of the disease itself, and only a small percentage of patients seek advice when there is an opportunity of doing good by surgery. In

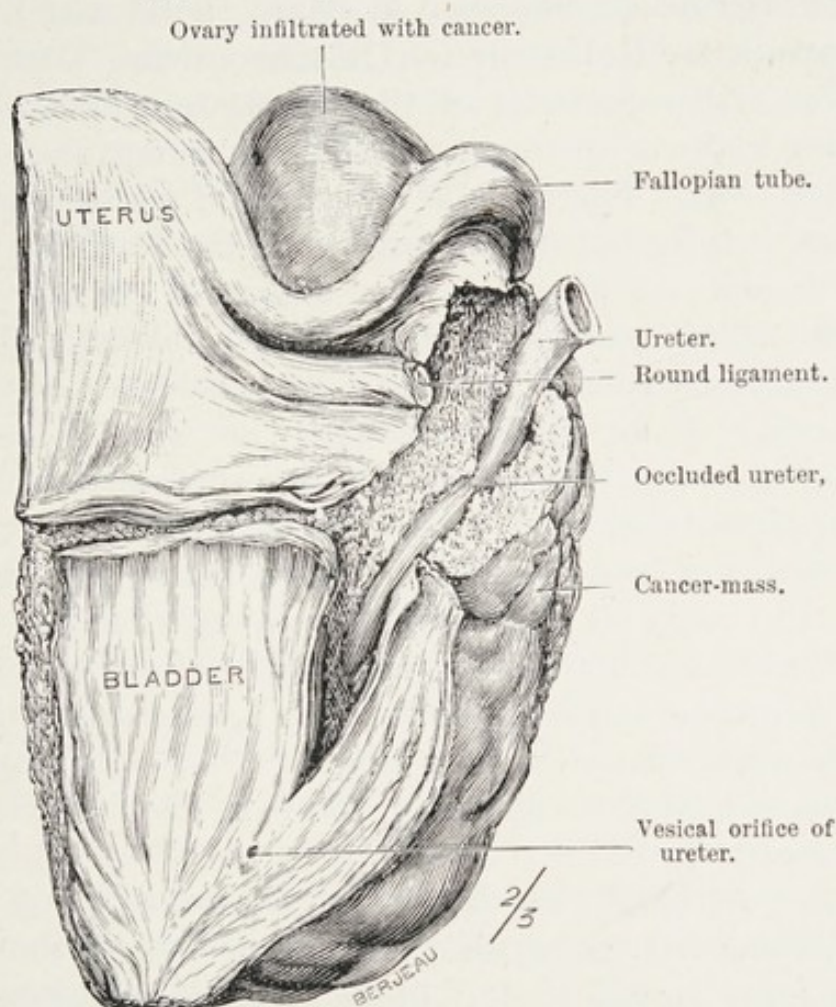


FIG. 103.—CANCER OF THE CERVIX UTERI IMPLICATING THE URETER AND BLADDER.

recent years the mortality of vaginal hysterectomy for cancer of the cervix has reached the low point of five per cent., but the frequency and rapidity of recurrence has caused surgeons to turn their attention to the abdominal route. It is now the practice of many gynecologists to remove a uterus affected with cancer of its neck by what is known as a "radical abdominal hysterectomy," a method associated with the names of Ries, Mackenrodt, Dührssen, and Wertheim. These methods enable the surgeon to remove, not



only the uterus and its neck, but the broad ligaments, the ovaries, and Fallopian tubes, infected lymph-nodes, and the para-uterine connective tissue.

The primary object of such extensive dissections is to allow the advantages of operative treatment to be extended to patients who would otherwise be absolutely barred from relief. The details of the operative treatment of cancer of the uterus are described in Chaps. LVII and LX.

**Sepsis in Relation to Cancer of the Uterus.**—The results of the removal of the uterus for cancer are by no means uniform even when the conditions are apparently similar. The microscopic features of cancerous growths do not help in explaining variations in the clinical course of the disease. Patients in the advanced stages of uterine cancer when wasted by discharges of blood and purulent fluid fall into a condition that used to be called the cancerous cachexia. This appearance has no special relation to cancer, it is due to the entrance into the circulating blood of toxic substances secreted by the bacteria and cocci which colonize cancerous growths. These micro-organisms influence the work of the surgeon very markedly. Cancer of the uterus is colonized by staphylococci and the coli group. The fate of a patient submitted to hysterectomy for cancer of the neck of the uterus depends, not so much on the skill of the surgeon, as on the nature of the infecting micro-organism.

Many patients submitted to hysterectomy for cancer of the neck of the uterus die within a few days of the operation from septic peritonitis, pulmonary embolism, or acute bacteraemia when the cancerous tissues are colonized by streptococci. It cannot be too emphatically stated that the virulence of cancer, as a rule, depends on its septicity; and cancers in exposed situations are rapidly destroyed by bacteria. It is also true that cancers, as a rule, grow and remain unsuspected in internal organs until they become septic: then they become painful, or bleed, as a result of their disintegration by ulceration.

*Radiology.*—The use of radium as an auxiliary in the treatment of cancer of the uterus has attracted great attention. At present it has been used extensively in patients



with inoperable cancer: in many instances it reduces the hæmorrhage, diminishes the discharges, and leads occasionally to a reduction in the size of the growth. It is probable that such changes are, in a large measure, due to the destructive effects of the gamma rays of radium on the micro-organisms in the cancerous tissues. It also destroys the epithelial elements of cancer and leads to the formation of tough sclerotic tissue. This is a matter of some interest. When a patient with cervical cancer suffers from hæmorrhage, if the cervix be submitted to radium rays the bleeding will be checked and the growth shrinks. Three weeks after the treatment, if the uterus be removed, the tissues in the vicinity of the neck of the uterus will be found tough and hard; this makes the separation of the uterus from the bladder a matter of difficulty. Recurrent nodules of cancer often shrivel in a remarkable manner after an application of radium. Occasionally the use of radium in uterine cancer is followed by a rapid increase of the cancer; the injudicious and inexperienced use of this powerful agent may lead to sloughing of the vagina and the formation of a recto-vesical or a vesico-vaginal fistula.

At present the results of radium in the treatment of uterine cancer are far from uniform. Histological investigations indicate that radium rays find distinctions in cancerous tissue imperceptible to the microscope. Occasionally startling successes are reported, but the experience of the majority of surgeons is decidedly disappointing.

*Palliative Treatment.*—In the majority of cases where no radical operation is possible much may be done to make the patient's life not only tolerable, but even comfortable. In a very large proportion of cases the patients are able to keep about, look after their homes, and lead useful lives, often for many months, until renal complications and anæmia, the joint result of repeated bleeding and septic infection, so weaken them that they are compelled to keep in bed. At this stage careful nursing renders them fairly comfortable; the patients should be kept scrupulously clean by daily douches of warm water tinged with permanganate of potash. When the discharge is offensive, a daily douche of perchloride of mercury (1 in 10,000) will rarely fail to correct it. Pain



may be alleviated by the judicious use of phenacetin combined with caffein. The routine use of opium and morphin in this disease is greatly to be deprecated. The patients soon become tolerant of the drug and require large and frequent doses, which produce dislike for food, and lead to very troublesome constipation and often vomiting.

In cases unsuitable for operation life is rarely prolonged beyond a year and a half. Many die within a few months from the time they come under observation.

#### CANCER OF THE NECK OF THE UTERUS AND PREGNANCY

The most appalling complication of pregnancy is cancer of the cervix. It is somewhat difficult to understand how a woman with cancer of the neck of the uterus can conceive, but it is quite certain that it happens, even when the disease is well established. Careful perusal of periodical gynæcological literature shows that this complication is not uncommon, but the cases in which cancer of the neck of the uterus obstructs labour are unusual, and this is due to two circumstances: (1) Cancer predisposes to abortion; and (2) when it has advanced to such a stage as to fill the vagina with an obstructive mass, it has had such effect upon the health of the mother that it endangers the life of the foetus. This is a matter of some importance, because in considering the advisability of performing Cæsarean section in these circumstances it is necessary to be certain that the foetus is really alive. However, in very exceptional cases it has been found absolutely necessary to resort to this operation in order to deliver a dead and putrid foetus.

The careful study of the literature relating to this complication shows clearly enough that, when a pregnant woman with early cancer of the uterus comes under observation in the early months of pregnancy, her best hope lies in vaginal hysterectomy. In the later stages (fourth to seventh months) very good consequences have followed the amputation of the cervix, and this operation has been carried out very successfully and without disturbing the pregnancy. In the latest stages the best consequences have followed the



induction of labour and the immediate performance of vaginal hysterectomy; for, surprising as it may seem, the uterus, though enlarged from the pregnancy, can be safely extirpated through the vagina.

These methods of treatment only apply to cases where the cancer is in such a condition as to afford reasonable hope of a prolongation of life. When the disease is in an inoperable stage and the foetus is dead, abortion usually occurs. When there is reliable evidence that the foetus is alive, the pregnancy should be allowed to go to term; if the cancer affords an impassable barrier to the transit of the child, then Cæsarean section becomes a necessity.



## CHAPTER XXXV

### CANCER OF THE BODY OF THE UTERUS

CANCER of the body of the uterus resembles in its naked eye and minute characters cancer of the cervix, with the exception that the cells are like those lining the cavity of the uterus (Fig. 104). Of its early stages little is known, because the disease is even more hidden from observation than cancer of the cervix.

When the cancer is well advanced the uterus is filled with soft, delicate masses of tissue which bleed on the slightest touch. This explains the name by which this disease used to be known, namely, villous endometritis.

For a time the cancer remains restricted to the body of the uterus, and may creep into the uterine sections of one or both Fallopian tubes; it only invades the cervix in the late stages. Buds of cancer may perforate the wall of the uterus and infect the peritoneum.

*Symptoms.*—Cancer of the body of the uterus is rare before the forty-fifth year; it is most frequent at, or subsequent to, the menopause. Most cases occur between the fiftieth and seventieth years; *the majority of the patients are nulliparæ.*

The signs that usually attract attention are the occurrence of fitful hæmorrhages after the menopause, followed by profuse, offensive, and often blood-stained discharges. On examination the cervix feels normal, and may appear so when examined with the help of a speculum, but the uterus often feels larger than natural.

The disease is very apt to be mistaken for some variety of endometritis, especially for the varieties called senile and villous endometritis; on the other hand, endometritis is frequently mistaken for cancer of the body of the uterus.

The *diagnosis* is usually made by dilating the cervical



canal and removing a fragment of tissue from the uterine cavity and examining it microscopically (Fig. 105).

Cancer of the body of the uterus is more frequent in spinsters and barren wives than in multiparous women; for this reason the cancer often assumes the massive form, because the cervical canal being narrow pathogenic micro-organisms do not obtain such free ingress as in the case of women with a patulous "os." Therefore the cancer can grow in security until a portion of it makes its way through the os uteri into the vagina; then sepsis, sloughing, and bleeding lead to the discovery of the disease.

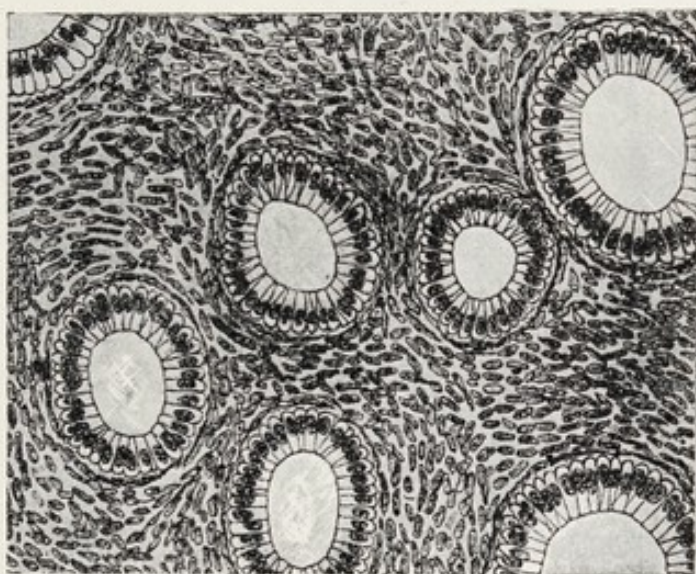


FIG. 104.—THE TUBULAR GLANDS OF THE UTERUS IN TRANSVERSE SECTION.

Cancer sometimes arises in the corporeal endometrium of small atrophic uteri. In such a case the small uterus can usually be extirpated by the vagina, but occasionally the narrowness of the vagina in aged spinsters compels the surgeon to resort to the abdominal route.

**Cancer of the Uterus and Fibroids.** — Uterine fibroids are very common, so is cancer of the uterus, and as the maximum of frequency in relation to age is very near in the two diseases, it is not a matter for surprise that the two conditions should frequently co-exist. In some cases the two diseases may be seen in close proximity without interfering with each other, but when the capsule of a fibroid is invaded by contiguous cancer the tumour ulcerates



and sloughs with great rapidity. Cancer of the body of the uterus is more frequently complicated with fibroids than cancer of the cervix, and it is a fact important to bear in mind that when a woman who has attained her menopause and is known to have fibroids, and especially if she be sterile, begins to suffer from irregular "issues of blood," these may be due to cancer of the endometrium. These are always suspicious signs, and demand the most careful investigation. The matter may be put in the following aphoristic form : *When a woman with uterine fibroids, having*

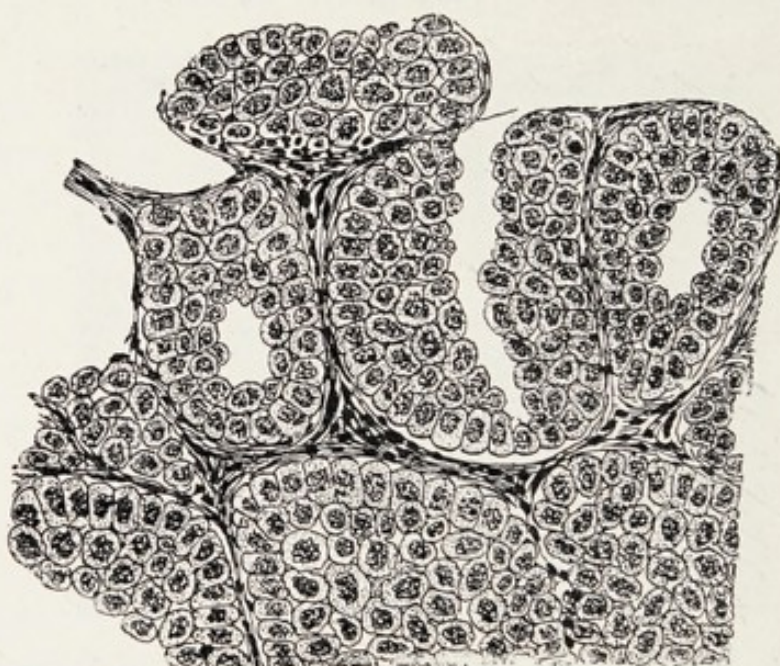


FIG. 105.—MICROSCOPIC CHARACTERS OF THE COMMON KIND OF CANCER OF THE BODY OF THE UTERUS.

*passed the menopause, begins to have irregular profuse uterine hæmorrhages, it is extremely probable that she has cancer of the body of the uterus.*

The signs which attract attention are fitful, vaginal hæmorrhages after the menopause, followed by profuse, offensive, and often blood-stained discharges. The uterus on examination may seem scarcely enlarged; sometimes, however, it may be much bigger than usual. In the majority of cases the diagnosis cannot be established with certainty until the cervical canal is dilated, and a fragment of the suspected cancer extracted and submitted to microscopic scrutiny. It often happens that when the cervical canal is



dilated in this way the disease may be so advanced that there is no reasonable doubt in regard to the diagnosis, and in such circumstances it is sometimes to the best interest of the patient to complete the treatment by at once removing the cancerous organ.

*Treatment.*—The only treatment available for cancer of the body of the uterus is hysterectomy. This operation may be carried out either by the vaginal or the abdominal route. We have carried out a series of operations by both methods, and feel satisfied that though the immediate risks of the operation are the same in both, the remote consequences are much better when the uterus is removed by the abdominal route. It must be remembered that in cases where the growth is very luxuriant the uterus may be very big, and its removal entire through the vagina becomes an impossibility; for it is a matter of the first importance to remove a cancerous uterus entire and without undue handling and squeezing, because the one great danger which women run in the operative treatment of this disease is **cancer-infection**. When the peritoneum is fouled with cancer material, the cells possess so much power of independent growth that large masses of cancer spring up on the pelvic peritoneum in a few weeks, and quickly destroy the patient.

When the uterus is removed by the abdominal route the operator is not only able to extirpate the uterus completely, but he can remove the Fallopian tubes, ovaries, and adjacent segments of the broad ligaments. It has also this advantage, that it enables the operator to satisfy himself as to the extent of the disease, and also he can assure himself as to the absence of lymph-node infection and dissemination. Should either of these conditions be present, then it would be useless to perform hysterectomy.

It is a fortunate matter that the prospects of a patient after hysterectomy for cancer of the body of the uterus are better than in cancer of the cervix, and a number of cases can be brought together where women have had immunity from recurrence for five and even ten years. *The great secret of success is early recognition of the disease and prompt radical treatment.*



*Mortality.*—The risk to life in abdominal hysterectomy for cancer of the body of the uterus is greater than after the removal of the uterus for fibroids. This is due to the fact that when the cancer ulcerates and sloughs there is risk of sepsis. This also makes convalescence slower.

Cancer of the uterus remains an opprobrium to medical as well as to operative gynæcology.



## CHAPTER XXXVI

### CHORION-EPITHELIOMA (DECIDUOMA)

IN 1889 Säger and Pfeiffer independently described a variety of malignant disease arising in the uterus presenting microscopic characters so strongly resembling decidual tissue that the disease was named **deciduoma malignum**. Subsequent investigations by other observers brought to light the important fact that this remarkable disease is very liable to arise in the endometrium within a few weeks, or months, of abortion, or delivery at term, and especially after the expulsion of the so-called hydatidiform mole. Moreover, the microscopic investigation of the tumour showed that it conformed in histologic type to the multinuclear mantle or syncytium which covers the chorionic villus. This discovery led to a change of opinion as to the source of the disease, and as most writers regard it as arising from changes in the epithelial elements of the chorionic villi rather than in the decidua, the name **chorion-epithelioma** has come to be adopted in preference to deciduoma.

The normal villi of the chorion in the early stages of their development consist of an axis or core of delicate connective tissue covered with epithelium arranged in two layers. The inner is known as *Langhans' layer*; the outer, called the *syncytium*, is peculiar, and resembles a large elongated multinucleated cell enveloping the villus like a mantle. The cells of Langhans' layer have definite boundaries; they atrophy in the latter half of pregnancy. In the early stages the connective tissue core of the villus is devoid of bloodvessels. The tissue in the early stages consists of branching cells, separated from each other by mucoid intercellular substance. Later the cells become spindle-shaped, and the tissue denser and vascularized.



In the disease known as hydatidiform mole the villi become changed into transparent grape-like bodies, and look not unlike the vesicles so characteristic of the cystic stage of *Tænia echinococcus* (hydatids); a hundred years ago the grape-like or vesicular bodies (Fig. 106) were regarded as hydatids, especially as the embryo is rarely to be found in these specimens.

In 1827 Madame Boivin and Velpeau showed that the disease depended on a change in the chorionic villi. Virchow

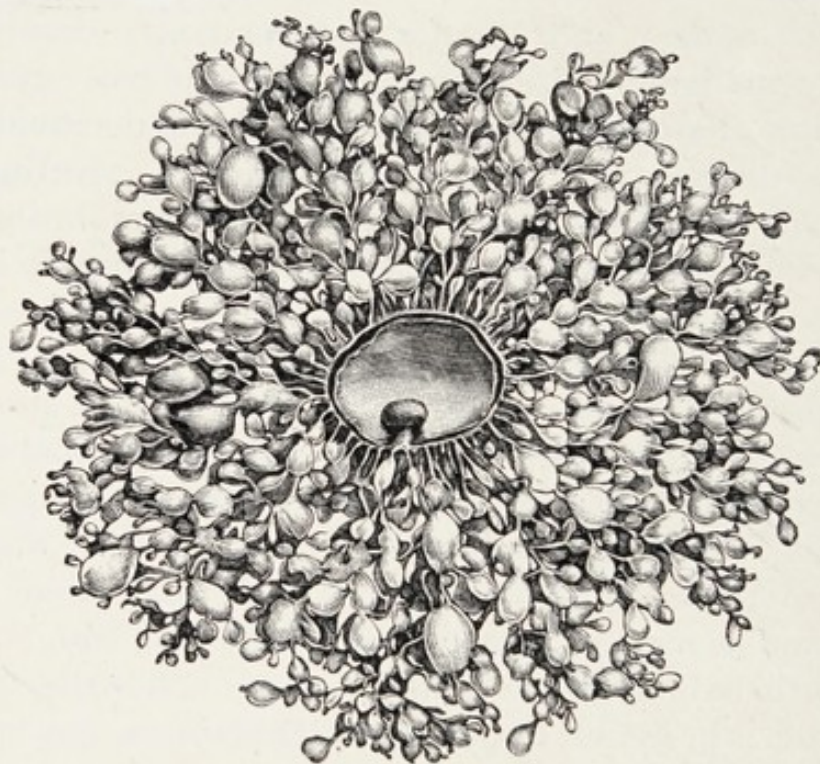


FIG. 106.—HYDATIDIFORM MOLE. (AFTER BUMM.)

gave attention to the histology of these vesicular bodies, and considered them to be due to a myxomatous change in the villi (1853). This view prevailed until Marchand, in 1895, demonstrated that the essential feature of the change depends more on the epithelium than on the stroma of the villus, for it undergoes irregular proliferation, and assumes invasive characters, penetrating the decidua, and even the muscular wall of the uterus. The vessels of the villi disappear, the stroma degenerates, and the swollen condition of the so-called vesicles is the result of œdema rather than mucoid change (Fig. 107). The invasiveness or destructiveness of



these altered villi has long been recognized, and specimens have been observed in which the villi have perforated the uterus, and caused fatal bleeding into the abdominal cavity.

Hydatid mole (or **chorion-epithelioma benignum**) is not common. Its relative frequency has been estimated by one writer (Madame Boivin, 1827) to occur once in 20,000 pregnancies, and by another (Williamson, 1899) once in 2,400. It is quite certain that only a small proportion of women who have expelled hydatid moles suffer from

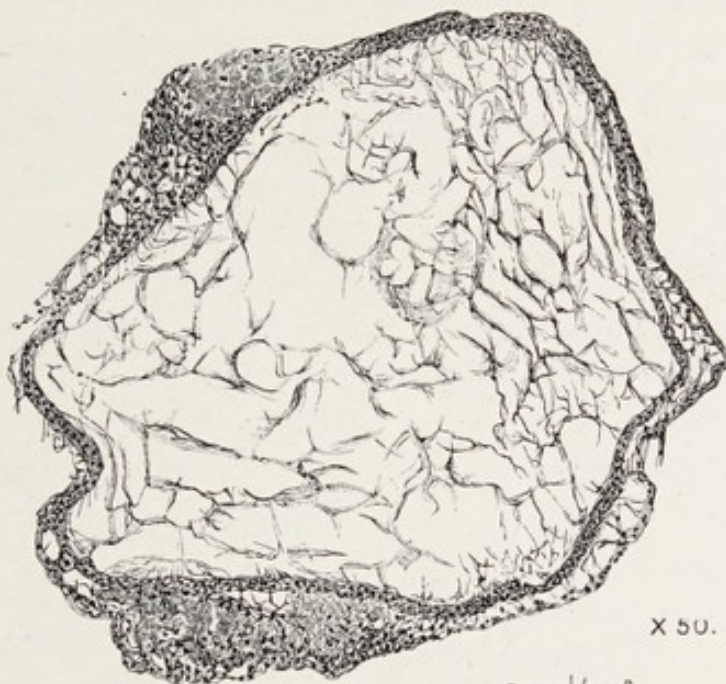


FIG. 107.—MICROSCOPIC APPEARANCE OF A CHORIONIC VILLUS FROM A HYDATIDIFORM MOLE, IN TRANSVERSE SECTION.

chorion-epithelioma, but no reliable estimates are available. The liability of a woman who has had a miscarriage of this kind to be the victim of such a deadly disease as chorion-epithelioma malignum renders it advisable that she should keep under medical supervision for some months after such an event.

Some writers are disposed to believe that there are two varieties of the hydatidiform mole, one being purely innocent, and the other giving rise to the malignant chorion-epithelioma. As yet microscopical inquiries have not provided these theoretical distinctions with a histologic foundation.



**The Relation of the Hydatid Mole (Chorion-epithelioma Benignum) to Lutein Cysts.**—Some valuable observations have been made on the frequent association of bilateral lutein cysts of the ovary and the so-called hydatid mole. Indeed, the presence of lutein cysts in this disease is constant enough to lead to the belief that the two conditions are correlated. The lutein cysts are large enough to be of clinical importance, and they have been known to obstruct delivery, and in one instance to cause acute symptoms by undergoing axial rotation.

This has given a new interest to the yellow tissue which composes the greater part of a corpus luteum, and some observers state that it furnishes an internal secretion, and that the adhesion of the oöperm to the endometrium depends on a proper supply of lutein secretion.

Fraenkel has elaborated this theory, and his views receive the support of some competent German pathologists. An over-production of this secretion, the result of a plus quantity of lutein tissue, sets up, according to Pick, a "chorio-epitheliomatous reaction" in the embedded ovum, and leads to the formation of a benign chorion-epithelioma (hydatidiform mole).

Lockyer has made a careful study of this question, and the result of his painstaking inquiry lends great support to the view that there is a close correlation between lutein cysts and chorion-epithelioma of both kinds.

**Chorion-epithelioma Malignum (Deciduoma).**—The uterus when attacked by this disease usually enlarges, and often becomes big enough to be appreciable as a tumour in the hypogastrium (Fig. 108). Its contour may be nodular. In some patients the disease is limited to the endometrium, and the primary focus of the disease may be so small as not to cause enlargement of the uterus. Some very exceptional cases have been described in which the disease did not involve the uterus, but began in the vagina.

The intimate dependence of chorion-epithelioma on changes associated with pregnancy is illustrated by the fact that this disease occurs primarily in the Fallopian tube as a sequel of tubal pregnancy, and in the ovary.



The result of the examination of a large number of examples of this disease by many investigators has established the fact that it arises in portions of the chorionic villi which remain embedded in the endometrium after the expulsion of the main products of gestation, and especially if the villi have undergone hydatidiform change.

Some competent authorities still believe that there may be two varieties of this disease, one arising from the epi-

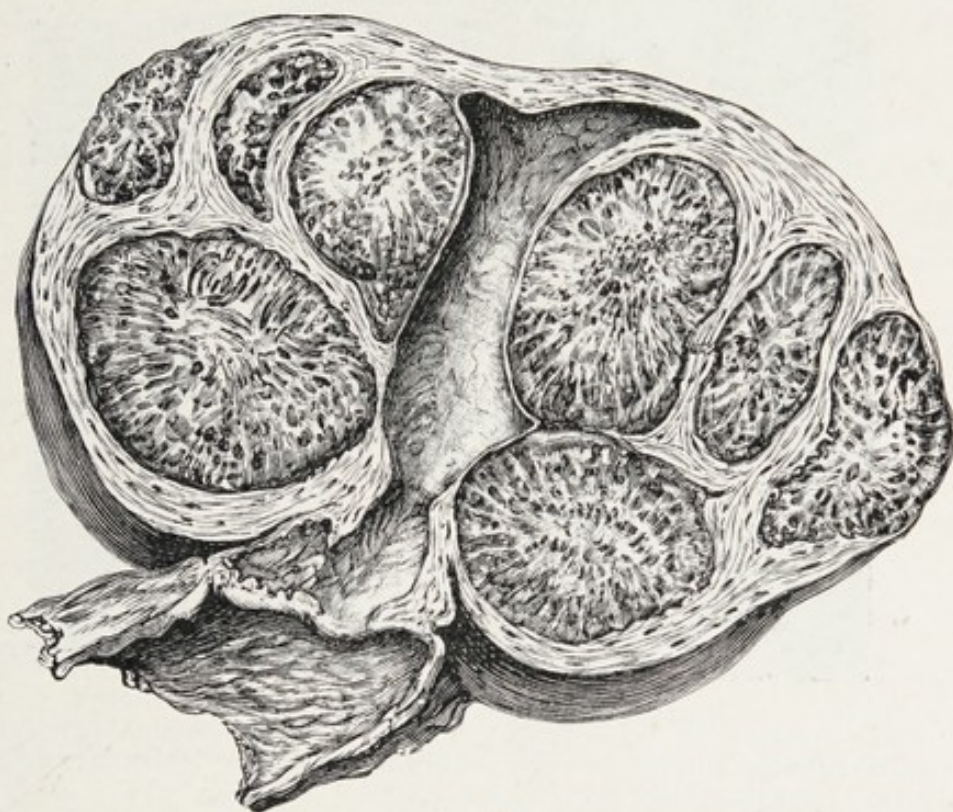


FIG. 108.—CHORION-EPITHELIOMA OF THE UTERUS. (SÄNGER.)

thelial elements of the chorionic villi (Fig. 109) and the other in decidual tissue.

To the naked eye the tumour-tissue appears on section as a soft reddish mass. "Histologically, a chorion-epithelioma consists of well-defined cells of various shapes and sizes closely packed together, and large multinuclear irregular masses of protoplasm in which no definite cell-masses are recognizable. This tissue invades and destroys the uterine tissues after the manner of a malignant growth. It contains no proper connective tissue stroma or bloodvessels of its own" (Teacher).



A remarkable feature connected with chorion-epithelioma is the discovery that certain intrathoracic teratomas and teratoid tumours of the testis contain tissue indistinguishable from that of chorion-epithelioma.

The eroding power of the cells of a chorion-epithelioma enables them to penetrate the tissues, and gaining entrance to veins colonize the blood-stream. The cell fragments are

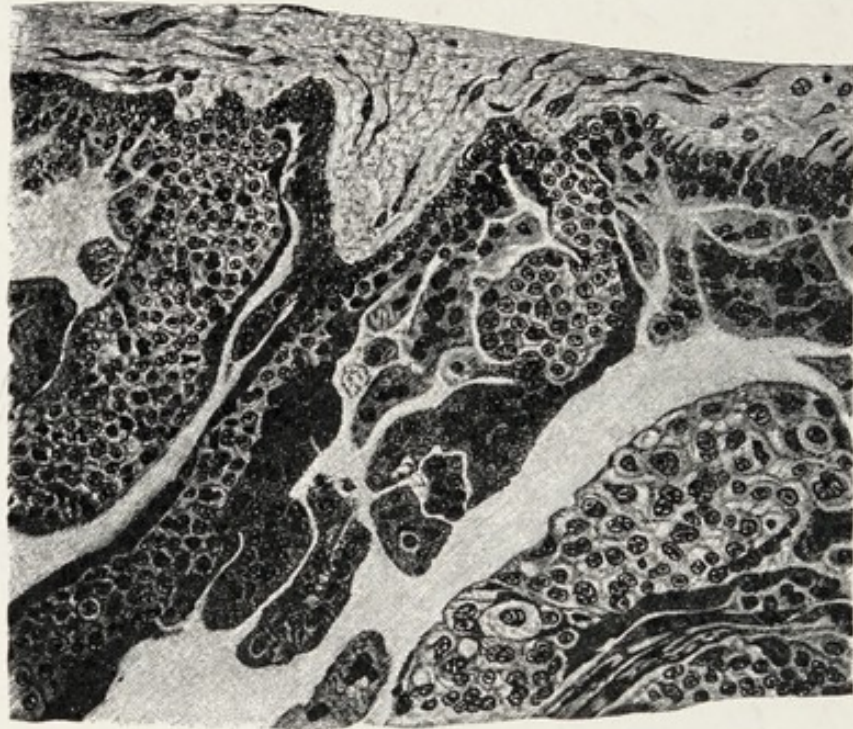


FIG. 109.—PORTION OF A CHORIONIC VILLUS FROM A CHORION-EPITHELIOMA, SHOWING THE ORIGIN OF THE TUMOUR FROM THE EPITHELIUM OF THE VILLI. (AFTER JOHN H. TEACHER.)

deported by the blood-stream, to lodge in lungs, bones, and other viscera, and grow into secondary deposits. The common situations for these deposits are the lungs and vaginal veins.

The course of the disease is marked by oft-recurring profuse bleeding from the uterus, rigors, pyrexia, great emaciation, and the signs of dissemination, such as secondary nodules in the lungs, bones, and the abdominal viscera. The disease is fatal, and often runs a very rapid course.

The chief clinical signs are frequent bleeding from the uterus, producing great anæmia, accompanied usually by enlargement of the uterus following a recent labour or miscarriage. Many of these signs are caused also by the



retention of a fragment of placenta, or a uterine mole. In such circumstances the cervical canal should be dilated, and the cavity of the uterus explored. Any retained products of conception that are removed should be submitted to careful microscopic examination, in order to establish a reliable diagnosis.

*Treatment.*—The most satisfactory method of dealing with this disease is prompt removal of the uterus. Teacher considers it reasonable to conclude that operation offers a fair chance of recovery, and that it may be done with some prospect of success in the face of the gravest signs of disease, and even of metastasis, having occurred. This investigator has also proved that secondary deposits of chorion-epithelioma in the lung may undergo spontaneous healing. This is due to the encapsulation of the growth by a zone of actively proliferating connective tissue.

#### CHORION-EPITHELIOMA OF THE FALLOPIAN TUBE AND THE OVARY

This malign disease attacks the Fallopian tubes and produces symptoms resembling those of tubal pregnancy: these subside, and there is a period of quiescence followed by rapid increase in the size of the tumour, accompanied by pain and severe constitutional disturbances. Cope has recently reported a case that occurred in a woman aged forty-five. He collected the cases and ascertained that in no instance had a hydatid tubal mole preceded tubal chorion-epithelioma.

Operative treatment is attended by a high mortality, and in those who recover, quick recurrence and death is the rule.

Fairbairn has described an example of chorion-epithelioma of the ovary. The woman was reported to be in good health two years after the operation.



## CHAPTER XXXVII

### TUMOURS OF THE FALLOPIAN TUBES—DISEASES OF THE CORPUS LUTEUM—APOPLEXY AND CIRRHOSIS OF THE OVARY

THE tumours found in the Fallopian tube are adenoma, carcinoma, and chorion-epithelioma.

**Adenoma.**—Tumours composed of glandular tissue have on several occasions been observed growing from the tubal mucous membrane. An adenoma of the Fallopian tube may assume the dendritic form of a large papilloma, or consist of a mass of cyst-like swellings and resemble a bunch of grapes. The stroma of the tumour consists of delicate connective tissue in which glandular acini, lined with a single layer of columnar epithelium, are embedded. Some of the cysts present in these tumours contain intracystic processes. A curious feature connected with these tumours is the presence of free fluid in the belly—hydroperitoneum. This is due to the secretion from the adenoma escaping through the abdominal ostium of the tube and irritating the peritoneum. Although the peritoneal fluid may be evacuated, it accumulates as long as the adenoma is allowed to remain. Removal of the adenoma at once and permanently arrests the effusion.

The inner wall of a dilated Fallopian tube (hydrosalpinx) is occasionally beset with warts (papillomata).

**Carcinoma.**—The fact that the Fallopian tube may be the seat of an adenoma leads us to expect that it would occasionally be affected with primary cancer. Many trustworthy cases have been recorded which establish the fact that this dreadful disease arises in the mucous membrane of the tubes.

The clinical facts concerning it are these—

The patients are generally women about fifty years of age; the chief signs are discharges of blood-stained fluid from the



vagina. This deadly disease seems to attack those who have had children, as well as those who are sterile. The outlook for the patient is not good, for the disease, as a rule, returns quickly after the affected tube has been removed.

In two remarkable cases under our care (Fig. 110) the disease was associated with large uterine fibroids. In each instance the disease arose in the ampulla of the tube, but

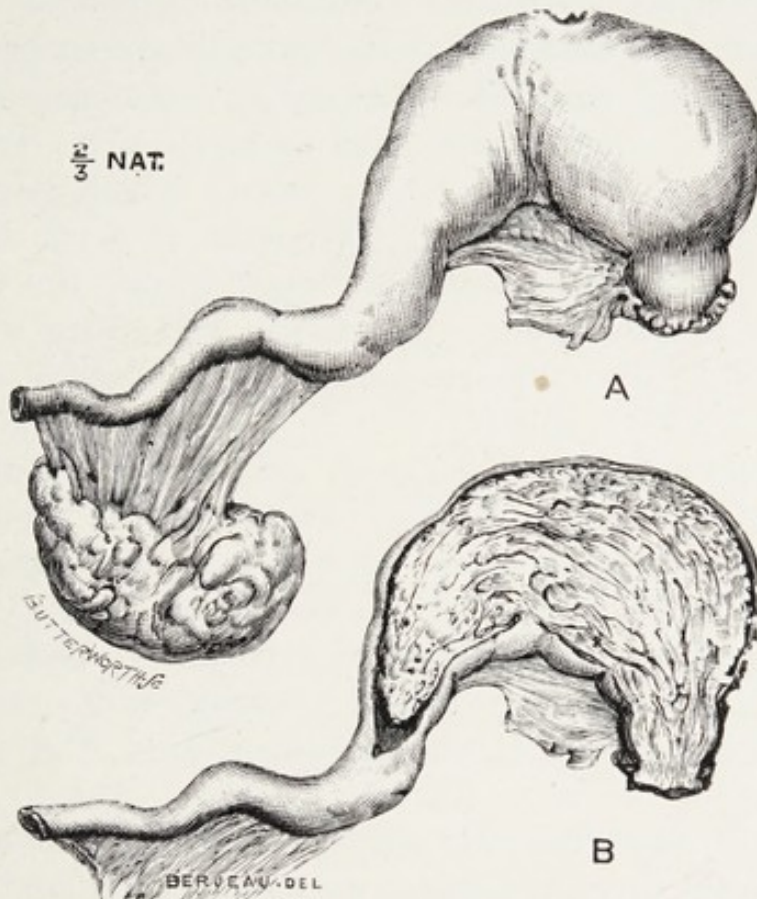


FIG. 110.—A, AMPULLA OF A FALLOPIAN TUBE OCCUPIED BY A PRIMARY CANCER; B, THE AMPULLA OF THE TUBE SHOWN IN SECTION.

in one it crept through the cœlomic ostium and infected the peritoneum, whilst in the other the disease led to occlusion of the ostium, but made its way along the tube to the uterus.

When cancer arises in the mucous membrane of a Fallopian tube and the cœlomic ostium becomes occluded, there is good reason to believe that this event is favourable for the patient, as it delays implication of the peritoneum. Cases are known in which primary cancer of the tube and an ovarian cyst have co-existed. The cyst in such conditions has become infected.



**Chorion-epithelioma.**—This dread disease may arise in the Fallopian tubes as a sequence of tubal pregnancy. Fortunately, it is uncommon, for it is very fatal.

Before commencing the description of ovarian tumours and cysts it will be convenient to describe some changes that are met with in relation to the corpus luteum and the ovarian stroma.

**The Corpus Luteum.**—This curious body is liable to the following secondary changes; it may be converted into a cyst, become a corpus fibrosum, calcify, or suppurate.

(a) *Cystic Corpora Lutea (Lutin Cysts).*—The centre of a corpus luteum is occupied by a cavity which in the early stages is filled with blood. The walls of such cysts are thick, and of a bright yellow when fresh; the cavity is lined with a thin delicate membrane and filled with albuminous fluid. The importance of these cysts is discussed in Chap. XXXVI, p. 332.

(b) *Corpora Fibrosa.*—These are tough, semi-opaque bodies, and are due to fibrous changes in the tissue proper of a corpus luteum. Many contain a small central cavity, others a laminated body. Less frequently they become calcified. Sometimes a corpus fibrosum is pedunculated, and is then apt to be regarded as a supernumerary ovary. Corpora fibrosa may attain the dimensions of a hen's egg (Patenko).

*Ovarian Concretions.*—In very rare instances blood effused into enlarged ovarian follicles may undergo colloid changes, and form dense bean-shaped bodies.

(c) *Calcified Corpora Lutea.*—When calcified, a corpus luteum may be irregular in shape or rounded; it is usually a bright yellow, and consists of tough fibrous tissue impregnated with calcareous particles.

These bodies are firmly embedded in the ovarian stroma; the concretion may be nodulated on its outer surface like a mulberry calculus, and lodged in a cyst in the substance of the ovary. Two calcified corpora lutea may be present in one ovary (Fig. 111); they must not be confounded with calcified corpora fibrosa.

**Apoplexy of the Ovary.**—The rupture of a mature ovarian follicle is always accompanied by a trifling amount



of bleeding; when a follicle is unusually large, the blood-clot occupying it may be as big as a ripe gooseberry. Follicular hæmorrhage of this character rarely gives rise to any serious consequences.

Occasionally blood is extravasated so freely into a follicle that it bursts the walls and invades the stroma, converting the organ into a spurious cyst, the walls of which are formed of expanded ovarian tissue and the cavity filled with blood.

For such conditions the term "apoplexy of the ovary" should be reserved. It may be defined as *hæmorrhage into*

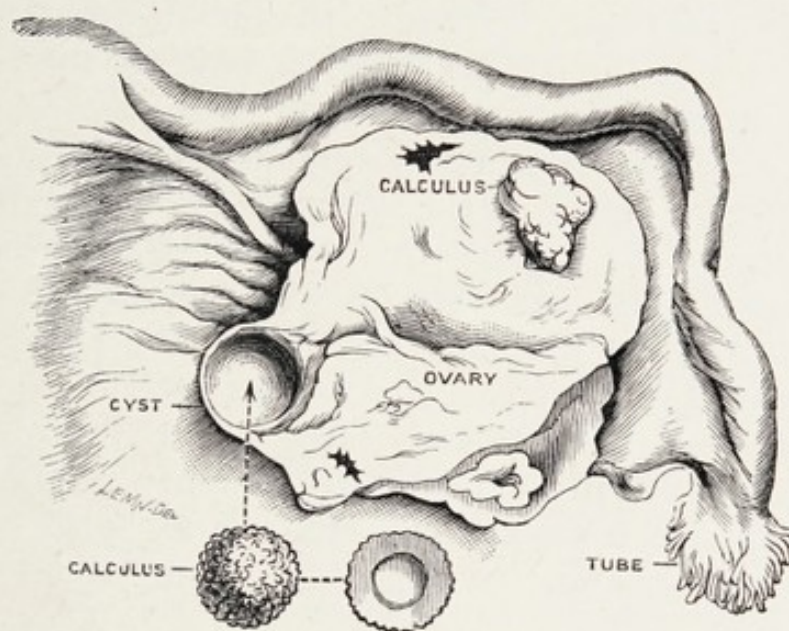


FIG. 111.—CALCIFIED CORPORA LUTEA.

the ovarian stroma through rupture of a follicle (Doran). Cases have been reported in which the ovary has been enlarged from this cause to the size of a billiard-ball.

Cases of this kind in future require careful investigation, for some may prove to be instances of early ovarian pregnancy (see Chap. XX).

Blood extravasated into the ovarian stroma undergoes the same change as when it escapes into other solid organs; that is, the fluid parts are absorbed, and the clot gradually becomes decolorized until nothing but a yellowish mass of fibrin remains. Occasionally it will be of a dirty brown, resembling that found in an old hæmatocele of the tunica vaginalis testis.



Extravasation of blood in the ovarian stroma occurs when the ovary undergoes axial rotation.

Care must be exercised to avoid mistaking apoplexy of the ovary with hæmorrhage into the cavity of a small ovarian cyst, or extravasation secondary to axial rotation of an enlarged ovary.

**Cirrhosis of the Ovaries.**—Ovaries are occasionally met with, in women between twenty and forty years of age, presenting a peculiar wrinkled appearance. Such ovaries are said to be cirrhotic, because the ultimate effect upon the proper tissue of the ovary is similar to that seen in hepatic, renal, and pulmonary cirrhosis—that is, destruction of the proper tissue of the liver, kidney, or lung, as the case may be. The great difference in fibrosis of the ovary, as compared with this change in other organs, is that in the ovary the connective tissue of the stroma shows no evidence of inflammation. In a cirrhotic liver the interstitial tissue is infiltrated with small round cells, but in the cirrhotic ovaries this is not the case, even when this change occurs in the ovaries of a woman who has also a cirrhotic liver.

The changes described as cirrhosis or fibrosis of the ovaries, occurring in women between twenty and forty years of age, require investigation. Even the cause or causes producing the change are imperfectly understood.



## CHAPTER XXXVIII

### DERMOIDS AND CYSTS OF THE OVARIES

THE ovary is a complex organ histologically and morphologically, and this fact explains in a measure the frequency and variety of the tumours which arise therein.

The ovary consists morphologically of three parts (Fig. 112)—

**The Oöphoron.**—This forms the free surface of the ovary and contains the follicles.

**The Paroöphoron.**—This is sometimes called the hilum of the ovary, and consists of fibrous tissue. It never contains follicles, and in young ovaries glandular tissue, vestiges of the mesonephros (Wolffian body) may be found in it.

**The Parovarium** (Epoöphoron).—A tubular structure lying between the layers of the mesosalpinx. The tubules terminate in the paroöphoron, and at the opposite end open into the duct of Gartner, which may sometimes be traced to the vagina.

The tumours that arise in the ovary will be described in the following order: Cyst-adenomas (multilocular glandular cysts); embryomas (dermoids); papillomatous cysts; parovarian cysts; Gartnerian cysts; endotheliomas; and carcinoma. (Lutein cysts are described in Chap. XXXVII.)

**The Oöphoron** is the source of cyst-adenomas, embryomas, and lutein cysts. A simple way of recognizing an oöphoronic tumour is to note the relation of the Fallopian tube; it lies curled up on the cyst, and when the parts are stretched the tube and tumour are separated by the mesosalpinx.

**Cyst-adenomas.**—These are important tumours. They possess a fibrous capsule and internally consist of a



great number of loculi, some of which will scarcely accommodate a pea, whilst others hold one litre or more of fluid.

The loculi in the early stages of growth are lined with tall columnar epithelium, and the walls contain mucous glands. In some tumours the lining membrane is indistinguishable from mucous membrane. The fluid contained in such loculi is identical with mucus, and it varies in consistency from that of the white of an egg to the gluey condition of jelly. Cyst-adenomas sometimes attain enormous dimensions. Dr. Reifsnyder, a lady missionary at Shanghai, removed

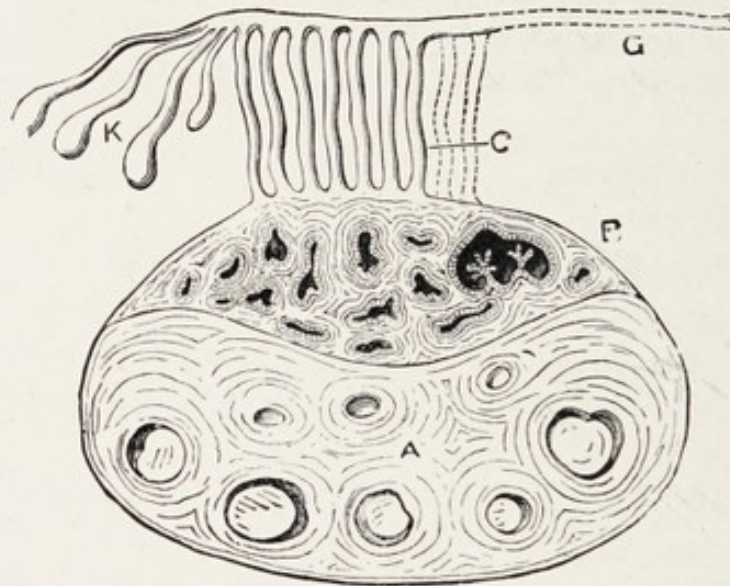


FIG. 112.—A DIAGRAM SHOWING THE CYST AND TUMOUR REGIONS OF THE OVARY.

A, Oöphoron; B, paroöphoron; C, parovarium; K, Kobelt's tubules; G, Gartner's duct.

from a Chinese woman, aged twenty-five, a tumour of this kind that yielded 100 litres of fluid.

**Embryomas (Dermoids).**—A large proportion of cysts arising in the oöphoron contain skin or mucous membrane, or both these structures, and some of the organs arising from and peculiar to them, such as hair (Fig. 114), sebaceous, sweat, mucous, thyroid, and mammary glands, as well as bone, horn, nails, and teeth (Fig. 113). Such tumours are now called embryomas. They may be unilocular or multilocular and attain a weight of 20 or even 40 kilogrammes.

It is impossible to separate adenomas and embryomas



from each other. Occasionally a tumour will display an internal lining of stratified epithelium that would serve either for skin or mucous membrane, yet if it possess a few hairs it is called skin and the cyst is classed as an embryoma. The contents of such a cyst is a mixture of shed epithelium, fat, and loose hair. In many complex multilocular dermoids some of the loculi contain mucous membrane and are filled with mucus; others possess hairs, and a few may be quite barren.

It is impossible to determine in many cases from a mere naked-eye examination whether an oöphoronic tumour should be regarded as an adenoma or a dermoid. In prac-

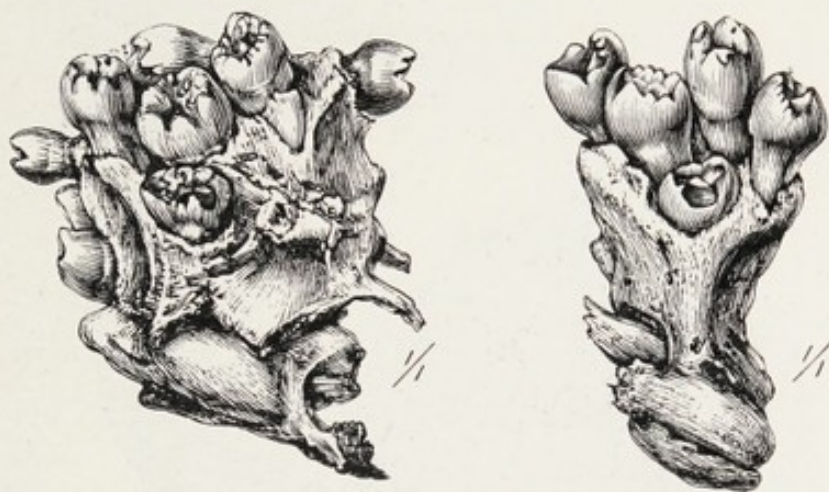


FIG. 113.—TEETH AND BONE FROM AN OVARIAN DERMOID.

tice the presence of a tuft of hair or a tooth is a useful and ready way of settling the question. Failing this, a careful microscopical examination is necessary.

Cysts of the oöphoron occur at all periods of life, and even in young girls sometimes reach a great size. Instances are known in which the tumour weighed more than the body of the patient. In one case a girl weighed 27 kilogrammes and her tumour 44 kilogrammes (Keen). Ovarian dermoids have been seen as early as the first year of life and as late as eighty-three.

**The Embryonic Rudiment.**—It is quite common to find in the interior of ovarian dermoids one or more tags of skin resembling a nipple or teat, associated with hair and teeth. These teats may be small, but usually they are conspicuous (Fig. 114). These nipple-like processes have



assumed some importance since Wilms has pointed out that an ovarian dermoid presents two parts—namely, a cyst and an embryonic rudiment. The cyst is composed of fibrous tissue arranged in wavy bundles; its inner aspect is lined with loose connective tissue, and at one part it presents a skin-covered surface of variable extent, usually beset with



FIG. 114.—OVARIAN DERMOID SHOWING THE EMBRYONIC RUDIMENT AND HAIRS.

hair. Associated with this skin-covered surface there is an “embryonic rudiment,” usually in the form of a nipple-like process: this rudiment may be inconspicuous or large and complex. For the pathologist the “rudiment” is of the greatest interest, but for the surgeon the cyst and its contents are the most important. The grease, oil or lumps of suet, epidermis, hair, etc., shed from the cutaneous surface of the “rudiment” make up the bulk of the tumour. These observations have led some writers to return to the old view



that a dermoid in the ovary may represent an attempt to form a foetus independent of impregnation. Apart from speculations of this kind, the more recent researches on the nature of these tumours show that some of these ovarian embryomas in children display malignancy. Cases have been observed and carefully recorded in which these tumours

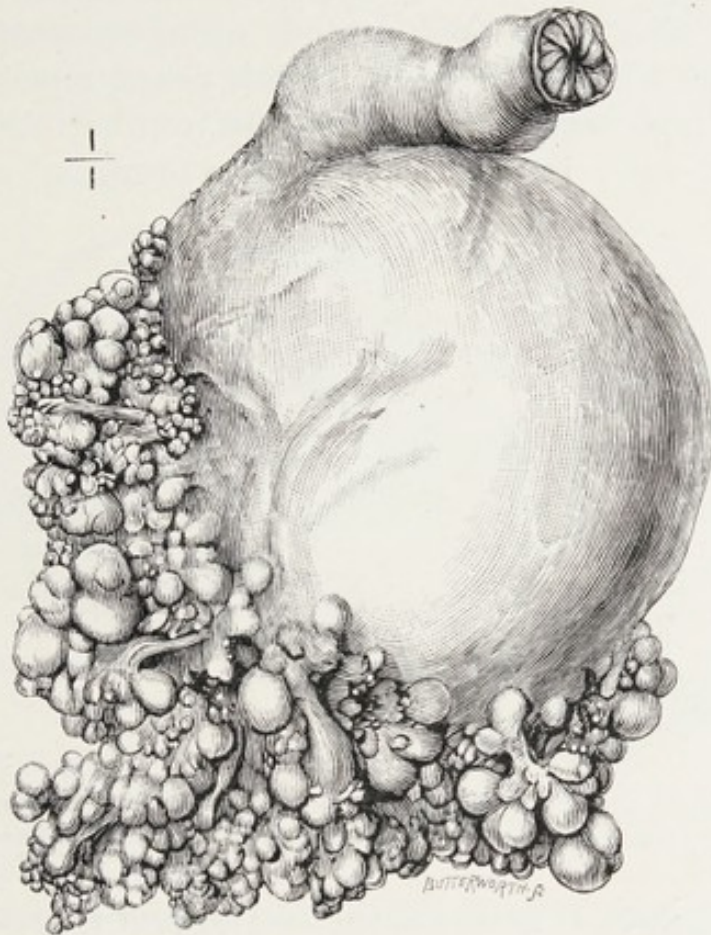


FIG. 115.—PAPILLOMATOUS CYST OF THE OVARY. SOME OF THE PAPILLOMAS ERODED THE CYST WALL AND PROTRUDED INTO THE PERITONEAL CAVITY. THERE WAS AN ABUNDANT HYDROPERITONEUM. THE DISEASE WAS BILATERAL.

From a woman aged forty-three.

have disseminated in the peritoneum, and the secondary nodules contained cartilage, epithelial pearls, hair, and even nerve cells. Such tumours are called malignant embryomas.

**The Paroöphoron.**—The tissues composing the hilum of the ovary have been the subject of much careful histologic investigation, and are believed by some writers to be the source of papillomatous cysts.



**Papillomatous Cysts.**—These differ from simple cysts of the ovary in the fact that they are invariably unilocular and their inner walls are beset with warts.

These cysts do not affect the shape of the ovary until they have attained an important size; they always burrow between the layers of the mesosalpinx, and, when large, make their way between the layers of the mesometrium by the side of the uterus. Papillomatous cysts are most frequent between the twenty-fifth and fiftieth years, and are usually bilateral. The warts vary greatly in number. Some cysts contain but few; in others they are so luxuriant as to cause

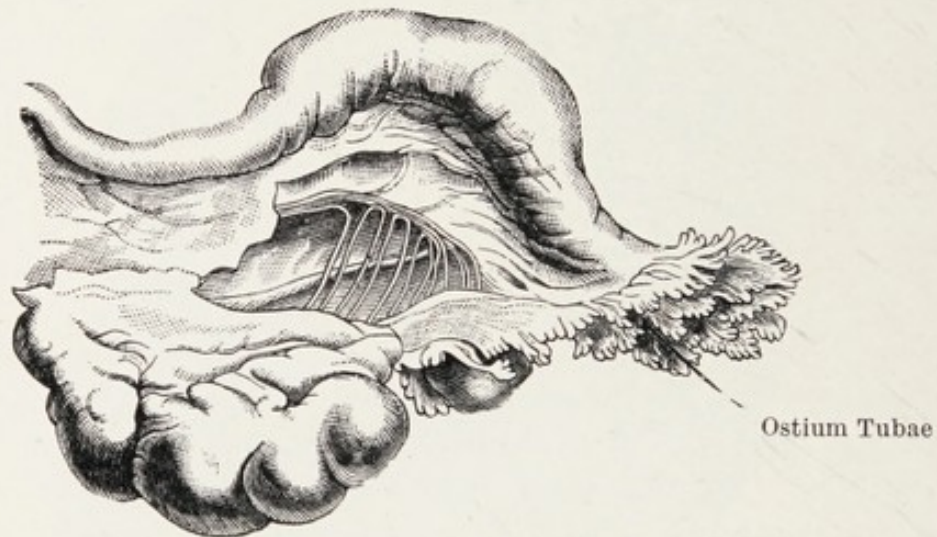


FIG. 116.—THE OVARY, FALLOPIAN TUBE, AND THE MESOSALPINX, WITH ITS POSTERIOR LAYER REMOVED TO DISPLAY THE PAROVARIIUM.

the cyst to burst (Fig. 115); the warts then protrude as soft dendritic vascular masses, and the surface cells become detached and engraft themselves on the peritoneum and form secondary warts. This accident is usually followed by hydroperitoneum. The exudation of fluid is due to the presence of the warts, and when the primary papillomatous cysts are removed the fluid ceases to accumulate. The microscopic structure of some of these papillomas recalls the structure of chorionic villi. There are probably two varieties—of which one is benign and the other malignant. The amount of fluid exuded into the abdomen in response to the irritation of papillomas on the peritoneum is sometimes almost beyond belief.

**Parovarian Cysts.**—The cysts which arise in the



parovarium (Fig. 116) are of two kinds. The most frequent are small pedunculated cysts arising in Kobelt's tubes; they are of no clinical interest. The most important cysts are sessile and remain between the layers of the mesosalpinx. When the cyst is large, the Fallopian tube is stretched across its crown (Fig. 117).

Small parovarian cysts are, as a rule, transparent, but when they exceed the size of a coco-nut the cyst-walls become thick and opaque. Small cysts are lined with columnar epithelium, which is sometimes ciliated; in cysts

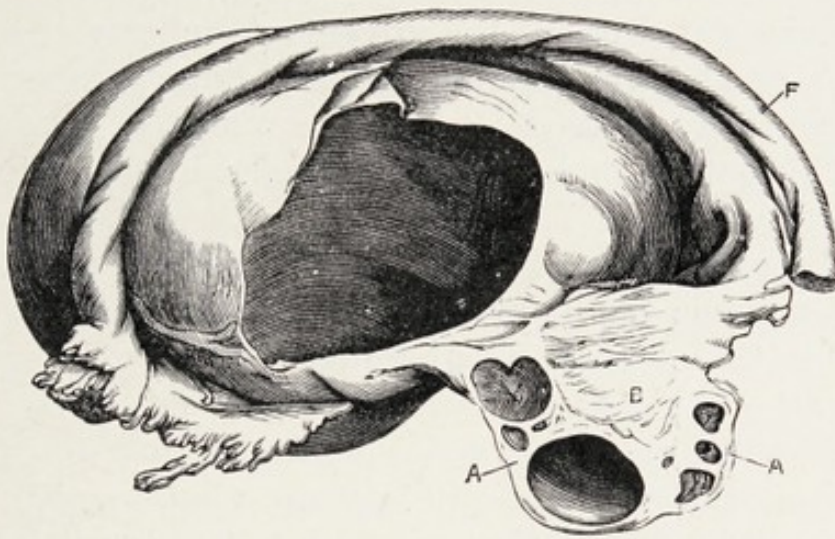


FIG. 117.—A SMALL CYST OF THE PAROVARIIUM, SHOWING ITS RELATION TO OVARY AND TUBE. (Two-thirds its natural size.)

A, Oöphoron; B, Paroöphoron; F, Fallopian Tube.

of moderate size the epithelium becomes stratified, and in large cysts it disappears.

The fluid they contain is limpid and slightly opalescent; specific gravity, 1002 to 1007; reaction slightly alkaline. A substance precipitated by alcohol is present in large quantity.

In large cysts the fluid is often turbid, and may contain cholesterin. When parovarian cysts rupture into the cœlom (peritoneal cavity) the fluid is quickly absorbed and excreted by the kidneys.

The chief anatomical points which enable a parovarian to be distinguished from an oöphoronic cyst are—

1. The peritoneal coat is easily stripped off;
2. The ovary is usually attached to the side of the cyst;



3. The cyst is, as a rule, unilocular ;
4. The Fallopian tube is tightly stretched across the cyst, and does not communicate with it.

The age at which parovarian cysts occur is of some interest. It has already been mentioned that cysts of the oöphoron are encountered at any period, from foetal life up to extreme old age. The occurrence of a parovarian cyst has not so far been recorded in an individual before the age of sixteen. Many undoubted cases have been observed at seventeen, eighteen, and nineteen, the cysts being large enough to rise above the pubes. Before sixteen the parovarium appears to be quiescent, but on the advent of puberty it seems to undergo great stimulation. A very large proportion of cysts, generally classed as ovarian, removed between the ages of seventeen and twenty-five, arise in this interesting structure.

**Gartnerian Cysts.**—There are good reasons to believe that some papillomatous cysts of the mesometrium, especially those which burrow deeply by the side of the uterus, arise in persistent portions of Gartner's duct.

Cysts of this character which burrow deeply often entail risk in removal, as they lie in intimate relation with uterus, ureter, and bladder; the cyst, when large, will come in contact with the iliac arteries and veins at the brim of the pelvis, and even rest upon the inferior vena cava.

Gartnerian cysts arising in the terminal segment of the duct project into the vagina.

There is a variety of papillomatous cyst arising in the mesosalpinx independently of the ovary or Gartner's duct. These cysts are found near the junction of the tubo-ovarian ligament with the ovary, and burrow between the layers of the mesosalpinx.

When fresh they are transparent, and resemble incipient parovarian cysts. The most striking feature of these cysts is the almost invariable presence of a tuft of warts. It is difficult to be sure of the presence or absence of these warts without opening the cyst. They are composed of very dense fibrous tissue. In this respect they differ in a striking manner from the soft papillomatous masses depicted in Fig. 115.



## CHAPTER XXXIX

### OVARIAN FIBROIDS, SARCOMA, AND CARCINOMA

**Ovarian Fibroids.**—Tumours composed of fibrous tissue arranged in the whorled manner characteristic of the hard uterine fibroid, and with the same microscopic structure, occur in the ovary, and, like the uterine fibroids, are encapsuled. Ovarian fibroids have a disposition to occur towards that pole of the ovary remote from the ligament. When the tumour is small (Fig. 118) the disproportion between it and the ovary is not so marked, but when one of these tumours measures 20 or 30 centimetres in its long axis—for they are nearly always ovoid—the small bud-like remnant of the ovary on the uterine pole of the tumour is very incongruous. Ovarian fibroids are innocent tumours, though occasionally complicated with hydroperitoneum. They have a wide age-limit; in patients under our own observations with this disease the youngest was nineteen and the oldest seventy-three. These tumours are liable to twist their pedicles, and to complicate pregnancy. They are occasionally bilateral and sometimes co-exist with uterine fibroids. They are easily removed, and the results of operation, immediate and remote, are excellent.

Tumours of the ovary supposed to be **myomas** were probably ovarian fibroids.

**Sarcomas.**—The ovary (like the kidney and retina) is very prone to become the seat of sarcoma in early life. To this succeeds a period of comparative immunity, followed by a second period of renewed but diminished liability.

Sarcomas of infant life attack both ovaries in more than half the cases; they grow rapidly, infiltrate the ovary throughout, attain a formidable size, and quickly destroy life.



Structurally, they consist of round and spindle-celled elements in which collections of cells are often conspicuous, resembling the alveolar disposition characteristic of cancer. These supposed alveoli are ovarian follicles entangled in the general overgrowth of the ovarian stroma. It may be taken as a useful rule that the softness of an ovarian sarcoma, especially in young women, is a fair indication

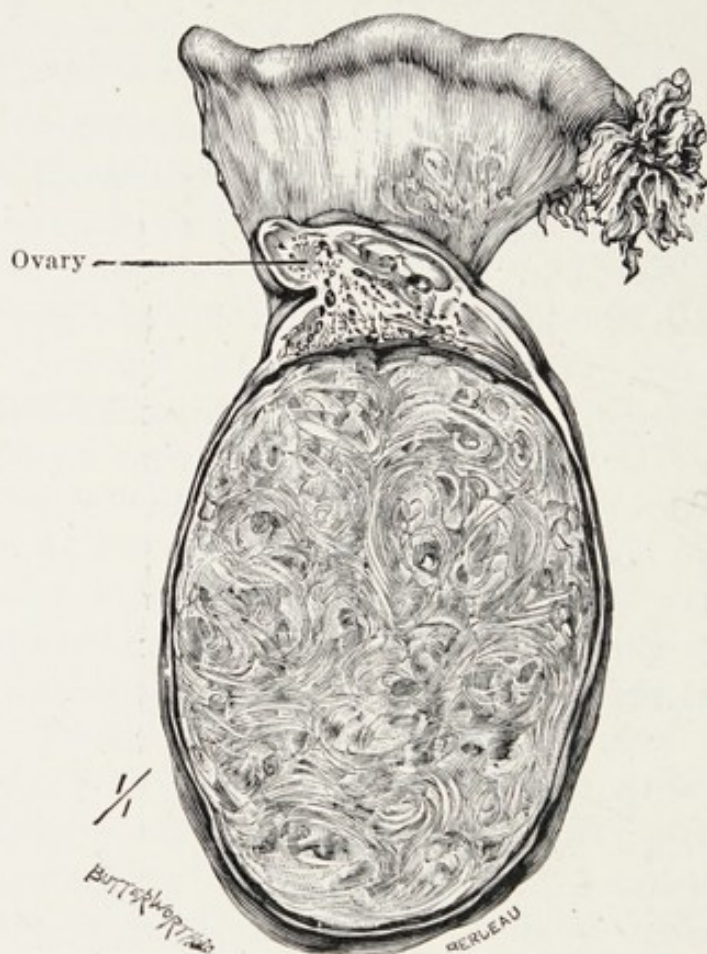


FIG. 118.—OVARIAN FIBROID IN SECTION.

of its degree of malignancy. Those very soft tumours which resemble a boiled suet-dumpling are excessively malignant; fortunately they are not common.

The first period of exceptional liability ends at puberty. Ovarian sarcomas are very rare from the sixteenth to the twenty-fifth year. From this age to forty-five they are met with occasionally, and are in most cases unilateral. They rapidly destroy life. Ascites complicates the last stages.

**Melano-sarcoma of the Ovary.**—Many examples of



melanomatous deposits in the ovary have been observed; with few exceptions they have been secondary to primary tumours in the skin or in the eye.

**Carcinoma of the Ovary.**—Primary cancer of the ovary is a rare disease, and one concerning which we know little. We have come to learn that the ovaries are common situations for secondary cancer, especially when the disease arises primarily in the breast, gastro-intestinal tract, or the



FIG. 119.—AN OVARIAN TUMOUR IN SECTION.

It consists of nodules of carcinoma. The primary growth arose in the colon.

gall-bladder (Fig. 119). In a fair proportion of patients both glands are infected, and in some instances the ovaries are so enlarged as to be obvious as tumours on physical examination.

Schlagenhauser published a valuable inquiry showing the frequent association of malignant disease of the ovary with carcinoma of the stomach, intestine, and gall-bladder. In addition to some personal cases, he has collected a large number of recorded observations, making a total of seventy-nine cases, and among these in sixty-one cases the primary



focus was in the stomach, ten in the bowels, and seven in the gall-bladder or its associated ducts. The relation between the primary cancer and the masses in the ovary is demonstrated by the fact that the structure of the ovarian tumours varies according to the situation in the gastrointestinal tract of the primary disease. In studying Schlagenhauser's tables it is astonishing to find in what a large proportion of patients ovariectomy, unilateral or bilateral, had been performed, and the primary cancerous focus in the stomach overlooked in spite of the presence of typical signs of gastric disturbance, especially persistent vomiting, and progressive emaciation.

The practical outcome of these observations is very important, and amounts to this: In cases of bilateral solid tumours of the ovary, if accompanied by vomiting and ascites, a careful and accurate examination should be made of the abdominal viscera, especially the stomach.

It is also significant that whenever surgeons have made inquiries into the remote results of ovariectomy they have been astonished to find that many of the patients have perished from recurrence in the abdomen, or from intestinal obstruction. The fact that many solid tumours of the ovaries are metastatic offers an explanation of some of these unhappy sequences.

We have often been puzzled on examining large deposits of cancer in the ovaries secondary to mammary or gastric carcinoma to satisfy ourselves how these things come to pass. The riddle is, we think, solved by Handley's discovery of the mode in which mammary cancer involves the abdomen. He has demonstrated in a most convincing manner that cancer spreads by permeating the deep fascia. By an insidious process the cancer cells slowly creep along the lymphatics of the fascial plexus until they reach the epigastrium immediately below the ensiform cartilage. At this point the cancer-filled lymphatics of the fascial plexus in the middle line are separated from the subperitoneal fat only by a simple layer of fibrous tissue. Through this weak defence the cancer cells slowly find their way into the general peritoneal cavity, and engraft themselves on the omentum and other suitable visceral plots, whereon



they thrive and grow into metastatic nodules or lumps. Many of these infecting cells are conveyed into the pelvis, and lodge on ovary, Fallopian tube, uterus, or pelvic peritoneum. The fluid normally present in the belly serves as an admirable vehicle for the transport of such cells, easily enabling them to reach the pelvic recesses, where they would remain undisturbed to grow into deadly lumps. If we apply Handley's observations on the serpiginous spread of mammary cancer to a primary cancer in the stomach, gall-bladder, or colon, we may read its course in this way: Arising in the mucous membrane, it slowly permeates it, and implicates the submucous, muscular, and peritoneal coats. The cancer cells can then escape freely into the great serous cavity, and be distributed by the fluid, aided by the movements of the bowels, and gradually reach the pelvis and other abdominal recesses. In the pelvis the most obvious organs on which they could fall would be the ovaries, as they so often rest on its floor. Under such conditions the ovaries may be fairly pictured in the mind receiving a covering of falling cancer cells, like evergreen shrubs are clothed by snowflakes in winter.

The fact that other parts of the internal genitalia receive these cells is a matter of some importance, because one of the most striking features of operations for the removal of malignant ovaries is the rapidity with which the disease recurs. Lockyer made a valuable observation relating to this. He examined microscopically the tumours removed for bilateral carcinomatous disease, and although the attached tube and mesosalpinx belonging to each tumour appeared normal to eyes and fingers when examined microscopically, they were found extensively infected with cancer through the lymphatics.

*Treatment.*—The outcome of these pathological observations will determine those who have to deal with bilateral malignant tumours of the ovaries to examine the patient carefully for evidence of primary cancer in the gastro-intestinal tract. If the disease is in such a position that it can be excised with good prospect of success this may be done. Then it will be necessary to remove not only the infected ovaries, but the tubes, adjacent segments of the mesometria,



and the uterus. Operations of this kind can only be carried out with hopeful prospects when there is no other evidence of gross infection than that afforded by the ovaries.

When the nature of solid malignant tumours of the ovaries comes to be more thoroughly appreciated by those who devote their attention to the surgery of the pelvic organs, it may enable them to contemplate the clinical aspect of the case with a wider knowledge of its surroundings, and perhaps save themselves and their patients much acute disappointment.



## CHAPTER XL

### THE SECONDARY CHANGES AND COMPLICATIONS OF OVARIAN TUMOURS

MANY of the secondary changes to which ovarian tumours are liable imperil life. The chief changes are : (1) Septic infection ; (2) axial rotation ; (3) rupture.

**1. Septic Infection.**—Contamination may arise from puncture with a trocar or aspirating needle. More frequently it arises from the entrance of gases from the intestine, due to adhesion of the tumour to an adjacent coil of bowel or to the vermiform appendix, or to infection from the Fallopian tube. In a case under our care suppuration in an ovarian cyst was due to a fishbone piercing the wall of the rectum and penetrating the cyst.

The result of the suppuration is to set up almost universal adhesions to surrounding structures ; in acute cases severe symptoms arise, and unless the pus finds an exit the patient dies. Even when the pus finds an outlet the patient leads a miserable existence, becomes emaciated by the prolonged discharge, and dies worn out by suffering.

In *acute suppuration* of a large ovarian cyst the symptoms are very characteristic. The patient presents the usual signs of an ovarian tumour, with pain and tenderness on pressure ; the pulse is rapid and feeble, and accompanied by great emaciation and exhaustion. The temperature is at first high, standing at 100° or 102° F. in the morning, and rising to 103° or 105° F. in the evening. As the patient becomes more and more exhausted towards the close of the case, the temperature may fall, and has been recorded as low as 95° F. This low temperature has been observed in cases where the pus was unusually offensive. In many cases the urine contains albumin. The cyst sometimes contains gas. Under such conditions the tumour dullness



is replaced by a highly tympanitic note. It is a fact of some interest that suppurating ovarian cysts have given rise to signs simulating typhoid fever, and the patient has been treated for this disease until the accidental discovery of the tumour made the case clear. Suppuration of an ovarian cyst has followed an attack of typhoid fever, and typhoid bacilli have been found in the pus. In order to prove that the bacillus in the pus from a suppurating ovarian cyst is *B. typhosus*, cultures must be made on special media and the agglutination test employed.

*Suppurating dermoids* of the ovary are by no means infrequent, and, like other forms of ovarian cysts, when inflamed, they become firmly adherent to surrounding structures. They may burst into the cœlom, the rectum, bladder, vagina, or even through the abdominal wall near Poupart's ligament, or at the umbilicus. The sebaceous matter in dermoids appears to be a favourite medium for the bacillus typhosus (Coe).

*Adhesions*, from whatever cause arising, are a source of anxiety to the operator when they are abundant. A few straggling omental adhesions are of no moment, or a few fibrous bands connecting the cyst to the anterior abdominal wall; but when tracts of small intestine or colon are firmly united to the cyst-wall by broad fibrous bands, or the tumour is fixed to the pelvic peritoneum by dense adhesions, the task of removing the tumour is very anxious, tedious, and occasionally impossible.

The mode by which adhesions arise is identical with the process by which bands form in connection with the intestines. The peritoneum becomes inflamed, and the exudation which accompanies that process—the so-called lymph—organizes and undergoes slow conversion into fibrous tissue. When the parts united by this material remain in apposition, whilst it organizes, a sessile adhesion results. When there is movement between the parts during the process, then the uniting material becomes elongated into bands—broad or narrow, according to the extent of surface involved.

**2. Axial Rotation.**—Abdominal tumours of all kinds are liable to turn round on their axis—a movement which leads to twisting (or torsion) of the pedicle, and interferes



with the circulation in the tumour. Ovarian tumours, large and small, are very liable to rotate. This movement frequently occurs when an ovarian tumour complicates pregnancy or a uterine fibroid; it has been especially noticed to follow the diminution in size of the uterus after delivery at term, or abortion. In one instance in which a prolapsing uterus was associated with an ovarian cyst, the dragging of the uterus as it slipped out of the vagina caused the cyst to rotate and twist its pedicle; it became impacted in the pelvis, and prevented replacement of the uterus until the cyst had been removed.

Rotation of a cyst in the early stages of pregnancy is due probably to the gradual enlargement of the uterus displacing the tumour upward; as the pressure is exerted upon one side of the cyst, it would be in a favourable position to impart a rotary motion to a non-adherent cyst.

The *amount* of rotation varies greatly. In some cases the cyst has only turned through half a circle; in others as many as twelve complete twists have been counted. The direction of the rotation may be from right to left, or *vice versa*, but cysts exhibit a stronger tendency to rotate toward the middle line than away from it. Tumours of the right and left sides are equally liable to rotate. In one instance, at least, in a case of bilateral ovarian dermoids, both tumours had twisted pedicles (Doran).

The effect of torsion on the circulation depends on the tightness of the twist, and this varies with the thickness of the pedicle. The vessels in a long, thin pedicle would suffer obstruction quicker than those in a short and thick one. When a pedicle is twisted, the thin-walled veins become compressed, whilst the more resilient arteries continue to convey blood to the cyst. The result is severe venous engorgement, and this leads to extravasation of blood into the cyst-wall; in many cases the veins rupture, and hæmorrhage takes place into the cavity of the cyst. The hæmorrhage may be so profuse as to cause the cyst to burst. Cases have been reported in which a patient has died in a few hours from this cause.

Occasionally the tumour will be completely detached from its pedicle in consequence of torsion. The force with



which large cysts rotate is very great, for in some instances the uterus is involved in the twist. Parovarian cysts are liable to rotation and even complete detachment (Fig. 120),

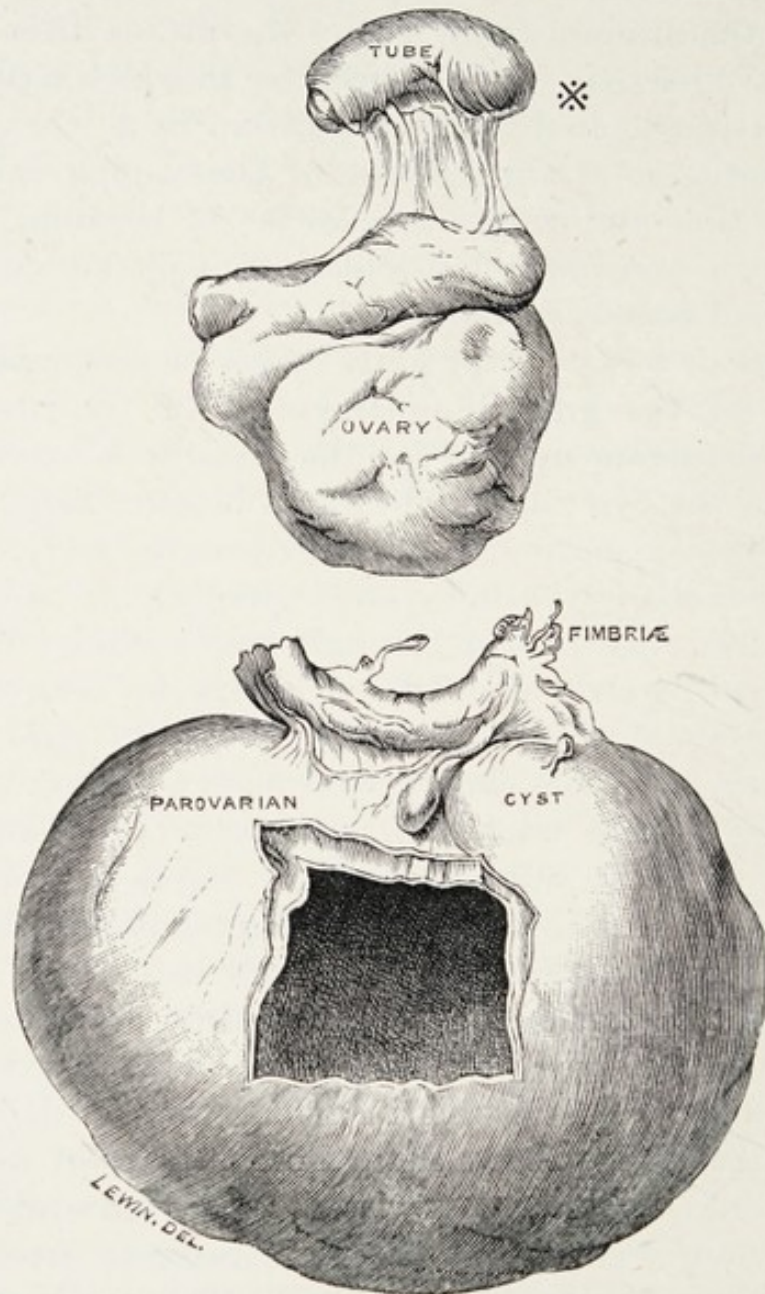


FIG. 120. OVARY AND STUMP OF A FALLOPIAN TUBE, LEFT AFTER AXIAL ROTATION, ENDING IN COMPLETE DETACHMENT OF A PAROVARIAN CYST.

\* The rounded stump of the tube at the point of detachment.

and in one recorded instance the ovary was involved in the twist and completely divided (Comyns Berkeley).

The signs of acute rotation of an ovarian cyst are often so characteristic as to lead to a correct diagnosis. When a woman complains of sudden and violent pain in the



abdomen, accompanied with vomiting, and she is known to have an ovarian tumour, or she presents herself for the first time to the surgeon, and these signs are associated with an abdominal swelling, the physical signs of which are indicative of an ovarian tumour, axial rotation should be suspected. When the patient has an ovarian tumour and is pregnant, or has been recently delivered, this is an additional reason for suspecting that the symptoms arise from a twisted pedicle.

It is important to remember that the predominant signs of acute axial rotation of abdominal organs and tumours are those common to a strangulated hernia minus stercoraceous vomiting, and even this will be present should a piece of gut be involved in the twists of the pedicle.

**3. Rupture.**—Ovarian cysts are liable to burst into the belly either without any obvious cause (spontaneous rupture) or from violence—for example, during “an immoderate fit of laughter,” or whilst stooping to “button the boots,” during vomiting, coughing, the manipulation of a physician, or a fall.

The signs of rupture of an ovarian cyst are : (a) Sudden accession of pain, accompanied by alteration in the shape of the tumour ; (b) subsequent profuse diuresis ; (c) gradual re-accumulation of the fluid in the cyst.

The results of such an accident depend on the nature of the cyst. The rupture of a parovarian cyst is not attended with ill effects ; the cyst may refill and burst repeatedly.

When the rupture of an ovarian cyst is due to axial rotation, then the patient may die from hæmorrhage. In the case of an adenoma, the mucoid material forms a curious sago-like deposit on the peritoneal surface of the viscera. In rare cases, cells from a dermoid will become engrafted on the peritoneum and form secondary dermoids.

The rupture of papillomatous cysts is invariably followed by secondary warts on the peritoneum and hydroperitoneum. When suppurating cysts burst into the cœlom, rapidly fatal peritonitis is the consequence.

Ovarian cysts, especially dermoids, may burst into hollow viscera, usually the rectum or the bladder. When the contents of a dermoid escape into the bladder, it is a source of



great misery, as the hair, teeth, or bones serve as nuclei for phosphatic deposits.

**Modes of Death.**—Tumours of the ovaries are now so promptly removed when discovered that there are happily few opportunities of studying the way in which they destroy life. It will be useful to enumerate the modes of death : (1) Pressure on ureters, hydronephrosis, uræmia ; (2) cystitis, pyelitis ; (3) intestinal obstruction ; (4) suppuration of cyst, septicæmia ; (5) peritonitis from leakage into the cœlom ; (6) large cysts impede respiration by pushing up the diaphragm and thus compressing the lungs ; (7) hæmorrhage from rupture of cyst ; (8) impediment to labour.

**Symptoms and Diagnosis.**—The symptoms which induce women with ovarian tumours to seek advice vary with their size. When the tumour is restricted to the pelvis, the troubles it may cause are different to those it may produce when it is large enough to rise above the pelvic brim and occupy the abdomen. When the tumour is large enough to rise up out of the pelvis, the only troublesome symptom, in a very large number of cases, is progressive enlargement of the belly. This, in a married woman, is often attributed to pregnancy ; in young unmarried women it is a source of annoyance, as it leads occasionally to a suspicion of pregnancy. At other times the pressure effects induced by ovarian tumours, such as troubles with the bladder, hydronephrosis, œdema of the leg, and dyspnœa, induce patients to seek advice.

When the tumour is small enough to be accommodated in the pelvis, it causes trouble by becoming impacted and exercising baneful pressure on bladder, ureters, rectum, and intestines.

Should complications arise (such as axial rotation, inflammation, or suppuration of the cyst), they will lead to detection of the tumour.

In a typical case of ovarian tumour the size of the abdomen is increased. With a big cyst the enlargement is general, but when the tumour is of moderate dimensions it is localized to one or other flank. Local enlargements due to ovarian tumours are always most marked below the level of the umbilicus. The skin of the abdomen some-



times presents a brown discoloration, and the superficial veins may be distended.

On *palpation*, the swelling feels firm and resisting. In cystic tumours its surface is uniform, as a rule, but multilocular cysts may have an irregular surface; this is also true of cystadenomas. Manipulation rarely causes pain. In large cysts a wave of fluctuation can easily be produced; in multilocular cysts the sign is restricted to large cavities. The distinctness with which the wave is perceived depends upon the character of the fluid and the thickness of the abdominal wall.

*Percussion* furnishes valuable evidence. The crown and sides of the swelling are quite dull, but on approaching the loins the dullness gradually gives way to resonance. If, now, the patient be turned to one or other side, we shall find that the alteration in position does not affect the percussion note. In those exceptional cases where the cyst communicates with intestine the swelling yields a tympanitic note on percussion, due to the presence of intestinal gas.

*Auscultation*, as a rule, gives no information. Gurgling of intestines and, occasionally, the pulsation of the aorta may be perceived, and very rarely a bruit has been detected. In non-ovarian tumours this method of physical examination often affords valuable information. After examining the abdomen, the surgeon should explore the parts by an internal examination. As a rule, this is best made through the vagina, but in young unmarried girls it will sometimes be necessary to make the examination by the rectum. In this way the surgeon ascertains the relation of the tumour to the uterus, the condition of this organ, and the state of the rectum. In some uncomplicated cases of ovarian tumour the information furnished by a vaginal or rectal examination is negative, but it should always be undertaken.

The recognition of a large, uncomplicated ovarian cyst is one of the simplest processes in clinical surgery. The signs may be thus summarized: A swelling of the abdomen, most marked below the umbilicus, associated with absolute dullness to percussion all over the tumour, most marked on its summit, and fading away to resonance in the flanks; such dullness is not affected by alteration in the position



of the patient. If such signs be associated with a uterus of normal size, the presumption that the swelling is an ovarian tumour is as certain as most things in clinical medicine.

The *diagnosis* of simple cases of ovarian tumour rarely gives rise to difficulty if the surgeon duly weighs the various signs together, and does not place too much reliance on any one of them. Difficulty arises sometimes in distinguishing between ovarian tumours and conditions which simulate them; the greatest care and skill are needed when diagnosis is complicated by secondary changes in the cyst and by the co-existence of other tumours, abnormal conditions of the abdominal viscera, ascites, or pregnancy.

The diagnosis of ovarian tumours involves the question of the diagnosis of abdominal swellings in general. Indeed, there is no organ in the belly which has not at some time or other given rise to signs resembling those presented by an ovarian cyst. These facts alone will serve to show that there is no pathognomonic sign indicative of an ovarian tumour. In many cases the methods of physical examination are incompetent to enable us to form a correct opinion of the nature of an abdominal tumour until it has been actually exposed to view; even then doubts and difficulties arise.

**Ovarian Tumours and Pregnancy.**—When an ovarian tumour complicates pregnancy, it is not too much to state that the life of the woman is in peril throughout the period, and the danger increases with each succeeding month of gestation, and often culminates with labour or abortion.

During pregnancy the chief dangers to be apprehended are—

1. Axial rotation of the tumour;
2. Rupture of the cyst;
3. With large tumours, impediment to respiration;
4. Incarceration of the tumour in the pelvis.

*Axial Rotation.*—This danger has already been discussed (p. 356), but it may with advantage be restated that when each ovary has a tumour, and pregnancy ensues, the chances of axial rotation occurring is more than doubled.

*Rupture.*—An ovarian cyst complicating pregnancy may



burst, but the accident is not necessarily lethal, as the fluid may be absorbed and excreted by the kidneys. In some cases, however, it is an accident that will destroy life.

*Impediment to Respiration.*—When a large ovarian cyst and a gravid uterus co-exist, the tumour will sometimes push up the diaphragm and encroach on the thoracic space, and seriously hamper respiration.

*Incarceration of the Tumour in the Pelvis.*—The risks which women run from pregnancy complicated with an ovarian tumour vary with the position of the tumour; when it lies in the pelvis, and therefore behind the uterus, it becomes impacted in the hollow of the sacrum as the uterus enlarges. In this situation it may be burst, or mechanically interfere with the functions of the rectum or bladder. It is very apt to cause abortion. In one instance a young married woman with a small ovarian tumour behind the uterus aborted three times in eighteen months, and when she was two months pregnant for the fourth time, ovariectomy was performed, and the pregnancy went to term.

These facts make it clear that *pregnancy exerts a baneful influence on ovarian tumours; and ovarian tumours are, as a rule, inimical to successful pregnancy.*

The appreciation of this fact has led surgeons to remove ovarian tumours whenever they are found complicating pregnancy, and from a study of a large number of records the following results may be stated—

(1) Before the fourth month of pregnancy, single and double ovariectomy is attended with a very low mortality, and the risk of disturbing the pregnancy is small.

(2) The removal of a parovarian cyst during pregnancy is more liable to be followed by abortion than single or double ovariectomy.

(3) After the fourth month the risk is that of an ordinary ovariectomy, but the chance of abortion increases with each month.

It is a fact that ovariectomy may be safely carried out between the eighth and ninth months of gestation, even when the tumour is incarcerated in the pelvis, without precipitating labour.

**Ovarian Tumours and Labour.**—It is undeniable



that in many instances women with ovarian tumours have passed through many labours without mishap. A much larger proportion of women pass through the nine months of pregnancy without inconvenience, but with the accession of labour, trouble is almost sure to arise. The dangers differ according to the position of the tumour. It may be said that when an ovarian tumour lies high in the abdomen *delivery exercises a baneful effect on the tumour*, but when the ovarian tumour occupies the pelvis *it exercises a baneful effect on the uterus and its occupant*.

1. *When the tumour is situated above the uterus the following accidents may happen—*

- (a) Rupture of the cyst ;
- (b) Axial rotation ;
- (c) Suppuration of the cyst.

2. *When the tumour occupies the pelvis, it offers mechanical impediment to delivery. The fœtus invariably dies in these circumstances.*

The following accidents have happened—

- (i) Rupture of the cyst ;
- (ii) Rupture of the uterus ;
- (iii) Rupture of the vagina ;
- (iv) Extrusion of the tumour through the anus.

Many methods have been advocated and practised for the relief of women when the passage of the child is obstructed by an ovarian tumour incarcerated in the pelvis by the gravid uterus. No attempts should be made to pull the child through by forceps or by turning. Obstetricians of repute recommend that an endeavour should be made to push the tumour out of the pelvis, if possible, and if this be accomplished the delivery should be completed and the woman allowed to pass through her puerperium, and subsequently submit to ovariectomy. This method, known as **reposition**, is attended with two grave dangers : (1) Rupture of the cyst ; (2) axial rotation of the tumour. If the tumour cannot be pushed up, then ovariectomy must be resorted to without delay, and in some of the recorded cases the tumour has been so firmly incarcerated in the pelvis that it has been necessary to perform Cæsarean section in order to allow the tumour to be extricated.



Looking at the subject broadly, the rules for treatment may be formulated thus : (1) When an ovarian tumour is discovered during labour, and it impedes delivery, ovariotomy should be performed. (2) If the tumour offer no obstacle to the passage of the foetus, it should not be interfered with until after the puerperium, unless unfavourable symptoms arise.

**Ovarian Tumours and Puerpery.**—It is not stating the case too positively to assert that “when an ovarian tumour complicates pregnancy, the life of the woman is imperilled throughout the whole of the term; the peril increases with each succeeding month of gestation, and culminates in a climax with labour (or abortion).” During delivery, however, mischief may be produced which becomes appreciable in the puerperium.

The three great dangers are—

- (1) Rupture of the cyst ;
- (2) Axial rotation ;
- (3) Suppuration of the cyst.

The dangers are profound enough when they supervene in a puerperal woman known to possess an ovarian tumour, but the peril is very greatly intensified when an ovarian tumour complicates labour and its presence is not even suspected; unfortunately, such cases are not infrequent, and in these circumstances the unfavourable signs are very often attributed to “puerperal fever,” and the patient almost invariably dies.

It is now a well-attested fact that ovariotomy can be successfully performed even while labour is in progress—that the operation in no way interferes with the contraction of the uterus. Single and even double ovariotomy can be successfully performed in the puerperium without in any way interfering with either the involution of the uterus or lactation. Therefore it cannot be too strongly urged that *when a puerperal woman known to possess an ovarian tumour exhibits unfavourable symptoms, ovariotomy should be resorted to without delay.*



## CHAPTER XLI

### DIFFERENTIAL DIAGNOSIS AND TREATMENT OF OVARIAN TUMOURS

**Method of Examination.**—When a woman suspected of an abdominal tumour comes under observation, it is the duty of the surgeon or physician, as the case may be, to inquire into the history of the case. Information concerning the age, social condition, and menstrual history is often as important in diagnosis as a knowledge of the general physical condition of the patient, and the facts she may be able to relate concerning the tumour itself.

In conducting the physical examination of the patient, she should, whenever possible, be undressed, for nothing is so unsatisfactory as examining an abdomen to ascertain the existence or nature of a tumour when the parts are encumbered by partially loosened skirts, stays, petticoats, and other garments.

The patient should be placed, when undressed, with her back flat upon a bed or couch, and the legs covered with a sheet or blanket. The surgeon should be careful that his hands and finger-tips are warm, as cold fingers are very uncomfortable to the patient, and hinder a proper examination.

At the outset he first attempts to assure himself of the existence of an abdominal swelling by employing his eyes, aided by palpation and percussion; auscultation sometimes renders important assistance.

Tumours are often simulated by **obesity**, and an accumulation of subcutaneous fat so deceives surgeons that in several recorded cases the abdomen has been opened before the character of the enlargement was recognized.

The strangest of all conditions simulating tumour is the “puffing up of the belly” known as **phantom tumour**,



where a woman thinks she is pregnant or suffering from a tumour. To avoid error, it is only necessary to be aware of the possibility of the condition. On percussion, the belly is everywhere resonant, and by cautiously engaging the patient in conversation during the manipulation it becomes quite flat. If, after physical examination, the surgeon is unable to decide the question with certainty, he should arrange for the administration of an anæsthetic. As the woman becomes unconscious the swelling diminishes, then the belly becomes flat; as consciousness returns, the swelling reappears.

Phantom tumour is liable to occur in sterile women who have married late in life, and especially in women who have a morbid desire for pregnancy. It is occasionally met with in women who have borne children, and now and then in young wives. Sometimes it is seen in women who have subjected themselves to illicit intercourse, and fear the results.

It is difficult to understand how this condition could be mistaken for an abdominal tumour, yet more than one case has been recorded in which the abdomen was opened to remove the supposed tumour. Most of the cases occurred in the early days of ovariectomy, and now that surgeons are fully aware of the condition, and with the assistance afforded by an anæsthetic, such blunders are not likely to be made.

**Pregnancy**, normal and abnormal, and **uterine tumours**, often simulate ovarian tumours (*see* p. 302). The remaining conditions which are apt to be mistaken for ovarian tumours are the following—

1. Ascites and hydroperitoneum;
2. Distended bladder;
3. Fæcal accumulation;
4. Renal cysts and tumours;
5. Splenic enlargement and tumours;
6. Morbid conditions of the gall-bladder;
7. Cysts of the pancreas, mesentery, or omentum;
8. Lipomas;
9. Echinococcus cysts;
10. Dilated stomach.



**Ascites.**—An accumulation of free fluid in the belly is, as a rule, easily distinguished from an abdominal tumour, but many instances have been recorded in which ascites has been mistaken for an ovarian cyst, and *vice versa*.

A well-marked case of ascites rarely causes difficulty in diagnosis. The abdomen is uniformly enlarged; when the patient lies on her back the fluid occupies the flanks, and when abundant the sides of the belly form a convex curve from the lower ribs to the crest of each ilium. On percussion, the flanks and lower half of the abdomen are dull, whilst around the umbilicus a clear, resonant note is obtained. If the patient be now turned to one or other side, the conditions are reversed; the higher flank becomes resonant and the umbilical region dull. This shifting dullness is the most characteristic sign of ascites. In addition, when the fluid is present in sufficient quantity, a percussion wave may be easily produced from side to side.

When free fluid in the cœlom is associated with secondary cancer or the presence of a tumour, innocent or malignant, then the diagnosis may be difficult. This condition is discussed in the chapter on Hydroperitoneum.

**Distended Bladder.**—It is of the first importance in investigating a doubtful case of abdominal tumour to obtain a sample of the urine, and to ascertain the quantity as well as the quality of the secretion. An *overflow-bladder* has a striking pyriform shape, and may extend as high as the navel and simulate a tumour. Such overdistension may be due to pressure on the urethra from a pelvic tumour or a retroverted (incarcerated) gravid uterus (p. 303).

**Fæcal accumulation** (coprostasis) in the rectum, cæcum, or colon will simulate an abdominal tumour. Copious enemata will quickly settle the doubts in such a case.

**The Kidney.**—Abnormal conditions of the kidney often simulate ovarian tumours, especially sarcomas, hydronephrosis, or pyonephrosis. When movable, misplaced, or single, a kidney has often caused great difficulty in diagnosis, especially when it occupies the hollow of the sacrum.

The *physical signs* of a renal tumour are very characteristic. There is a swelling in one or both loins which yields a dull sound on percussion; but, as the colon lies in front



of the kidney, an area of resonance is usually present when it is percussed from the front.

**The Spleen.**—When enlarged, this viscus forms a tumour extending from the left hypochondrium obliquely downward to the umbilicus, and when big, may dip into the pelvis. It gives rise to dullness on percussion, moves up and down with respiration, lies in front of the colon, and presents a characteristic notched border.

Occasionally the spleen has such a long pedicle that it may reach every region of the abdomen, and even lodge on the floor of the pelvis. Such “wandering” spleens are liable to twist their pedicles.

Very large spleens have been mistaken for ovarian or uterine tumours, more often the latter. In one remarkable case coeliotomy was performed, and a tumour supposed to be a uterine fibroid was removed; subsequently, when the fragments were examined microscopically, the tissue was discovered to be splenic (Varneck).

When the spleen is occupied by a large echinococcus colony, then the resemblance to an ovarian cyst is very close.

**The Liver.**—When the liver is greatly discharged, it is sometimes mistaken for an ovarian tumour. A very distended gall-bladder may simulate a renal tumour, cancer of the pylorus, or even an ovarian cyst with a long pedicle. But a very large gall-bladder has been known to reach into the pelvis.

**Lipomas.**—Large tumours, sometimes as big as a football, composed of fat, grow in the mesentery, subperitoneal tissue, or even in the mesometrium, and very closely simulate ovarian cysts.

A greatly distended **stomach**, a large cyst of the great omentum (omental hydrocele), chyle cysts of the mesentery, pancreatic cyst, and echinococcus colonies in relation with any abdominal viscus are sometimes sources of difficulty in diagnosis, but they rarely complicate the differential diagnosis of tumours of the pelvic organs.

In order to emphasize the occasional difficulty in diagnosis, cases have been reported where a very enlarged and distended stomach has been operated upon and tapped,



the surgeon being under the impression that he was dealing with an ovarian cyst.

*Treatment.*—The treatment of ovarian tumours, including in this general term tumours of the oöphoron, paroöphoron, and parovarium, is early removal. It has been shown by an overwhelming amount of evidence that the earlier these tumours are removed the more likely is the operation to be followed by success. The removal of an uncomplicated ovarian tumour by a surgeon of experience in abdominal operations is the safest and most successful major operation in surgery. As it is impossible from a macroscopic examination to distinguish between a benign and a malignant ovarian cystic tumour, we have for several years removed them entire, even when this proceeding involved an incision from the ensiform cartilage to the pubes.

Ovariectomy has been successfully performed on an infant of four months (D'Arcy Power) and a woman of ninety-four years (Knowsley Thornton). In girls between the ages of ten and fifteen years ovariectomy is attended with great success. Even suppurating cysts are removed with admirable results.

*Mortality.*—Speaking generally, the deaths from ovariectomy vary from two to five per cent. in experienced hands; now and then operators get a run of twenty, fifty, or even one hundred cases without a death.



## CHAPTER XLII

### EPITHELIAL INFECTION OF THE PERITONEUM—HYDRO-PERITONEUM—TUMOURS OF THE MESOMETRIUM—ECHINOCOCCUS COLONIES

**Epithelial Infection of the Peritoneum.**—In this book mention has been made of epithelial infection of the peritoneum, and it will be useful to summarize briefly our knowledge of this condition. It occurs in connection with the following affections—

- (a) Papillomatous cysts;
- (b) Ovarian dermoids;
- (c) Cancer of uterus, gall-bladder, rectum, and sigmoid flexure.

It has already been stated that when papillomatous cysts rupture into the cœlom the fluid contents of the cysts, often heavily charged with cells, are scattered over the peritoneum; it naturally follows that the recto-vaginal and utero-vesical fossæ become inundated with fluid, and the cells sink to the lowest parts of these recesses. In many cases the cells engraft themselves on the peritoneum and grow into warts. This accounts, in cases of affections of this kind, for the abundance of warts on the pelvic peritoneum in comparison with other parts.

Similar changes are sometimes associated with the rupture of ovarian dermoids, and one case has been reported in which the peritoneum was beset with small tufts of hair secondary to an ovarian dermoid. Several cases have been carefully observed and reported, in which the peritoneum has been dotted with minute dermoids secondary to the rupture of primary ovarian dermoids.

Further on it will be shown that echinococcus colonies sometimes infect the peritoneum in a similar manner. The



condition is strongly exemplified when the peritoneum is infected with cancer. Any one who has had merely a moderate experience in the dead-house must have noticed in individuals dying from cancer of the uterus, colon, or gall-bladder that in the majority of instances the peritoneum is free from deposits. Yet occasionally a case comes under observation in which the peritoneum is crowded with hundreds of minute nodules. In such cases a careful examination of the tumour will reveal the existence of a small process of the cancer which has perforated the serous covering. This process may be no larger than a split-pea, yet it is sufficient to produce hundreds of secondary nodules on the peritoneum. When the cancer involves the peritoneum, fluid is sure to be exuded (hydroperitoneum), and the movement of this fluid serves as an excellent means of disseminating the epithelial cells over the belly (p. 353).

**Hydroperitoneum.**—This may be defined as an accumulation of free fluid in the belly, due to the irritation of primary or secondary tumours of the abdominal viscera, or to the extension of tubal disease, especially tuberculosis, to the peritoneum.

Fluid effusion in the belly secondary to cardiac or renal disease or obstruction to the portal circulation is due to passive causes, and the name ascites should be restricted to it; hydroperitoneum depends on an active irritative cause, and is met with in the following pelvic conditions: Papillomatous cysts of the ovaries; ovarian sarcoma; ovarian dermoids with burst loculi; inflamed ovarian cysts and uterine fibroids; tubercular peritonitis; mild forms of salpingitis; and adenoma of the Fallopian tubes.

In the greater proportion of cases hydroperitoneum causes no difficulty. Scattered nodules in the omentum and in the parietal peritoneum are signs rarely misinterpreted. The conditions which give rise to difficulty are those occurring in women about mid-life who are apparently in excellent health, but seek advice on account of increase in the size of the belly, which furnishes on physical examination the ordinary signs of ascites; but there is no œdema of legs or eyelids, no cardiac disease, the urine is normal in quantity and quality, and there are no signs of liver trouble. On careful examin-



ation of the abdomen there is no evidence of the existence of a solid tumour, and perhaps on vaginal examination only an indefinite resistance is made out on each side of the uterus. In such conditions the fluid increases in quantity very rapidly, and renders interference imperative.

*Treatment.*—In all cases where there is reasonable doubt as to the cause of hydroperitoneum, it is a wise course to place the patient under the influence of an anæsthetic and make a small incision in the linea alba, midway between the umbilicus and the pubic symphysis; and, after allowing the fluid to escape, it is usually easy to determine the cause of the hydroperitoneum. In many cases the peritoneum, visceral and parietal, is found dotted with a multitude of minute secondary nodules; then the fluid is cautiously sponged out and the incision closed. Even then it is to the patient's advantage, as a clear diagnosis is insured. On the other hand, and by no means infrequently, a pedunculated and easily removable tumour of the ovary, uterus, or Fallopian tubes is found, the removal of which is accompanied by a rapid convalescence and restoration to vigorous health.

It is also important to remember that hydroperitoneum is sometimes complicated with hydrothorax, and the removal of the cause of the cœlomic effusion—ovarian, uterine, or tubal tumour—is sometimes followed by rapid absorption of the fluid in the pleural cavities.

#### **Tumours of the Mesometrium (Broad Ligament).**

In addition to tumours of the ovary, parovarium, and Gartner's duct, others sometimes arise from the round ligament of the uterus, the ovarian ligament, as well as from the proper tissues of the mesometrium, and so simulate ovarian and uterine tumours that accurate diagnosis from physical signs is impossible.

It will be convenient to describe them in the following order: Lipoma, myoma, and sarcoma.

**LIPOMA.**—Under normal conditions, fat is sometimes seen between the layers of the mesometrium, but it is rarely met with in the neighbourhood of the Fallopian tube.

Occasionally the mesometrium is occupied by a fatty tumour as large as a fist, and in one exceptional case a lipoma reaching as high as the navel was successfully



enucleated from a woman thirty-two years of age; it weighed five kilogrammes (Treves).

**MYOMA.**—Unstripped muscle fibre, apart from the uterus and Fallopian tubes, exists in three situations in the mesometrium: (1) In the round ligament of the uterus; (2) in the ovarian ligament; (3) in the connective tissue between its folds.

(1) *The Round Ligament of the Uterus.*—Myoma and fibromyoma arising in this structure are rare. Several examples have been recorded in connection with the part of this ligament which traverses the inguinal canal. They are oval in shape, and have been reported as big as cocoa-nuts.

(2) *The Ovarian Ligament.*—Myomas of this structure have been observed as large as a fist. They simulate small ovarian tumours, and require the same treatment—that is, removal.

(3) *Mesometric Myomas (or Fibroids).*—A stratum of unstripped muscle fibre lies immediately beneath the peritoneum forming the mesometrium, and replaces the subserous tissue which exists in other regions; this layer of muscle fibre is directly continuous with the muscle tissue of the uterus, and is occasionally the source of myomas which may attain large dimensions.

Mesometric myomas are sometimes bilateral, and when of moderate size they are mobile, ovoid in shape, and enucleate easily. After a time they grow with great rapidity, and may in a few months attain a weight of 10 kilogrammes or more. As the tumour rises out of the pelvis, it carries the uterus and its appendages with it. The tissue of such myomas is very liable to become myxomatous, resulting in the formation of large cavities; calcification is not infrequent.

Mesometric myomas have been observed as early as the twentieth year, but the majority occur after the thirty-fifth year. They are very formidable tumours to deal with; the best method of treating them, even when large, is enucleation.

**SARCOMA.**—This is very rare in the mesometrium, and usually consists of spindle-cells. These tumours grow very rapidly, and quickly destroy life. There are good reasons for believing that many specimens described as myomas or fibroids of the mesometrium are really spindle-celled



sarcomas. Such tumours occur in other parts of the sub-peritoneal tissue, especially in the neighbourhood of the kidney; they often resemble a football in size and shape.

### **Echinococcus Colonies (*Hydatids*) of the Pelvis.**

In connection with the pelvis, it will be necessary to consider echinococcus cysts in the following situations: (a) The uterus; (b) the mesometrium; (c) the pelvic bones; (d) the omentum; (e) the Fallopian tubes.

There is no authentic example on record of a primary

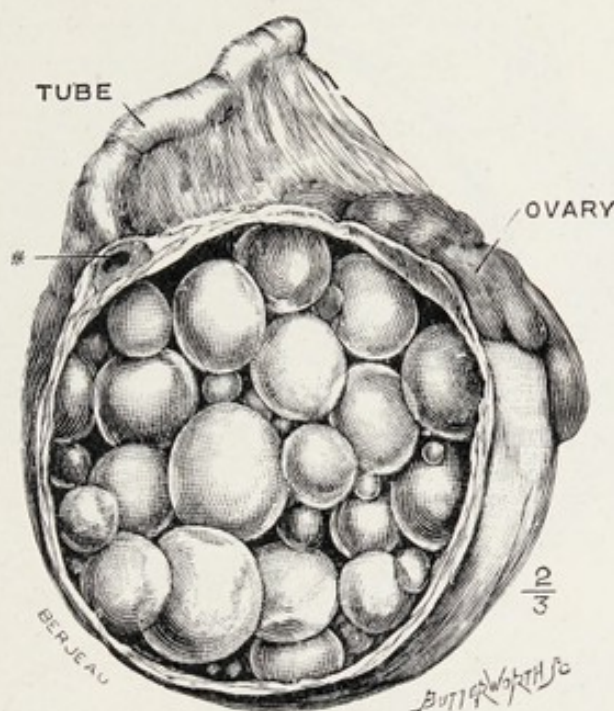


FIG. 121.—A MESOSALPINX WITH THE TUBE AND OVARY IN TRANSVERSE SECTION.

The ovary is flattened upon the wall of an echinococcus colony occupying the mesosalpinx. \* The cut surface of the Fallopian tube.

echinococcus cyst of the ovary. Many cases described in recent years as “hydatid cysts of the ovary” are conditions where the colony has grown primarily in the mesometrium and implicated the ovary secondarily (Fig. 121).

(a) *The Uterus*.—Echinococcus cysts have on several occasions been observed growing beneath the peritoneal investment of the uterus, and forming a tumour as large as the patient's head.

Clinically, such cysts simulate either an ovarian tumour or a uterine fibroid (Fig. 122). When the cysts contain vesicles there is no difficulty in determining their nature in



the course of an operation. When they are sterile, the echinococcus nature of the cyst is rarely suspected.

(b) *The Mesometrium*.—Many examples of echinococcus colonies between the layers of the broad ligament have been reported (Fig. 123). As a rule, they form part of a general invasion of the subperitoneal tissue. The colonies are apt to communicate with the vagina, bladder, or rectum, and the characteristic vesicles escape with the urine or fæces.

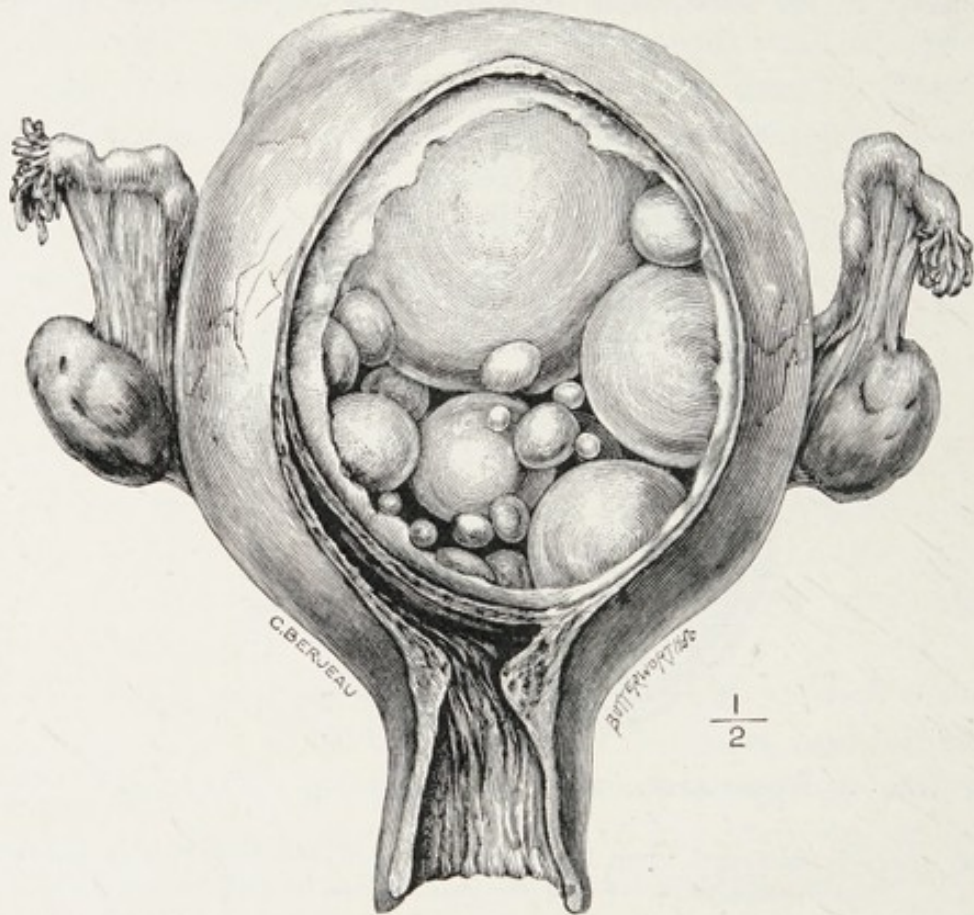


FIG. 122.—AN ECHINOCOCCUS COLONY IN THE WALL OF THE UTERUS.

Such communications lead to septic infection of the cyst, and suppuration with all its evils is the consequence; or sinuses form in the groin, and the patient sinks exhausted from long-maintained suppuration.

(c) *The Bony Pelvis*.—Not the least interesting circumstance in connection with the echinococcus cysts affecting the pelvis is the effect they produce on the bones; firm osseous barriers offer little resistance to the invading propensities of echinococcus cysts, and they pass from the ilium into the sacrum irrespective of the sacro-iliac synchondrosis.



Hydatids of the ilium or ischium erode the walls of the acetabulum, and overrun the hip-joint, and when left to run their course unchecked will extend into the head of the femur.

(d) *The Omentum*.—Large echinococcus colonies in the great omentum may lodge in the pelvis, and so simulate the physical signs of ovarian cysts that they deceive the most careful and experienced surgeons. Occasionally they dip so low that they lodge on the floor of the pelvis and fill the

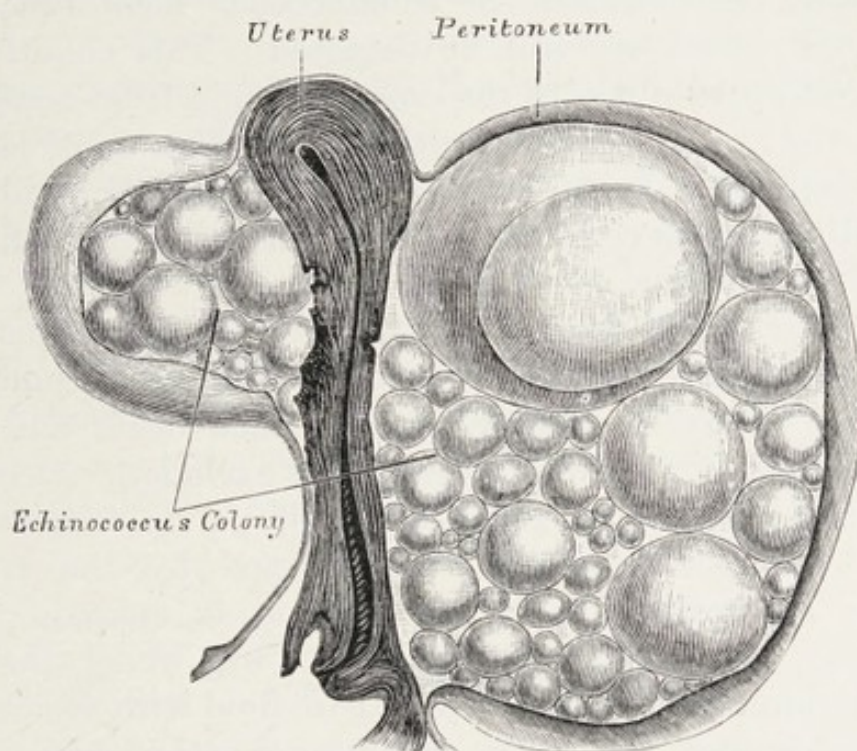


FIG. 123.—AN ECHINOCOCCUS COLONY IN THE MESOMETRIUM. (FREUND.)

recto-vaginal fossa. Accurate diagnosis is then very difficult—indeed, almost impossible.

(e) *The Fallopian Tubes*.—Very exceptionally echinococcus vesicles have been found in the Fallopian tubes. In a remarkable case in a woman thirty-two years of age (reported by Doléris) both tubes were so stuffed with vesicles that they formed a large tumour reaching above the umbilicus. The mass weighed two kilogrammes, and consisted of the two tubes coiled upon themselves like small intestines, and so elongated that one measured 57 and the other 53 centimetres. The tubes were successfully removed. Maloney described the case of a girl of fourteen years of



age whose right Fallopian tube was greatly distended and thrown into convolutions by a mass of echinococcus vesicles. The girl had echinococcus cysts in her liver, and one adherent to the fundus of the uterus had communicated with the Fallopian tube.

**SECONDARY PERITONEAL INFECTION.**—In the course of a coeliotomy for echinococcus cysts, minute cysts and nodules are sometimes seen scattered over the peritoneum, particularly in the pelvic region. Many of these nodules show the lamination characteristic of echinococcus membrane, and occasionally hooklets will be detected. This condition is due, in all probability, to the escape of fluid from an echinococcus cyst, in consequence either of rupture or of leakage during tapping. Brood capsules escape with the fluid, and, gravitating to the recesses of the pelvis, engraft themselves on the peritoneum.

*Diagnosis.*—The clinical recognition of echinococcus cysts in the pelvic organs, mesometrium, or bones is sometimes made by a sort of “lucky guess,” when other and more common diseases can with certainty be excluded. Occasionally when a patient seeks advice for pelvic trouble, and brings “vesicles” which have escaped by the rectum, vagina, or urethra, much speculation is spared. When the bones are eroded and swellings form under the skin, they are punctured, and characteristic fluid with vesicles and hooklets escapes, and so the diagnosis is established. When the cysts suppurate, the physical signs are those of abscess.

*Treatment.*—When the cysts take the form of pedunculated tumours, either of the omentum or uterus, they require the same treatment as ovarian tumours—viz. ligature and removal. When sessile, or when their false capsules are very adherent, enucleation of the mother cysts is a very successful measure.

Should the cysts burrow in the mesometrium and open into hollow pelvic viscera, then the treatment of the suppurating cavities and sinuses is very unsatisfactory and is rarely successful. The method of dealing with them should be on the same principle as that adopted for pelvic abscess. The course of the case is very protracted, and death usually occurs from septic complications.



## SECTION VIII

### FUNCTIONAL DISORDERS

IN this Section we have to describe the disorders of menstruation, namely, amenorrhœa; menorrhagia and metrorrhagia; dysmenorrhœa and the disorders of the menopause; dyspareunia; and sterility.

These disorders have one important feature in common; and that is, that they are not to be regarded as separate diseases or entities, but as symptoms. Consequently for their successful treatment it is essential that the underlying causal conditions should be investigated and determined. The correct treatment of the cause of these disorders gives the only hope of the successful treatment of the symptoms, that is, of the disorders themselves.

## CHAPTER XLIII

### DISORDERS OF MENSTRUATION

#### AMENORRHŒA

ACCORDING to most writers, amenorrhœa is of two kinds, primary and secondary; and the former includes cases of retained menses. For descriptive purposes a further classification is required, since, as a matter of fact, four distinct conditions are commonly included under the term amenorrhœa—namely, (1) primary amenorrhœa in cases where puberty is delayed; (2) primary and permanent amenorrhœa; (3) secondary amenorrhœa; (4) retention of the menses. The last condition is one of apparent amenorrhœa, and remains so until the true nature of the case is determined by examination; but in a scientific classification it cannot be included under the term amenorrhœa. For by menstruation



must be understood not only the flow of menstrual fluid from the vagina, but also the changes in the endometrium preparatory thereto. In cases of atresia of the genital passage, menstruation is indicated by no outward and visible sign; but the essential periodic changes in the uterus may be going on all the time, though concealed. Hence the condition is not one of amenorrhœa, but is correctly expressed by the term cryptomenorrhœa (*i. e.* concealed menstruation).

The classification of these conditions is, therefore, as follows—

A.—Amenorrhœa.

1. Primary amenorrhœa.
  - (a) Delayed menstruation.
  - (b) Permanent amenorrhœa.
2. Secondary amenorrhœa.

B.—Cryptomenorrhœa.

The following definitions will serve to show the precise sense in which these terms are used.

Before the age of puberty, and after the time of the menopause, the absence of menstruation is not spoken of as amenorrhœa. Hence—

A.—*Amenorrhœa means the absence of menstruation during the usual period of sexual maturity.*

1. *Primary amenorrhœa means the absence of menstruation in the case of a woman who, though above the usual age of puberty, has never menstruated.*

It is clear that a case which appears to be one of “delayed menstruation” may turn out to be one of “permanent amenorrhœa”; hence the terms may have a prognostic rather than a diagnostic value. A more precise definition of these terms will appear later.

2. *Secondary amenorrhœa means the temporary suppression of menstruation during the usual period of sexual maturity.*

A case that appears to be one of secondary amenorrhœa may turn out to be one of premature menopause, if the patient does not menstruate again.

B.—*Cryptomenorrhœa means that menstruation occurs, but its products are retained owing to atresia of some portion of the genital passages.*



We must now consider in detail the different kinds of amenorrhœa.

**1. Primary Amenorrhœa.**—The causes of variation in the age of puberty have already been discussed in Chapter III. It was found that under normal conditions it was not very unusual for the first menstruation to be delayed till the age of seventeen. Consequently, in the case of a girl of seventeen or younger who has not yet menstruated, we do not say that it is a case of amenorrhœa any more than we should apply the term to the absence of menstruation in a child of ten.

When, however, a girl has reached the age of eighteen or upwards without menstruating, some pathological condition is in most cases responsible for the delay. Up to the age of twenty-five there is still a fair chance of menstruation coming on if the pelvic organs are not abnormally small or ill-developed; but in cases of marked under-development, and in practically all cases above the age of twenty-five, whether under-developed or not, menstruation remains permanently absent. It is clear that no hard-and-fast line can be drawn to define either the lower or the upper age-limits of "delayed menstruation"; but in view of the above facts the following definitions will serve for clinical purposes—

(a) *Delayed menstruation is primary amenorrhœa in a patient of eighteen to twenty-five years of age, whose pelvic organs are normal, or only slightly under-developed.*

(b) *Permanent amenorrhœa is primary amenorrhœa in a patient who is over twenty-five years of age, or in a younger woman whose pelvic organs are markedly under-developed.*

**CAUSES OF PRIMARY AMENORRHŒA.**—These are—

1. Constitutional conditions, of which the most important are anæmia, and tuberculosis; also some rare conditions, such as cretinism.

2. Defective development of the uterus or ovaries.

3. Pregnancy.

4. Immaturity, without either constitutional disease or malformation of the internal genital organs.

In forming a *diagnosis*, general conditions must be first sought for; if they can be excluded, a pelvic examination



should be made to determine the presence of abnormalities. It must be remembered that pregnancy may occur before the patient has menstruated. In the absence of the above conditions, a diagnosis of immaturity is arrived at by exclusion.

*Prognosis.*—We can formulate some general principles to guide us in a prognosis, when consulted in any given case on account of the non-establishment of menstruation. The two points on which we shall most probably be asked to express an opinion are, first, the likelihood of menstruation coming on; second, the likelihood of childbearing in case of marriage. With regard to the first point, the coming-on of menstruation, our forecast will depend, in the first place, on the patient's age. An analysis of the age of puberty in 1000 cases shows that—

28·8	per cent.	of girls	do not	menstruate	before	the age of	16
13·7	”	”	”	”	”	”	17
6·1	”	”	”	”	”	”	18
3·3	”	”	”	”	”	”	19
1·5	”	”	”	”	”	”	20
0·9	”	”	”	”	”	”	21
0·6	”	”	”	”	”	”	22

Even without examination, therefore, we can give a good prognosis in the case of a girl of sixteen or seventeen; at eighteen or nineteen the prognosis must be more guarded, and the effect of treatment should be watched; after the age of twenty no opinion should be expressed without making an examination.

In the second place, we shall be guided by the general health of the patient. If she be suffering from anæmia, tuberculosis, or other constitutional condition that may cause amenorrhœa, we shall be able to say (with the proviso of age just considered) that menstruation will probably begin when the general condition has improved.

Supposing the general condition to be good, and the patient to be twenty years of age or older, the development of breasts and pubic hair should be noted. Any marked deficiency in these secondary sexual characters is unfavourable; nevertheless, too much reliance cannot be placed on them, and an examination of the pelvic organs should be made. For this purpose it is best to give an anæsthetic, especially if the patient is unmarried. In some cases a recto-



abdominal examination will give all the information that is necessary; in others a vaginal examination will be required. If no abnormality can be found, or the uterus is only slightly under the normal size, the prognosis is not unfavourable; on the other hand, if the uterus is very small or rudimentary, or if the ovaries are very small and infantile in shape, the probability is against the establishment of menstruation.

With regard to the forecast as to childbearing, the question will probably arise in the case of a patient of eighteen or over, and the first thing necessary will be to examine the pelvic organs. If these are found to be normal, we can say that if the patient is eighteen the prognosis is still fairly good; if she is nineteen and has not menstruated, she is more likely to be relatively, though not absolutely, infertile. If she is twenty or over, the likelihood of childbearing diminishes rapidly in proportion to the age; and if she is twenty-five or older, she will almost certainly be sterile. If, on the other hand, the uterus is under-developed, the uterine canal measuring two inches or less, the patient will be sterile, even though she may menstruate.

*Treatment.*—When there is any faulty constitutional condition this should be treated. Anæmia especially requires iron with arsenic and strychnine or nux vomica, and as the anæmia improves menstruation is more likely to be established. As to the action of reputed emmenagogues, such as manganese dioxide, potassium permanganate, senecin, etc., the results have not been encouraging. After a reasonable trial of drugs, if no result is obtained, it is usually advisable to examine the pelvic organs, preferably under an anæsthetic; for if a condition of under-development be present, prolonged drug treatment is futile and disappointing to the patient. In these circumstances it is best to explain the condition and leave matters alone. The most effective stimulus is that supplied by marriage, which may bring to rapid maturity an otherwise tardy reproductive development.

**2. Secondary Amenorrhœa.**—Cessation of menstruation, like primary amenorrhœa, may be temporary or permanent; the latter kind is synonymous with the menopause. The term “amenorrhœa” is not applicable after the meno-



pause any more than it is before puberty; this is why the term "secondary amenorrhœa" is restricted to the temporary condition.

CAUSES OF SECONDARY AMENORRHŒA.—These are—

1. The same constitutional conditions as cause primary amenorrhœa.
2. Pregnancy, lactation, and too-prolonged lactation.
3. Catching cold, as from getting the feet wet during menstruation.
4. Febrile disorders, and some chronic intoxications such as morphiomania.
5. Some forms of cerebral disease.
6. Mental shock.

The *diagnosis* of the cause of secondary amenorrhœa is always of importance because of the possibility of its being physiological. If menstruation ceases abruptly after it has been going on regularly and in undiminished quantity, pregnancy must be first thought of, even in the case of unmarried women and widows, and whatever the patient's station in life. The mode of onset of amenorrhœa due to anæmia is different; there is a history of a gradual diminution in quantity of the menstrual flow, which becomes very scanty before disappearing altogether; in addition, there is often a history of irregularity extending over several months or years. The existence of anæmia is easily determined by the history of shortness of breath, languor, and ready fatigue, taken in combination with pallor of the mucous membrane of the lips and conjunctivæ. When the symptoms and signs of anæmia co-exist with a history of scanty and irregular menstruation, it is permissible and often desirable to refrain from making any examination of the pelvic organs in the first instance. In the opposite conditions the breasts and abdomen should be examined, and if such examination is inconclusive a vaginal examination should be made. It must be remembered that suppression of the menses occurs not infrequently for a few months after the onset of puberty in perfectly healthy girls.

Amenorrhœa from catching cold or from febrile disturbances resembles that due to pregnancy in coming on abruptly without previous diminution or irregularity, but in this case



we have the history of the chill or the fever. A chill contracted at the onset of menstruation may result in the suppression of the flow for the remainder of the period, and in amenorrhœa for two or three months subsequently. In this case some definite condition of pelvic inflammation is usually found. Diphtheria, small-pox, enteric, typhus, and scarlet fever may be followed by amenorrhœa of one to several months' duration.

The effect of lactation on the menstrual function varies. In some cases menstruation begins again some months after childbirth whether lactation be continued or not. In other cases lactation prolonged beyond a year may lead to superinvolution of the uterus, with the result that after the child has been weaned menstruation still remains in abeyance for some months. It is possible, indeed, that a premature menopause may set in from this cause.

The chief forms of cerebral disease causing amenorrhœa are cerebral tumours and insanity. It is especially with tumours of the base of the brain that this symptom is observed, and the diagnosis of the cause of the amenorrhœa may be very difficult at first, because it may come on before the development of localizing symptoms. In cases of tumours of the pituitary body associated with acromegaly the amenorrhœa may be thought in the early stages to be due to myxœdema.

Insanity, especially melancholia, is frequently associated with amenorrhœa, and we may have to correct the impression of the patient's friends that return of menstruation will necessarily be followed by mental improvement. It is true that, if the mental condition improves, menstruation usually returns, indicating not that the amenorrhœa is the cause of the insanity, but that nutritive conditions, which were probably responsible for both symptoms, have improved. Return of menstruation without mental improvement makes the prognosis of the insanity unfavourable.

When amenorrhœa has resulted from myxœdema or morphiomania, return of menstruation is usually an indication of general improvement.

*Treatment.*—This resolves itself into the treatment of the cause of the amenorrhœa, and much that has been said under



the head of the treatment of primary amenorrhœa is applicable here. When amenorrhœa is due to a chill a course of hot douches with glycerin tampons should be ordered, together with hot foot- or hip-baths administered before the period is due. In addition, some form of tonic may be given, according to the state of the general health. The bowels must be attended to, saline purgatives being the best. The prognosis as to the re-establishment of menstruation is nearly always good, except in some cases of cerebral tumour, myxœdema, insanity, and morphiomania.

**Cryptomenorrhœa.**—This subject has been fully dealt with when discussing the clinical aspects of malformations of the reproductive organs (*see* Chap. V).



## CHAPTER XLIV

### DISORDERS OF MENSTRUATION—(continued)

#### MENORRHAGIA AND METRORRHAGIA

**Menorrhagia.**—This denotes excessive bleeding at the menstrual periods, and is a relative term. What is an ordinary menstrual flow in one woman may constitute menorrhagia in another. Some lose more in three days than others in seven or eight. So the loss sustained by a patient at any one time must be judged of in relation to the standard of her habitual menstruation type.

**Metrorrhagia.**—This signifies a discharge of blood from the uterus, independent of menstruation. Menorrhagia passes insensibly into metrorrhagia, and it is therefore convenient to consider the two conditions together. Many diseases lead at first to menorrhagia, and subsequently to metrorrhagia.

*It is important to remember that menorrhagia and metrorrhagia are symptoms, not diseases ; consequently, no treatment should be attempted without endeavouring to ascertain their cause.*

At the outset we must emphasize one important difference between these two symptoms : menorrhagia is an exaggeration of a physiological phenomenon, and may be of functional origin ; but metrorrhagia is always due to some organic condition, and is essentially pathological.

An abundant menstrual discharge occurring once and limited to the period need cause no anxiety, but repetition of such hæmorrhage, or its prolongation into the intermenstrual period, necessitates an examination of the pelvic organs. The only admissible exception to this rule is in



the case of young and unmarried girls and women; with them, if the hæmorrhage be not very severe and has not lasted long, it is permissible to postpone examination until drugs have had a trial. In all other cases the rule is urgent and imperative: *in all cases of uterine hæmorrhage a careful vaginal examination must be made.* The non-observance of this rule has often enabled uterine cancer to make such progress that when at last it is discovered there is no possibility of cure, whilst in other cases a polypus, whose removal at any time would have been most easy, has been allowed to blanch a woman to such an extent that months or years have been required to make up the lost ground.

**Causes.**—These may be enumerated as follow—

**MENORRHAGIA.** 1. *Constitutional Causes.*—Purpura, scorbutus, hæmophilia, hepatic cirrhosis, over-indulgence in food and alcoholic drinks, and warm climates.

2. *Local Causes.*—Uterine congestion and displacements; endometritis, subinvolution, and retention of products of conception; uterine fibrosis; uterine fibroids; tubo-ovarian inflammation, especially when suppurative; some ovarian tumours.

**METRRORRHAGIA.**—There are no constitutional causes for metrorrhagia, which is always due to some disease of the uterus or appendages.

*Local Causes.*—Retention of products of conception; extra-uterine gestation; hæmorrhages connected with pregnancy; new growths of the uterus, such as mucous and fibroid polypus, adenoma, fibromyoma, sarcoma, carcinoma, and chorion-epithelioma (deciduoma malignum).

Of the causes above enumerated, some never lead to anything more than menorrhagia; this is true of all the constitutional causes, and of some of the local ones—namely, uterine congestion and displacements, subinvolution, and some pathological conditions of the uterine appendages. In all these cases the proximate cause of menorrhagia is congestion, resulting in more extensive growth and breaking down of vessels, and more complete denudation of the uterine mucosa; in other words, the menstrual changes in



the uterus are exaggerated. In all these conditions there is primarily no disease of the endometrium; later on the endometrium may become diseased owing to the constant repetition of excessive congestion, and it becomes thickened and hyperplasic. It is probable that under certain conditions marked retroversion of the uterus leads to twisting of the broad ligaments on their transverse axis, and consequent pressure on the veins contained therein, whilst the arteries are not affected, and congestion is increased by this means.

Menorrhagia brought about by other causes is from the first due to disease of the endometrium. Among such causes we may enumerate endometritis in all its forms, uterine fibrosis, retention of products of conception, and new growths. The mode of action of these varies; in some of them the uterus cannot properly contract and retract, owing to the presence of a foreign body in its interior—a good example of which is the retention of a piece of placenta. In other cases the muscular structures of the uterus are at fault; for instance, in uterine fibrosis the muscle tissue of the walls is largely replaced by fibrous tissue, and the vessels themselves are found thickened and fibrotic. Lastly, the bleeding may be due to ulceration exposing vessels as in the case of malignant growths.

Menorrhagia due to pathological conditions of the endometrium may pass on, almost insensibly, into metrorrhagia. That is to say, the monthly flow becomes at first prolonged; from four to six days it may extend to ten or twelve, and ultimately the hæmorrhage may become constant, with the exception, perhaps, of a few clear days here and there which bear no sort of relation to the monthly periods.

Hæmorrhage due to malignant disease of the uterus hardly ever begins as menorrhagia. From the first it is irregular, and independent of menstruation; and is due, not to congestion, but to ulceration exposing and destroying bloodvessels.

*Diagnosis.*—Menorrhagia and metrorrhagia are of the greatest possible importance as symptoms of organic



disease. From the point of view of diagnosis, the age and sexual history of the patient will materially assist us. Accordingly cases of menorrhagia and metrorrhagia may conveniently be considered in two main groups, with minor subdivisions, according to certain salient features, which would be readily recognized if the inquiry were being conducted in the presence of an actual case.

GROUP 1. *Cases in which the Patient is a Virgin.*—Below the age of twenty-five increase of the menstrual flow is most often the result of uterine congestion, which in turn may be due to cold or exposure during a period. Sometimes a mucous or glandular polypus will lead simply to menorrhagia, but much more frequently it produces metrorrhagia. This fact usually serves to distinguish hæmorrhage due to congestion from that which is due to a polypus.

At any age menorrhagia may be due to retroflexion of the uterus, combined with retroversion.

Above the age of twenty-five uterine fibroids begin to be an important factor, though they are not very often found before the age of thirty or thirty-five. At first a fibroid causes simply an increase in the quantity and duration of the monthly flow, and in the case of an interstitial fibroid this characteristic may remain even when the tumour is large. On the other hand, increase in size is often accompanied by intermenstrual hæmorrhage, and this is almost invariably the case when the tumour is submucous or polypoid. A subserous fibroid does not commonly affect the character of menstruation. Uterine congestion or endometritis may also lead to menorrhagia, and a mucous polypus to metrorrhagia at the age that we are considering.

Above the age of forty any of the above causes may be operative, and in addition we have to think of the possibility of malignant disease, especially carcinoma or sarcoma of the body of the uterus. Carcinoma of the cervix, on the other hand, is very rare in virgins. Malignant disease may develop before the age of forty, and this is especially the case with sarcoma. Hæmorrhage due to malignant disease takes the form of metrorrhagia.



We may sum up the above facts in a table as follows, the conditions put in brackets being rarer ones—

Age.	Menorrhagia.	Metrorrhagia.
Under 25	Uterine congestion Retroflexion and retroversion (Interstitial fibroid)	Mucous polypus (Submucous fibroid)
25 to 40	Uterine congestion Endometritis Retroflexion and retroversion Interstitial fibroid	Mucous polypus Submucous fibroid (Carcinoma or sarcoma of the body of the uterus)
Above 40	Interstitial fibroid Endometritis Uterine congestion Retroflexion and retroversion	Submucous fibroid Mucous polypus Carcinoma of the body Sarcoma of the body (Carcinoma of the cervix)

The diagnosis must of course be reserved until the physical signs have been investigated, and this will be done either by bimanual examination or by exploration of the uterine cavity.

GROUP 2. *Cases in which the Patient is not a Virgin.*—In this group we have two new factors introduced which may lead to hæmorrhage, namely, gonorrhœal infection and pregnancy and its sequelæ. To simplify the matter this group may be considered under three heads—

(a) *The Patient has never been Pregnant.*—When a patient who has been married but a short time gives a history of menorrhagia following on symptoms of gonorrhœal infection, such as purulent discharge and scalding micturition, she is probably suffering from pyosalpinx. In the absence of such infection, menorrhagia, accompanied by backache and leucorrhœa, points to uterine congestion, probably brought on by want of moderation in the sexual functions. Metrorrhagia coming on in the absence of any signs of pregnancy points to a polypus; slight metrorrhagia, accompanied by severe lateral pain, especially when following on a short period of amenorrhœa, must lead one to look for extra-uterine pregnancy. Menorrhagia, followed by



metrorrhagia, in a woman over thirty-five will suggest uterine fibroid, whilst hæmorrhage occurring after forty is suspicious of malignant disease. In their tendency to the last two conditions, *married nulliparæ resemble unmarried women*; that is, they are prone to fibroids and to carcinoma or sarcoma of the body of the uterus, whilst they are relatively exempt from cancer of the cervix.

(b) *The Patient is Pregnant.*—As a rule hæmorrhage coming on after a few months of amenorrhœa points to a threatened abortion, and if profuse and accompanied by rhythmic pains the miscarriage may be regarded as inevitable. The possibility of a hydatid mole must also be remembered. Irregular hæmorrhage, small in quantity and dark in colour, following on a short period of amenorrhœa, may be due to tubal pregnancy. From the middle of the term of pregnancy onwards hæmorrhage may be due to placenta prævia or to partial detachment of the placenta. Occasionally carcinoma of the cervix complicates pregnancy, and causes metrorrhagia.

(c) *The Patient has been Pregnant.*—In cases of recent pregnancy menorrhagia may be due to subinvolution, but when associated with metrorrhagia the cause is often a piece of retained placenta. It must be remembered that the condition known as chorion-epithelioma (deciduoma malignum) is characterized by metrorrhagia. When the patient is a multipara, and is over forty years of age, the bleeding may be due to cancer of the cervix or to endometritis. Multiparæ are also subject to uterine fibroids, but less frequently than nulliparæ. When hæmorrhage sets in some months or years after the menopause it is almost invariably due to carcinoma, but occasionally it arises from endometritis. A diagnosis of senile endometritis must be reserved for those cases in which the possibility of carcinoma has been definitely excluded.

There is a widespread fallacy that irregular and profuse bleeding occurring in a woman at or near the time of the menopause is often due to physiological changes. This is not so. Such hæmorrhage is due to organic pathological conditions, mostly of a serious type in the great majority (about 95 per cent.) of cases; and the simpler explanation must never be assumed till other conditions have been



definitely excluded, not only by ordinary examination, but by dilatation of the cervical canal, exploration of the uterine cavity, and, if necessary, microscopical examination of scrapings.

In both single and married women solid tumours of the ovary, especially carcinoma and sarcoma, may lead to menorrhagia, and the same result may occur when the pedicle of a benign tumour, cyst, or dermoid becomes twisted.

Traumatic hæmorrhages from the genital tract require no more than mention.

The hæmorrhages met with in married women may also be stated in tabular form, as follows—

	Menorrhagia.	Metrorrhagia.
Nulliparæ	Uterine congestion Pyosalpinx Uterine fibroid	Uterine polypus Uterine fibroid Carcinoma or sarcoma of the body (Carcinoma of the cervix) Extra-uterine pregnancy
During pregnancy	(Menstruation during pregnancy)	Threatened miscarriage Accidental hæmorrhage Placenta prævia Hydatid mole Extra-uterine pregnancy (Carcinoma of the cervix)
After pregnancy	Subinvolution Endometritis Uterine fibroid (Senile endometritis)	Placental polypus Carcinoma of the cervix Uterine fibroid (Chorion-epithelioma) (Carcinoma or sarcoma of the body of the uterus)

*Treatment.*—When menorrhagia is due to constitutional conditions or to subinvolution, or when no definite local cause other than congestion can be assigned for it, medicinal measures are indicated. These, of course, include the special treatment of any defective general condition.

General hygiene must be considered. This includes moderation in food and drink, the avoidance of excessive fatigue, hot and badly ventilated rooms, and too frequent



sexual intercourse. The last is a frequent cause of uterine congestion and resulting menorrhagia.

Among uterine hæmostatics we may mention, in the first place, ergot and ergotin. The former is given in the form of liquid extract; usually drachm doses should be prescribed, as smaller doses may have very little effect. Ergotin is given in 3-grain doses, either in tabloid form or hypodermically. It is often useful to combine ergot with the tincture of hydrastis, or of hamamelis, in 15 to 20 minim doses, or these two drugs may be given together without ergot. A relatively recent uterine hæmostatic of great value is stypticin (cotarnine hydrochlorate), which may be given alone in 1 grain doses, or combined as in the following prescription, made up in palatinoid form: hydrastin hydrochlorate,  $\frac{1}{3}$  grain; ergotin,  $\frac{3}{4}$  grain; cannabin tannate,  $\frac{1}{2}$  grain; stypticin,  $\frac{1}{4}$  grain. Any of these preparations may be administered three times a day. It is advisable for the patient to begin taking the medicine two or three days or a week, according to circumstances, before the period is due. The same treatment may be carried out, at any rate as an adjunct or as a temporary expedient, in cases of metrorrhagia, but it must be remembered that whereas some cases of menorrhagia are due to conditions of congestion, and so yield to drugs, the great majority of cases of metrorrhagia are due to some definite pathological condition which requires operative treatment.

Among accessory measures in the treatment of menorrhagia an important place must be given to rest in bed, which should be maintained for the first two or three days of the flow; and to free purgation, which should be carried out before the period is due. Constipation is a potent factor in increasing pelvic congestion.

In cases of menorrhagia where the cause is local, and in all cases of metrorrhagia, the treatment will be that of the causal condition as described elsewhere under the appropriate heading.



## CHAPTER XLV

### DISORDERS OF MENSTRUATION (*continued*)

#### **DYSMENORRHŒA, MEMBRANOUS DYSMENORRHŒA AND INTERMENSTRUAL PAIN**

**Dysmenorrhœa.**—This means “painful menstruation,” but we must qualify our definition, for 60 to 70 per cent. of women suffer pain during menstruation, and we cannot say that we have to deal with dysmenorrhœa in this proportion of cases. The term is, therefore, generally restricted to cases in which the pain is so severe that the patient is confined to bed, or incapacitated for duty, or suffers in her general health.

Dysmenorrhœa affects women in different ways. In some the pain is abdominal, being referred more especially to the umbilicus and the hypogastric region below it, and it is then usually a kind of colic—a sharp “doubling-up” pain. With this is often associated pain shooting round the hips and down the thighs nearly to the knees, mainly in the area of distribution of the obturator nerve—that is, the inner side of the thigh. With others the pain is chiefly or entirely sacral—a dull aching pain low in the back, described sometimes “as if the back were going to break in two,” and leading to a feeling of marked lassitude and weakness and a desire to sit or lie down. Or, again, the pain may be limited to one or other side of the abdomen in the iliac region, the position to which ovarian pain is referred. Lastly, the pain may be felt in all these regions at once, being described as “all round the lower part of the body.”

The successful treatment of dysmenorrhœa depends in great measure on a recognition of its proximate cause, and tabulating the varieties of dysmenorrhœa on the basis



of their origin, we can adopt the following simple classification—

A. Constitutional.

B. Local.

1. Pelvic congestion.
2. Faults of conformation.
3. Faults of position.
4. Pelvic inflammation.

A. CONSTITUTIONAL CAUSES.—These are to be regarded chiefly as predisposing causes, and fall into two main divisions, malnutrition and neurosis. In cases of malnutrition the patient shows general debility, and not infrequently the uterus is found to be smaller than normal. Overworked servants, shop-girls, and waitresses, who are liable to long hours of standing, underfed girls who live in unhealthy conditions of overcrowding and bad ventilation, are liable to this form of dysmenorrhœa. The neurotic form is found in neurasthenic girls, in overworked students and teachers, and in those of indolent habit of life, who supply a large proportion of the subjects of hysteria.

In the absence of local causes dysmenorrhœa of constitutional origin is spoken of as “functional.” It is probably in reality akin to neuralgia, and arises from inadequate nerve nutrition. We might consequently very well call it neurasthenic dysmenorrhœa whether the subjects of it are neurotic or otherwise ill-nourished.

The effect of environment is illustrated by cases where girls suffer from dysmenorrhœa in London, though they menstruated painlessly when living in the country.

B. LOCAL CAUSES. 1. *Pelvic Congestion*.—Dysmenorrhœa due to this cause is generally of the kind in which the pain is said to be all round the lower part of the body—in the back, sides, abdomen, and thighs. It generally begins a day or two before the onset of menstruation, and continues for the first day or two days of the flow. It is accompanied by a feeling of weight and bearing-down. The congestion is in many cases otherwise indicated by leucorrhœa in the intervals of menstruation, and the subjects of it nearly always suffer from chronic constipation. On examination marked pulsation of vessels in the vaginal vault may be



felt; the uterus is often heavy and rather bulky, and the vulva is apt to become swollen during menstruation.

2. *Faults of Conformation.*—In cases of under-development, when the uterine canal is narrow and the walls unduly rigid, the swelling of the endometrium that precedes and accompanies menstruation may lead to pain. A uterus of this type is, in addition, not infrequently acutely flexed, either backwards or forwards, and there is stenosis of the os internum. Two forms of stenosis are found in association with these uterine conditions: namely, anatomical stenosis, which is either developmental, or due to cicatrization after inflammation, or to fibroid induration; and spasmodic stenosis, due to muscular contractions. In cases of stenosis, when the uterine sound is introduced, the patient sometimes complains of pain in the back, which she says is just like her menstrual pain, at the moment the sound is passing the os internum. Probably the passage of the sound induces reflex spasm, and so leads to pain. This form is sometimes called “spasmodic dysmenorrhœa.” The term “obstructive dysmenorrhœa” has also been employed, but it is probably incorrect. If the stenosis were sufficient to cause “obstruction” we should expect to find accumulation of menstrual products behind the obstruction, with dilatation of the body of the uterus. It is doubtful whether either of these conditions is ever found; it is more probable that the pain is to be explained partly by the compression of the swollen mucosa as above stated, and partly by the occurrence of painful uterine contractions, especially when there is marked flexion. This view is supported by the analogy of labour pains, which are also referred to the back. It is to be noted that many women menstruate painlessly in whom the uterus is markedly flexed, and, further, that dysmenorrhœa of this kind often supervenes some years after the onset of menstruation, the early years being quite free from pain, so the cause is probably complex. But whatever explanation we adopt, the fact remains that dilatation of the cervical canal is followed by relief of the menstrual pain in a considerable proportion of cases.

3. *Faults of Position.*—Prolapse and retroversion of the uterus are frequently associated with dysmenorrhœa, and



it is probable that the pain is in a considerable measure due to congestion. For in either case the free return of blood through the veins is hindered, as explained in the previous chapter. The pain is more constant when retroversion or prolapse is associated with prolapse of the ovaries into the recto-vaginal pouch; we may then get the typical ovarian pain superadded to the pain referable to the uterus. *A fortiori*, the pain is more acute when congestion or inflammation complicates the prolapse of the ovaries.

4. *Pelvic Inflammation*.—This is a frequent cause of dysmenorrhœa in married women, and it may be intra-uterine and due to endometritis and metritis; or peri-uterine when it is the result of salpingitis, oöphoritis, and pelvic peritonitis. In the peri-uterine variety the uterus is more or less fixed in the midst of an inflammatory mass, and the increased uterine congestion of the menstrual periods and the hampered uterine contractions are alike sources of pain. Added to this there is the pain due directly to ovarian and peritoneal inflammation.

Some writers raise ovarian pain into a separate variety, and call it "ovarian dysmenorrhœa"; but this symptomatic classification is to be deprecated, for it tends to hinder the proper differentiation of the widely varying causes of ovarian pain referred to in the two preceding paragraphs, and it has encouraged in the past the pernicious plan of removing the ovaries to cure dysmenorrhœa.

*Diagnosis*.—In the case of girls and unmarried women with no other symptom but pain, it is undesirable to make a vaginal examination in the first instance as a matter of routine; this should be reserved for cases in which medical treatment fails to give relief. Meanwhile the character of the pain and the quantity of blood lost will assist in the diagnosis. Thus painful and profuse menstruation is generally associated with great congestion before the flow begins, and the pain generally occurs during the congestive period—the commencement of the flow is then accompanied by a feeling of relief. When menstruation is painful and scanty the pain more often occurs during the flow, and has its origin in painful uterine contractions. The situation of the pain has also its significance; when this is in the



back the cervix is generally at fault, and stenosis of the os internum, acute flexion, or cervical endometritis may be suspected. On the other hand, pain referred to the umbilicus is related to disturbance in the body of the uterus, especially in the fundus; it is analogous to after-pains, and is often associated with the passage of clots. Pain in the iliac fossæ is suggestive of ovarian inflammation or irritation, or of salpingitis. In the case of married women, and single women who have not been relieved by medicinal measures, an examination should be made in order to determine the presence of some anatomical cause for the dysmenorrhœa, such as those previously enumerated, namely, endometritis, flexions or displacements of the uterus, prolapse of the ovaries, inflammation or cystic growths of the ovaries, salpingitis, pyosalpinx, or general pelvic peritonitis with adhesions.

*Treatment.*—For constitutional or functional dysmenorrhœa the remedy lies in improved hygienic conditions, more exercise, plain and sufficient food, early hours, regularity of habits, with a definite occupation in some cases and restricted mental work in others. Among the medicinal measures for the relief of menstrual pain a foremost place must be given to aperients and purgatives, which should be administered a day or two before menstruation is expected. By this means congestion is much reduced. Hot foot-baths and sitz-baths are useful adjuncts. With regard to drugs, diffusible stimulants are useful in congestive cases, and they may be combined with sedatives, as in the following mixture: bromide of ammonium, 10 grains; solution of acetate of ammonia, 1 drachm, or aromatic spirits of ammonia, 20 minims; tincture of hyoscyamus, 1 drachm; chloroform water to 1 ounce: a few doses at intervals of three to four hours will usually give relief. Or the hyoscyamus may be combined with 10-minim doses of tincture of cannabis indica. Alcoholic stimulants, and especially gin, taken in hot water often give relief, but for obvious reasons they must be ordered with great circumspection, and the same may be said of the preparations of opium, for the fostering of an alcohol or opium habit is a heavy price to pay for relief from dysmenorrhœa. Painful



uterine contractions can be relieved very satisfactorily by phenalgin, ammonol, or phenacetin in 10-grain doses. The action of these drugs is best obtained when the patient lies down for half an hour afterwards. Although medicinal treatment generally gives relief, it is seldom curative—that is to say, it will usually require to be repeated at successive monthly periods.

Passing on to the treatment of local causes of dysmenorrhœa, we may consider first the case of faults of conformation, stenosis, and flexions. Dysmenorrhœa from these causes can often be relieved by dilatation of the uterine canal under anæsthesia.

When pain is caused by prolapse or retroversion of the uterus a well-fitting pessary will usually give relief. An obstinate retroversion, combined with retroflexion, that does not yield to pessaries, should be treated by hysteropexy; this often gives brilliant results, especially when the uterus has been held down by adhesions. Endometritis requires local applications to the endometrium or curetting according to its character and severity.

Congestion and the milder degrees of pelvic inflammation should be treated by hot douches given twice daily, and the introduction of glycerin tampons two or three times a week. The local applications must be supplemented by plenty of rest and regular attention to the bowels. In the severer kinds of pelvic inflammation the dysmenorrhœa is an incident rather than a leading feature, and the mode of treatment, whether medicinal, surgical, or expectant, will depend on the exact nature of the case, so that no general rules can be laid down.

In conclusion, it must be remembered that dysmenorrhœa, like menorrhagia and metrorrhagia, is in most cases only a symptom, the origin of which requires to be investigated; it is only in a minority of cases that it is present without any constitutional disturbance or anatomical pelvic condition to account for it.

**Membranous Dysmenorrhœa.**—This is the name given to a condition in which menstruation is very painful, and is characterized by the discharge of membrane from the uterus.



Nothing is known respecting its cause.

*Pathological Anatomy.*—When complete the membrane is a hollow cast of the interior of the uterus; it is the shape of an isosceles triangle, the base of which corresponds to the fundus of the uterus. At each of the truncated angles there is an opening, the small ones at the base indicating the position of the uterine ostia of the Fallopian tubes, and the larger apical opening marking the site of the os internum. A menstrual decidua is usually 2·3 centimetres in length, and 2 millimetres in thickness. The inner surface is smooth, and dotted with minute pits, the orifices of the uterine glands. The outer surface is shaggy, as is best seen when the membrane is floated out in water. Histologically, the membrane consists of recent blood-clot, characterized by the presence of a large excess of leucocytes; fragments of organized tissue are found, consisting of small round cells with a small amount of delicate fibrous stroma, and sometimes portions of shed and partially disintegrated epithelium. No glands are found, nor are the large decidual cells characteristic of the decidua of pregnancy present. The condition is best described as one of exfoliative menstrual endometritis.

*Symptoms.*—The patient complains of severe intermittent pain, beginning with the onset of the menstrual period and reaching a maximum just before the expulsion of the membrane, after which the pain usually ceases. The membrane may come away whole, in several pieces, or in numerous shreds, and is usually discharged within forty-eight hours of the commencement of the menstrual flow.

*Diagnosis.*—The membranous cast must be distinguished from the decidua that comes away in cases of tubal pregnancy, or from the unimpregnated horn of a gravid bicornual uterus, and from the products of early abortion. The histological appearances will usually be decisive; in addition to which, the history will generally serve for a diagnosis. In cases of deciduæ associated with pregnancy within or without the uterus there is always a history of one or more missed periods, except in some few cases of tubal gestation. The hæmorrhage in cases of membranous dysmenorrhœa is limited to the usual few days, whilst in



cases where the membrane is decidual it may go on for one or several weeks. When the case has been under observation some time the regular painful discharge of membranes at monthly intervals is absolutely characteristic.

*Treatment.*—No drugs affect the formation of the membrane, although pain may be relieved by this means, as described in the previous chapter. The incidence of pregnancy sometimes effectually arrests the membranous formation, but not always. The best results are obtained from curetting, which affords at least a temporary relief; but it may require to be repeated once or twice.

**Intermenstrual Pain.**—Under this designation has been described a condition called *Mittelschmerz* by German and some British writers, in which the patient experiences regularly recurrent pain in the intermenstrual periods. There may or may not be pain at the periods themselves.

*Causation and Pathology.*—This is as yet obscure. It has been attributed to recurring painful ovulation independent of menstruation. The more probable explanation is, that it is due to painful efforts on the part of a diseased tube to expel its contents. In the majority of instances it has been found associated with tubal mischief, and especially with that curious condition known as intermittent hydrosalpinx. It is suggested that the uterine congestion which precedes menstruation causes occlusion of the uterine ostium, and accumulation of catarrhal contents in the tube; the distension causes pain. When menstruation occurs, the congestion is relieved, the uterine ostium of the tube becomes patent, and the tube discharges its contents. Pain is then relieved.

*Symptoms.*—It is in harmony with the above explanation that a discharge of watery fluid occurs periodically in some cases of menstruation, and the tube, which had previously been felt to be enlarged, is now found flaccid. When these conditions are present, associated with the periodic intermenstrual pain, the diagnosis may be regarded as conclusive.

*Treatment.*—Abnormal conditions of the tubes may require to be dealt with surgically. In the absence of such signs the pain may be alleviated by drugs.

**Ovarian Neuralgia.**—Under this term it is usual to



consider a group of symptoms consisting mainly of pain in the pelvic and sub-umbilical regions; whilst, on the most careful physical examination, nothing abnormal can be detected in the pelvis to account for the painful symptoms.

Many of the patients are single, highly neurotic, and complain of the *globus hystericus*; some are highly religious, and therefore emotional. Others may be highly educated, intellectual, and interested in the "fine arts." Unfortunately, a large proportion of these patients are addicted to two vices—alcoholism and masturbation.

The troubles do not arise before puberty, but may occur at any period during sexual life, and in some the symptoms are markedly accentuated at the menopause.

The patient complains of pain in one or both iliac fossæ; it is often increased by the pressure of the clothes, by walking, riding, or exercise in any form; some patients remain confined to bed for weeks and even months, and some actually become bedridden. With many sexual intercourse increases the pain; in nearly all the suffering is worse during menstruation.

Although these pains are often described as ovarialgia it is quite certain that the ovaries are not the source of the painful sensations, because these have in many instances continued, and even become intensified, after bilateral oöphorectomy. In some the severity of the symptoms has led surgeons to remove the uterus; even this extreme method has failed to afford an escape from the pain.

*Treatment.*—This is of little avail, as may be inferred from the variety of methods which have been employed.

Nothing is so prejudicial as local treatment; frequent examinations, the use of vaginal tampons, pessaries, and all kinds of electrical treatment do great harm. Change of air, employment, a happy marriage (especially if fertile), often lead to improvement.

Anodynes, such as opium, morphia, chloral, are dangerous, and above all alcohol should be strictly forbidden.

Surgical measures are equally useless, for unilateral and bilateral oöphorectomy may do good for a few months, but the almost inevitable relapse leaves the patient worse than



before. Even sham oöphorectomy and vaginal hysterectomy have been tried, with the same temporary success. These patients are hopeless with physician and surgeon, singly or combined. Many become chronic alcoholics; some figure in divorce courts; others end their days in lunatic asylums.



## CHAPTER XLVI

### DYSPAREUNIA—STERILITY

**Dyspareunia.**—This signifies pain during sexual intercourse. The causes may be classified as follows—

1. **VAGINISMUS.**—By this is meant a condition of painful and spasmodic reflex contractions of the muscles surrounding the vaginal orifice during coitus, or during a digital examination. The muscles chiefly at fault are the levators of the anus. It may be due to mere nervousness and hysteria, to hyperæsthesia of the vulva, or to one of the local pathological conditions enumerated below. The latter may, however, give rise to dyspareunia directly, and without producing vaginismus.

2. **PSYCHICAL CAUSES.**—These include mere incompatibility or aversion when the marriage is unsuitable, nervousness or *mauvaise honte*, especially in the newly married. Dyspareunia from psychical causes may persist for months or years after marriage, and lead to much domestic unhappiness.

3. **ANATOMICAL CAUSES.**—(a) Smallness of the vulva and vagina, congenital and due to under-development, or acquired, as the result of cicatricial contraction or atrophy of the vagina, or kraurosis vulvæ. In the first instance the obstacle may be a rigid hymen.

(b) *Inflammatory Conditions of Vulva, Vagina, or Urethra.* Under this head may be enumerated vulvitis, vaginitis, and urethritis; ulcers, sores, and excoriations of the vulva or vagina; kraurosis vulvæ, an inflammatory condition of the hymen or carunculæ myrtiformes; inflamed Bartholinian glands; urethral caruncle. Piles will often produce a condition of vaginismus.

(c) More deep-seated conditions, such as metritis, pelvic inflammation, and prolapse of the ovaries. The last-



mentioned is a frequent unsuspected cause of dyspareunia; prolapsed ovaries are nearly always hyperæsthetic, and pressure upon them, whether during intercourse or during a vaginal examination, gives rise to acute pain.

*Treatment.*—The first essential is to discover the anatomical cause if one exists, otherwise time and effort may be wasted in the adoption of constitutional treatment when a simple local application may effect an immediate cure. Thus, in all inflammatory conditions, these must be treated by the methods described under their respective headings, and temporary sexual abstinence must be enjoined. When the vaginal orifice is small the use of simple lubricants such as vaseline may suffice; if not, the vagina must be dilated with the fingers, or with dilators, preferably under an anæsthetic; a series of Fergusson's specula often answers very well. A rigid hymen should be incised, and a sensitive one excised. Simple vaginal hyperæsthesia may be relieved by a vaginal pessary containing  $\frac{1}{2}$  to 1 grain of cocaine, and made up with cacao butter; this is inserted ten to fifteen minutes before intercourse. Hyperæsthesia is also often improved by dilatation under an anæsthetic. Caruncles and cysts must be removed. Vaginismus due to kraurosis must be treated by anæsthetic local applications such as carbolic acid, cocaine, or menthol, or by dissection as described under Kraurosis (p. 88).

In the case of hysterical or nervous women constitutional remedies may be required, including sedatives such as bromides or hyoscyamus.

It must be remembered, however, that the cases where no local treatment is available, are very rare and include cases of "incompatibility," which are beyond the reach of medical intervention.

**Sterility.**—With causes of sterility affecting the man we have here nought to do, but they must never be lost sight of in investigating a case. For the want of carefully directed inquiry, the woman has not infrequently been erroneously held responsible for a childless marriage.

In considering sterility as it concerns women we must draw a broad distinction between—

(a) Conditions which do not allow of conception.



(b) Conditions which do allow of conception, but which do not allow of development.

(a) *Conditions which do not allow of Conception.* (1) *Age.* Save under exceptional circumstances conception does not occur before puberty. After this age fertility generally increases, attains its maximum at about the age of twenty-five, and then declines. Thus Matthews Duncan gave the following figures as the result of the analysis of 4447 cases—

Age at marriage—

15-19; 20-24; 25-29; 30-34; 35-39; 40-44; 45-49; 50, etc.

Percentage sterile—

7.3; 0.—; 27.7; 37.5; 53.2; 90.9; 95.6; 100.

That is, in proportion as marriage is deferred the probability of sterility is increased. After the age of forty the chances of childbearing are remote.

The following laws which Matthews Duncan enunciated are also worth bearing in mind—

The question of sterility is decided in three years of married life.

When the expectation of fertility is greatest the question of probable sterility is soonest decided, and *vice versa*.

Relative sterility will arrive after a shorter time according as the age at marriage is greater. A wife who, having had children, has ceased for three years to exhibit fertility has probably become relatively sterile—that is, will probably bear no more children—and the probability increases as time elapses.

It must be remembered that these “age-rules” are subject to marked exceptions. Conception has been known to occur for the first time as long as ten or even fifteen years after marriage.

(2) *Deficient Ovulation.*—When the ovaries are under-developed sterility is absolute. The atrophy which they undergo as time goes on has the same effect, and to this may be attributed the increasing tendency to sterility as the age of marriage is postponed. Ovarian disease, such as solid tumours and cysts, also leads to sterility. These conditions may generally be diagnosed by careful bimanual examination.

(3) *Deficient Uterine Changes.*—When the uterus is very small and menstruation absent or scanty, sterility nearly



always results. This may be due in some cases to the concomitant deficiency of ovulation; in others to the inability of the uterus to prepare for an oöperm (fertilized ovum). Delay or absence of menstruation cannot be regarded as an absolute indication of sterility.

(4) *Incomplete Sexual Intercourse*.—This may be due to narrowness of the vagina or to a rigid hymen. It must be remembered, however, that conception may occur when penetration has never taken place.

(5) *Mechanical Obstacles to Impregnation*.—Under this head are included all cases of atresia, whether of the vagina, of the internal or external os of the uterus, or of the Fallopian tube. The latter frequently becomes sealed up at its fimbriated extremity, as the result of pyosalpinx; uterine atresia may be congenital, but it is probably more often acquired as the result of inflammatory disease. Vaginal atresia is nearly always congenital. The mechanical obstacle may consist not in atresia, but in want of adaptation—as, for example, in cases where the cervix is pointed markedly forward, either from retroversion or from ante flexion. The spermatozoa, which, as the result of intercourse, come to lie principally in the posterior vaginal fornix, are then unable to make their way through the os externum, which is turned away from them. Polypi and other tumours in the genital passages may also be the cause of sterility.

(6) *Noxious Discharges*.—Septic and gonorrhœal discharges are injurious to the vitality of spermatozoa, and to this cause is probably due the sterility which is found in cases of gonorrhœa, endometritis, and adenomatous disease of the cervix. Gonorrhœa has perhaps an even more considerable effect in the changes which it induces in the Fallopian tubes. Strong antiseptic and frequent simple vaginal douches also prevent conception.

(b) *Conditions which allow of Conception, but which do not allow of Development of the Oöperm*.—Under this heading are included, first, the as yet obscure conditions which lead to extra-uterine gestation; and, secondly, pathological conditions of the uterus which cause early abortion, such as disease of the endometrium, extensive laceration of the cervix, and acute flexions of the uterus.



*Treatment of Sterility.*—It is most important that the practitioner should first ascertain whether the cause of sterility is remediable or not, for nothing leads to greater disappointment of the patient, and, we may add, to greater discredit to her attendant, than the confident holding out of a hope which is doomed to non-fulfilment. Therefore the development of the uterus and ovaries should be first investigated; if under-developed, treatment is useless, and no hope should be held out.

In cases of atresia the obstacle may often be overcome, as by division of a vaginal septum or by uterine dilatation. Correction of a malposition of the cervix will often be followed at once by conception.

With inflammatory conditions of the uterus there is a fair prospect of a favourable issue as the result of appropriate treatment, whether they have acted by preventing conception or by leading to early abortion. The same cannot, however, be said of tubal disease, where the prognosis is bad. But treatment should nevertheless be undertaken on conservative lines. Similarly, polypi and other tumours should be removed, the integrity of the uterus being preserved.

Harmful discharges will be removed by the treatment of the uterine or vaginal conditions which cause them.

When the uterus and appendages appear to be normal, the patient's husband should be submitted to careful examination, so that she may not be blamed erroneously when the fault is on his side.

Lastly, the conditions of intercourse must be inquired into, and the patient advised accordingly.

Sterility due to psychical causes is probably irremediable in most cases, but moral treatment is most likely to succeed. Here the judicious husband will probably be a better physician than the medical attendant.



## SECTION IX

### TOPOGRAPHICAL SUMMARY

IN view of our departure from the anatomical in favour of the pathological grouping of the Diseases of Women, we deem it useful to give here a short summary showing the diseases to which the several organs and regions are liable.

## CHAPTER XLVII

### TOPOGRAPHICAL SUMMARY

#### **Diseases of the Vulva**

- I. Malformations of the vulva.
- II. Injuries of the vulva.
  - Accidental injuries.
  - Injuries during coitus.
  - Injuries during labour.
- III. Inflammation of the vulva.
  - Simple vulvitis.
  - Infective vulvitis (including gonorrhœa).
- IV. Vascular disturbances.
  - Varicocele or varix.
  - Hæmatoma.
  - Edema.
  - Gangrene.
- V. Cutaneous diseases of the vulva.
  - Erythema.
  - Eczema.
  - Herpes.



Lichen.  
Tuberculosis.  
Syphilis.  
Condylomata.  
Elephantiasis.  
Vulvitis pruriginosa.  
Kraurosis vulvæ.  
Pruritus vulvæ.

VI. Morbid conditions of the clitoris, hymen, urethral orifice, and perineum.

VII. Tumours and cysts of the vulva.

(a) Tumours—

Lipoma.  
Fibroma.  
Myxoma.  
Angeioma.  
Papilloma.  
Sarcoma.  
Carcinoma.

(b) Cysts—

Mucous and sebaceous cysts.  
Bartholinian cyst or abscess.  
Hydrocele of the canal of Nuck.  
Hernia.

### **Diseases of the Vagina**

I. Malformations of the vagina.

II. Injuries of the vagina.

Lacerations.  
Fistulæ.

III. Foreign bodies in the vagina.

IV. Displacements of the vagina.

Cystocele.  
Rectocele.

V. Inflammation of the vagina.

Gonorrhœal vaginitis.  
Non-gonorrhœal vaginitis.



## VI. Tumours and Cysts of the vagina

## (a) Tumours—

Lipoma.

Myoma.

Sarcoma.

Carcinoma.

## (b) Cysts—

Mucous cysts.

Gartnerian cysts.

Peri-urethral cysts.

Echinococcus colonies.

**Diseases of the Uterus**

## I. Malformations of the Uterus.

## II. Injuries of the uterus.

Laceration of the cervix.

Perforation of the uterus.

## III. Foreign bodies in the uterus.

## IV. Displacements of the uterus.

Flexions and versions.

Prolapse and procidentia.

Inversion of the uterus.

Hernia of the uterus.

## V. Inflammation of the uterus.

Acute endometritis.

Chronic endometritis.

Tuberculous endometritis.

## VI. Diseases resulting from gestation.

Retained products of conception.

Superinvolution.

Subinvolution.

## VII. Tumours of the uterus.

Fibrosis.

Fibroids.

Adenoma.

Fibro-adenoma.

Sarcoma.

Carcinoma.

Chorion-epithelioma.



**Diseases of the Fallopian Tubes**

- I. Malformations of the Fallopian tubes.
- II. Inflammation of the Fallopian tubes.
  - Salpingitis.
  - Pyosalpinx.
  - Hæmatosalpinx.
  - Tuberculosis of the tubes.
- III. Tubal pregnancy.
- IV. Tumours of the Fallopian tubes.
  - Adenoma.
  - Carcinoma.
  - Chorion-epithelioma.

**Diseases of the Ovaries**

- I. Malformations of the ovaries.
- II. Displacements of the ovaries.
  - Undescended ovary.
  - Hernia of the ovary.
  - Prolapse of the ovary.
- III. Diseases of the corpus luteum.
  - Secondary changes in the corpus luteum.
  - Apoplexy of the ovary.
- IV. Inflammation of the ovary.
  - Oöphoritis.
  - Perioöphoritis.
  - Cirrhosis of the ovaries.
- V. Ovarian pregnancy.
- VI. Tumours and cysts of the ovaries.
  - (a) Tumours—
    - Fibroid.
    - Sarcoma.
    - Carcinoma.
    - Chorion-epithelioma.
  - (b) Cysts—
    - Cystic adenoma.
    - Dermoids.
    - Lutein cysts.
    - Papillomatous cysts.



Parovarian cysts.  
Gartnerian cysts.  
Ovarian hydrocele.

### **Diseases of the Pelvic Peritoneum**

- I. Peritonitis.
- II. Epithelial infection.
- III. Hydroperitoneum.

### **Diseases of the Pelvic Connective Tissue**

- I. Pelvic inflammation.
  - Pelvic cellulitis.
  - Pelvic abscess.
- II. Tumours of the mesometrium.
  - Lipoma.
  - Myoma (fibroid).
  - Sarcoma.
  - Echinococcus colonies of the pelvis.

### **Functional Disorders**

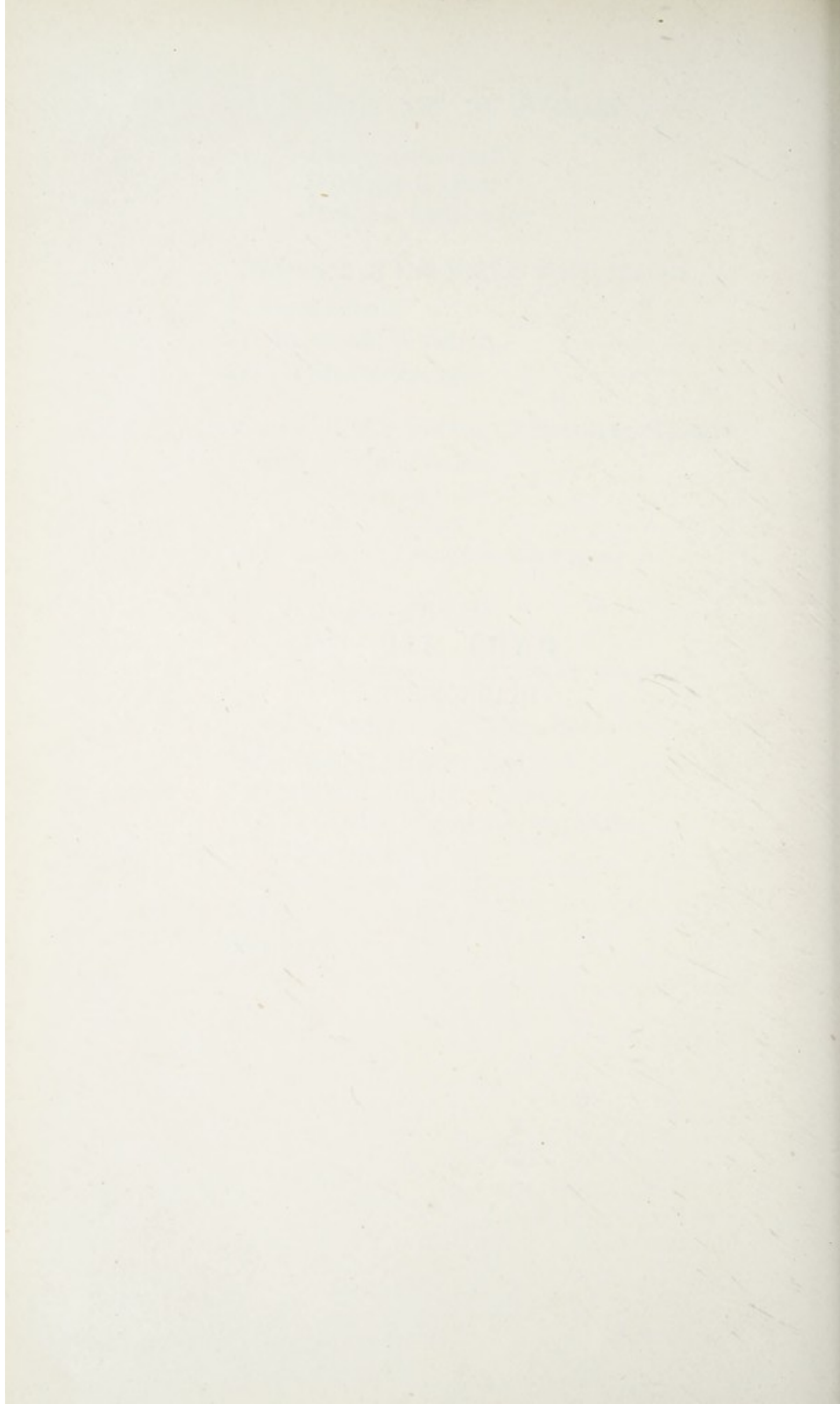
- Disorders of menstruation.
  - Amenorrhœa.
  - Menorrhagia and metrorrhagia.
  - Dysmenorrhœa.
  - Intermenstrual pain.
- Dyspareunia.
- Sterility.



## PART III

### DIAGNOSIS







## CHAPTER XLVIII

### METHODS OF EXAMINATION OF THE FEMALE PELVIC ORGANS

ACCURATE diagnosis is not a matter of intuition. It depends on a scientific interpretation of physical signs and of symptoms.

The value of symptoms is threefold. They determine, first the necessity, and secondly the method of examination; thirdly, they influence the interpretation of signs.

The value of physical signs is that they are of the nature of facts; for their discovery, training and a systematic method are essential. This chapter is concerned with the exposition of a systematic method, whilst the student will obtain his training by the application of the method in the out-patient room and by the bedside.

**Abdominal Examination.**—This should always be made first, in the classical order: Inspection, palpation, percussion, auscultation. The patient lies flat on her back, with the knees slightly flexed.

*Inspection.*—This shows the size of the abdomen, and may reveal striæ, pigmentations, prominence of superficial veins, irregularities of surface, as evidence of past or present distension or of intra-abdominal pressure.

*Palpation* shows in the first place the resistance of the abdominal walls, and when carried deeper will give information as to the enlargement of particular organs or of certain parts of the abdomen. If there should be any abdominal tenderness this is also revealed. It is often necessary to ascertain the condition and relations of the liver, stomach, spleen, and kidneys. Palpation is also most important in pregnancy. In the absence of a tumour occupying the pelvic inlet, the sacral promontory can easily be reached.



*Percussion* indicates the nature of local or generalized abnormalities discovered by palpation; solid, liquid, or gaseous local conditions may thus be analysed, and the size and distribution of tumours or of collections of fluid may be ascertained. A loaded colon, often of significance, will sometimes be discovered by this and the preceding method.

*Auscultation* has also its value, chiefly in pregnancy and in certain uterine tumours (vascular fibroids) where a venous murmur may be heard.

In conducting the above inquiries the position of the patient may require to be changed; she may be turned to one or the other side, or the knees may be drawn up in order to relax the abdominal muscles.

*Inspection of the external genitals* is often unnecessary, at least in the first instance, whilst in other cases it will be indicated by the nature of the symptoms complained of.

**Vaginal Examination.**—For this purpose the patient may lie on her back or side.

*The Dorsal Position.*—We take this first because it is the best for a complete pelvic examination. It is often convenient to let the patient retain the position in which the abdominal examination was made, the knees being drawn up.

The right hand is used for the vaginal exploration, and the left for abdominal palpation, the physician sitting at the right side of the patient. Or, if more convenient, the patient is placed at the foot or side of the bed, with knees drawn up and the legs everted, the physician standing or sitting opposite the perineum. In either case the examination is made in the same systematic manner.

The index finger, well lubricated, is introduced into the vagina by feeling gently for the perineum, and passing forward till the posterior margin of the vaginal outlet is reached. In the vagina, the finger should press chiefly against the posterior wall. It must be remembered that the direction of the vagina is towards the body of the first sacral vertebra. After the characters of the vaginal walls and of the cervix have been noted, the left hand is placed on the abdomen, to make the **bimanual examination**. The abdominal wall is depressed just above the pubes, the



fingers being placed as flat as possible to avoid hurting the patient with the nails or finger-tips. The position of the pelvic brim must be remembered; for exploration of the posterior regions of the pelvis the hand will have to be placed nearer the umbilicus; similarly, it must be moved to one or other side in examining the lateral parts of the pelvis. As the external hand is moved, the finger in the vagina is moved at the same time, passing into the anterior, posterior, or lateral vaginal fornices, in order to meet the external fingers; and gentle pressure must be made till the inside and outside fingers meet, or till some definite structure is felt between them.

In women who have borne children it is generally better to use two fingers for the vaginal examination, because we can thus reach higher up, and a better idea is obtained of the position of the organs.

Still using the dorsal position, a *recto-abdominal examination* may be required, either in the first instance in virgins or to give additional information in others. Much may be made out by this method: the general size, position, and shape of the uterus can be determined, the posterior surface of the uterus explored, and the appendages often distinctly mapped out.

In certain cases a *recto-vagino-abdominal examination* is resorted to; this is specially useful in defining exudations or solid bodies in the recto-vaginal fossa, for vaginal touch alone might suggest that these were in the rectum, while rectal exploration alone might give the impression that they were in the vagina or connected with the uterus.

*The Lateral Position.*—The patient lies on her left side, with buttocks projecting over the edge of the bed, and with the knees drawn up. In this position the relation of parts is not so clear, and the beginner will more readily make mistakes. It is well, however, to accustom one's self to both methods, and in certain cases it is useful to employ both in turn. But for some purposes the lateral position answers all requirements, especially when the bimanual examination is not necessary; whilst for some manipulations, both for diagnosis and for treatment, it is preferable.

*The Lithotomy Position*, with pelvis raised and knees flexed



on the abdomen, is seldom required for an examination, unless under an anæsthetic.

*The Semiprone Position*, or Sims', is useful when it is required to examine, with the speculum or otherwise, the anterior vaginal wall, and sometimes for purposes of treatment. The patient lies on her left side, and partly prone; both knees are drawn up, the right in front of the left. The patient's chest lies almost flat on the pillow, the left arm is placed behind her or hangs over the edge of the bed.

*The Genu-pectoral Position* is occasionally required; for instance, to replace a retroverted gravid uterus. The patient rests on her chest, arms, and knees, the pelvis being raised and the thighs vertical.

We have so far traced the methods to be adopted, and the information that may be obtained, in using the hands alone. We must now pass under review the various accessory procedures, with the aid of instruments. Of these, the most important is the uterine sound.

**The Uterine Sound.**—This should be a rod of copper, silver-plated, rigid enough to retain any shape imparted to it, and flexible enough to admit of being bent with the fingers. It is set on a handle which is flattened, and rough on one surface (Fig. 124). The sound is straight in the portion next the handle; the distal portion is curved, the concavity being on the same side as the rough surface of the handle. The curve is of such a nature that the last  $2\frac{1}{2}$  inches (6.2 centimetres) form an angle of about  $140^\circ$  with the straight portion; and at the junction of these two parts there is a well-marked knob or angle on the convex side, which can readily be distinguished by the finger, and marks the distance to which the sound should enter a normal uterus. The instrument is graduated by means of notches on the convex side. The first notch is  $1\frac{1}{2}$  inches (3.7 centimetres) from the tip; the knob or angle forms the next mark,  $2\frac{1}{2}$  inches (6.2 centimetres) from the tip, and the remaining notches are 1 inch (2.5 centimetres) apart; the first being  $3\frac{1}{2}$  inches (8.7 centimetres) from the tip.

The sound should not be used when the patient has missed a menstrual period, unless pregnancy be certainly



excluded; when there is any pelvic inflammation, malignant disease of the uterus, or when the vagina or cervix is septic. All these points can be determined by the preliminary digital examinations.

*How to Use the Sound.*—It is most important that the position and direction of the uterus should first be determined, for facility in passing the sound depends almost entirely on knowing the direction it must take. This settled, the index finger of the right hand (with the patient in the ordinary left lateral position) is placed so as to rest against the os, and the point of the sound is carried along the concavity of the finger and guided by it into the cervical canal. Once entered (a matter of little difficulty, as a rule), the handle of the sound is to be carried gently back to the perineum. In most cases this will suffice to cause the end of the sound to slip through the os internum. No pressure need be used. If the uterus is retroverted the concavity of the sound should first be directed backward, and by moving the handle slightly forward the sound enters the cavity. When the uterus is retroflexed as well as retroverted, the sound should be held with its concavity forward until its point reaches the internal os; the handle should then be carried back with a semicircular sweep, after which it is carried forward in a straight line till the point passes into the uterine cavity. In some cases, when there is lateral deviation of the uterus, or when the canal is tortuous (as when a fibroid is present),

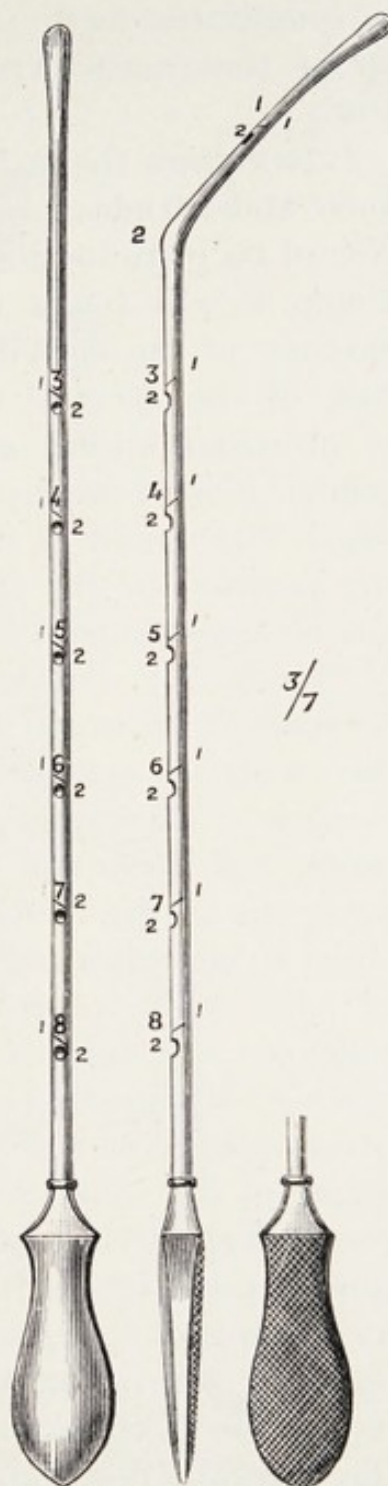


FIG. 124.—THE UTERINE SOUND.



a little patience and care will be needed. But always desist rather than use force. The introduction of the sound is sometimes facilitated by taking hold of the anterior lip of the cervix with a volsella, and drawing it gently down.

*Information Given by the Sound.*—It is possible to introduce and withdraw a sound, and to realize little but the fact of its introduction; but, used as an extended, sensitive finger, it will teach much. At the outset the degree of patency of the os will be noted, the smoothness or otherwise of the cervical canal, and the existence (if present) of muscular spasm at the os internum; one gets also a general idea of the firmness or flabbiness of the tube through which the sound is passing. The sound once introduced, the position of the fundus is recognized, when this could not be ascertained by the bimanual examination, the length of the cavity can be measured, and by gentle rotatory movement its width may be gauged. Projections may be met with, as sessile tumours, which at first obstruct the passage of the sound. Sometimes, also, two distinct directions will be found in which the sound passes, as in a bipartite uterus. Meanwhile the patient will herself have given some indications; at certain points she may complain of pain, as in passing through the internal os, or when touching the fundus. If the bimanual examination has revealed a tumour, it will now be noted whether the sound passes into it or not, and in the latter case whether movements of the sound are at once conveyed to the tumour or *vice versa*; in this way a uterine can often be distinguished from a non-uterine tumour. When the tumour is uterine, by placing one finger in the anterior and the other in the posterior fornix, or with one finger in each lateral fornix, it may be possible to determine whether the tumour is in the anterior, posterior, or side wall of the uterus.

As the sound is withdrawn, it may be felt to be gripped, either by spasm or by mere narrowness of the passage; we have here the test of stenosis. If, while the sound is introduced as far as possible, the finger be placed on it up against the cervix, and it be kept in this position when the sound is withdrawn, the length of the cavity can be exactly



read off. Lastly, we look at the sound, to see if its introduction has caused bleeding.

**The Volsella.**—This is principally an instrument for treatment, but may be required also for diagnosis. It is

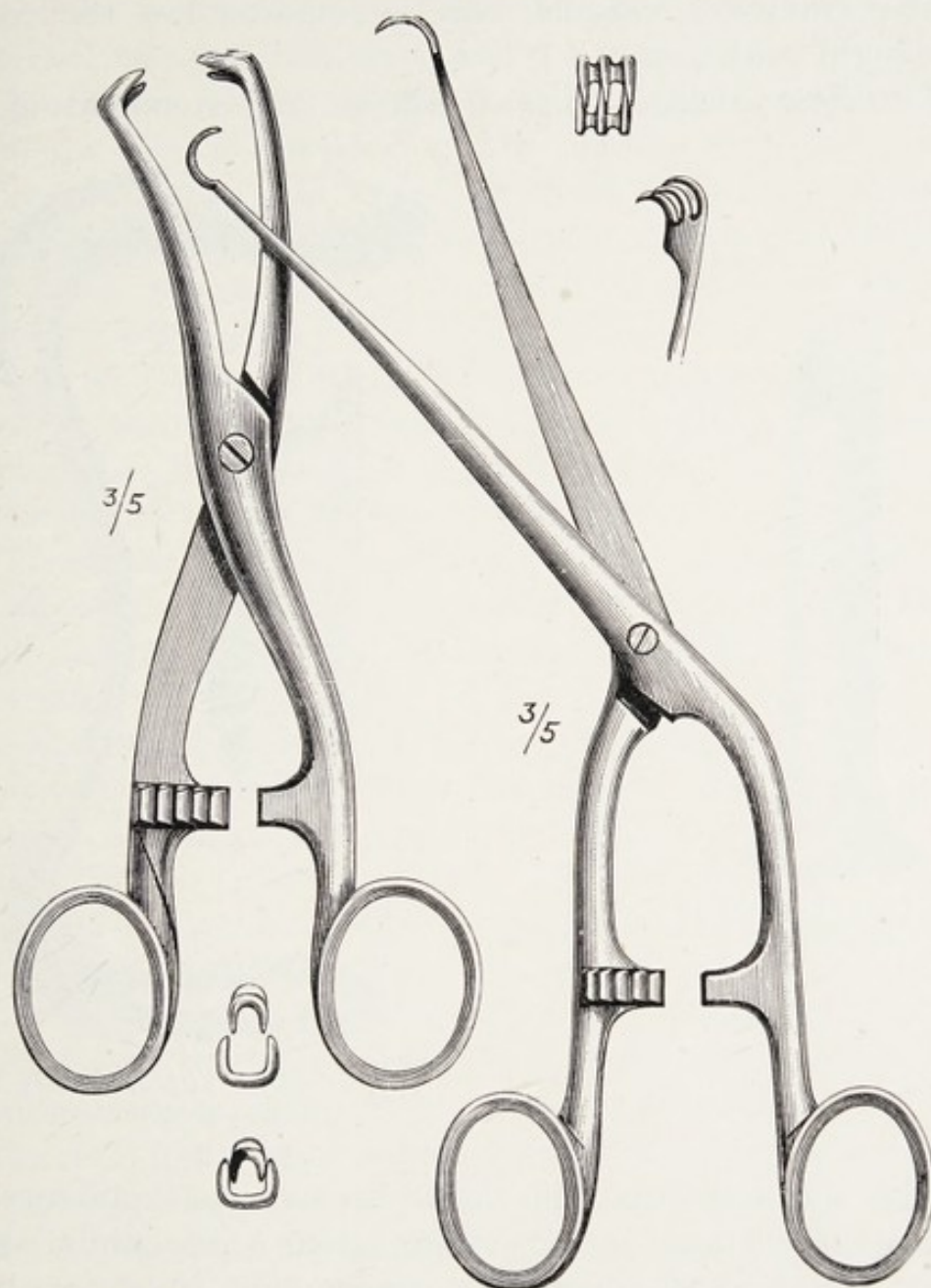


FIG. 125.—BULLDOG VOLSELLA; SLENDER VOLSELLA.

used to draw the cervix down, and is generally applied to the anterior lip. In most cases an antero-posterior grasp of the anterior lip is obtained; but in nulliparæ with a small cervix it is often more convenient to seize the lip transversely. When the uterine canal is bent, traction on the cervix tends to straighten it, and thus facilitates the



introduction of the sound. The ordinary volsella (Fig. 125) is slender, with thin hooks; for obtaining a firm hold, as when the uterine canal is being dilated, the bulldog volsella is a very convenient instrument (Fig. 125).

In removing a volsella, care is required lest the vagina be caught and torn.

**The Speculum.**—Introduced as an instrument of dia-

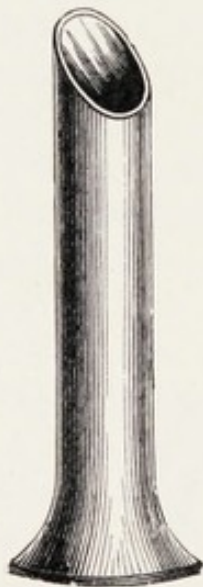


FIG. 126.—FERGUSSON'S SPECULUM.

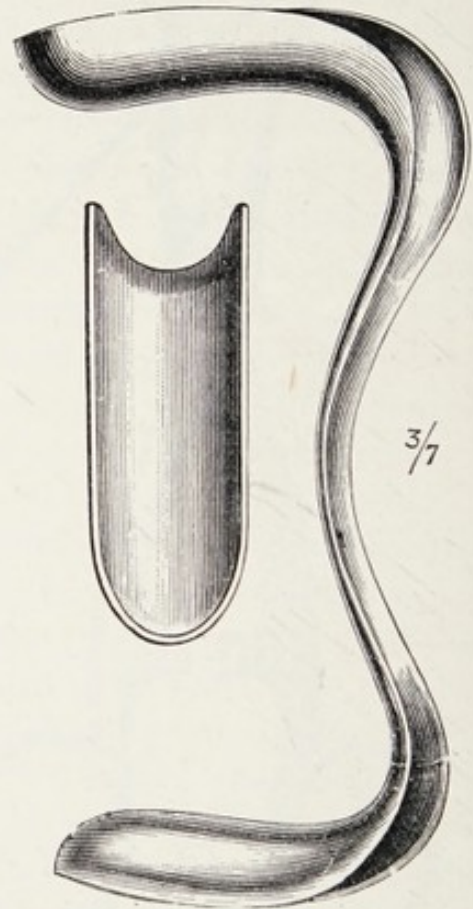


FIG. 127.—THE DUCKBILL (SIMS') SPECULUM.

gnosis, the speculum has now become an appliance for treatment. There is very little that a speculum shows that cannot be discovered by touch; but it is sometimes desirable to see the condition of the vagina and the cervix. The simplest is the *cylindrical* or *Fergusson's speculum* (Fig. 126). This is usually a hollow cylinder of stout glass, silvered like a mirror and coated with vulcanite. Its extremity is bevelled, and is very liable to chip. When this happens, it will scratch the patient and cause pain. This drawback is avoided by using specula made of metal



or celluloid. To introduce it, the instrument is warmed and lubricated with oil or vaseline, and the perineum is held backward while the end of the speculum is pressed against it. The instrument is gently pushed in the direction of the vaginal axis. If care be taken to avoid pressure anteriorly against the pubes, and if a suitable size be chosen, the procedure causes no pain. As the speculum passes up, a general view is obtained of the vaginal walls, and finally the cervix comes into view. A small swab of cotton-wool should be at hand to clear away the mucus and blood (if any) from the surface of the cervix; this can then be examined with ease.

*Sims' speculum* (Fig. 127) can be used only in the semi-prone or the lithotomy position, and requires an assistant to hold it. By its means a good view can be obtained of the anterior vaginal wall and of the cervix.

*The bivalve (Cusco's) speculum* is easy to introduce, and allows of considerable separation of the two free ends, whilst the part embraced by the vulvar outlet is not further distended. A good view of the vaginal walls may be obtained by slightly rotating the instrument. It has the disadvantage of complexity of screw and hinges, making it a matter of difficulty to keep it perfectly clean.

*Neugebauer's speculum* (Fig. 128) is one of the most generally convenient. The larger posterior blade is first introduced, well lubricated; the smaller blade lies within the larger, the two together forming a cylinder where they touch. Any degree of separation of the inner ends of the speculum can be obtained that may be desired; a good view of the cervix can be obtained, and by using one blade alone the anterior or posterior vaginal wall can be explored.

It is sometimes necessary to include in one's examination the digital exploration of the interior of the uterus. Except immediately or soon after confinement or miscarriage, or when the cervix is dilated by a tumour (polypus), this can only be done under an anæsthetic, and the cervical canal must be dilated. Tents were formerly used for this purpose, but they are always tedious and often unsafe, and except in special circumstances it is better to carry out dilatation at one sitting.



**Examination under an Anæsthetic.**—We would lay special stress on the importance of this as an aid to exact diagnosis. In the case of unmarried girls and nulliparous women with narrow vagina it is especially indicated; partly, in the former case, for ethical reasons. In order that it may be satisfactory, the rectum should first be emptied by

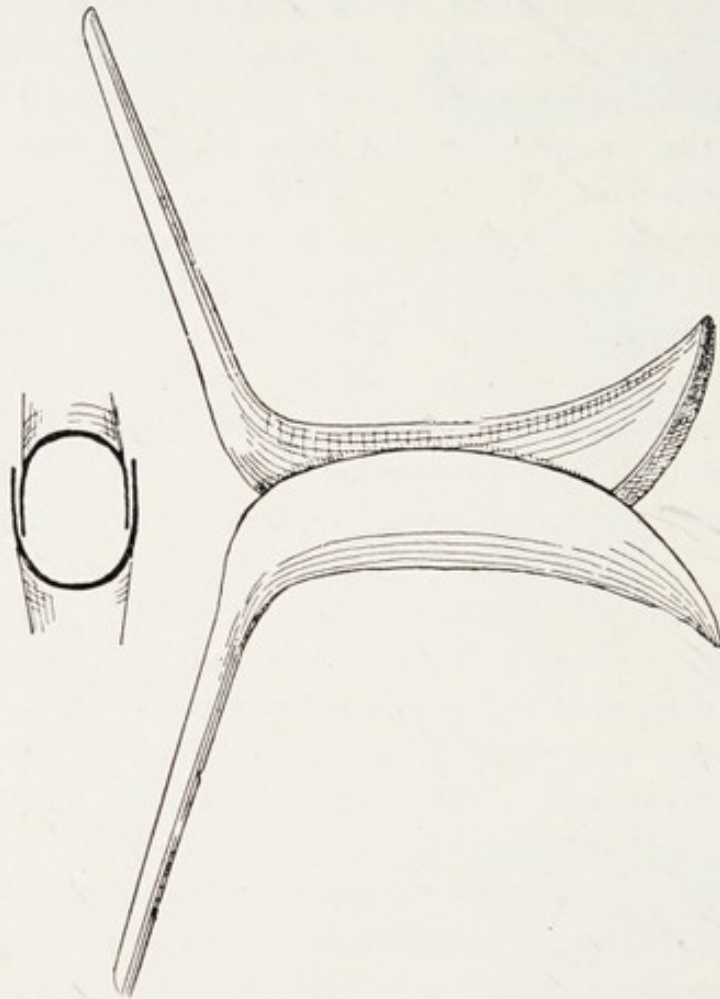


FIG. 128.—NEUGEBAUER'S SPECULUM.

means of an enema, and the urine drawn off, if necessary, by catheter.

The first advantage is the avoidance of pain; as a consequence the examination can be much more thorough, and deep pressure exerted as required. In the second place, the muscular relaxation allows of a much better bimanual examination. There should be no difficulty, in an ordinary case, in mapping out exactly the position of the uterus, ovaries, and tubes. The differential diagnosis of pelvic



conditions from one another and from renal and other abdominal tumours is comparatively easy.

Small pelvic swellings are often easily overlooked in an ordinary examination; whilst an examination under an anæsthetic in the lithotomy position will generally reveal them without trouble. In addition, the bladder and rectum can, if necessary, be thoroughly explored.



## CHAPTER XLIX

### THE INVESTIGATION OF SYMPTOMS

ACCURATE diagnosis depends upon a systematic method of inquiry into symptoms and examination of physical signs. We shall here give an outline of the way such inquiry and examination should be set about.

The **anamnesis** is the account obtained by questioning the patient. The age, occupation, and civil condition should be first noted as a matter of routine, for these points may influence subsequent inquiries. We may then proceed in the following order—

(a) **Family History.**—The present health or cause of death of the nearest relations should be noted. A clue may thus be gained as to the probability of tuberculosis, syphilis, or neuroses in the patient's case.

(b) **Previous Health.**—Inquire concerning exanthemata or rheumatic fever in childhood, anæmia after puberty, syphilis or gonorrhœa after marriage, and previous treatment for disease of the pelvic organs. Thus a history of gonorrhœa, followed by repeated attacks of pelvic inflammation, will lead one to suspect tubal mischief, and it may explain the presence of vaginitis, endometritis, or a Bartholinian abscess. Tuberculosis may lead to the diagnosis of tuberculous peritonitis from other abdominal swellings or of tuberculous salpingitis when the tubes are affected; it may also clear up the nature of vulvar cutaneous affections. A history of operative treatment for dysmenorrhœa will prepare for the finding of congenital smallness or ante-flexion of the uterus; whilst if the patient has worn pessaries, a present vaginitis or endometritis may be explained, or retroversion or hernia of the pelvic floor may be expected. So also the patient may have had curetting, trachelorrhaphy, amputation of the cervix, perineorrhaphy, or abdominal



section performed, and these will all shed light on the present condition.

(c) **Menstruation.**—The age of the onset of menstruation, and of its cessation if the patient be past the menopause, should be noted; also its regularity, duration, the quantity of the flow as estimated by the number of diapers used, and its association with pain. It is important to ascertain whether the character of the menses has altered. Thus, if there has been a gradual diminution, followed by cessation, in a young woman, it is probably due to anæmia; diminution in an adult is often associated with ovarian tumours. Increase in the duration and quantity will point to pelvic congestion or inflammation, retention of products of conception, or some new growth, such as a polypus, a fibroid, or malignant disease. The diagnosis, especially between an ovarian tumour and a fibro-myoma, is often facilitated by a careful inquiry as to menstrual changes. Recent amenorrhœa, following on previous regularity, is always suggestive of pregnancy. When the menses have never appeared, and the patient has reached adult life, there is a likelihood of congenital malformation, with or without retention of menstrual products.

(d) **Confinements ; Miscarriages.**—The patient may give a history of sterility after several or many years of married life. This, especially if associated with dysmenorrhœa, will lead one to suspect under-development of the uterus, or if there is at the same time a history of gonorrhœa, there is considerable probability of disease of the uterine appendages. This probability is increased if the sterility has supervened after a single pregnancy, or after one or two miscarriages; whilst endometritis will at the same time be looked out for. Relative sterility, when there has been no gonorrhœal disease, and when the menstrual loss has increased, will prepare one to find fibroid changes.

Repeated miscarriages in early married life, followed by delivery of a viable child, usually point to syphilis. Repeated miscarriages coming on after the birth of several living children may be due to inflammation or displacement of the uterus or laceration of the cervix, or to a tuberculous diathesis.



When the patient is a multipara who has had several difficult or instrumental labours one is likely to find a laceration of the cervix, or a rupture of the perineum with its attendant symptoms of hernia of the pelvic floor.

Recent instrumental or otherwise abnormal labour followed by severe illness often means pelvic inflammation, either peritonitis or cellulitis; on the other hand, this may follow a labour that has been apparently normal, and may be due to the reawakening of a dormant infection in the vagina, uterus, or Fallopian tubes, to a suppurating ovarian cyst, or to secondary changes in a dermoid.

Metrorrhagia or menorrhagia dating from a miscarriage or from a labour at term is most often due to the retention of portions of placenta or membranes.

Various vulvar affections, such as œdema, hæmatoma, and cellulitis, may owe their origin to a recent labour.

(e) **The History of the Present Illness** should next be inquired into, so as to obtain an idea as to its mode of origin and duration. A good deal of care is necessary in elucidating this, as the patient's statements are often not only vague but contradictory. Bleeding that has lasted a month may be due to miscarriage; irregular bleeding for two or three months may indicate tubal gestation or cancer; bleeding that has gone on for many months is more likely to be due to a polypus or to a fibroid. So also a tumour that has existed many months without much increase in size cannot be due to normal pregnancy. An illness that has come on suddenly with severe pain generally indicates pelvic inflammation, but it may also be due to tubal gestation, to the rupture of a cyst, or to torsion of a pedicle. The history of new growths is a gradual onset, whilst conditions such as chronic endometritis and uterine displacements have probably existed off and on for several years. The history of tubal disease is generally that of chronic ill-health with periodic exacerbations.

(f) **Present Symptoms.**—In the out-patient room and in the consulting-room the symptoms will generally be ascertained at the outset, but in "taking out a case" in hospital it is best to obtain first the previous history. In many gynæcological conditions the symptoms present a



marked similarity; thus, pain referred to the sacrum or hypogastrium, and pains on sitting or walking, leucorrhœa, menorrhagia, and dysmenorrhœa, may be met with in the most varied diseases. We shall attempt, however, to analyse them to some extent in order to estimate the value to be attached to them in forming a diagnosis.

*Pain.*—This, when referred to the umbilicus and hypogastrium in front and to the sacrum behind, generally indicates uterine disorder. It is found characteristically as dysmenorrhœa. It is said that the pain may be further localized, and that sacral pain has its origin in cervical conditions, whilst when the fundus is involved the pain is referred to the umbilicus (*see* p. 399). A sense of aching, fullness, and ill-defined weight, often summed up by the patient as “bearing-down pain,” is associated with pelvic congestion, and also with dragging on the uterine attachments, as in cases of prolapse and of retroversion of a heavy fundus.

Pain in the iliac regions and shooting down the thighs is often due to congestion or inflammation of the uterine appendages, but it is also a frequent manifestation of neurasthenia, when it may be called neuralgic.

The above kinds of pain may occur irregularly or almost continuously; they may come on as a result of long standing or much walking, and they are then worse in the evening. Or they may be limited to the menstrual periods.

Lastly, pain may come on suddenly and acutely. When it is situated in the iliac region the most frequent causes are rupture of an ovarian cyst, pyosalpinx, tubal gestation, or torsion of the pedicle of an ovarian tumour or cyst. A sudden pain referred to the back sometimes marks the occurrence of displacement or of inversion of the uterus as the result of a fall or strain.

General acute abdominal pain is usually due to the onset of pelvic inflammation.

*Leucorrhœa.*—The character of the discharges should be carefully inquired into, and the account given by the patient may often be confirmed by the subsequent examination. The information to be derived therefrom has already been given in discussing the secretions (Chap. XI).



*Menorrhagia and Metrorrhagia.*—The significance of these is described in Chap. XLIV.

*Rectal and Vesical Symptoms.*—Straining at stool, tenesmus, and pain preceding and during the action of the bowels are sometimes due to pressure on the rectum due to retroversion of the uterus, to pelvic inflammation, or to a tumour situated more especially at the back or left side of the pelvis. Such a tumour may consist of a subperitoneal fibroid, a uniform enlargement of the uterus from fibromyoma or pregnancy, an ovarian cyst in the recto-vaginal pouch, or a cyst in the left broad ligament. Constipation is favoured also by these conditions, and the pain is then aggravated by the hardness of the motions. A prolapsed and inflamed left ovary is very liable to cause an acute and sickening pain during defæcation. When the patient complains of "bearing down in the back passage" piles are often found, due in part to constipation and pelvic congestion.

The principal bladder symptoms are frequency of micturition, incontinence, retention of urine, and burning pain on passing water; both frequency and incontinence may be of nervous origin and occur in anæmic and neurotic girls. In such cases the absence of organic cause for the symptoms is shown by the relief which follows simple hydrostatic dilatation of the bladder. In other cases these conditions arise from moderate pressure on the neck of the bladder causing continual irritation. If the pressure be greater, retention results, and later the overflow due to retention—*i. e.* a spurious incontinence. The conditions which give rise to pressure are retroversion of a gravid or otherwise enlarged uterus, cervix fibroids, pelvic inflammation, and the jamming of the uterus against the pubes by a growth filling the recto-vaginal fossa. Burning pain on passing water is always found with gonorrhœal urethritis, and it may occur also from non-gonorrhœal leucorrhœal discharges, causing peri-urethral excoriation and irritation, and from the presence of an urethral caruncle. The possibility of cystitis and of a stone or other foreign body in the bladder must not be overlooked.

**General Symptoms.**—Under this heading are included



symptoms other than pelvic; thus, a patient with amenorrhœa may complain of palpitation and shortness of breath due to anæmia—amenorrhœa due to this cause does not of course require a vaginal examination. Or the complaint may be reflex functional disorders, such as vomiting, disordered vision, epilepsy, or other neuroses. These will necessitate the preliminary examination of the organs to which the symptoms are referred; if these organs be normal, an explanation must be sought in the pelvis.

Weakness, headache, anorexia, etc., occur in almost all cases where the general health is affected, so that they have but little diagnostic value, but loss of flesh in addition may give a clue to the presence of tuberculosis or malignant disease.

The pulse-rate and temperature should be noted when necessary, because when these are raised they will assist in diagnosing inflammatory from non-inflammatory conditions in the pelvis.

The evidence to be obtained by questioning the patient has been set forth in some detail, not with a view to replacing physical examination, for symptoms are proverbially unreliable, but rather to suggest possibilities and direct the course of further examination. Many things are missed simply because one is not on the look-out for them, whilst, on the other hand, it is in a measure true in medicine that "the eye sees that which it brings with it the power to see." Consequently, during the process of diagnosis all possibilities should be arrayed and retained before the mind until one after another is definitely excluded as examination proceeds. By this means little will be missed, though at the same time there may be left in the mind at the conclusion of examination an uncertainty as to which of two or three conditions is actually present.



## CHAPTER L

### THE INVESTIGATION OF PHYSICAL SIGNS

(a) *General Health and Appearance.*—The information to be gained under this head comprises (1) evidences of fever, as indicated by pulse and temperature, by extra dryness of the skin, or by sweating; (2) evidences of wasting; (3) indications of the general nutrition of the body. In the face we shall read signs of anæmia, jaundice, cachexia, habitual suffering, or anasarca. There may be œdema of the lower limbs, or varicose veins, indicating backward pressure in thorax, abdomen, or pelvis. General signs of under-development may be noted, such as a childish face, smallness of the breasts, a narrow pelvis, and deficiency of pubic hair. Dark mammary areolæ and the presence of milky secretion in the breasts may give useful information as to a previous or present pregnancy.

(b) *Condition of the Cardiac, Respiratory, Digestive, Excretory, and Nervous Systems.*—This part of the examination need not always be made exhaustively, but no well-marked pathological condition should ever be overlooked. Thus, when there has been sudden pain or collapse, a perforated gastric ulcer, or appendix abscess, or a gall-bladder with impacted stone may require to be diagnosed from tubal gestation, a ruptured cyst, or pyosalpinx. Renal or biliary colic and appendicitis may simulate pelvic pain.

(c) *The Abdomen.*—Note the presence of striæ as indicating former distension, and dilatation of superficial veins as evidence of intra-abdominal pressure.

Swelling of the abdomen may be due to the following conditions (Figs. 129, 130)—

1. Causing uniform or regular enlargement: Deposition of fat, especially at the menopause; distension due to



flatus; ascites and tubercular peritonitis; pregnancy; uniform enlargement of the uterus from fibro-myoma; large ovarian tumours; large hydronephrosis.

2. Causing irregular enlargement : Small ovarian tumours ;

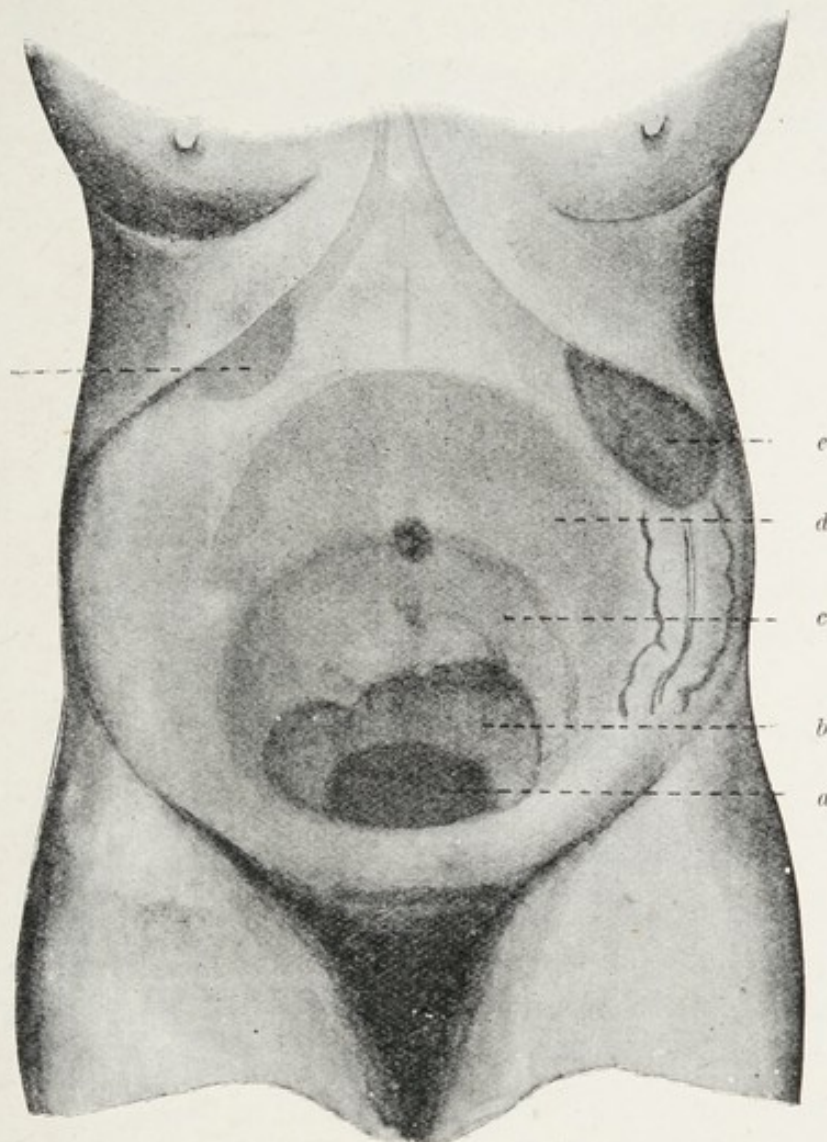


FIG. 129.—DIAGRAM TO INDICATE THE POSITIONS OF ABDOMINAL SWELLINGS.  
(FROM GILES' GYNÆCOLOGICAL DIAGNOSIS.)

*a.* Pregnancy at three months or fibroid; *b.* multiple fibroids; *c.* pregnancy at six months, ovarian or fibroid tumour; *d.* pregnancy at eight months or large ovarian tumour; *e.* splenic tumour; *f.* enlarged gall-bladder or hepatic tumour.

encysted peritoneal effusions; fibroids; moderate enlargement of kidney from hydronephrosis or new growth; movable kidney; enlarged spleen; omental tumours; malignant disease of the intestines; ectopic gestation.

We must begin by excluding the first two conditions.



For the determination of mere obesity, palpation and percussion will generally suffice, especially under an anæsthetic. Ascites is indicated by the absence of definite

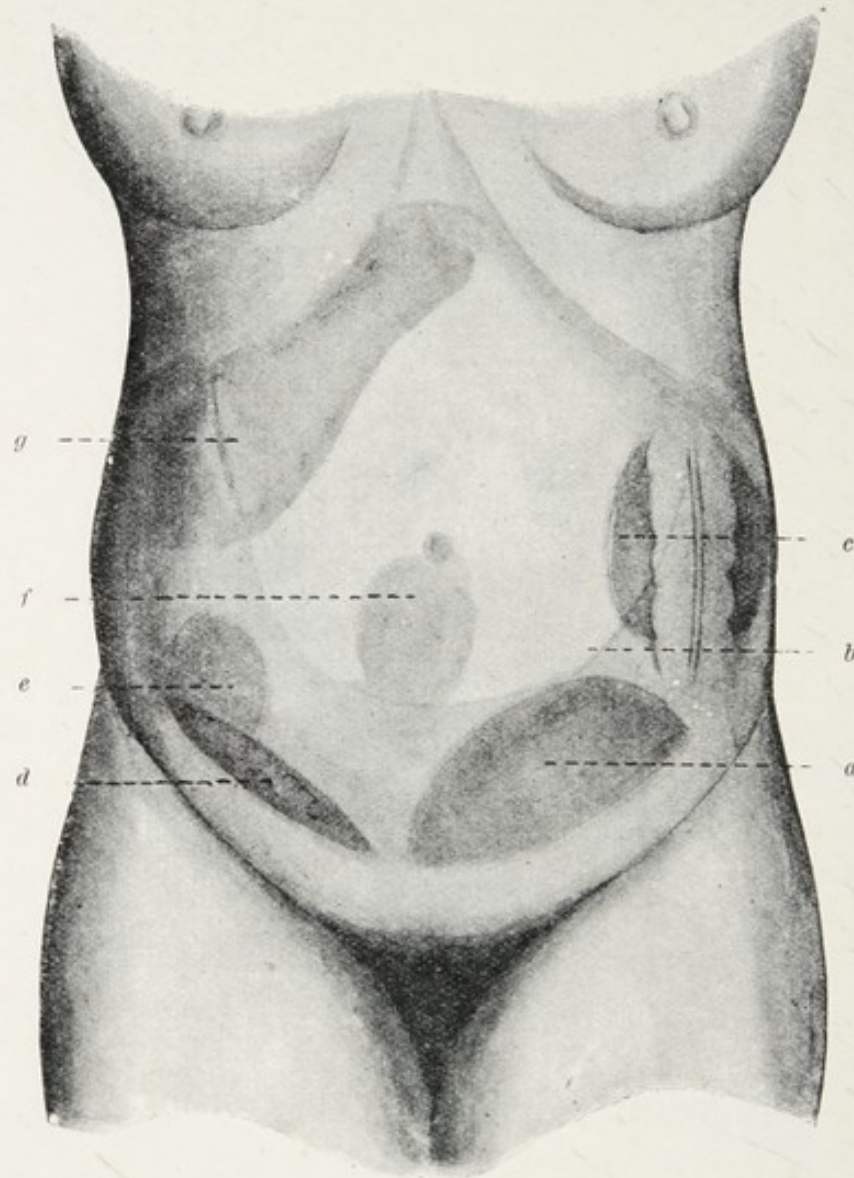


FIG. 130.—DIAGRAM TO INDICATE THE POSITIONS OF ABDOMINAL SWELLINGS.  
(FROM GILES' GYNÆCOLOGICAL DIAGNOSIS.)

*a.* Ovarian tumour, pelvic abscess, or extra-uterine pregnancy; *b.* concave line of dullness with ascites; *c.* renal tumour; *d.* pelvic cellulitis or pelvic abscess; *e.* appendix abscess; *f.* tumour of omentum or mesentery; *g.* enlarged liver.

limits, the dullness in the flanks and hypochondrium with resonance in the epigastrium, the line of dullness having a margin concave toward the umbilicus, and the variations in dullness on altering the position of the patient. An encysted collection of peritoneal fluid may, however, have



fairly definite margins, unaltered by the position of the patient, and may lie excentrically.

The next question is, Does the swelling originate in the pelvis? If so palpation cannot reach its lower margin. If we find the swelling median and uniform it is probably a gravid uterus, a uterine fibroid, or a large ovarian tumour; if arising laterally it may be a small ovarian tumour, a fibro-myoma, an ectopic gestation, or pelvic inflammation.

If, on the other hand, the lower limit can be defined, we usually have to do with an abdominal tumour. If left-sided, smooth, passing up under the left costal margin, and superficially dull, it is probably spleen. A corresponding condition on the right side may indicate a distended gall-bladder or enlargement of the liver. If nearer the middle line, and disappearing under the costal margin, with an area of resonance superficial to it, it is probably renal. A movable kidney will be definable above and below. An isolated and well-defined tumour somewhere near the umbilicus is probably an omental tumour, malignant disease of the intestines, or a pancreatic cyst. It must be remembered that an ovarian cyst or a subperitoneal fibroid with a long pedicle may be in the abdomen and simulate an abdominal tumour; its lower margin may then be readily definable.

(d) *Vaginal Examination*.—It is frequently advisable to begin with an inspection of the genital organs, for, in the first place, we may thus avoid the risk of infection from gonorrhœal discharges and from syphilitic sores, and, secondly, we shall note the existence of malformations of the vulva, cutaneous affections, enlargement of the nymphæ (indicating irritation), kraurosis vulvæ, prolapse of the uterus or vaginal walls, and laceration of the perineum: these present no difficulty in diagnosis. We shall also determine the presence of swelling in the vulva, such as hæmatoma, labial cysts, labial abscess, etc.

On introducing the finger, we note the condition of the hymen, and the pain and spasm so induced may indicate vaginismus. At this stage the character of the secretion should be observed: if muco-purulent we shall find inflammation higher up; if malodorous we may have to do with



carcinoma, a sloughing fibroid, a polypus, or a retained pessary.

If we find the vaginal walls protruding the case is probably one of cystocele or rectocele, and this may be confirmed, if necessary, by passing a sound into the urethra or the finger into the rectum.

Heat and dryness of the vagina indicate pelvic inflammation; heat and great moisture indicate vaginitis or pelvic congestion; the latter may be due to pregnancy, in which case we shall find the well-known purple coloration.

Marked pulsation of the vaginal vessels is most often due to pregnancy or uterine fibroid; if confined to one fornix there is probably tubal disease or tubal gestation.

At this stage we shall discover swellings in the vagina due to cysts or to lateral hæmatometra; the exact diagnosis will probably require aspiration with a fine trocar. Growths affecting the vagina will be recognized without difficulty, but we may find other things projecting, such as a polypus, a pedunculated cervical fibroid, or an inverted uterus, which must be investigated as previously described. The condition of the cervix next occupies us—lacerations, erosion, faulty position, softness due to pregnancy, malformations, cancer, the patulousness or otherwise of the os externum. If the cervix be normal in these respects we proceed at once to ascertain the position, mobility, and size of the uterus by bimanual examination. If the position be faulty it may be due to a simple displacement, to pelvic inflammation, or to the distortion produced by a tumour pressing on it; impaired mobility may also be due to one of the last two conditions. If pelvic inflammation be present it will be indicated by the board-like hardness converting the structures at the summit of the vagina into a kind of firm roof. The position and limits of the effusion are determined by bimanual examination, and the parts will usually be very tender to manipulation. A large, soft, movable uterus is nearly always indicative of pregnancy; this may be simulated by a soft fibro-myoma, and in diagnosing the condition we shall have to be guided by the history, especially the suppression or increase of menstruation, and by the age of the patient, for fibro-cystic tumours generally



occur after forty, whilst pregnancy is then less common. The possibility of hæmatometra in one-half of a double uterus or in the single organ must be borne in mind. If pregnancy can be excluded the sound may be passed, and this will show whether and how much the uterus is enlarged. If it passes not more than  $3\frac{1}{2}$  inches the enlargement may be due to subinvolution, chronic metritis, hypertrophy of the cervix, a small polypus or retained products of conception. To determine further which of these conditions is present the cervix must be dilated and the uterine cavity explored with the finger. If the sound passes from  $3\frac{1}{2}$  to 6 inches we have to do with a fibro-myoma of the uterus as a rule. But sarcoma and carcinoma of the body of the uterus may also cause considerable enlargement; the free bleeding on passing the sound will give a clue; and, in addition, the uterus may be more or less fixed. It must be remembered also that in lateral hæmatometra the patent half of the uterus may be considerably elongated.

Supposing the uterus to be fairly normal, we next examine the adnexa. An endeavour should first be made to trace the Fallopian tubes from the cornua of the uterus outward. If normal they will be felt bimanually as cord-like structures, and in some part of their course we shall meet the ovaries, whose position will generally be indicated by their tenderness to pressure and the shrinking of the patient. If enlarged the tubes will be felt as elongated swellings; the thickening may extend right up to the uterus, or it may affect principally the distal portions. At the same time a small ovarian cyst or a distended tube may be discovered. Enlargement of the ovaries, tubes, and broad ligaments can often be felt more distinctly, and their limits better ascertained by recto-abdominal examination. Sometimes tubal and ovarian swellings are found occupying the pouch of Douglas, which they may depress so as to obliterate the posterior vaginal fornix. A mass is then felt behind the vagina, and rectal examination may be necessary to determine whether the mass is between the vagina and rectum or in the rectum itself, for scybala in the rectum give much the same sensation. And here we may remark that the feeling of a swelling in the pouch of



Douglas, or in the left broad ligament, may be so closely simulated by malignant disease affecting the sigmoid flexure that a rectal examination is necessary to clear up the diagnosis. It is often impossible to distinguish between tubal disease and small ovarian or broad-ligament cysts. When double, and following on an attack of gonorrhœa, the probability is in favour of tubal disease, but bilateral ovarian cysts are not uncommon. It is then sometimes possible to feel the tube passing over the swelling, or, when the tubes are affected, the ovaries may be felt separately. On the right side tubal disease is often closely simulated by disease of the vermiform appendix. The history will serve as a guide, but sometimes the diagnosis can only be made after the abdomen is opened.

The consistency of a small pelvic tumour is often very misleading, so that a tense cyst may be mistaken for an outlying fibroid, and *vice versa*. When a mass of some size occupies the recto-vaginal pouch we may have to distinguish between a cyst, an enlarged retroverted uterus, a sub-peritoneal fibroid, and a hæmatocele. If the passage of the sound be contra-indicated the diagnosis is sometimes difficult, but careful examination under an anæsthetic may enable us to feel the fundus of the uterus distinct from the tumour. A hæmatocele in this position will generally be due to rupture and subsequent encystment of a tubal gestation, but it may also be due to tubal abortion.

Tubal disease, extra-uterine gestation, and small cysts, especially when suppurating, may be complicated by pelvic inflammation; it will then be necessary to wait until this is partly absorbed before the nature of the original swelling can be made out.

In the case of large pelvic tumours the diagnosis lies principally between uterine fibroids and ovarian cysts. The latter may be partly solid or the former fibro-cystic, when the difficulty will be increased. The menstrual history is here of great service, for increase of menstruation is the rule in fibroids, cystic or otherwise, while it is the exception in the case of ovarian tumours. For further diagnosis we may pass the sound; if the uterine cavity be of normal length the tumour is extra-uterine. And the same may



usually be said when the tumour can be moved independently of the uterus, though at times a subperitoneal fibroid may have a long thin pedicle. If the fundus can be felt bimanually independent of the tumour, as can often be made out under an anæsthetic, the tumour is probably ovarian; it will generally be found in such a case that the fundus has been jammed up against the pubes or backward into the cavity of the sacrum by the growing tumour. It must be remembered that an ovarian tumour and a uterine fibroid sometimes co-exist, that either may be found complicating pregnancy, and that in rare cases any one of the three may be found in connection with a double uterus. In all these cases the diagnosis is very difficult, and no general rules can be laid down. Cœliotomy will probably be required before an exact diagnosis can be made.

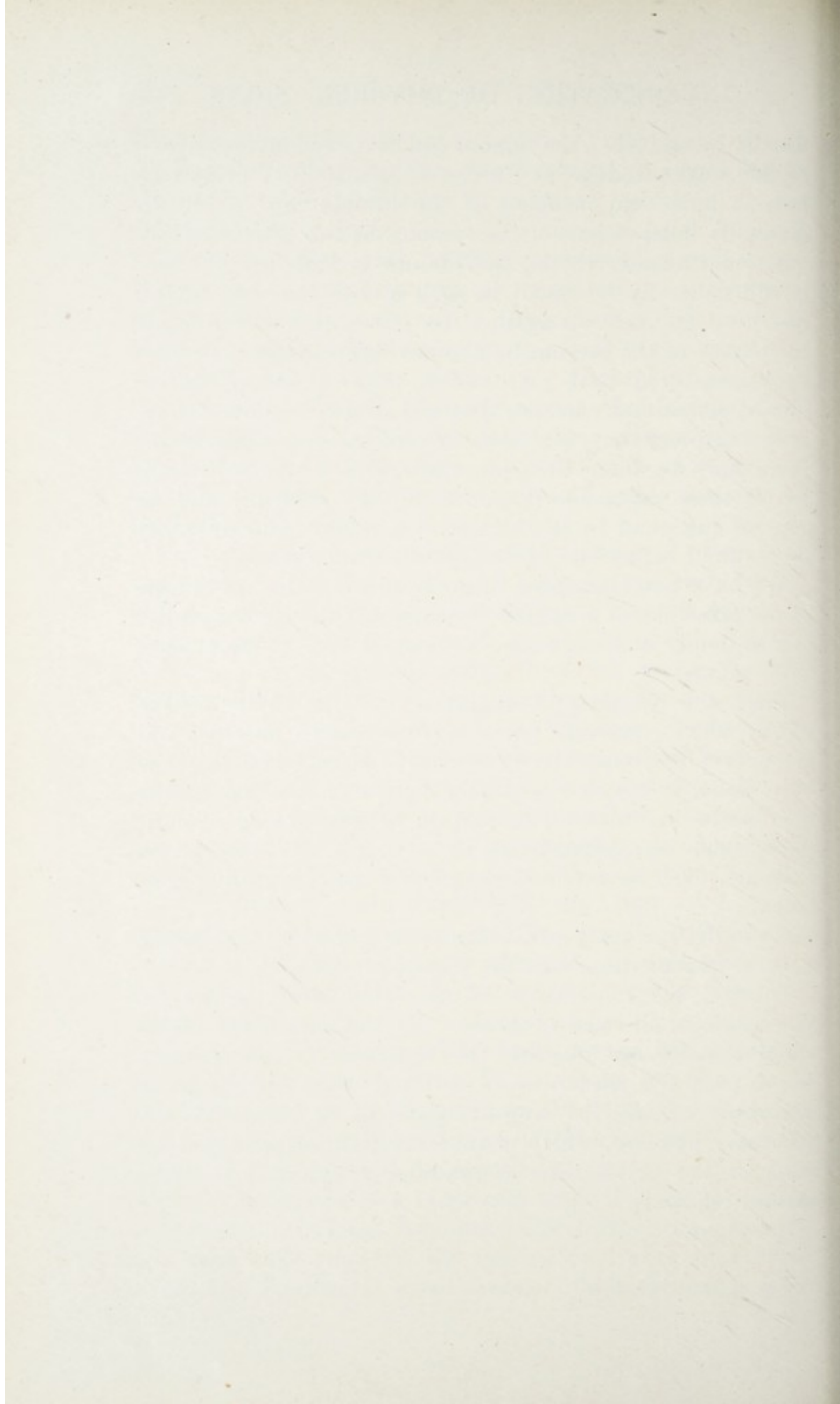
We have not attempted to do more than give an outline of the principles of diagnosis in examining the female genital organs, and, in conclusion, we should like to emphasize three points—

First, the necessity of exploration of the cavity of the uterus when symptoms point to intra-uterine mischief and the cervix is comparatively normal. Even when this has been done, it may be necessary to call in the aid of the microscope in order to distinguish between benign conditions, such as endometritis or adenoma, and malignant tumours, such as carcinoma, sarcoma, and chorion-epithelioma.

Secondly, the great advantage to be gained by combining a rectal examination with the bimanual method.

Thirdly, the importance of an examination under an anæsthetic in all cases of doubt. By this means the abdominal muscles are relaxed, the resistance of the patient due to pain and tenderness is obviated; and, perhaps most important of all, the examination can be made in the lithotomy position, which is the only position in which all parts of the pelvis can be thoroughly explored in their natural relations.







## **PART IV**

### **TREATMENT**

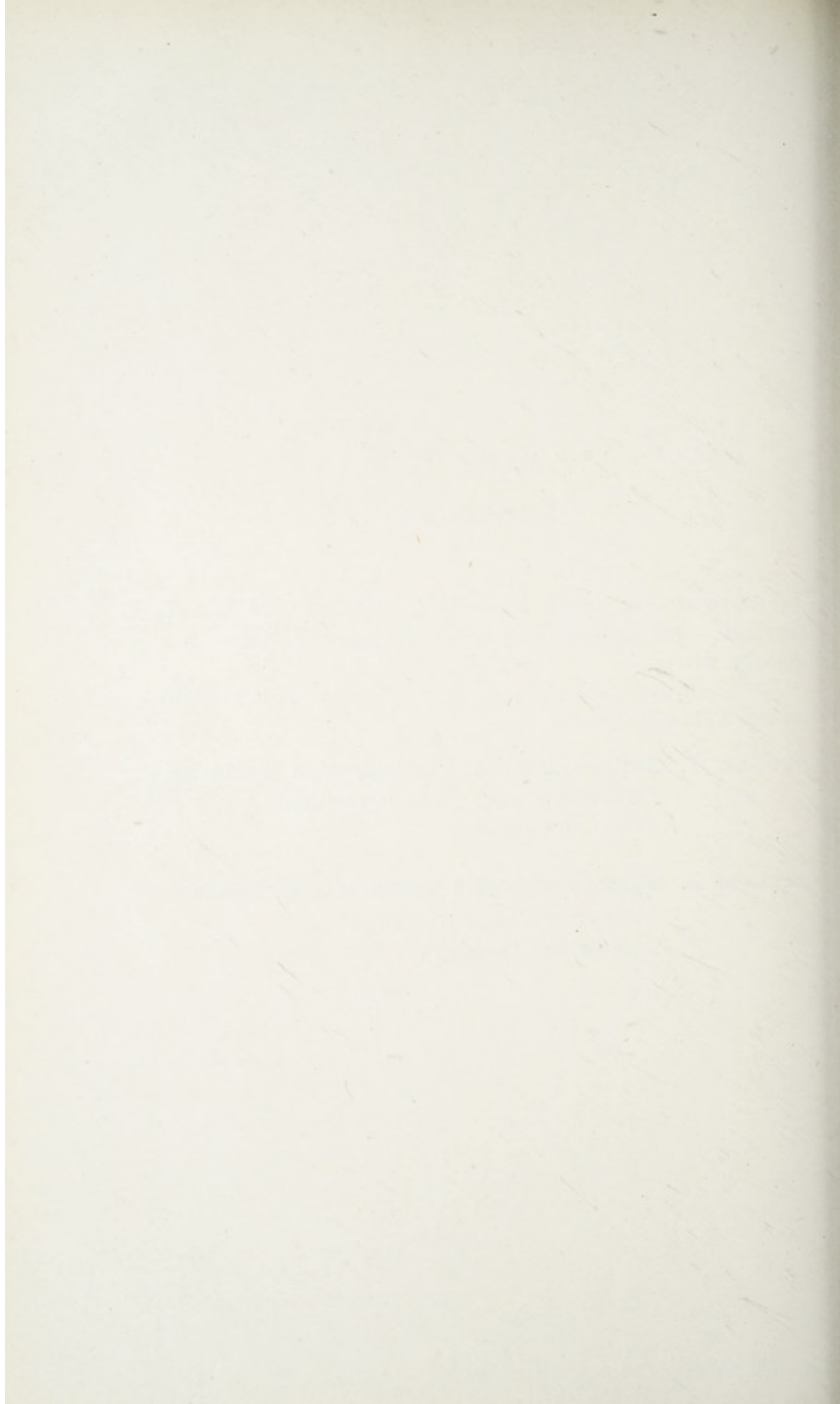
THE treatment of the Diseases of Women is in the main surgical; but general and local therapeutics have also a definite place.

We shall deal with the subject of treatment, therefore, on the following lines—

**Section 1. Gynæcological Therapeutics, including**  
CONSTITUTIONAL TREATMENT and  
LOCAL TREATMENT.

**Section 2. Gynæcological Operations, including**  
VAGINAL OPERATIONS and  
ABDOMINAL OPERATIONS.







## SECTION I

### GYNÆCOLOGICAL THERAPEUTICS

IN this section we shall have to consider briefly those medicinal measures that require to be used, either alone or in conjunction with local treatment; and local treatment itself, which includes the use of the douche and of medicated tampons, pessaries, and the application of electricity, the X-rays and radium.

## CHAPTER LI

### CONSTITUTIONAL TREATMENT OF GYNÆCOLOGICAL CONDITIONS—LOCAL TREATMENT

**Constitutional Treatment** has but a limited field in its direct bearing upon the diseases of women. Indirectly it is very important, because many women who suffer from pelvic disease have their general health affected in various ways; and in such cases the treatment of the pelvic condition will not suffice to restore health. The general condition must be attended to at the same time. Clearly we cannot go into this subject in detail, as it would involve a treatise on general medicine: it must suffice to point out that the principal general disturbances found in gynæcological cases are associated with the digestive, nervous, and circulatory systems.

Of digestive disturbances the most important are constipation, flatulence, and intestinal stasis. In some cases the pelvic condition is directly responsible, for example, when the bowel is pressed upon by a tumour, an inflammatory



swelling, or a bulky retroverted uterus, and the removal of the cause will improve the digestive trouble; but in other cases the association is accidental, and the digestive disorder must receive appropriate treatment.

Nervous disturbances range from simple headaches and vague malaise to pronounced hysteria. Insomnia, anorexia, and loss of memory are not infrequent; some women complain merely of being nervous or "all nerves," by which they mean that they are irritable or depressed or unduly startled by sudden sounds, or afraid to go out alone. The causal influence of pelvic disease is more pronounced with nervous than it is with digestive disturbances; and consequently the good results of direct gynæcological treatment are more general in the former than in the latter conditions. Nevertheless there are many cases where the nervous disturbance is independent of the pelvis and must be treated by suitable means.

The disturbances of the circulatory system that are most often found with pelvic disease are varicose veins, œdema of the legs, functional heart troubles, such as palpitation and irregularity of the pulse, and occasionally actual heart-disease. The pressure of tumours and repeated heavy losses of blood are chiefly responsible for these conditions; but they may be present independently and require separate treatment.

The possibility of the presence of other general diseases must not be overlooked. The medicinal measures that have a direct bearing upon pelvic disease are the following—

*Aperients.*—Many gynæcological conditions are associated with congestion of the organs affected; this congestion is directly aggravated by constipation, and directly relieved by catharsis. For example, dysmenorrhœa is often materially improved by the administration of aperients for two or three days before the expected period.

In other cases a loaded sigmoid or rectum causes pain or discomfort by mechanical pressure; a prolapsed and tender left ovary may give but little trouble when the bowel is clear, but when pressed upon by hard scybala it may cause acute pain. Again, a woman who has a marked rectocele may have only slight inconvenience when the



bowel is empty; but when it is full, the sense of discomfort and bearing-down may be very pronounced.

Each case must be treated on the lines appropriate to it. Some patients require to take aperients constantly or for a long time together; and salines will usually be best for this purpose, especially when combined with the practice of taking a tumblerful of hot water morning and evening. Other patients require a stronger aperient occasionally; and when this is the case it is usually advisable to vary the drug from time to time. In some cases the best results are obtained by the administration of liquid paraffin for two or three weeks at a time.

*Styptics.*—Uterine hæmorrhage is a frequent symptom; as a rule there is some organic cause for it, which should be dealt with surgically. But in some cases no organic cause is evident; and even when such a cause is present it may be advisable to delay surgical intervention, and to endeavour in the meantime to check the amount of loss by means of drugs. In such cases ergot and its derivatives are of great value; sometimes the best results are not obtained because the dose given is too small. Thus, with the liquid extract of ergot, it is very little use giving less than drachm doses three or four times a day. It is often an advantage to combine therewith 15 to 20 minim doses of the tincture of hamamelis or the tincture of hydrastis.

The extracts of the pituitary and of the suprarenal glands are useful in some cases; the pituitary extract is said to have a more prolonged effect than the suprarenal. Various preparations of these glands are put up by reputable chemical firms.

Cotarnine hydrochloride (stypticin) had a considerable vogue at one time in the treatment of hæmorrhage: a cheaper form is the proprietary preparation known as styptol. The practitioner is apt to have some disappointments with these drugs, but they may be tried if other measures fail.

The same remarks apply to calcium chloride, which is given in five-grain doses thrice daily.

There is no doubt that many of the failures of styptics are due to the fact that they are often employed in cases



where the hæmorrhage is due to anatomical rather than physiological causes, and where, consequently, all drugs are of but little value.

*Sedatives.*—For the relief of pain, nothing is so effective as the preparations of opium, including morphia. But these drugs have the serious drawback that when used repeatedly they tend to induce a drug-habit. They should be used, therefore, with great caution, and only in temporary conditions. For recurrent pain, as in dysmenorrhœa, their use is unjustifiable: many women afflicted with the morphia habit can trace the origin of that habit to the administration of morphia for dysmenorrhœa. Incurable carcinoma is the only condition that warrants the repeated use of morphia.

There are other sedatives, however, of great value, that can be given repeatedly. Thus we have the bromide group, of which the ammonium salt is the best, because its effect is less depressing than the others. It may be combined with chloral hydrate. Aceto-salicylic acid (better known under its proprietary name of "aspirin") is of great service, as are also some of the coal-tar preparations, such as phenacetin and ammonol. The latter is a preparation of phenacetin with an ammonia base and is often effective in cases of dysmenorrhœa.

There are some drugs that are reputed to have great value in most of the diseases of women; for example, apiol and viburnum prunifolium. The wide range of their indications is really the index to their inefficacy.

**Local Treatment.** *The Vaginal Douche.*—This is ordered for various purposes.

(a) For simple cleansing, in cases of moderate leucorrhœa, and when the patient is wearing a pessary. For this purpose, plain warm water is sufficient, and the temperature should be about 105° F.

(b) As an astringent, when the vaginal walls are rather relaxed, and when there is a mild degree of pelvic congestion causing leucorrhœa.

For both these purposes the douche should be used only occasionally.

(c) In the treatment of pelvic inflammation, especially



chronic salpingitis, oöphoritis, and pelvic cellulitis. Here the primary object of the douche is to apply moist heat to the pelvic organs, and the temperature, which should be about 115° F., is more important than the composition of the douche. Plain water or a mild antiseptic may be used, and the douche must be given two or three times a day.

(d) For vaginitis and for adenomatous disease of the cervix. For this purpose an antiseptic douche is required, and the temperature is of less importance; the best is 105° to 110° F. Here also the douche must be given two or three times a day.

As a rule vaginal douching is carried out by the patient herself, and it is important that she should be instructed to do it properly. Very often the patient uses a Higginson's syringe, which necessitates her adopting a sitting posture, generally on a chamber vessel. A douche given in this way is quite useless, as the lotion does little more than bathe the vulva and lower part of the vagina, without reaching the deeper parts. It is essential that the patient should be lying down, and a douche-can with a long delivery-tube should be used.

The lotions most frequently employed, with the purposes for which they are used, may be enumerated as follows—

*Astringent Douches—*

Alum, 1 drachm to the pint.

Sulphate of zinc, 1 drachm to the pint.

Sulphocarbolate of zinc, 1 drachm to the pint.

Decoction of oak bark,  $\frac{1}{2}$  ounce to the pint.

*Mild Antiseptic Douches—*

Condy's fluid, mixed to a port-wine colour.

Boracic acid, 1 drachm to the pint.

*Antiseptic Douches—*

Tincture of iodine,  $\frac{1}{2}$  to 1 drachm to the pint.

Biniodide or perchloride of mercury, 1 in 10,000 to 1 in 2000.

Carbolic acid, 1 in 80 to 1 in 60.

Sanitas sypol, 1 drachm to the pint.

Lysol,  $\frac{1}{2}$  to 1 drachm to the pint.



*Deodorant and Antiseptic—*

Crude sanitas,  $\frac{1}{2}$  ounce to the pint.

*The Intra-uterine Douche.*—This is used only when the uterine canal is dilated, that is to say, after the operation of dilatation, after a miscarriage or childbirth, and in cases in which a polypus has rendered the canal patulous.

The indications for an intra-uterine douche are threefold—

(a) To wash out the uterus after operating on its interior.

(b) Uterine sepsis.

(c) Uterine hæmorrhage.

For a simple wash out, a mild antiseptic is the best; for uterine sepsis a stronger antiseptic is required, such as tincture of iodine, 1 drachm to the pint; biniodide of mercury, 1 in 4000; or sanitas sypol, 1 drachm to the pint.

For uterine hæmorrhage, normal saline solution, plain sterilized water or a weak antiseptic may be used. The point of chief importance is that for the arrest of hæmorrhage the douche must be hot, viz.  $115^{\circ}$  to  $120^{\circ}$  F. For other purposes a temperature of  $105^{\circ}$  to  $110^{\circ}$  F. suffices.

An intra-uterine douche should never be entrusted to a nurse, but should always be given by the medical man himself; and he should satisfy himself that there is a free return of the fluid. Many cases are on record of an intra-uterine douche being given when the uterus has been perforated or ruptured (especially during labour) and the fluid has found its way into the peritoneal cavity. If normal saline solution were being used, this accident would be of minor importance; but strong antiseptics introduced into the peritoneal cavity may have a serious, and even a fatal, result.

*Tampons.*—A tampon is a plug of cotton wool tied round with a piece of thread to facilitate removal. *Dry tampons* are sometimes used, either to plug the vagina in cases of hæmorrhage; or to absorb vaginal discharge, so that it may not cause irritation to the vulva; or to support the walls of the vagina in cases of prolapse, when there is too much ulceration to allow of a pessary being worn.

*Medicated Tampons* are used chiefly in cases of pelvic inflammation and congestion. Generally speaking, the



method of using them is that a douche is given in the evening; then the tampon, soaked in the prescribed preparation, is passed well up into the vagina, and left there for the night. In the morning the tampon is withdrawn, and another douche is given. The treatment is carried out every night, or every second or third night, according to the nature of the case. After the introduction of a medicated tampon the patient should wear a diaper or a pad of wool, because the effect of the medication is to cause a free, watery discharge from the uterus and vagina. The simplest medication is glycerine; this is used because it has the property of attracting water to itself, and so of withdrawing fluid from the tissues. The tampon should be soaked in glycerine for some hours before use.

Frequently the glycerine is mixed with ichthyol, in the proportion of 5 or 10 parts of ichthyol to 95 or 90 parts of glycerine. If ichthyol be used too strong, it acts as a caustic, and makes the vagina very sore. The discharge when an ichthyol tampon has been used is dark and stains the linen; patients should be warned of this fact. The introduction of the ordinary ichthyol tampon is rather a "messy job," but there is a clean and convenient way of carrying out the treatment by using what are known as "Pond's Tampons."

Here the medication is contained in a conical gelatine cap, and the broad end of the cone is plugged with dry cotton wool, which helps to absorb the discharge. The conical point facilitates introduction, and when the gelatine is slightly moistened with water it slips in easily. When it has been introduced the warmth of the body melts the gelatine, and the medication can get to work. Occasionally other medications, such as antiseptics and sedatives, are introduced in this manner.

*Cauterization of the Cervix.*—In the treatment of the condition of adenomatous disease of the cervix, commonly known as "erosion," the best results are obtained by cauterizing the part of the cervix affected. This may be done by means of the thermo-cautery, but as this necessitates an anæsthetic, it is often more convenient to use chemical agents. The cervix should be exposed in a good light by means of



a speculum; any discharge present is wiped away with cotton-wool, and the surface is cleaned up by swabbing it with peroxide of hydrogen, or with a mixture of equal parts of creosote, absolute alcohol, and glycerine. The caustic is next applied: solid nitrate of silver or sulphate of copper may be used; or a fluid such as nitric acid; a solution of nitrate of silver (40 grs. to the ounce); or iodized phenol. The last-named, which is a mixture of one part of iodine with four parts of pure phenol, is perhaps the best for general use; but nitrate of silver is very useful when there is reason to suspect any gonorrhœal taint. Any excess of the caustic is wiped away with cotton-wool, and a dry tampon is introduced, the object of which is to save the vaginal walls from being acted upon by the caustic. In cases in which this precaution has been omitted, the vagina has sometimes been deeply ulcerated in a ring just below the cervix; and this has been followed by cicatricial contraction, producing a marked narrowing of the vagina in this position. The tampon is withdrawn by the patient just before the evening douche is used.

The treatment should be repeated at intervals of four to eight days.

*Electricity, X-Rays, and Radium in Gynæcology.*—These agents have a certain defined influence in some gynæcological conditions, chiefly in the arrest or checking of hæmorrhage, and in some cases of hyperplasia, passive congestion, and inflammation of the uterus and adnexa. Their legitimate employment has been seriously handicapped by the exaggerated claims that have been made on their behalf in some quarters, and by the unscrupulous use of them, amounting to charlatanism, in other quarters. Further, the use of X-rays and radium is still in the experimental stage.

In expert and conscientious hands good results have been obtained; the principal drawbacks are that treatment is apt to be a very lengthy matter, sometimes extending over several months; that there is an element of uncertainty, in virtue of which a patient who has spent all this time on treatment may require surgical intervention in the end; and that the effects of treatment cannot always be gauged



with sufficient accuracy to avoid untoward results, including the induction of degenerative changes.

In the hands of those who are not expert in the theory and practice of electrical treatment serious and even fatal results may follow.

It would be beyond the scope of this manual to go fully into the technique of these procedures; and those who desire to be fully informed on the subject are recommended to consult some of the treatises dealing therewith.

*The Use of the Uterine Sound in the Treatment of Uterine Displacements.*—When it is proposed to treat a backward displacement of the uterus by means of a pessary, it is necessary as a preliminary step to get the uterus into its proper position by lifting the fundus forward. This can often be done by using the fingers alone, when the procedure is described as digital reposition of the uterus. In other cases the uterus cannot be brought forward by this means, and the uterine sound is used. Scrupulous cleanliness is essential; and it is advisable to introduce a Fergusson's pessary into the vagina, swab away all discharge from the cervix, and pass the sound into the cervical canal. It should be steadied in that position while the speculum is withdrawn; and the rest of the proceeding is carried out by the sense of touch. The mode of passing the sound into the retroverted uterus was described in Chap. XLVIII. When the sound has been introduced, and its handle brought round with a wide sweep so that the concavity of the sound is forward, the forefinger of the left hand should be placed behind the cervix and used as a fulcrum, while the handle of the sound is gradually carried backwards. This process brings the uterus forward, and as long as the pressure made against the uterine endometrium is only that of the longitudinal surface of the sound and not that of its point, no injury can be done to the uterus. When the fundus has been raised sufficiently, the left forefinger is placed on the front of the cervix, which is pressed gently backwards while the sound is being withdrawn. The right hand is then placed on the abdomen and the uterus is grasped bimanually and manipulated carefully until the fundus can be felt lying quite forward behind the pubes.



## CHAPTER LII

### PESSARIES

A PESSARY is an instrument used to support the pelvic organs in cases of hernia of the pelvic floor, or to maintain in a normal position a uterus which has a tendency to flexions or displacements.

Pessaries must be regarded as a palliative method of treatment, though at times a radical cure may be effected by their means. In late years their use has been restricted by the introduction of operative measures, but operations are in some cases contra-indicated by the age or ill-health of the patient, or by her unwillingness to submit to them, whilst in other cases they fail to relieve the condition for which they are undertaken. Pessaries remain, therefore, indispensable, though they should be used as seldom as possible.

To be effectual, a pessary must answer the following requirements—

1. It must maintain the normal position of the uterus and vaginal walls, and relieve symptoms.

2. When it is in its place the patient should be unconscious of its presence.

3. It must be light, smooth, not acted upon by the uterine and vaginal secretions, and not irritating to the vaginal walls. The best materials for this purpose are aluminium, vulcanite, block tin, celluloid, and hardened indiarubber. The last three have the advantage that they can be moulded to any required form. In the case of celluloid and indiarubber this is done by immersing them in boiling water, when they become soft, regaining their rigidity on cooling. There are three types of pessary in general use.

**The Ring Pessary** (Fig. 131).—This should be made



of good hard rubber, with a central wire spring, so that it may be compressed to facilitate introduction, and may regain its shape when released.

It is used for **cystocele**, **rectocele**, and **uterine prolapse**—*i. e.* for hernia of the pelvic floor. It should not touch the bony parts of the pelvis, but should slightly stretch the lateral vaginal walls. It depends for its efficacy on the integrity of the posterior vaginal wall and the levator ani, and is useless when the perineum is much lacerated, for then it comes out as soon as the patient strains, as during coughing, sneezing, and defæcation. The same result follows if the ring be too small, whilst if too large it interferes with the action of the bladder and rectum, and may cause vaginal ulceration.

A rubber ring should not be left *in situ* longer than three months without being seen to, for the rubber tends to become rough and corrugated, leading to irritation of the vaginal mucous membrane and profuse leucorrhœa. In some cases this effect follows in three or four months; in others a pessary of the best rubber may be worn for a year without inconvenience.

**The Hodge Pessary.**—This is, in surface aspect, rectangular, with the angles rounded; in profile it resembles an opened-out **S** (Fig. 132). It is used for **backward displacements of the uterus, when the uterus is movable**. It may be made of aluminium, celluloid, vulcanite, or block tin. The two latter will be found most convenient, as it is often necessary to modify the shape slightly to suit the requirements of the individual case. Various modifications of the original Hodge pattern are found (Fig. 133), but the important element of success in treatment by means of pessaries is that **the instrument should fit**.

**Mode of Action.**—Like the ring, the Hodge pessary should not touch any bony points. The action is described as that of a lever, the middle portion of the pessary resting against



FIG. 131.—THE RING PESSARY.



the posterior vaginal wall, and forming the fulcrum. The intrapelvic pressure acts in a direction downward and backward, mainly against the lower portion of the pessary, and this tends to tilt the upper end forward and upward, whereby the posterior vaginal fornix is pushed upward against the posterior surface of the body of the uterus. Another influence is exerted also: the cervix is drawn backward, and if the uterus be fairly rigid, the fundus is in this way tilted forward. The backward pressure of a heavy uterine body is also resisted, through the lever action of the Hodge

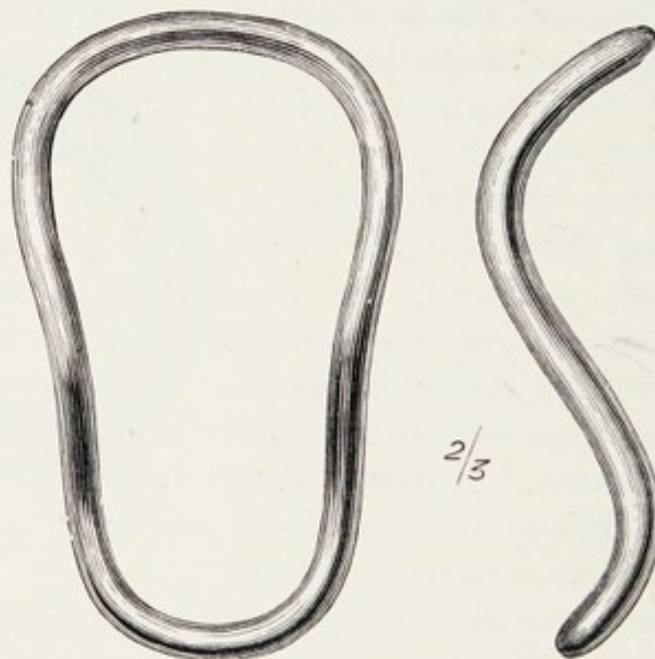


FIG. 132.—THE HODGE PESSARY.

pessary, by the anterior vaginal wall as long as this is not much relaxed. It is in harmony with this explanation that the crescent-shaped instrument is used, with the lower end pointing forward; but pressure on the urethra must here be specially guarded against.

**The Vaginal Stem Pessary.**—This consists of a cup or ring mounted on a stem, the lower end of which projects from the vulva, and has attached to it perineal bands which pass forward and backward to be fastened to the waistband (Fig. 134). Such an instrument is sometimes used for prolapse of the uterus or vaginal walls when the perineum is so deficient that a ring cannot be retained, and the age or other



conditions of the patient do not allow of repair of the perineum. Zwaneke's pessary is used for the same purpose, but has the disadvantage of being difficult to keep clean.

### **Contra-indications to the Use of Pessaries.**

Whatever the malposition of the pelvic organs, a pessary should not be introduced unless the malposition gives rise to symptoms. In the case of unmarried women pessaries are undesirable except when symptoms are severe and there is a strong probability of cure by their means. Inflammatory conditions of the genital organs contra-indicate the use of pessaries; pain and irritation would be the result. This

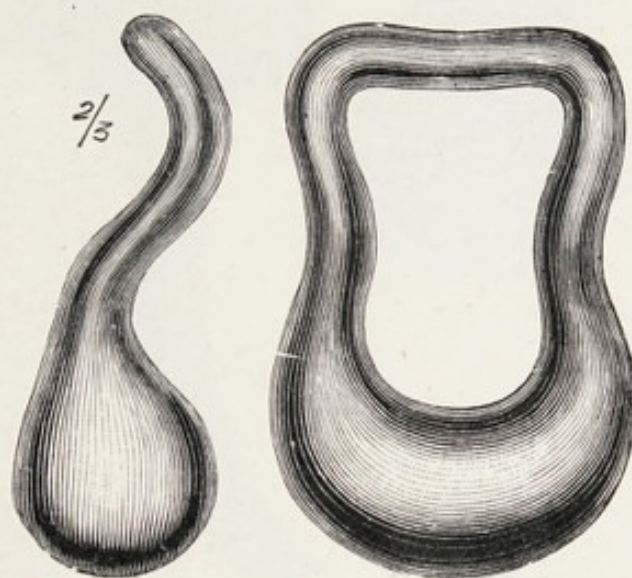


FIG. 133.—A GLYCERIN PESSARY, HODGE PATTERN.

remark applies to endometritis and erosion, as well as to pelvic cellulitis, ovaritis, and salpingitis. When the uterus is fixed, pessaries are harmful, as well as useless; no pessary can overcome adhesions. When the uterus is markedly retroflexed as well as retroverted it is useless to put in a Hodge pessary, unless the flexion be first corrected, for all that would result would be an anteversion with retroflexion.

**Retained Pessary.**—The first effect of a pessary long retained is vaginitis; if the vagina has not been kept clean by douching, the discharges become purulent; the pessary hinders their exit, and comes to lie ultimately in what is practically an abscess cavity. The bad effects are aggravated by the contraction of the vaginal orifice which occurs at the menopause. If the pessary be a ring or a Hodge the



vaginal wall in contact with it becomes ulcerated, so that there results a groove lined with granulations. These tend to grow up around the pessary, and may at length grow over and fuse, forming a bridge of tissue holding the pessary firmly imbedded in the vaginal wall. In the case of a flattened pessary with perforations the granulations may in like manner sprout and project through the perforations, forming bands between the anterior and posterior vaginal walls. Consequently, it may be no longer possible to remove the pessary without considerable violence, whilst

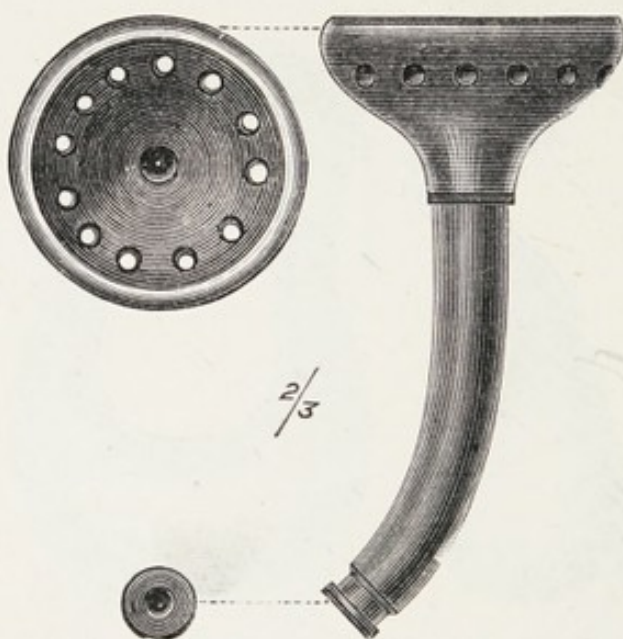


FIG. 134.—VAGINAL STEM PESSARY.

this result is contributed to also by the narrowing of the vaginal outlet. The pus becomes offensive, and, if the cause of irritation be not removed, constitutional symptoms indicating septic absorption may arise.

As a result of prolonged ulceration of the anterior vaginal wall, vesico-vaginal fistula sometimes occurs. Similarly ulceration of the posterior vaginal wall may lead to a recto-vaginal fistula. The length of time required for a pessary to set up such ulceration varies with the shape of the pessary and with the frequency or otherwise of douching. In the absence of douching a few months may suffice for the production of a considerable groove, especially in the case of a tightly fitting pessary with a narrow edge.



The **dangers** of retained pessaries may be thus summed up—

1. Purulent vaginitis.
2. Urethritis.
3. Ulceration of the vagina.
4. Imbedding of the pessary in the vaginal tissues.
5. Vesico-vaginal fistula.
6. Recto-vaginal fistula.
7. Incarceration of the pessary from narrowing of the vaginal outlet.



## SECTION II

### GYNÆCOLOGICAL OPERATIONS

THE operations on the female pelvic organs are divided into two important groups—

**1. Vaginal Operations**, carried out on the vulva or through the natural genital passages.

**2. Abdominal Operations** where an incision is made in the abdominal wall.

#### GROUP I.—VAGINAL OPERATIONS.

This group will include operations on the **perineum** (perineorrhaphy); on the **vulva**, such as removal of urethral caruncle, the clitoris, tumours, and cysts of the labia; such procedures on the **vagina** as the repair of fistulæ, the relief of atresia of the genital passage, and colporrhaphy; colpotomy; and operations on the **uterus**, such as dilatation and curetting, trachelorrhaphy, amputation of the cervix, removal of polypi, myomectomy, and vaginal hysterectomy.

## CHAPTER LIII

### GENERAL OBSERVATIONS ON VAGINAL OPERATIONS

**Gynæcological Operations** demand for their successful performance the same qualities of head and hand as are necessary for carrying out operations in other regions of the body. The individual ambitious for success in operative gynæcology must possess a sound practical knowledge of pelvic anatomy and pathology, and carry out rigidly all the details of what is known as aseptic surgery. The more



thoroughly he attends to the preliminary preparation of the patient, the selection of the room and surroundings, and the more care he devotes to the sterilization of the instruments and materials employed in operations, *and his hands*, the greater will be his measure of success.

To facilitate the sterilization of instruments it is now usual to have them made of metal throughout. Of course all cutting instruments are made of steel, but knives may be fitted to handles which are coated with nickel, so that they retain their brightness.

It is assumed that the student before he begins the study of gynæcology has been a dresser, and is already familiar with the common tools of surgery, such as knives, dissecting forceps, artery forceps, pressure forceps, needle-holders, retractors, and the like. He should also be familiar with the various kinds of material employed to secure bloodvessels and wounds, such as catgut, fishing or silkworm gut, and silk. His occupation of dresser will have made him acquainted with the various kinds of material used as dressings for wounds.

Although a large number of gynæcological operations may be carried out with the assistance of the implements employed in general surgery, nevertheless there are certain instruments indispensable to the performance of vaginal operations. Some of these, such as the speculum, the uterine sound, and the volsella, have already been described in Chap. XLVIII. Others will be considered with the operations in which they are of special service.

The student should realize that it is part of his duty to make himself familiar with the names of the instruments as well as to understand their use. If he has the least taste for mechanics there is much to interest him in the construction of surgical instruments, and there is need also for improvement. The names of some great surgeons, famous in their day for operative ability, are saved from utter oblivion by the fact of being associated with the invention or improvement of some useful instrument of surgery. Thus the history of instruments employed in special departments of surgery is indirectly the history of the speciality.

In gynæcology, as in other departments of surgery, many



operations are carried out upon definite principles—the outcome of the accumulated experience of many operators. The student, however, should remember that the description of an operation is, in fact, merely a narration of principles; the details require modification according to the necessities of the case and the complications which may arise during its performance.

Before embarking upon an operation the surgeon should satisfy himself that the patient has no constitutional defect likely to militate against success. Thus, chronic renal disease, diabetes, leucocythæmia, hæmophilia, malaria, chronic alcoholism, and visceral disease are conditions which need to be carefully considered in advising patients to submit to operations which are not urgently necessary. In grave conditions where life is in imminent peril, where nothing short of operation (so far as human foresight enables one to judge) holds out any prospect of prolonging life, then the constitutional defect is not allowed to bar operative interference.

In arranging for operation in women during the sexual period of life there is one function almost invariably to be considered—namely, menstruation.

Operative procedures on the external genital passages are barred during menstruation, and, as a rule, the patients themselves fix the day of operation according to their knowledge of the expected appearance or disappearance of the menstrual flow. It must, however, be borne in mind that with many women the anxiety occasioned by an expected operation will defer or even arrest a menstrual period, but more frequently causes it to anticipate the regular date.

When a woman is suffering from an intra-uterine fibroid, carcinoma, or retained products of conception, uterine bleeding is no obstacle to operation, but necessitates it.

In abdominal operations, such as ovariectomy or oöphorectomy, it is the rule not to operate during menstruation, but occasionally the environment of a patient is such that the surgeon neglects to regard it. Operations of this kind performed during menstruation do very well, and we have never seen anything untoward arise in such circumstances.

The ensuing accounts of operations will not be merely



descriptions of the methods of performing them, but will contain information concerning the various sequelæ and remote effects, as well as the immediate risks to life.

In order to prevent repetition it will be useful to describe the preliminary preparation of the patient.

In all operations belonging to this group it is important to secure the services of a nurse who has had a gynæcological training. Such a nurse understands the methods of washing and disinfecting the vagina, is apt at passing the catheter, and without fuss arranges the patient and prepares the needful apparatus. For any operation under an anæsthetic the patient should abstain from food for at least four hours—six is preferable; this not only prevents vomiting during the exhibition of the drug, but diminishes the chances of its occurrence on the return to bed. As in other cases, the rectum should be thoroughly emptied by an enema some hours before the time fixed for the operation.

It is good practice to have the nurse in attendance upon the patient at least forty-eight hours before operation; they grow accustomed to each other, and the nurse is able to douche the vagina systematically—an important matter when there is a purulent or offensive discharge. In ordinary cases a douche, morning and evening, of a quart of warm water lightly tinged with permanganate of potash answers every purpose. When the discharges are offensive then it will be necessary to employ a lotion of biniodide of mercury (1 : 5000).

The room (when there is opportunity for choice) should be well lighted and well ventilated. If near a bath-room or water-closet, the surgeon should satisfy himself that these offices are in a sanitary condition.

In all vaginal operations the patient lies upon her back, fixed in what is known as the lithotomy position by means of the crutch, or by means of leg-rests attached to the operating table. Her buttocks are brought well to the edge of the table, and a piece of waterproof sheeting adjusted so as to convey any fluid discharges into a convenient receptacle. The table should be so arranged as to face a window free from the encumbrance of thick blinds or curtains.

Every well-trained nurse in arranging for a vaginal opera-



tion prepares the following things : a firm and convenient table, waterproof sheeting, a dozen towels, plenty of warm water, douche-can, aseptic cotton-wool dabs, two glass catheters, some good brandy, vessels in which to immerse the instruments, antiseptic lotions according to instructions, vaseline or glycerine, and tampons.

In the performance of vaginal operations certain instruments are indispensable, and it will save much repetition to enumerate them.

**The Crutch.**—This invaluable instrument consists of two stout semicircular bands fitted with leather straps and buckles for grasping the legs just below the knees ; the bands are fitted to a sliding crossbar of iron, which can be lengthened at will by means of a thumbscrew. When the crutch has been fixed to the legs the patient can be secured in the lithotomy position by a broad strap passing obliquely around the shoulders.

The crutch is necessary when an ordinary table is used, or where the operation is carried out on the patient's bed. A regular operating table has special leg-rests which obviate the necessity for the crutch.

A very useful instrument in vaginal operations is **Auvard's Speculum**. It is on the principle of Sims' speculum, but is made " self-retaining " by means of a weight on the handle. The handle itself is grooved, so that it can be used as a conduit for fluids when the vagina is being douched ; it can only be used with the patient in the lithotomy position.

Other instruments required for nearly all vaginal operations are : the uterine sound for determining the length of the uterine cavity and the position of the uterus ; the vesical sound to indicate the position of the bladder ; volsellæ for manipulating the uterine cervix ; sponge-holders, sterilizer.

**The Sterilizer.**—This instrument is made of copper, and stands on four legs, which leave sufficient space for a spirit-lamp or gas-jet to be placed underneath. The sterilizer is half filled with hot water, the instruments placed in the wire basket, immersed in the water, the lid is closed, and the boiling maintained for twenty minutes. A new fish-kettle makes an excellent sterilizer.

In describing the various vaginal operations and in enumer-



ating the requisite instruments, it will be assumed that the operator is already furnished with those mentioned in the above list.

**Gloves.**—Increasing experience proves that gloves are most valuable in securing freedom from sepsis. It is a very important matter that the surgeon, the assistant, and the nurses who help at the operation should wear rubber gloves boiled for ten minutes immediately before the operation.

The wearing of gloves diminishes the mortality of the operation and minimizes its unpleasant and often dangerous sequelæ, such as suppuration around sutures, septic emboli, tympanites, and the like. Care must be taken to impress upon all who take part in an operation that it is as essential to wash and disinfect the hands thoroughly before inserting them in gloves as when no gloves are worn. It is also necessary to warn nurses that the smallest hole in a glove renders it useless.

To the operator thorough disinfection of the hands is of the highest importance, for he may puncture or tear the gloves during the operation; or a difficulty may arise in the course of it which will render it advantageous for him to remove one or both gloves to overcome it. If in the course of an operation it is necessary to remove the gloves, we resume them for the final stages, and particularly for the insertion of the sutures. The use of rubber gloves marks a most important advance in operative surgery.



## CHAPTER LIV

### OPERATIONS ON THE PERINEUM, VULVA, AND VAGINA

#### **PERINEORRHAPHY ; REMOVAL OF URETHRAL CARUNCLE ; REMOVAL OF CLITORIS ; COLPORRHAPHY ; AND FOR VAGINAL FISTULÆ**

**Perineorrhaphy.**—Under this term are included the various operations performed for the repair of lacerations of the perineal body in the female.

Many methods of operating have been devised for this purpose, but they have been greatly modified in the last fifteen years, with the result that it has become one of the simplest, safest, and most certain of all gynæcological operations, providing care is exercised in the preparation of the patient, in the details of the operation, and in the after-treatment.

Perineorrhaphy may be described in two sections—

1. When the laceration is partial.
2. When the laceration is complete.

*Preparation of the Patient.*—To insure success it is necessary that the bowels should be thoroughly and regularly evacuated, and the vagina douched twice daily with an antiseptic lotion for several days beforehand; and if there be endometritis it is advisable to carry out a preliminary curetting, as harmful discharges from the uterus interfere with healing.

The instruments required are scissors, angular or curved on the flat, one pair pointed and one with rounded ends; hæmostatic forceps, dissecting forceps, large and small curved needles, needle-holder, fine and thick catgut.

*Partial Perineorrhaphy.*—This is the operation for the



repair of a partial laceration. The patient being anæsthetized and placed in the lithotomy position, the vulva is shaved. A vaginal douche is given, and the vagina is cleansed by thorough swabbing. Two fingers of the left



FIG. 135.—PERINEORRHAPHY FOR PARTIAL LACERATION, SHOWING THE LINE OF INCISION.

hand are introduced into the rectum to put the parts on the stretch. The necessary incision is shown in Fig. 135, and is made by means of sharp-pointed angular scissors introduced in the middle line and carried forward in a curve on each side, skirting the line of junction of skin and mucous membrane, as far forward as the posterior extremity of the



labia minora. The incision should end towards the *inner* side of the labia minora, and the anterior extremities of the two halves of the incision should be exactly opposite one another. The flap so marked out is raised, and to assist in this step an assistant should hold the flap in the middle

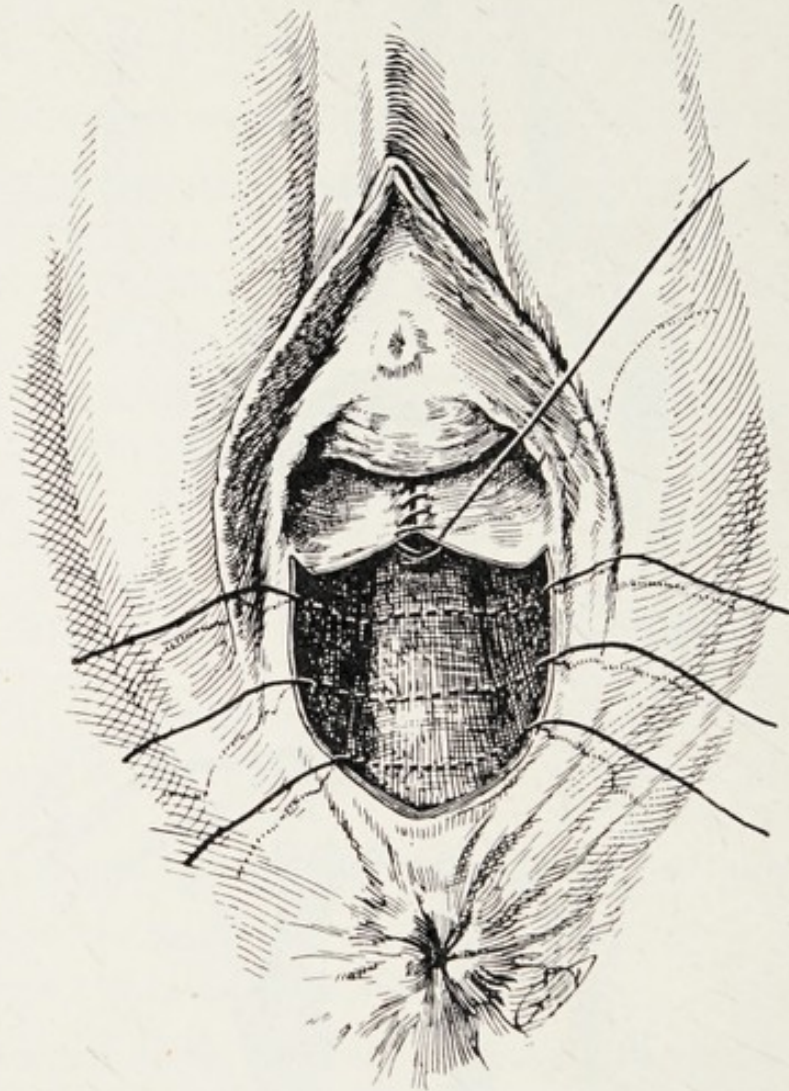


FIG. 136.—PERINEORRHAPHY FOR PARTIAL LACERATION: DISSECTION OF THE FLAP, AND PASSING OF THE LATERAL AND CONTINUOUS SUTURES.

of its convex border with forceps. During the dissection, which splits the recto-vaginal septum, the operator must be careful neither to button-hole the flap nor to let the scissors cut into the rectum; and therefore it is better to use scissors with rounded points for this stage of the operation. It is important that the flap should be well freed at its upper lateral portions. The next step is the introduction of the sutures. These consist of stout catgut threaded on a needle



with a large curve, which is introduced through the raw surface close to the skin edge; it is directed at first outward and then downward, to take a grip on the levator ani; then it is passed deeply under the wound, and made to emerge at the corresponding point on the opposite side. Great care is necessary not to pierce the rectum; the fingers, which have not so far been removed from the rectum, act as a guide. Three to five sutures are passed in this way, according to the extent of the laceration; the most anterior one should correspond to the anterior limit of the incision (Fig. 136). Before these sutures are fastened, the flap must be dealt with: the manner of doing so will depend on the nature of the case. If the posterior wall is not very lax or redundant, the whole of the flap may be preserved, and it is treated in the following fashion: it is doubled up on itself laterally by means of a continuous suture of fine catgut, which starts at the apex of the flap and passes from side to side, bringing the edges gradually together, until the two sides of the base of the flap have been approximated. The usual method of passing this suture is to introduce the needle from the mucous surface of the vagina to the raw, and back on the other side from the raw surface to the mucous. This results in the formation of a projecting longitudinal ridge on the posterior vaginal wall, which is often a source of discomfort to the patient. To obviate this one of us (Giles) introduced the plan of passing the needle in the reverse direction, as in Fig. 136; that is to say, from the raw surface to the mucous and back on the other side from the mucous surface to the raw. The resulting longitudinal ridge is by this means made to project toward the perineal body, which is thereby strengthened; whilst on the vaginal aspect the surface is smooth. When the two sides of the base of the flap have been brought together, the needle is passed through on the right side from the raw surface to the skin surface, and the thread is held by the assistant, while the deep sutures are tied and cut short. The continuous thread is then taken up again and employed to bring together the skin edges of the perineum (Fig. 137). The method of dealing with the flap, just described, is an important part of the operation, for it



shuts off any entrance of discharges into the wound from the vagina.

When the posterior vaginal wall is lax and redundant, as in the condition known as rectocele, it is best to remove a portion of the flap in the shape of a V, the apex of which is uppermost. The vagina is then closed with a continuous

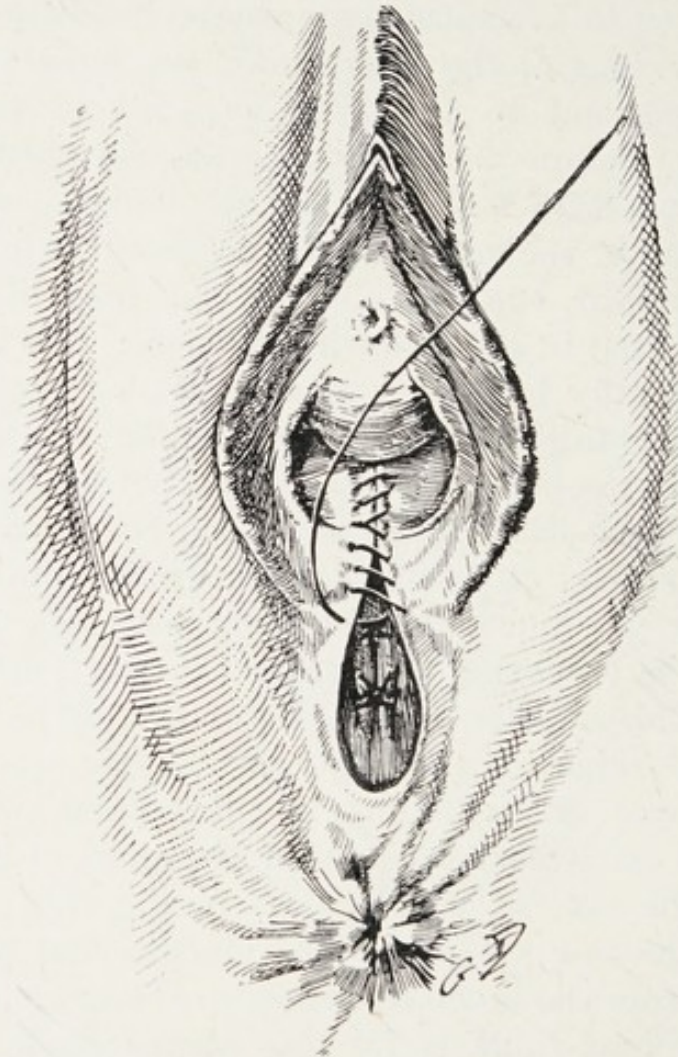


FIG. 137.—PERINEORRHAPHY FOR PARTIAL LACERATION; SHOWING THE SUTURING OF THE VAGINAL AND SKIN EDGES BY THE CONTINUOUS SUTURE.

suture as before, starting at the apex of the V and bringing the limbs gradually together, so that their union forms a vertical seam running down the middle of the posterior vaginal wall.

As regards dressing, the vagina is lightly packed with gauze, and a pad of sterilized absorbent wool is kept in position against the perineum by means of a T-bandage.



*Complete Perineorrhaphy.*—This operation, which is an extension of the preceding one, has three objects: (1) to provide a posterior wall for the vagina; (2) to form an

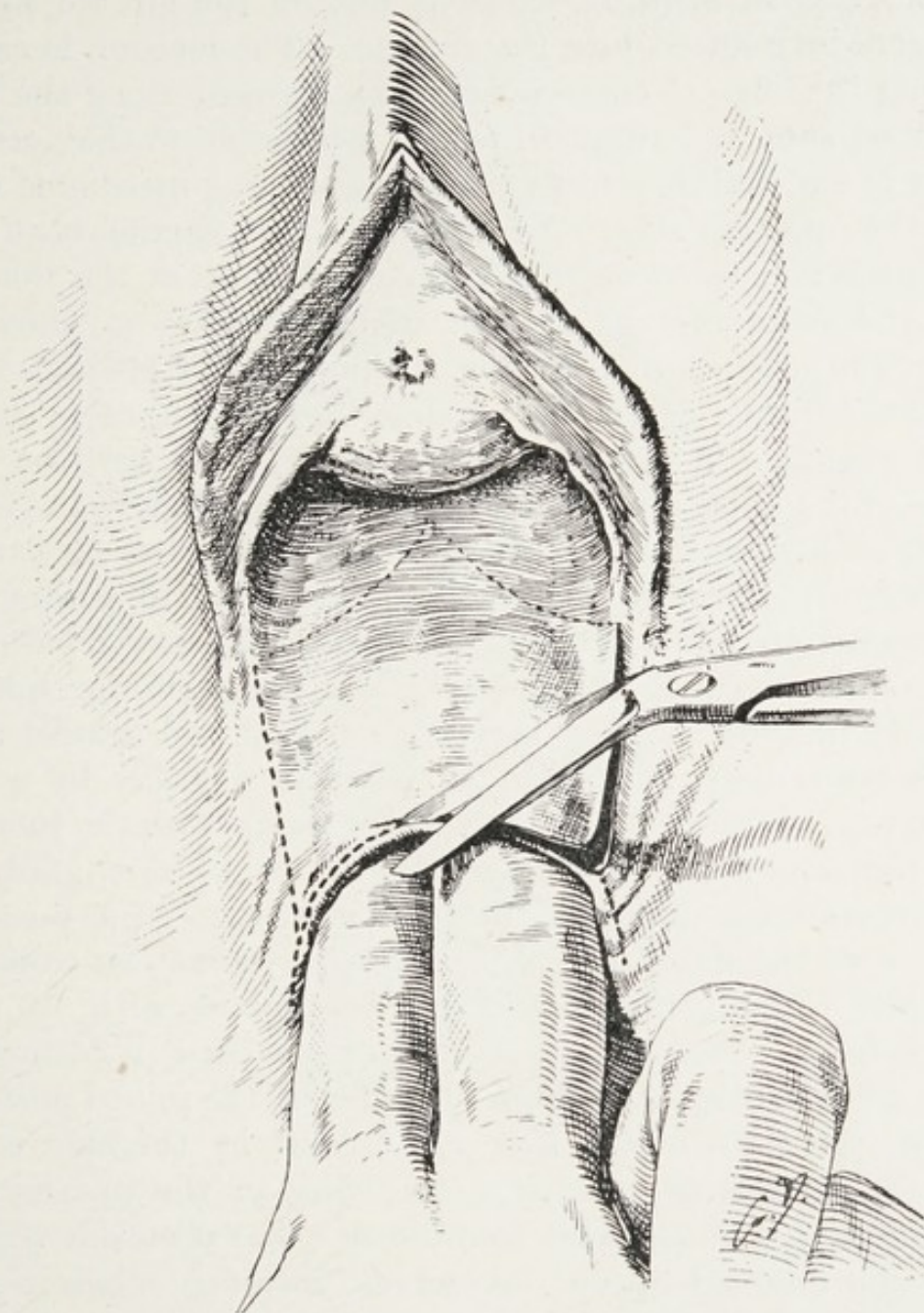


FIG. 138.—PERINEORRHAPHY FOR COMPLETE LACERATION, SHOWING THE LINES OF INCISION.

anterior wall for the rectum; (3) to form a new perineum between the two structures. The first object is attained by raising a flap towards the vagina as above described. The second object is effected by raising two small lateral



flaps backward and inward towards the rectum. The lateral sutures fulfil the third object.

The incision is shown in Fig. 138. The point of the scissors is introduced in the middle line at the edge of the recto-vaginal septum, which is put on the stretch by two fingers introduced into the rectum. The incision is carried along the edge of the septum, then forward along the junction of skin and vaginal mucous membrane to the posterior end of the labium minus. A corresponding incision is made on the opposite side. An incision is then carried backward on each side for about half an inch, starting at the junction of the recto-vaginal septum with the skin, as shown in Fig. 138. The total incision is thus roughly H-shaped, the anterior limbs of the H passing forward on each side of the vagina, the posterior limbs passing backward on each side of the anus, and the crossbar corresponding to the recto-vaginal septum. The anterior flap is dissected forward as previously described. Two triangular lateral flaps are then dissected up posteriorly, the apex of each corresponding to the angle between the crossbar and the posterior limb of the H incision. When turned backward and inward these two flaps meet, and they are fastened together by a continuous suture of fine catgut, which starts from the junction of the two flaps, and passes from side to side, gradually approximating first the median and then the posterior edges of the flaps (Fig. 139). At this stage the wound is shaped roughly like a four-sided pyramid with its base superficial. The anterior border of this base is formed by the anterior flap, the posterior border by the joined posterior flaps, the sides of the base are formed by the skin edges. In the completed operation the sides of the pyramid are brought together, whilst the anterior and posterior borders become doubled up on themselves, forming ridges respectively on the anterior and posterior aspect of the perineal body.

After the posterior flaps have been fashioned, but before they are brought together, the deep sutures are passed from one skin margin to the other and left unfastened. By the dissection of the two triangular flaps above mentioned the two ends of the sphincter ani (torn through at the time of



laceration) are exposed, and these should be carefully picked up and united either by a separate suture, or by the most posterior of the deep sutures. The posterior flaps are then sutured in the manner described above; the anterior flap is

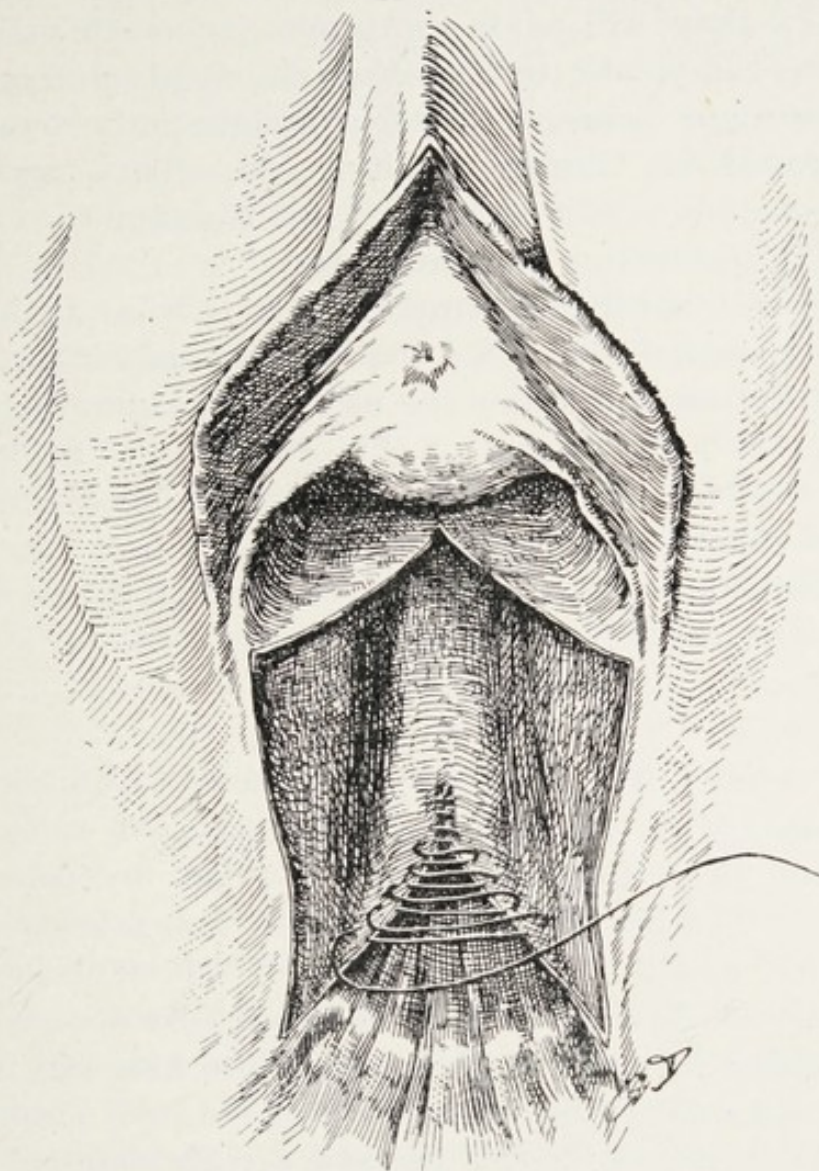


FIG. 139.—PERINEORRHAPHY FOR COMPLETE LACERATION, SHOWING THE METHOD OF SUTURING THE FLAPS TO FORM THE ANTERIOR RECTAL WALL.

sutured as shown in Fig. 136; and, lastly, the deep sutures are fastened. The dressing is as before.

*After-treatment.*—The urine should be drawn off by catheter for the first two days, to prevent soiling of the wound. The bowels should be open early when the laceration is partial; when it involves the rectum it is well to keep the bowels at rest for two or three days. The wound should be kept as



dry as possible, and this remark applies to its vaginal as well as to its perineal portion. For this purpose the pad of absorbent wool should be renewed frequently, and fresh sterilized gauze should be introduced into the vagina from time to time. The sutures, being of catgut, do not require removal; they will come away spontaneously in eight or ten days. It is wise to keep the patient absolutely resting for a fortnight, especially after complete perineorrhaphy.

**Removal of Urethral Caruncle.**—This troublesome condition admits of two methods of treatment: (1) Excision; (2) destruction by the cautery.

Whichever method be employed, it is wiser to have the patient anæsthetized. No doubt many cases have been successfully treated under the use of local anæsthetics, but for the satisfactory relief of this condition it is, before all things, necessary that, whatsoever method be employed, the removal should be thorough.

Instruments required: Auvard's speculum, metal dilators, fine scissors and forceps, artery forceps, small curved needles and fine catgut, glass catheter, and a Paquelin or an electric cautery.

1. *Excision.*—The patient is anæsthetized and secured in the lithotomy position. The urethral orifice is well exposed in a good light and the bladder emptied by means of a catheter. The bill of the speculum is then introduced into the vagina, and the urethra dilated with the uterine dilators up to No. 6. The caruncle is then carefully dissected from the muscular layer of the floor of the urethra, and followed up the canal until its limits are reached, and snipped off. Useful instruments for this purpose are the delicate forceps and scissors employed for operations on the iris. After the caruncle is snipped off there is generally free bleeding; this is easily controlled by passing two sutures through the cut edge of the urethral mucous membrane and the free margin of the urethral orifice. When the sutures are tied the bleeding ceases.

*After-treatment.*—Some patients are able to micturate unaided within a few hours after the operation; in others retention lasts for several days, necessitating the careful use of the catheter thrice each twenty-four hours or oftener.



In this event the nurse observes scrupulous cleanliness, always removing any discharge which may have accumulated round the urethral orifice before introducing the catheter. The best method of keeping the catheter clean is to boil it. The patients require to keep their bed for about four or five days.

2. *Destruction by the Cautery.*—This is the simplest method: the patient, duly anæsthetized, is arranged as for excision. The vulvar structures are then carefully protected by retractors or the fingers of an assistant, and the caruncle is thoroughly destroyed with the narrow point of the cautery at a red heat. Vaseline is then applied to the cauterized surface. The cautery answers very well for small caruncles.

The *after-treatment* is the same as that described after excision.

**Removal of the Clitoris.**—This operation is necessary in two conditions: (1) Cancer; (2) elephantiasis.

Instruments required: Scalpel, scissors, hæmostatic forceps, Paquelin's cautery, dissecting forceps, needles, and sutures.

*The Steps of the Operation.*—The patient is anæsthetized and arranged in the lithotomy position, the skin freely incised so as to include the diseased area. The crura of the clitoris are then exposed, and detached from the pubic arch by means of a raspatory or the handle of a scalpel. The bleeding is always free, but the surgeon aims to secure with forceps the dorsal arteries of the clitoris as soon as they are divided. Should there be much oozing after the larger vessels have been secured, the application of a cotton-wool compress wrung out of very hot water will control it.

Usually the diseased parts may be removed with the scalpel, and leave sufficient loose skin to enable the edges to be brought into apposition by means of sutures. This is very desirable, as it controls the oozing, and should be followed by immediate union. When the diseased surface is destroyed by the cautery, or the surrounding tissues are so involved that a wide removal of skin as well as clitoris is necessary, then the denuded area is left to repair by granulation and cicatrization.

**Tumours of the Labia.**—No definite plan can be



described to meet the needs of every species of tumour occurring in this region, but the principles involved are those which apply in other regions of the body. It is advisable to have the hair removed from the part, the field of operation washed thoroughly with warm soap and water, and a compress wrung out of an antiseptic solution applied for twelve hours before the time fixed for the operation. As the labia are very vascular, operations on them are attended with free bleeding. It is always a great advantage to bring the skin edges together, even when it is necessary to sacrifice this tissue freely, as in the case of cancer or melanoma. In applying dressings to operation wounds in this region it is essential to arrange them in such a way that they need not be disturbed or soiled during micturition.

**Cyst of Bartholin's Gland.**—The incision should be vertical; when it is possible the cyst should be removed without being punctured or incised, as this renders the operation easier, and in the case of abscess the tissues are not soiled with the pus. But it is often very difficult to avoid puncturing a suppurating cyst.

Hæmorrhage is generally moderately free from the venous plexus round about; this is especially the case with suppurating cysts. In the deeper portions small branches of the internal pudic artery may be cut and require ligature. Oozing is best controlled by passing three or four deep sutures from one side to the other; each suture should enter and leave the skin three millimetres from the cut edge, and should pass under the cavity left by the removal of the cyst without penetrating into it. Even when this is done there is generally a little oozing for the first twenty-four hours, so that it is advisable to introduce a thin piece of sterilized gauze to serve as a drain for a few hours.

In addition to the deep sutures a few superficial ones may be used to keep the wound margins in accurate apposition.

A gauze dressing is applied, and changed frequently to avoid urinary contamination. If there be much vaginal discharge a douche of boracic acid or biniodide of mercury solution (1 in 5000) is advisable once or twice in the twenty-four hours.

**Colporrhaphy** (*Elytrorrhaphy*).—This term is applied



to an operation (of which there are many modifications) for removing a redundant portion of the mucous membrane, either from the rectal aspect (*posterior colporrhaphy*) or from the vesical aspect of the vagina (*anterior colporrhaphy*). The operation is mainly employed for the relief of severe prolapse of the uterus, cystocele, and rectocele.

**POSTERIOR COLPORRHAPHY.**—The patient is secured in the lithotomy position, and the vagina thoroughly exposed with retractors. The nature of the incision will depend on the object of the operation. When narrowing of the vagina is desired it is best to remove a long triangular flap whose apex is in the posterior fornix, and whose base runs along the junction of the vagina and perineum. When the posterior vaginal wall is too long, an elliptical incision is to be preferred, one end of the major axis being close to the cervix and the other near the vulvar orifice. In either case care must be taken not to cut deeper than the recto-vaginal septum, lest the bowel be opened. The vaginal mucous membrane is then cautiously dissected off; the amount to be removed is estimated by the laxity of the parts. After removing the vaginal wall and securing the bleeding vessels, the cut edges of the mucous membrane are brought into apposition by a continuous catgut suture. In the case of the triangular flap the edges are brought together laterally, so as to produce a vertical seam down the middle of the posterior vaginal wall. When the elliptical incision is adopted, the edges should be brought together vertically, so as to make a transverse seam, and thus shorten the vaginal wall.

The patient is kept in bed for at least two weeks; her bowels are regulated, and the bladder should not be allowed to become over-distended.

**ANTERIOR COLPORRHAPHY.**—This is a similar procedure carried out on the anterior vaginal wall. The bladder is very liable to be injured in dissecting off the mucous membrane, and is particularly liable to be punctured when the sutures are introduced.

A variety of incisions have been advocated. One method is to remove a circular area of the mucosa of the anterior vaginal wall, and bring the edges together by means of a purse-string suture. The plan that we prefer is as follows :



The cervix being drawn down as far as possible with a volsella, a transverse incision 2 to 3 inches long is made across the base of the cervix, where it joins the anterior vaginal wall. A vertical incision is carried from the middle of the previous incision down the middle of the anterior vaginal wall towards the urethral orifice. Two triangular flaps are now dissected up, proceeding from the middle line outwards, and then cut off along the line of their attachment. This leaves a triangular raw surface, of which the base lies in front of the cervix and the apex is near the urethral orifice. A suture is now passed through the apex of the V, and through the middle of the base line below the cervix. The tying of this suture shortens the anterior vaginal wall, and from this middle point two continuous sutures are carried out laterally, resulting in a transverse seam in front of the cervix.

**Colpo-perineorrhaphy.**—Posterior colporrhaphy is generally combined with perineorrhaphy. All that is necessary, in addition to the procedure described under the latter operation, is to remove with scissors a wedge-shaped piece of the vaginal flap, and then to bring the resulting cut edges together with fine sutures.

**Operations for Vaginal Fistulæ.**—The successful operative treatment of these conditions demands not only operative dexterity and perseverance on the part of the operator, but experience and judgment. A clean linear cut in the bladder or ureter heals spontaneously, but fistulæ which need the assistance of the surgeon are always the result of sloughing and loss of tissue.

*Preparation of the Patient.*—This consists in thorough irrigation of the vagina and complete evacuation of the bowels. The excoriation of the vulva and the adjacent parts of the thighs heals quickly enough when the leakage of urine is arrested.

Instruments required: The crutch, duckbill speculum, vesico-vaginal fistula knives, thin needles in handles, cat-gut, dissecting forceps, scissors.

**VESICO-VAGINAL FISTULA.**—In the majority of cases the lithotomy position is the most convenient, but special conditions may demand a different position.



The principles underlying the treatment of all fistulæ of mucous canals apply here, namely: (1) The vivifying of the edges of the fistula; (2) the careful suturing of the edges; (3) immediate union.

*Paring the Edges of the Fistula.*—This is effected in the following manner. Access to the vagina is obtained by means of an Auvard's or a duckbill speculum. The margins of the fistula are then freely pared by means of a sharp delicate knife mounted on a long handle. These knives are usually supplied in sets of three or four, with the blades adjusted at different angles to meet any difficulty according to the position of the fistula. The vaginal edges of the fistula should be removed by two slightly curved incisions meeting above and below, and the vaginal tissue is removed by superficial dissection which does not reach the bladder wall. A lens-shaped raw surface is left, which has its long axis vertical. The bladder edges of the fistula are similarly removed, but with the long axis of the resulting denudation horizontal. The edges of the bladder incision are now brought together with fine catgut, so as to make a *transverse* seam in the bladder; and the operation is completed by bringing together the vaginal cut edges, producing a *vertical* seam in the vaginal wall. Thus the wounds on the bladder and vagina cross each other at right angles, and touch only at one point, and the chances of complete union are in this way greatly augmented.

*Application of Sutures.*—The sutures should be introduced with a slender needle, and should traverse the muscular but not the mucous coat of the bladder or urethra. This stage affords much scope for ingenuity on the part of the operator.

After the sutures are fastened it is wise to test the wound to ascertain if it be watertight. For this purpose milk is injected into the bladder. Should any escape through the wound an additional suture is inserted at the situation of the leak. If all be secure the bladder and vagina are gently irrigated with warm water and the patient returned to bed.

*After-treatment.*—It is advisable as soon as the patient recovers consciousness to allow her to lie on her side or even in the prone position.

Some operators prefer to keep a catheter in the bladder



for several days, others of equal experience reject this method and enjoin the regular careful use of the catheter. It is important to keep the bowels regular.

When the fistula is small its complete closure may be effected by a single operation, but in many cases—especially when the hole is large—a small fistula will remain, and require a second and even repeated operations for its complete occlusion.

It is wise to allow a good interval to elapse before performing a second operation, to permit the wound to contract and the patient to benefit by change of air and scene after the confinement to bed. The misery these patients suffer makes them importunate in regard to operation.

The most difficult fistulæ to close are those situated near the vesical orifice of the urethra and those near to, or actually involving, the ureteric orifice.

**URETERO-VAGINAL FISTULÆ.**—These often close spontaneously; failing this, attempts should be made to close them by a plastic operation on the principles employed for the occlusion of a vesico-vaginal fistula. In some cases surgeons have removed the kidney in order to relieve women of their almost insufferable distress.

**UTERO-VESICAL FISTULA.**—This is very rare, and in order to deal with it the surgeon will find it necessary to separate the bladder from the neck of the uterus, as described in the first steps in the operation of vaginal hysterectomy, in order to expose the vesical portion of the fistula.

**RECTO-VAGINAL FISTULA.**—This is a fæcal fistula, and when it complicates grave diseases of the rectum or vagina, such as cancer, sarcoma, or syphilitic lesions, operations are not admissible. When the fistula follows an injury and persists it is treated on the same lines as a vesico-vaginal fistula. The operation may be conducted from the rectum when the fistula is accessible, but most operators prefer to carry out the treatment through the vagina.

**Colpocleisis.**—This term signifies an operation for the closure of the vagina. It has been practised for the relief of incurable forms of vesico-vaginal fistulæ. The principle of the operation consists in vivifying the whole circumference of the vagina below the fistula, and then bringing



the pared edges into close apposition by means of sutures on the same principle as that employed for closing vesico-vaginal fistulæ.

**Excision of the Vulva.**—This operation, which is undertaken for carcinoma and for kraurosis of the vulva,

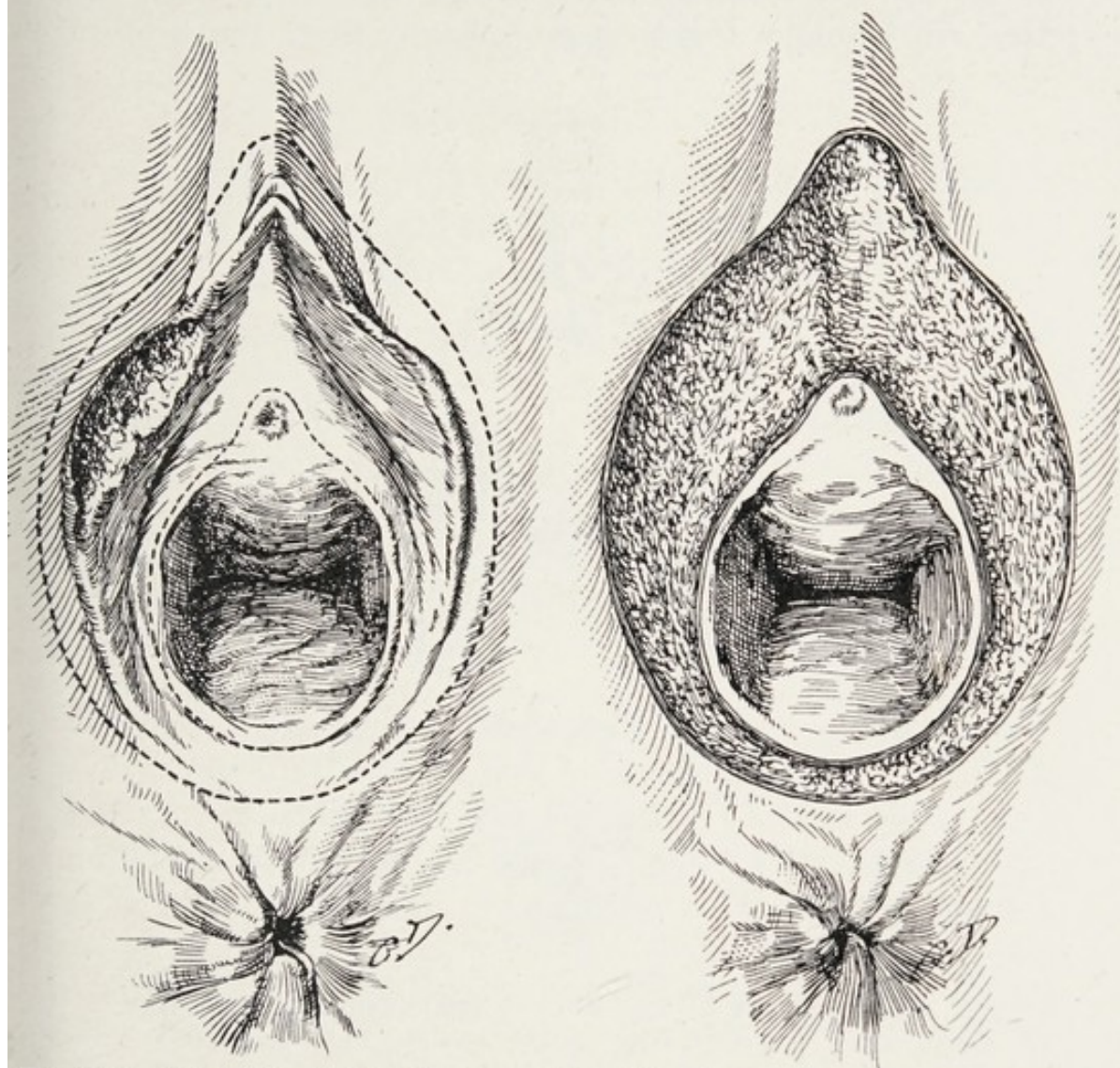


FIG. 140.—EXCISION OF THE VULVA: THE LINES OF INCISION.

FIG. 141.—EXCISION OF THE VULVA: THE DENUDED AREA BETWEEN THE LINES OF INCISION.

is carried out as follows: An incision is begun in front of the urethral orifice and carried backwards in a curve, skirting the junction of the vagina and vulva till it ends in the middle line, and a corresponding incision on the opposite side joins the two ends of the first incision. A second incision is begun in front of the clitoris and carried backwards in a curve which passes outside the labium



majus, till it reaches the middle line in the anterior part of the perineum. The ends of this incision also are connected by a corresponding incision on the opposite side (Fig. 140). The excentric area between the two oval incisions is dissected off as shown in Fig. 141. Any bleeding points are picked up with artery forceps and ligatured. The cut edges are brought together as follows: first, the urethral

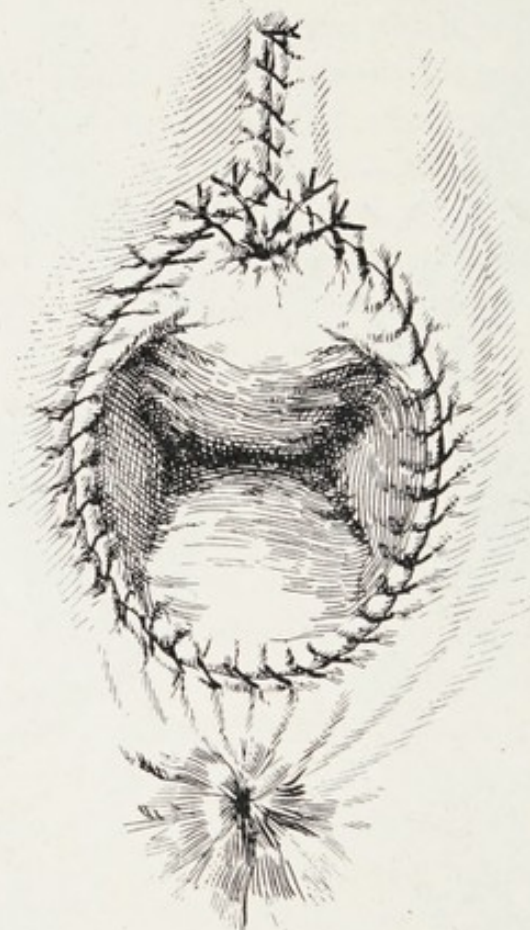


FIG. 142.—EXCISION OF THE VULVA: THE METHOD OF SUTURING.

margin on each side is secured to the corresponding skin edge by means of a couple of fine catgut sutures. Then, beginning at the top of the wound the skin edges are brought together with a continuous suture of fine catgut, until the urethra is reached; after which, each lateral skin edge is united to the corresponding cut edge of the vagina by means of a continuous suture of fine catgut, beginning at the side of the urethra and finishing in the middle line behind. The appearance of the wound when the suturing is finished, is shown in Fig. 142.



## CHAPTER LV

### OPERATIONS ON THE UTERUS

#### DILATATION OF THE CERVICAL CANAL OF THE UTERUS; CURETTING; VAGINAL MYOMECTIONY

**Dilatation.**—It may be necessary to dilate the cervical canal for the following conditions: (1) To remove retained products of conception; (2) curettage; (3) for dysmenorrhœa; (4) removal of a polypus; (5) diagnostic purposes in cases of suspected polypus or cancer of the body of the uterus.

In addition to the usual gynæcological instruments (*see* p. 464) it is necessary to be furnished with dilators and curette (scraper).

**Uterine Dilators.**—There are many varieties of dilators; the set we find most useful was designed by Dr. W. H. Fenton. It comprises ten dilators; each consists of a curved metal rod made of copper and electroplated with silver. The advantage of using metal dilators is that they can be immersed in the sterilizer. Each dilator is 30 centimetres (12 inches) in length, but differs in thickness at each end, so that after introducing the narrow end into the uterine cavity the operator reverses the instrument for the succeeding number. In using these instruments they need to be thoroughly lubricated. It is also well to have a distinctive mark, so that the operator can easily distinguish the smaller from the larger end. There are many ways of doing this; in some sets the higher number is distinguished by a metal collar. These instruments are very useful for dilating the urethra when it is necessary to explore the interior of the bladder.

**The Curette (or Scraper).**—This term is applied to



an instrument employed for scraping the cavity of the uterus or its cervical canal. There are several varieties of curettes—some are shaped like a spoon, with sharp edges, whilst others are ring-shaped, with thin edges. They are furnished with handles so that they may be effectively used. Some curettes are made hollow, and are connected with an irrigator by means of indiarubber tubing, so that a stream of sterilized water or an antiseptic solution issues from the instrument and flushes the uterine cavity whilst the scraping is in progress.

The principle of the curette is this—all soft processes and diseased tracts of mucous membrane or retained pieces of placenta and decidua are easily detached by it, whilst its edge is not sharp enough to damage the underlying muscular wall of the uterus when the implement is used with due care and gentleness.

*The Steps of the Operation.*—The patient is anæsthetized, and secured in the lithotomy position. The vagina is douched with warm water, and the bill of the speculum introduced into the vulvar orifice. The anterior lip of the cervix is secured with a volsella so as to be under the control of the operator. The uterine sound is introduced gently to furnish information as to the length and direction of the uterine cavity.

The dilators are then introduced in the following manner. They lie in their proper order in a vessel of warm water or weak antiseptic solution; from this they are taken up in turn and dipped in vaseline or a vessel containing glycerine and perchloride of mercury (1 in 2000), or any suitable lubricant, and introduced into the cervical canal with the right hand, whilst the operator makes counter-traction by firmly grasping the volsella, which is fixed to the cervix, with his left. The early numbers usually pass easily so long as they are well anointed and introduced in the axis of the uterine cavity.

The rapidity and degree of dilatation vary with the necessity of the case. Thus, when the operation is undertaken to remove retained products of conception the softened cervical canal dilates very easily, and the dilatation is carried on until the canal is large enough to admit



the index finger, and permit thorough exploration of the uterine cavity. (The finger will follow No. 16 or 18.)

For diagnostic purposes in cases of suspected polypus it is wise to dilate sufficiently to admit the finger; in this way exact information as to the seat, size, and condition of the tumour is obtained.

When needed for suspected disease (cancerous or otherwise) of the endometrium, dilatation to No. 10 or 12 is sufficient, as this allows the introduction of the curette and abstraction of fragments, and even complete curettage of the uterine cavity. For dysmenorrhœa the dilatation should be carried to No. 12. In many cases of single and sterile married women the cervical tissues do not easily yield to the dilator, and great care is necessary to avoid extensive laceration of the cervical tissues in the vicinity of the internal os.

It is sometimes an advantage to secure the neck of the uterus with two volsellæ—one on the anterior and one on the posterior lip.

There are two opposite conditions to be borne in mind when using dilators. A soft and yielding cervix, as in patients who have recently aborted or who have a cancerous uterus, readily admits the instruments, but is easily perforated by the sound or thin dilators. A firm, unyielding cervix easily lacerates, and the exercise of undue force during the introduction will cause the instrument to perforate the uterine wall or tear the lower part of the cervix from the upper in a circular direction. Unless the direction of the uterine canal be carefully observed, a false passage is apt to be made, burrowing into the uterine tissue or into the mesometrium. The risk of this accident is greatest in the early stages of dilatation, when the smaller instruments are being used.

After the canal has been dilated to the requisite size, and the operator has met the necessities of the case by abstraction of fragments of placenta or a polypus, etc., he thoroughly douches the cavity with hot water, then dries it with pledgets of cotton-wool on a uterine probe, and applies iodized phenol, iodine, or any application he deems necessary to the endometrium. In cases where the oozing



is free the cavity may be plugged with sterilized gauze, or gauze impregnated with iodoform, aristol, or other drugs in fashion. The vagina is tamponed, the surrounding parts are dried, and the patient returned to bed.

*After-treatment.*—This is very simple. In twenty-four hours all tampons and plugs are withdrawn, and a warm vaginal douche administered twice daily.

In the simplest case it is wise to keep the patient confined to her bed for a week, in other cases no rule can be laid down; it must be decided by individual experience.

**Dangers.**—Dilatation of the cervical canal is the simplest of all gynaecological operations, and if conducted with scrupulous care and cleanliness should have but one risk: namely, that of the anæsthetic. It is, however, occasionally a source of grave danger and death. Fatal results have been due to the following causes: (1) Perforation of the uterus with the sound, curette, or dilator; (2) septic endometritis spreading into the Fallopian tubes; (3) pelvic cellulitis secondary to laceration of the cervix; (4) rupture of purulent collections in the Fallopian tubes (pyosalpinx) or ovaries (ovarian abscess).

Should dilatation be incautiously advised and the uterus be gravid, abortion would be the almost inevitable consequence.

**Vaginal Myomectomy.**—Under this heading will be described the various operations for the removal of fibroids from the cervical canal and cavity of the uterus.

Instruments required in addition to those enumerated on p. 464: Scissors, scalpel, bull-dog volsella, and hæmostatic forceps.

*Steps of the Operation.*—These vary considerably according to the size, character, and position of the tumours. It will be convenient to describe the simplest condition, and then proceed gradually to those that may offer very great difficulty.

The patient is secured in the lithotomy position; the vagina is thoroughly douched, and the cervix exposed by a duckbill speculum.

*A Pedunculated Fibroid (Polypus) protruding from the Cervix.*—In such a case the operator carefully examines the



polypus with a view of ascertaining, if possible, the point where the pedicle is connected with the uterus; he should also satisfy himself that the uterus is not partially inverted (*see* p. 136). When the pedicle is very narrow it can easily be severed by twisting it on its longitudinal axis. When it is thicker the pedicle is snipped through with a stout pair of scissors and the tumour detached; and the forefinger is introduced to be certain that there are no other polypi. The parts are then thoroughly irrigated and dried with cotton-wool on the uterine probe; tampons impregnated with a mild antiseptic reagent (liquid or powder) are inserted into the vagina, and the patient returned to bed.

*After-treatment.*—The tampons are removed in twelve hours and the vagina douched twice daily. If there has been much bleeding prior to operation, and this has produced marked anæmia, some preparation of iron may be prescribed. Convalescence at the end of two weeks is the rule.

*A Sessile Fibroid protrudes at the Cervix.*—When such a tumour does not exceed the size of a bantam's egg it may be dealt with in the following way—

The cervical canal is dilated until it easily admits the finger; this enables the operator to determine the size and position of the tumour. With a scalpel he divides the mucous membrane overlying the tumour, and with his finger or a raspatory shells the tumour out of its capsule up to its base. With a stout bull-dog volsella the tumour is seized close up to its base, inside the capsule, and then the operator gently and cautiously rotates the volsella, and at the same time drags upon it; this twists the fibroid, and after two or three complete turns it is dragged out of its bed.

The uterus is flushed with water at 115° F., then carefully dried with cotton-wool on forceps. When there is free oozing the cavity is plugged with antiseptic or sterilized gauze.

The chief danger in this operation is seizing the tissue of the uterine wall instead of the tumour. Free bleeding and even fatal peritonitis may follow a tear through the wall of the uterus.



When the fibroid is septic the cavity of the uterus should be thoroughly curetted and disinfected.

*Sessile and Pedunculated Uterine Fibroids with an Undilated Cervical Canal.*—When the symptoms indicate the probable presence of a submucous fibroid the operator dilates the cervical canal and explores the uterine cavity with his finger. On detecting a tumour he then determines its size, seat, and character. When it is small he proceeds according to the instructions detailed in the two preceding sections.

It occasionally happens that he finds himself face to face with one or other of these conditions: (1) A large pedunculated fibroid; (2) a large sessile fibroid with a broad base.

In the first example it is easy to detach the tumour from its pedicle by rotation, but the difficulty will be met with in its "delivery." In the second example there will be difficulty in detaching as well as in extracting the fibroid.

This brings us to the consideration of the important question: How large a tumour may be safely and expeditiously delivered by vaginal myomectomy?

We will relate our own practice in this matter. With a yielding cervix the cervical canal can be readily and without risk dilated up to No. 20 (a diameter of 25 millimetres), and this will allow of the extraction of the fibroid of the size of a bantam's egg. Submucous fibroids are often ovoid. When the tumour exceeds these dimensions its detachment and delivery may be facilitated by turning the bladder off the cervix, as in the first stages of vaginal hysterectomy, and then splitting the anterior lip of the cervix in the middle line as high as the peritoneal reflection. Fibroids with a diameter of five centimetres may be detached and extracted in this manner. The divided surfaces of the cervix are easily brought into apposition and secured with catgut sutures, and the vaginal incision closed.

When a fibroid equals in size a foetal head it is possible to remove it through the vagina by the method known as "*morcellement*." The cervical canal is dilated, and then the cervix is split as above described. The division of the cervix gives free access to the uterine cavity. As a rule



bleeding is very slight; if it should prove troublesome the uterine arteries may be ligatured.

The next step of the operation consists in freely incising the capsule of the tumour; then, after enucleating it to its base, the operator proceeds to remove it piecemeal by means of scissors and stout volsellæ.

Myomectomy by *morcellement* was formerly in favour in Germany and France. In this country it is not widely practised. The custom of the leading gynæcologists in this country is to limit vaginal myomectomy to tumours not exceeding a diameter of five or six centimetres—roughly the dimensions of the patient's fist. When a fibroid exceeds these dimensions, and in many cases when it is even smaller, a much more satisfactory operation is that of abdominal hysterotomy, which will be described later; or it may be advisable to perform an abdominal hysterectomy.

The **dangers** of vaginal myomectomy are bleeding, perforation of the uterus, inversion of the uterus, and septicæmia.



## CHAPTER LVI

### OPERATIONS ON THE UTERUS (*continued*)

#### TRACHELORRHAPHY; AMPUTATION OF THE CERVIX

**Trachelorrhaphy.**—This name is applied to an operation for the repair of lacerations of the cervix uteri.

Instruments required in addition to those enumerated on p. 464: Two volsellæ, scalpel, dissecting forceps, pressure forceps, scissors, stout curved needles, and catgut.

*Steps of the Operation.*—The patient is anæsthetized and placed in the lithotomy position, and the cervix well exposed by means of Auvard's speculum. The vagina is thoroughly disinfected by douching and swabbing, and dilatation and curetting are carried out when necessary. After this the anterior lip of the cervix is seized with a volsella, exactly in the middle line, and the posterior lip is similarly held with another volsella. By this means the two lips of the cervix are held widely apart. By means of scalpel and forceps two flaps are now dissected off the exposed surface, taking care to leave a narrow strip of mucous membrane in the middle line, which will form the lining for the new cervical canal when the lips are approximated. In Fig. 143 the flap is shown dissected on the left side and partly on the right. While the surfaces are being vivified there is usually free oozing; this is useful, as it serves to deplete the cervix and diminish its volume. In many cases before operation the bulky everted lips look as if they could not come together, yet after the depletion brought about by the dissection they can be approximated with ease. It is important that the tissue should be removed from the deep part between the two lips. This object is best secured by dissecting the flap off both lips in one piece. When the flaps have been dissected off the sutures are introduced. For this purpose a curved needle armed with stout catgut



is entered just outside the raw surface, passed under this surface, and made to emerge close to the central strip of

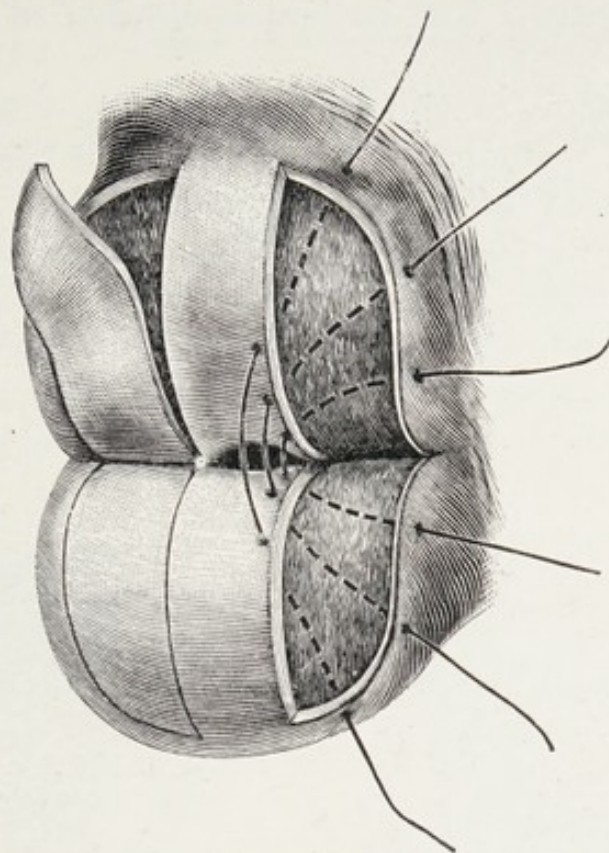


FIG. 143.—TRACHELORRHAPHY, FIRST STAGE, DISSECTION OF THE FLAPS AND PASSING OF THE SUTURES.

mucous membrane. It is then repassed in the reverse direction on the opposite lip. Three or four such sutures

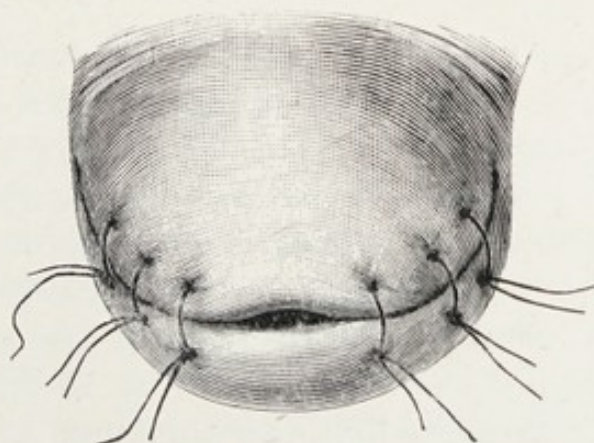


FIG. 144.—TRACHELORRHAPHY, SECOND STAGE, AFTER TYING THE SUTURES.

are passed on each side. The volsellæ are then removed, and the sutures are tied, when the cervix will present the appearance shown in Fig. 144. The parts are carefully dried and the vagina lightly packed with gauze.



*After-treatment.*—The gauze is removed on the day following, and the vagina is douched occasionally if there is any discharge. The patient is allowed to get up on the tenth day.

**Amputation of the Cervix Uteri.**—This operation is performed for elongation of the neck of the uterus. The elongation may affect the vaginal portion of the cervix, or the supravaginal, and the procedure to be adopted will vary accordingly. Vaginal amputation is the simpler, and we shall, therefore, describe it first; and then point out the modifications necessitated by the supravaginal operation.

Instruments required in addition to the list on p. 464:

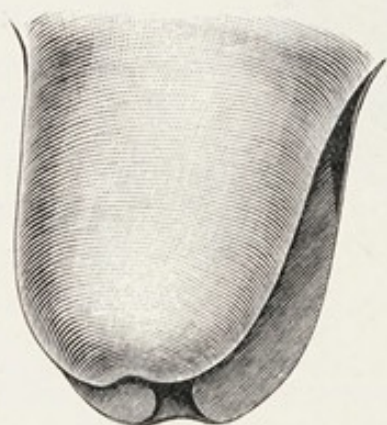


FIG. 145.—AMPUTATION OF THE CERVIX: THE CORONAL SPLITTING OF THE CERVIX.

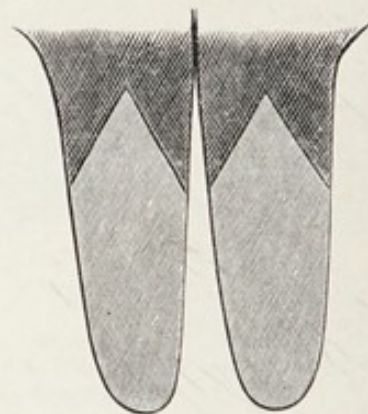


FIG. 146.—AMPUTATION OF THE CERVIX: THE REMOVAL OF THE ANTERIOR AND POSTERIOR LIPS BY V-SHAPED INCISIONS.

Retractors, catheter, scalpel, scissors, hæmostatic forceps, dissecting forceps, needles, and catgut sutures.

*Vaginal Amputation.*—The patient is placed in the lithotomy position, a douche is given, and Auvard's speculum introduced. The cervix is split bilaterally or coronally as far up as may be required (Fig. 145). A transverse incision is then carried across the anterior lip from the vaginal aspect, the blade of the knife travelling obliquely upwards and backwards through half the thickness of the lip. A similar incision is made on the posterior surface of the anterior lip, the knife passing upwards and forwards to meet the deepest part of the first incision. In this way the portion of the lip removed is cut out in the form of a wedge (Fig. 146). The posterior lip is treated in a similar



fashion, and the sutures are then introduced in the following manner (Fig. 147): One or two sutures are passed through the anterior lip near the middle line in such a way as to bring together the mucous membrane of the cervical canal and that covering the cervix anteriorly. The same thing is done in the case of the posterior lip, and thus the boundaries of the new cervical canal are formed. Two or three sutures are then put in on each side, passing through both anterior and posterior lip, and these when tied (Fig. 148) complete the operation. The vagina is

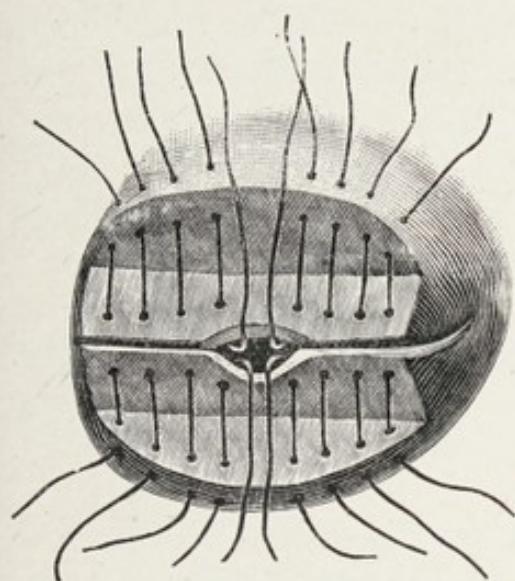


FIG. 147.—AMPUTATION OF THE CERVIX: THE PASSING OF THE SUTURES.

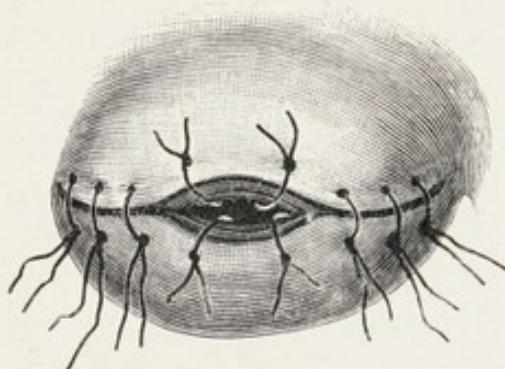


FIG. 148.—AMPUTATION OF THE CERVIX: THE APPEARANCE WHEN THE SUTURES HAVE BEEN TIED.

douched and packed with gauze, which is left in for twenty-four hours.

*Supravaginal Amputation.*—The features that distinguish this operation from the one just described are three: First, the bladder has to be turned off the cervix, as in the first stage of vaginal hysterectomy; secondly, to reach the cervix posteriorly it may be necessary to open the peritoneal cavity in the pouch of Douglas; thirdly, some branches of the uterine artery must be tied. The steps of the operation are as follows: The cervix is exposed by the introduction of Auvard's speculum, seized with a volsella, and drawn down. A transverse incision is made with a scalpel across the front of the cervix, just below the



bladder-reflection, and the bladder is then pushed up with the handle of the scalpel, or with a gauze swab. When this stripping up has been carried as far as necessary, the cervix is held forwards, and an incision is made across the posterior lip in the vaginal vault. It may be possible then to strip up the cellular tissue and peritoneum from the back of the uterus without opening the peritoneal cavity. A few touches of the scalpel at the sides will then free the denuded cervix all round; and while it is drawn down a forceps is applied on each side to secure the cervical branch of the uterine artery. The amputation is effected as described under Vaginal Amputation—that is, the cervix is split bilaterally, and two wedge-shaped pieces are cut out, one in front and one behind. The arteries are tied, and the sutures are passed as previously described (Fig. 147). A strip of gauze is placed in the vagina after this has been douched, and the patient is returned to bed.

The *after-treatment* is simple. The gauze is removed in twenty-four hours, and the vagina douched twice daily. The catheter is used every eight hours unless the patient can void her urine unaided—this is always an advantage. Convalescence is usually rapid.

**Dangers.**—In judiciously selected cases the operation is one of the safest in surgery. The pitfalls are these: The bladder may be injured in the process of separating it from the cervix. If the arteries are tied at a distance from the uterus the ureters are apt to be included in the ligature. When the posterior incision is carried too far back the rectum may be damaged and cause a temporary fistula. If the peritoneum is accidentally incised and the recto-vaginal fossa opened, then the incision should be closed. Pelvic cellulitis and peritonitis may arise if aseptic precautions are not rigidly carried out. Hæmorrhage may occur from slipping of an ill-applied ligature.



## CHAPTER LVII

### OPERATIONS ON THE UTERUS—(*continued*)

#### VAGINAL HYSTERECTOMY

**Vaginal Hysterectomy** signifies the removal of the uterus (and sometimes the ovaries and Fallopian tubes with it) through the vagina. It is performed for cancer of the cervix, sarcoma of the uterus, uterine fibroids, fibrosis of the uterus giving rise to uncontrollable metrorrhagia, and intractable procidentia.

Vaginal hysterectomy for malignant disease has been superseded by the more thorough abdominal methods of extirpation described in Chap. LX; and in almost all other cases abdominal hysterectomy is the better operation. The vaginal method is still called for occasionally, and it is therefore described here.

The instruments required are the same as those employed for amputation of the cervix.

*The Steps of the Operation.*—The patient is anæsthetized and secured in the lithotomy position by the crutch, and arranged so that the perineum faces a good light. The hair is shaved from the pubes and labia (it is an advantage to have this carried out by the nurse some hours previously, but it is not always agreeable to the patient), and the external parts washed with warm soap and water, and then douched with a solution of biniodide of mercury (1 in 2000), or some equally efficacious antiseptic.

The operator, seated at a convenient level, introduces the beak of the speculum into the vagina, and passes a sound into the bladder; this the assistant retains there in order to keep the operator informed of the relation of the bladder to the cervix throughout the first stage of the operation.



*Stage 1.*—The cervix is seized with a stout volsella, and then by means of a scalpel the mucous membrane on its anterior aspect is divided transversely at a point sufficiently low to avoid injury to the bladder. The bladder is then cautiously separated from the cervix with the forefinger, assisted, if necessary, with the handle of the scalpel. On reaching the level of the os internum the bladder and uterus are connected only by the fold of peritoneum forming the lower limit of the utero-vesical pouch. This is divided transversely, giving access to the peritoneal cavity. Throughout this stage the operator constantly informs himself of the exact position of the bladder by manipulating the sound.

*Stage 2.*—The incision in the mucous membrane is now carried round each side of the uterus, and by means of scissors the recto-vaginal pouch is opened.

*Stage 3.*—The broad ligaments are dealt with in the following manner: a curved needle in handle armed with strong silk is made to transfix the connective tissue tract close by the side of the cervix in order to avoid the ureter. The object of this ligature is to secure the uterine artery near the spot where it turns on to the side of the uterus. The ligature is firmly knotted. Very often the artery may be seen. It is then picked up with forceps and deliberately tied. When the artery has been secured on each side, and the tissue between the ligature and the uterus divided with scissors, the organ can, as a rule, be drawn low down into the vagina, and the upper segments of the broad ligament transfixed with double silk ligatures. These are tied above and below so as to embrace the Fallopian tubes with the ligament of the ovary, the ovarian artery and veins, and the round ligament of the uterus; the tissues between the uterus and the ligatures are divided, and the uterus is removed. Should the ovaries or Fallopian tubes be found diseased, then they should be removed by transfixing the pedicle with silk.

If the silk threads have been properly secured there is, as a rule, no bleeding; should any free oozing be noticed the bleeding-point is sought, seized with hæmostatic forceps, and ligatured with thin silk. The vagina is then irrigated



with warm water, and if the cut edge of the vaginal mucous membrane bleeds—a frequent condition—it is useful to secure it with a continuous suture of thin silk, or arrest the bleeding with forceps, and leave them on for twelve hours.

The details given above are those which are easily carried out when the vagina is capacious, and the uterus but slightly enlarged and mobile. It is very different when the vagina is narrow and rigid, as in virgins, and especially when the uterus is large, and cannot be drawn down. In these circumstances very much depends on the experience and skill of the operator. Sometimes it is necessary to divide the perineum, and even to make incisions in the lateral walls of the vagina. In some cases it is useful to secure the uterine arteries, and then split the uterus sagittally with scissors and remove it in halves, or adopt the method of *morcellement*, and excise it piece by piece.

Some operators do not employ ligatures, but prefer to secure the broad ligament on each side of the uterus with specially constructed clamps. The uterus is then cut away; and the clamps remain *in situ* for at least forty-eight hours; they are then carefully removed.

Each method has its advocates, and there are advantages and disadvantages associated with both. The employment of clamps greatly shortens the time occupied in the operation, and avoids subsequent troublesome sequelæ due to separation and sloughing of ligatures.

**Operative Dangers.**—The chief of these are—

1. *Injury to Bladder.*—Should this viscus be cut the opening should be allowed to remain without suture; it usually closes.

2. *Injury to Ureters.*—(See Chap. LXI.)

3. *Injury to Bowel.*—Occasionally the rectum has been cut in making the opening into the recto-vaginal fossa, and the small bowel has been nicked with the scissors in cutting through the broad ligaments. Should the small gut be adherent to the uterus it is apt to be torn. Such an injury will lead to the formation of a fæcal fistula, which is usually temporary, but a source of inconvenience and great distress as long as it persists.



4. *Bleeding*.—However carefully the bleeding may be controlled, whether by ligature or clamp, a small quantity of reddish serum always finds its way down the gauze drain. Any serious loss of blood is due to the slipping of an ill-applied ligature or forceps, or to a vessel which remained unsecured and then bled freely as the patient recovered from shock and anæsthesia. Free bleeding necessitates re-examination of the parts under an anæsthetic, and whilst preparations are being made to carry this out the loss of blood may in a measure be controlled by temporary digital pressure applied to the abdominal aorta. When the hæmorrhage has been severe the patient should be transfused (p. 507), as soon as the source of the bleeding has been detected and secured.

*The After-treatment*.—This is carried out on the same lines as those adopted after abdominal hysterectomy. The vagina needs to be considered; for instance, the gauze may be changed in twenty-four to thirty-six hours; when forceps are left *in situ* they require to be taken away with the following precautions—the patient's thighs are slightly raised and the knees gently separated, then a forceps is very carefully isolated from its fellows and the handles are unlocked; after waiting a few moments, if there be no trickling of blood, the blades are detached by a gentle twisting movement. Should free bleeding occur in attempting to detach a forceps it is wise to relock it and leave it *in situ* for a further period of twenty-four hours. Oozing on the attempted removal of one forceps should not deter the surgeon from attempting to remove its companions. The temperature after vaginal hysterectomy usually rises towards the close of the second day; this is due to separation of ligatured or compressed and necrosed tissue. It may rise as high as 103° F., and the discharges become offensive. When this happens the vagina should be gently mopped out with small dabs of antiseptic gauze or cotton-wool. By the ninth day the ligatures begin to become detached, and as a rule they are all away by the twentieth day. Occasionally one or two remain in for several weeks. Generally the patient is allowed to leave her bed at the end of the second week.



*Sequelæ.*—Vaginal hysterectomy, like other surgical proceedings, is liable to be followed by evil consequences. Thus the operation may be rapidly fatal from shock and hæmorrhage. Death may follow in a few days from peritonitis (sepsis), and occasionally from injury to the ureters. With care, however, and with strict asepsis the operation has a very low rate of mortality (5 per cent.). The sequelæ are purulent discharge due to retained ligatures, vesical complications, especially cystitis, and occasionally thrombosis of the pelvic veins with œdema of the lower limbs and liability to embolism. In a few instances fatal intestinal obstruction has supervened on this operation, but patients seem less liable to this grave complication after vaginal than after abdominal hysterectomy or ovariectomy.

**Colpotomy.**—Experience acquired in the performance of vaginal hysterectomy has taught surgeons that the intraperitoneal relations of the uterus and its appendages may be explored, with reasonable safety, through an incision in the vaginal culs-de-sac.

When the incision is made posterior to the cervix it is called *posterior colpotomy*. When the operation is carried out anterior to the cervix, between it and the bladder, it is called *anterior colpotomy*.

Colpotomy has been employed for the following conditions: retroflexion of the uterus, small tumours of the ovary, tubal pregnancy, tubal disease, and prolapse of the ovary.

Instruments required in addition to the list on p. 464: Scalpels, scissors, hæmostatic forceps, dissecting forceps, needles in handles, silk, needles, volsellæ.

**ANTERIOR COLPOTOMY.**—The patient is placed in the lithotomy position, and the bill of the speculum introduced into the vagina; the cervix is then drawn down with a volsella, and a sound is introduced into the bladder. The vaginal mucous membrane anterior to the cervix is incised transversely, taking care not to injure the bladder. (Some operators make this incision vertical.) With the handle of the scalpel the bladder is detached from the cervix as in the first steps of a vaginal hysterectomy. The peritoneum as it passes from the uterus to the bladder is divided, and



the operator's fingers are now in the utero-vesical pouch. This enables him to ascertain accurately the position of the uterus and the co-existence or otherwise of ovarian enlargement or distension of the tubes.

When an ovary is prolapsed, or obviously diseased, it may be withdrawn through the incision, its pedicle ligatured, and the organ removed. This would be vaginal oöphorectomy. Retroflexion of the uterus is dealt with thus: a sound is introduced into the uterus, which is then straightened and anteverted. A curved needle armed with a silk ligature is passed through the anterior aspect of the body of the uterus; the ends of the sutures are carried through the margins of the vaginal incision; when this ligature is fastened it maintains the uterus in position, and at the same time closes the vaginal incision. The adhesions which form in consequence of these proceedings are supposed to retain the uterus in its rectified position. This operation is known as vagino-fixation.

In some cases where the uterus is mobile in its flexed condition it is unnecessary to open the utero-vesical cul-de-sac. The fixation of the uterus thus becomes an extra-peritoneal proceeding, but then the operator is unable to ascertain the true condition of the ovaries and tubes.

The subsequent treatment is very simple—the bowels are carefully regulated, and the vagina douched twice daily.

The advantage claimed for this operation over abdominal hysteropexy (ventro-fixation) is that it is safer and avoids the chance of a yielding cicatrix. We do not recommend it.

Noble, in writing of the results of vaginal fixation of the uterus, states: "Over one-fourth of the pregnancies following this operation have ended in abortions, and the recent literature is burdened with reports of versions, artificial extractions, forceps operations, craniotomies, and Porro operations, so that I feel that, following its originators, we must consider it as condemned by its results, and as an unjustifiable operation in the case of women of child-bearing age" (1896).

POSTERIOR COLPOTOMY.—This is an extremely simple



proceeding. The field of operation is exposed as for anterior colpotomy, and the recto-vaginal fossa is reached through a transverse incision in the posterior cul-de-sac. The surgeon is then able to ascertain the condition of the uterus and the ovaries and tubes. Through such an incision he is able to break down adhesions which may fix the uterus, or remove a prolapsed ovary, or a small ovarian tumour, or a gravid tube in its very early stages.

In cases of pelvic abscess, and fluid effusions such as exist in posterior serous perimetritis, or extravasation of blood following intra-peritoneal rupture of a gravid tube, or tubal abortion, this method of exploring the recesses of the pelvis is simpler than an incision through the linea alba.

Pelvic operations through the vagina are greatly facilitated by the use of Professor von Ott's method of electric illumination of the pelvis.



## GYNÆCOLOGICAL OPERATIONS (*continued*)

### GROUP II.—ABDOMINAL OPERATIONS

#### CHAPTER LVIII

##### GENERAL OBSERVATIONS ON ABDOMINAL OPERATIONS

IN this group the following operative procedures will be described : (1) Cœliotomy ; (2) ovariectomy ; (3) enucleation of sessile pelvic cysts and tumours ; (4) oöphorectomy ; (5) hysterectomy ; (6) hysteropexy ; (7) Cæsarean section.

**Cœliotomy.**—When the surgeon opens the abdomen for the purpose of removing a tumour growing in a viscus the operation receives a specific name according to the organ concerned, such as ovariectomy, nephrectomy, splenectomy, and so forth. In very many cases the conditions preclude an exact diagnosis, and the operation of making an opening into the belly cavity is styled cœliotomy, but it may become a colectomy, or an oöphorectomy, etc. There are many conditions in the abdomen requiring treatment through an incision in its walls which do not readily lend themselves to a single, expressive term—for instance, omental tumours, cysts of the mesentery and echinococcus colonies—so that it becomes convenient to use the term Cœliotomy as expressing an operation by which the belly is opened by a cut.

In all the operations described in this section the important step is to gain entrance into the cœlom (or peritoneal cavity) by an incision in its parietes, most frequently through the linea alba ; it will, therefore, be convenient to describe the mode of preparation of the patient, the requisite instruments, and the manner of carrying it out.

*Preparation of the Patient.*—It is advantageous to keep the patient confined to bed for two or three days preceding the operation, and she is prepared as for any other serious



surgical proceeding. The rectum should be emptied, preferably by enemata. Soap is a common constituent of enemata, but it is very apt to produce a well-marked red papular rash, especially if the enema be retained for a time. The **enema rash** is often irritating, and usually alarms patients from its resemblance to scarlet fever, etc. It may be avoided by using soft-soap. The patient abstains from food at least six hours before the operation—this diminishes the chances of vomiting. The nurse shaves the pubes, and washes the abdomen with warm soap and water. Six hours previous to the operation the lower part of the belly is painted over with a two per cent. solution of iodine in rectified spirit. Immediately before the patient is placed on the table the bladder should be emptied naturally or by means of a glass catheter. In all abdominal operations it is a great advantage to employ nurses who have had special training in “abdominal nursing.”

*Menstruation and Pelvic Operations.*—It is the rule not to perform such operations as ovariectomy, oöphorectomy, hysteropexy, and hysterectomy during menstruation. Experience teaches that such operations performed during menstruation are not followed by untoward consequences, and for many years we have disregarded it.

*Instruments.*—All instruments employed in performing cœliotomy are constructed of metal, as this enables them to be thoroughly sterilized by boiling. The following are always necessary: A scalpel, twelve hæmostatic forceps, two dissecting forceps, scissors, needles, silk, cotton-wool dabs, sponge-holders.

All dabs and instruments should be counted, and the number written down before the operation is begun.

Instruments are immersed in hot water or laid out on a sterile towel and the dabs washed in water (at 100° F.) during the operation.

**Suture and Ligature Material.**—The most useful material at present employed in abdominal surgery is silk. This material has a wide range of usefulness, as it is employed to secure pedicles, for the ligature of vessels, and for sutures. Silk may be easily sterilized. It is convenient to wind the thread on a glass spool and then boil it in the



sterilizer for one hour immediately before an operation. Sets of these spools provided with silk of three degrees of thickness answer most purposes: a stout silk for ordinary pedicles; a thinner silk for vessels, omental adhesions, or sutures for the skin; and fine silk for securing torn surfaces of bowel.

Strong linen thread answers just as well as silk for most purposes, and for hospital use it is much cheaper.

Many surgeons hold catgut in high esteem; we do not share this opinion.

**Dabs** (*Artificial Sponges*).—Nothing is so convenient for removing blood from a wound as sponges: their absorbent powers and softness are excellent; but they are difficult to sterilize; therefore sponges have been banished from surgery, as they are highly dangerous. An excellent substitute is absorbent cotton-wool enclosed in gauze (gamgee tissue), or compressed squares of moist cotton-wool or simple folds of gauze. This material can be cut to any size or folded into any shape, and is easily sterilized by heat or by boiling without damage to the absorbent properties of the material. Moreover, cotton-wool and gauze are so cheap and easily obtainable that dabs should be used for one operation and then burned.

**Gloves.**—See p. 465.

**The Table.**—In many cases of coeliotomy a table such as is employed for any ordinary surgical operation answers very well. But for hysterectomy, oöphorectomy, and similar purposes it is a very great convenience to have a table on which the patient can be placed in the Trendelenburg position—that is, with the pelvis raised and the head and shoulders lowered; this allows the intestines to fall towards the diaphragm, and leaves the pelvis unencumbered. When the table is raised in order to elevate the pelvis the patient's arms should lie parallel with the trunk, otherwise if they fall backwards or are allowed to hang over the edge of the table, the patient is liable to acquire paralysis of the muscles supplied by the ulnar or musculo-spiral nerves. In some instances the post-anæsthetic paralysis is that form known as Erb's palsy: the muscles particularly concerned are the deltoid, brachialis anticus, biceps, and supinator brevis.



Sometimes the spinati are involved. Occasionally the paralysis is bilateral. Recovery is the rule. In lowering the table after the operation the patient's hands run some risk of being squeezed in the framework unless care is exercised.

**Anæsthesia.**—Some surgeons prefer chloroform; others employ ether. The usual practice in London is to render the patient unconscious with nitrous oxide gas, and maintain the anæsthesia with ether. It is wise, whenever possible, to employ an experienced anæsthetist, and trust to his judgment in regard to the selection of the anæsthetic.

In many cases, operations such as ovariectomy, hysteropexy, and hysterectomy have been performed with the aid of intradural injections of a solution of cocain, eucain, novocain, or stovaine.

**The Abdominal Incision.**—The patient being completely unconscious, the operator, with his assistant opposite him, divides the skin and fat in the middle line of the belly, between the umbilicus and the pubes, for a space of 7 to 10 centimetres. This incision should reach to the aponeurotic sheath of the rectus; any vessels that bleed freely require seizing with hæmostatic forceps. The linea alba is then divided, but as it is very narrow in this situation the sheath of the right or left rectus muscle is usually opened. Keeping in the middle line, the posterior layer of the sheath is divided and the subperitoneal fat (which sometimes resembles omentum) is reached; in thin subjects this is so small in amount that it is scarcely recognizable, and the peritoneum is at once exposed. In order to incise the peritoneum without damaging the tumour, cyst, or intestine, a fold of the membrane is picked up with forceps and cautiously pricked with the point of a scalpel; air rushes in, destroys the vacuum, and generally produces a space between the cyst (or intestines) and the belly wall; the surgeon then introduces his finger, and divides the peritoneum to an extent equal to the incision in the skin.

It is important to remember that the bladder is sometimes pushed upward by tumours, and lies in the subperitoneal tissue above the pubes; it is then apt to be cut.

On entering the cœlom (peritoneal cavity), the surgeon introduces his hand, and proceeds to ascertain the nature of



any morbid condition that he sees or feels, or he evacuates any free fluid, blood, or pus which may be present. Occasionally he finds that attempts to remove a tumour would be futile or end in immediate disaster to the patient; then he desists and closes the wound, and the procedure is classed as an exploratory coeliotomy. Should a removable tumour, such as an ovarian cyst, an echinococcus colony of the omentum, or the like, be found, it is removed.

The recesses of the pelvis are then carefully mopped in order to remove fluid, blood, or pus; the dabs and instruments are counted, and preparations made to suture the incision.

**Closure of the Wound.**—This consists in suturing each layer separately. The peritoneum is first secured by a continuous suture of fine silk. The sheath of the rectus is then brought together by interrupted sutures of silk. Lastly, the skin is secured by interrupted or continuous sutures of silk or other material, according to the fancy of the operator. The great advantage of this *triple method* is that it minimizes the risk of a yielding cicatrix, and obviates the use of an abdominal belt. At the present time there are more than fifty methods in vogue for closing the abdominal wound. The materials employed for this purpose are silk, silkworm-gut, catgut, horse-hair, linen thread, iron wire, silver wire, platinum wire, and Michel's clips.

**Dressing.**—This should be very simple. A fold of sterilized gauze or cyanide gauze, covered with two or three pads of cotton-wool or gamgee tissue, retained in position by a flannel binder fastened with safety-pins, is sufficient.

**Drainage.**—After the removal of an adherent tumour or uterine appendages blood may ooze from a number of points too small or inaccessible to permit the application of ligatures. In such circumstances it is sometimes desirable to insert a narrow strip of gauze or a piece of rubber tubing to act as a drain.

The gauze should reach to the floor of the recto-vaginal fossa, while its upper end projects from the lower angle of the wound. The cutaneous orifice is surrounded by absorbent dressing to receive the escaping fluid. As a rule there is at first a free escape of blood or blood-stained serum, and



the dressing requires frequent changing; at the end of twenty-four hours it rapidly diminishes. The gauze may be withdrawn in thirty-six or forty-eight hours.

**Transfusion.**—A simple apparatus for this purpose consists of a yard of indiarubber tubing to which a funnel is attached. The opposite end of the tube is fitted with a glass (or metal) nozzle with the point fine enough to enter the median basilic (or the median cephalic) vein. The nozzle is introduced into the vein and secured by a silk ligature, and 2 to 3 pints of saline solution, consisting of a teaspoonful of clean table salt (chloride of sodium) to a pint of water at a temperature of 102° F. are allowed to run slowly into the vein. The effect is often magical. Two to three pints is sufficient, as a greater quantity will lead to œdema of the lungs.



## CHAPTER LIX

### OVARIOTOMY AND OÖPHORECTOMY

**Ovariectomy.**—This term signifies the operation for the removal through an incision in the abdominal wall of tumours and cysts of the ovary and the parovarium. (For the preparation of the patient and the necessary instruments, see p. 502.)

*Steps of the Operation.*—As soon as the operator enters the cœlom (peritoneal cavity) and recognizes the bluish-grey glistening surface of an ovarian cyst, he inserts his hand and passes it over the wall of the tumour to ascertain the presence or absence of adhesions. Instead of a typical ovarian cyst he may find a solid tumour or an enlarged uterus; secondary nodules may exist on the peritoneum and indicate a malignant tumour, or adhesions may be so strong and so numerous that it will be undesirable to continue the operation.

It is of the highest importance to be satisfied as to the nature of the tumour before proceeding further; to plunge a trocar into a pregnant uterus or a fibroid is an accident sure to involve the operator in anxious difficulty.

*Removal of Cyst.*—Feeling satisfied that the tumour contains fluid, is not connected with the uterus, and is removable, the operator proceeds to lift it out of the abdominal cavity. In the case of a large tumour it will be necessary to extend the incision upwards. The length of the incision is a matter of less consequence than the removal of the tumour entire. We are strongly in favour of removing even the largest cysts entire in order to avoid infecting the peritoneum with malignant cells. Many patients have lost their lives because a surgeon, in attempting to withdraw a cyst through a short abdominal incision, has, after evacu-



ating its contents, been unable to avoid septic fluid from suppurating cysts, or grease and hair from dermoids, and the cells from malignant cysts escaping into the peritoneal cavity.

*Adhesions.*—Large portions of omentum may require detachment, transfixion, and ligature with thin sterilized silk to arrest the bleeding. Intestinal adhesions require care and patience; adhesion to the peritoneum in the pelvis is often a source of great difficulty, and care must be taken not to damage the ureters or large vessels, such as the vena cava and the iliac veins.

Adhesions to the bladder are rare, and require great care; it is wise to introduce a sound into the bladder whilst separating it from the cyst.

*The Pedicle.*—When the tumour is withdrawn from the belly the pedicle is usually easily recognized; the Fallopian tube serves as an excellent guide to it. The pedicle consists of the Fallopian tube and adjacent parts of the mesometrium, containing the ovarian artery, pampiniform plexus of veins, lymphatics, nerves, and the ovarian ligament. When the constituents of the pedicle are unobscured by adhesions the round ligament of the uterus is easily seen and need not be included in the ligature.

In transfixing the pedicle the aim should be to pierce the mesometrium at a spot where there are no large veins, and tie the structures in two bundles, so that the inner contains the ovarian ligament, the Fallopian tube, a fold of the mesometrium, and occasionally the round ligament of the uterus, whilst the outer consists of the ovarian artery and veins, and a larger fold of peritoneum than the inner half.

Pedicles differ greatly; they may be long and thin, or short and broad. Long thin pedicles are easily managed. The assistant gently supports the tumour whilst the operator spreads the tissues with his thumb and forefinger, and transfixes them with the pedicle needle armed with a long piece of silk. The loop of silk is seized on the opposite side and the needle withdrawn. During the transfixion care must be taken not to prick the bowel with the needle. The loop of silk is cut so that two pieces of silk thread lie in the pedicle. The proper ends of the threads are now secured, and each



is firmly tied in a reef-knot; for greater security the whole pedicle may be encircled by an independent ligature, taking care that it embraces the pedicle below the point of transfixion.

After the operator has gained some experience in this simple mode of tying the pedicle he may, if he thinks it desirable, practise other methods.

After securely applying the ligature the tumour is removed by snipping through the tissues on the distal side of the ligature with scissors. Care must be taken not to cut too near the silk, or the stump will slip through the ligature; on the other hand, too much tissue should not be left behind. The stump is seized on each side by pressure forceps, and examined to see that the vessels in it are secure; it is then allowed to retreat into the abdomen. Should it commence to bleed it must be retransfixed and tied below the original ligature. Occasionally a broad short pedicle will contain so much tissue that it will be necessary to tie it with three threads.

It is impossible to frame absolute rules for ligaturing the pedicle. In this, as in all departments of surgery, common sense must be exercised, and at the present day, when ovariectomy is practised so widely, no one would think of performing this operation without assisting at, or watching its actual performance by an experienced surgeon.

Having satisfied himself that the pedicle is secure, the surgeon examines the opposite ovary, and if obviously diseased it should be removed.

The operator then sponges up any blood or fluid which may have collected in the recesses of the pelvis. Whilst employed in this way he gives instructions to have the dabs and instruments counted.

When the operator limits the number of dabs to six he can easily have them displayed before him. The incision is sutured in the manner described on p. 506.

*Sessile Cysts.*—It happens occasionally that the surgeon exposes a cyst in the pelvis through an abdominal incision, and finds he cannot withdraw the cyst wall from the pelvis.

Sessile cysts of this kind are removed by what is known



as enucleation. The peritoneum overlying the cyst is cautiously torn through with forceps until the cyst wall is exposed; then by means of the forefinger the surgeon proceeds to shell the cyst out of its bed, taking care not to tear the capsule or any large vein in its wall; it is also necessary to exercise the greatest care to avoid injury to the ureter. It is not uncommon, after enucleating a cyst in this way, to find the ureter lying at the bottom of the recess.

When the enucleation is complete the operator carefully examines the walls of the capsule for oozing vessels, and ligatures them. The capsule can often be closed in such a way as to obliterate its cavity, and it then requires no further attention. In other cases, and nearly always when there is a tendency to oozing, the capsule is treated by the plan known as *marsupialization*. The edges of the capsule are then brought to the margins of the abdominal wound, and secured with sutures to the peritoneum. It is occasionally useful to introduce a thin gauze drain. The abdominal incision is closed in the usual way, and the wound is dressed.

The capsule of a sessile cyst requiring treatment of this character is formed by the divaricated layers of the mesometrium (broad ligament); and occasionally it is a spurious capsule due to the organization of the so-called inflammatory lymph, especially in connection with true ovarian cysts.

Enucleation is needed for—

- (a) Papillomatous cysts and cysts of Gartner's duct burrowing deeply between the layers of the mesometrium.
- (b) Fibroids and other solid tumours of the mesometrium.
- (c) Very large examples of hydrosalpinx and pyosalpinx.
- (d) Some ovarian cysts, especially suppurating dermoids.
- (e) Tubal pregnancy in the mesometric stage.

Enucleation is usually accompanied by more loss of blood than simple ovariectomy, and the prolonged manipulation is often responsible for severe shock.

**Incomplete Ovariectomy.**—The surgeon may start on



an operation, and after opening the abdomen may find many adhesions, yet feel that the removal of the tumour is possible. He sets to work, overcomes many of the difficulties, then suddenly finds such extensive and firm adhesions to important structures at the floor of the pelvis that he deems it imprudent to proceed. In such cases he evacuates the contents of the cyst, and if it be an adenoma, the semi-solid contents are freely removed, and the edges of the cyst are stitched to the abdominal wound as described in the preceding section, and the cavity drained. This mode of dealing with a cyst is usually termed "incomplete ovariectomy."

An incomplete ovariectomy is a very different condition to an enucleation. The cavity left after enucleation closes completely, but when the wall of an ovarian cyst or adenoma is left the tumour gradually reappears, or it may suppurate so profusely that the patient slowly dies exhausted. There are few things sadder in surgery than the slow miserable ending of an individual who has been subjected to an incomplete ovariectomy.

**Anomalous Ovariectomy.**—In a few instances, generally under an erroneous diagnosis, surgeons have removed ovarian tumours through an incision other than the classical one in the linea alba. Under the impression that the tumour was splenic, an ovarian tumour of the right side has been successfully removed through an incision in the left linea semilunaris.

An ovarian tumour supposed to be a renal cyst has been successfully extracted through an incision in the ilio-costal space.

Strangest of all, a small ovarian dermoid has been removed through the rectum under the impression that it was a polypus of the bowel.

**Repeated Ovariectomy.**—Very many cases are known in which women have been twice submitted to ovariectomy. Thus, it is the duty of the surgeon when removing an ovarian tumour to examine carefully the opposite ovary. So many examples are known of women who have borne children after unilateral ovariectomy (twins and even triplets) that this alone is sufficient to prohibit the routine ablation of both glands.



A second ovariectomy is not attended with more risk than the first, but more care is needed in making the incision, for should a piece of intestine be adherent to the cicatrix it would be very liable to injury.

**Oöphorectomy.**—This signifies the removal of the ovaries and Fallopian tubes through an abdominal incision, for affections mainly inflammatory, also the removal of healthy ovaries and tubes in order to anticipate the menopause. This operation is performed for the relief of a variety of diseases connected with the internal reproductive organs—

1. TUBAL DISEASES; such as pyosalpinx and tubo-ovarian abscess, hydrosalpinx, tubercular salpingitis, tumours of the tube—adenoma, carcinoma, gravid tubes, hæmatosalpinx, etc.

2. OVARIAN DISEASES; as, for example, ovarian abscess, apoplexy of the ovary, hernia of the ovary, prolapse of the ovary, and ovarian pregnancy.

3. Oöphorectomy has been performed in order to anticipate the menopause in hystero-epilepsy, some forms of insanity, dysmenorrhœa unassociated with demonstrable diseases of the ovaries, and in uterine fibroids; but we do not recommend the performance of the operation for these conditions.

*Steps of the Operation.*—The patient is prepared as for ovariectomy, and the instruments needed are the same (p. 503). The Trendelenburg position is of great advantage, as it enables the surgeon to view distinctly the depths of the pelvis.

The abdomen is opened in the usual manner and situation; the surgeon then seeks the fundus of the uterus, and with this as a guide he is able to find the ovary and Fallopian tube. When the parts are not adherent it is a very simple matter to seize the ovary and tube, draw them into the incision, and retain them in position by ovum forceps, whilst the broad ligament is transfixed and secured with silk ligatures. When the tubes are filled with pus and fixed with firm adhesions to the floor of the pelvis, and perhaps intestine, the manipulations necessary to detach the tubes and ovaries from their surroundings demand great care and the exercise of much patience.



When the tubes are in the condition of pyosalpinx the tubal tissues are in places so thin that even under the most cautious fingers the sac bursts and septic fluid rushes into the pelvis.

On the other hand, the ovaries may be so firmly fixed to the floor of the pelvis that they break, and portions of ovarian tissue are left; this often impairs the subsequent results, as menstruation continues if only a small portion of an ovary is left.

In order to perform oöphorectomy satisfactorily the essential point is to be able to bring the ovaries and tubes into the wound to permit the application of the ligatures; these are applied in exactly the same manner as in ovariectomy. The assistant must be especially careful to avoid dragging on the tubes and ovaries, for they tear easily, and the ligatures need to be very cautiously tied, as any jerking is very apt to lacerate the tissues and necessitate retransfixion. When the pedicles are very thick it is often an advantage to cut carefully through the pedicle and secure the bleeding points separately. The very large mass ligatures often give rise to an abscess.

*After-treatment.*—This is conducted on the same lines as after ovariectomy.

The dangers are the same, but oöphorectomy when undertaken for infective conditions is attended with greater risk to life than ovariectomy. It is, however, important to remember that the greatest operative risk is with those cases in which the necessity for surgical interference is the greatest.

When oöphorectomy is performed for pyosalpinx there is risk with the pedicle, because its tissues are often infected, and this may cause it to slough and set up fatal peritonitis or give rise to an abscess in the stump which may burst through the scar, the rectum, or bladder.

The *sequelæ* are the same as after ovariectomy.

**The After-treatment of Ovariectomy.**—The patient is returned to a warm bed with gentleness to avoid vomiting; a pillow is placed under her knees. Care must be taken that the hot-water bottles do not come in contact with the patient's skin so as to cause blisters. It is



a good rule *that hot-water bottles should not be allowed in bed with an unconscious patient*. As consciousness returns, pain is complained of, and if severe it may be relieved by morphia, either subcutaneously or in the form of a suppository. The routine use of this drug is injudicious.

**Vomiting.**—This troublesome complication is best prevented by keeping the stomach empty of solids for at least twenty-four hours. If there is faintness or shock, stimulants, such as brandy-and-water, or even milk, beef-tea, or the like, may be administered by the rectum. The bowel will retain 8 or 10 ounces of normal saline solution at a temperature of 100° F. slowly injected. In some cases the vomiting persists for two or more days, and when accompanied by increased frequency of pulse and distension of the belly it is usually an unfavourable sign.

**Diet.**—At the end of six hours, in the absence of vomiting, small quantities of barley-water, water, or milk and soda-water, may be given by the mouth at regular intervals; at the end of two or three days the bowels should be relieved by an enema, and then boiled fish or fowl may be allowed, and the patient soon requires convalescent diet.

**Distension of the Abdomen** is due to the accumulation of gas in the intestines. It is usually first observed in the transverse colon. The administration of morphia predisposes to it. It occasions in some cases much discomfort, and it is not always easy to relieve it. The passage of the rectal tube every three hours as a matter of routine is useful, or the administration of an enema made of soft-soap and water and half an ounce of turpentine. The hypodermic injection of pituitary extract is often attended by excellent results.

**The Bladder.**—The urine requires to be drawn off by the nurse every eight hours, or oftener if the patient requires it, by means of a sterilized glass catheter. Before passing the catheter the nurse wipes the orifice of the urethra so that no mucus is conveyed from the vulva into the bladder. It is a good plan to encourage patients to pass water unaided.

**Bowels.**—At the end of four or five days the bowels will occasionally act of their own accord. Usually, however, it is necessary to use a simple enema, and this is in the majority



of cases quite sufficient. When opium has been freely administered still more active measures will be required.

**Temperature.**—This should be observed every four or six hours, and duly recorded in the note-book. The first record after the operation is usually subnormal; in twelve hours it becomes normal, and may even be raised half a degree. During the first twenty-four hours it may ascend to 100° F. without causing alarm; beyond this, especially if accompanied by a rapid pulse, an anxious face, and distended belly, it is sufficient to make the surgeon anxious. A temperature of 101° or 102° F., unaccompanied by other unfavourable symptoms, is not a cause for alarm unless maintained. The very high temperatures which used to alarm surgeons were due to absorption of carbolic acid, especially when the spray was in fashion.

**Pulse.**—This is a valuable guide, and even more trustworthy than the temperature. When the pulse remains steady and full there is no cause for alarm. When it increases in frequency to 120 or 130 or more beats in the minute, and is thin and thready, then there is danger even with the temperature only slightly raised. A very rapid feeble pulse is often an indication of internal hæmorrhage.

**Metrostaxis.**—After operations for the removal of both ovaries and tubes blood sometimes escapes from the uterus and simulates menstruation. It usually begins within the first forty-eight hours after the operation. Metrostaxis occurs in about one-half the cases, and has nothing whatever to do with menstruation.

**Sutures.**—On the seventh or eighth day the superficial sutures will require removal.

**Bed-sores** may give trouble after ovariectomy in an elderly and enfeebled patient, as after any other surgical procedure which requires the patient to remain for several consecutive days upon her back. With due care and watchfulness on the part of the nurse a bed-sore should not occur.

**The Risks of Ovariectomy.**—The performance of ovariectomy is attended by several risks; the chief are indicated in the subjoined list: (1) Shock; (2) injury to viscera; (3) bleeding; (4) peritonitis; (5) foreign bodies left in the



belly; (6) tetanus; (7) parotitis (septic); (8) insanity; (9) thrombosis; (10) embolism; (11) pneumonia.

1. SHOCK.—The amount of physical disturbance clinically termed "shock" varies greatly. The removal of even a small ovarian tumour may be followed by great collapse, which occasionally terminates in death. It is more common after prolonged operations and enucleation of tumours from the mesometrium.

Unless shock has been intensified by great loss of blood during the operation it usually disappears in six or twelve hours. The degree of shock may be gauged by the fall of the body temperature and the duration of the depression. The deepest shock in these operations often accompanies unusual loss of blood. It is no uncommon thing for the temperature to fall to 96° F. after a severe operation, and then in a few hours it will rise to 99° or 100°. This causes no alarm, but post-operative shock with the temperature at 96° or lower, which does not rise in twelve hours, needs consideration, and it is wise to resort to restoratives such as injections of warm water, beef-tea, or milk, by the rectum, with a small quantity of brandy added.

2. INJURY TO VISCERA.—Those most liable to injury during ovariectomy are: (a) The intestines; (b) the bladder; (c) the ureters; (d) the gravid uterus.

(a) *Intestines*.—These may be cut or lacerated in making the abdominal incision; more frequently they are torn in detaching adhesions. The vermiform appendix has been divided before its nature was suspected. The bowel has been pierced by the pedicle needle whilst passing the ligatures, and has even been tied to the pedicle. In suturing the abdominal wall the intestines have been not only pricked but accidentally stitched to the belly wall.

Wounds of intestine should be sutured immediately with fine silk. A wound of intestine overlooked is almost certainly fatal.

(b) *The Bladder*.—A full bladder has been punctured with a trocar in mistake for a cyst; it has been opened in making the abdominal incision and torn in separating adhesions. Wounds of the bladder should be closed immediately with fine silk sutures.



(c) *The Ureter*.—See Chap. LXI.

(d) *Injury to a Gravid Uterus*.—When ovariectomy is undertaken during pregnancy the surgeon is necessarily on his guard against mistaking the enlarged uterus for a cyst. Injury is very liable to happen if such an error of diagnosis be made.

To plunge a trocar into a gravid uterus is a serious misfortune, and has happened on several occasions. In such conditions there are three courses open to the surgeon: (1) Perform a Cæsarean section; (2) amputate the uterus; (3) sew up the puncture without disturbing the uterine contents.

Each of these methods had been practised with success, but Cæsarean section has so far given the best results.

3. BLEEDING.—Secondary hæmorrhage may be due to the slipping of an ill-applied ligature from the pedicle or an adhesion. Oozing, which is scarcely appreciable when a patient is collapsed, may become very free when reaction occurs.

Severe internal bleeding is manifested by well-known signs—pallor, cold skin, rapid but feeble pulse, and sighing respiration. When these signs are manifested the wound must be reopened, the clots turned out, and the bleeding-point secured. When there has been great loss of blood the patient should be transfused with saline solution (*see* p. 507).

Hæmorrhage usually occurs within the first twenty-four hours. After enucleation has been practised and the broad ligament ligatured, but not drained, bleeding may take place within it and form a hæmatoma. As a rule it is slowly absorbed.

4. PERITONITIS.—This was formerly the terror of the surgeon. Its frequency has been diminished by improved methods of dealing with the pedicle, greater cleanliness, antiseptic and aseptic precautions, and the abolition of sponges. Peritonitis may arise from infection at the time of the operation in consequence of the escape of pus or other fluids from the interior of cysts or tumours; from sponges, compresses, and instruments inadvertently left in the abdomen; from operations conducted in rooms in which sewer gas



and similar deleterious agents are present; from damage to and subsequent sloughing of portions of the viscera, especially bowel; gangrene of the stump, pieces of adherent cyst wall, or adhesions; from decomposition of blood carelessly left in the pelvis, or from *the operator's hands*.

Its occurrence in a fatal form is not likely to be mistaken. The pulse is rapid (120, 130, or 140), at first full and bounding, then quickly becoming thin and feeble. The temperature may be subnormal, then slowly rise to 100°, 102°, or 103° F., or the onset may be marked by a rigor, followed by rapid rise of temperature. These signs, accompanied by vomiting, the fluid being bile-stained or like black coffee, an anxious and pinched face, a dry brown tongue, sunken eyes, and distended abdomen, form a picture never mistaken when once seen. Death is rarely long delayed.

5. FOREIGN BODIES LEFT IN THE ABDOMEN.—Every writer on ovariectomy insists on the importance of exercising the utmost personal vigilance in counting instruments, and especially sponges, after an abdominal operation. Many cases in which foreign bodies were left in the abdomen ended fatally, and more than one writer has expressed the opinion that the accident has probably been overlooked when no post-mortem examination was made.

Besides sponges and forceps, such things as pads of tatlant, iodoform gauze, and a glass drainage tube have been left in the abdomen.

In a few lucky cases a sponge or compress has given rise to an abscess, and the foreign body has been discharged, sometimes through the belly wall, sometimes through the anus. Forceps thus left behind have made their way into the bladder, the cæcum, or have escaped at the navel many months after the operation.

6. TETANUS.—Since the clamp has been banished tetanus rarely attacks the abdominal wound. Ovariectomy should not be performed in rooms recently plastered. Tetanus, a sequel to hysteropexy and hysterectomy, has been traced to badly prepared catgut. In practice it is to be remembered that tetanus arises from infection, and all instruments which have been in contact with a case of tetanus should be sterilized by prolonged boiling.



7. PAROTITIS.—Inflammation of the parotid gland is apt to complicate injuries to, and operations upon and in, the abdomen. One or both glands may be effected, and the disease occasionally ends in suppuration. This form of parotitis runs no regular course; it may subside and recur in the course of the convalescence from the original injury or operation. There are two views in regard to its ætiology: (a) It is due to direct infection of the duct of the parotid gland by micro-organisms from the mouth. (b) Infection by the blood-stream. The direct infection theory is that which accords most with the facts.

Septic parotitis is an unpleasant and painful complication of an abdominal operation, but it is rarely dangerous.

8. INSANITY.—Acute mania occasionally complicates the convalescence from ovariectomy. It was common during "the reign of the carbolic spray." In the majority of cases it quickly subsides.

9. THROMBOSIS.—After operations on the pelvic organs thrombosis occasionally occurs in the iliac, femoral, and saphena veins, accompanied by fever, pain in the course of the affected vein and œdema of the limb. It is noticed most frequently about the twelfth day after operation. This complication is often serious for the patient, as it entails a long confinement to bed, a tedious convalescence, and the risk of embolism. In the majority of cases post-operative thrombosis is due to sepsis, and the chances of its occurrence may be greatly diminished if the surgeon protects his hands with sterilized rubber gloves (*see* p. 465).

10. EMBOLISM.—In perusing the clinical histories of a long series of cases of ovariectomy, or of hysterectomy, here and there a record may be read to this effect: "The patient did well after the operation till the eighth day; the sutures were taken out and the patient sat up, laughed and chatted with the nurse, then suddenly fell back dead." Death in this tragic form is due to the sudden blocking of the pulmonary artery with an embolus.

Sudden death is a more frequent sequel to abdominal hysterectomy than to ovariectomy. It is well to bear in mind that after hysterectomy a patient may exhibit the signs of pulmonary embolism and recover, and curiously



enough a patient may have signs suggesting a succession of emboli.

11. PNEUMONIA.—This is a serious and not infrequent sequel of pelvic operations. It may arise from the inhalation of ether; or be due to the patient maintaining the dorsal position (hypostatic pneumonia), or arise from infection, the result of the lodgment of septic emboli in the pulmonary vessels.

**The Sequelæ or Remote Risks of Ovariectomy.** These include: (1) Intestinal obstruction; (2) perforation of the intestine; (3) trouble with the ligature; (4) yielding cicatrix.

(1) **INTESTINAL COMPLICATIONS.**—It is difficult to estimate with any approach to accuracy the relative frequency of intestinal complications following ovariectomy. The danger is nevertheless real.

Intestinal obstruction may be acute or chronic—may supervene within a few days of the operation or be delayed for months or years. The causes are fourfold: (*a*) The formation of a band; (*b*) adhesions to the pedicle; (*c*) adhesions to the cicatrix; (*d*) strangulation in the sac formed by a yielding cicatrix.

(2) **PERFORATION OF INTESTINE.**—This arises from damage to the wall of the gut in separating adhesions. The rectum is the most frequent seat of this accident. When a fæcal fistula arises after operation, if it be carefully drained, as a rule it closes spontaneously, sometimes in a few days, more commonly in a few weeks, and rarely it runs for a few months.

(3) **THE LIGATURE.**—When a piece of silk thread or whipcord, thoroughly sterilized by boiling, is applied to a healthy pedicle, it causes no evil consequences, and is either encysted or slowly removed by the aggressive leucocytes. The thread disappears in about a year, but the knots require at least an additional six months.

When the tissues of the pedicle are infiltrated with inflammatory products, especially when the Fallopian tube is septic, the ligature, instead of being absorbed, excites inflammation and becomes surrounded with pus. An abscess around the pedicle may give rise to the following



complications: (a) Fatal peritonitis; (b) the abscess may open through the abdominal cicatrix and form a sinus; (c) it may perforate the rectum, intestine, or even the bladder; (d) the loop of silk may pass down the stump of the Fallopian tube and escape through the uterus.

When a sinus results from an abscess of the pedicle it usually persists until the ligature is discharged; this may require many months. When the ligature escapes into the bladder, it may form the nucleus of a vesical calculus.

(4) THE CICATRIX.—One of the most troublesome and frequent sequelæ of ovariectomy used to be a yielding cicatrix, which allowed the formation of a large ventral hernia. In very many cases these herniæ caused more trouble than the disease for which the operation was performed, besides being a source of danger. The inconvenience of wearing a belt is such that many women prefer to run the risk of hernia rather than be encumbered with such an apparatus. When the abdominal incision is closed with a triple series of sutures, as described on p. 506, the chance of a yielding cicatrix is very slight, and the belt may be discarded.

*Cancer of the Cicatrix.*—Cases have been reported in which, after removal of ovarian adenomata, tumours similar in structure have appeared in the scar. In some cases such a tumour has been associated with wide dissemination due to recurrence of a malignant growth; in others it has been attributed to direct infection of the wound during removal of the primary tumour.

**The Remote Effects of Ovariectomy on the Primary and Secondary Sexual Characters.**—The removal of one ovary has no effect upon women, and a large number of instances have been reported in which pregnancy has followed unilateral ovariectomy.

The complete removal of both ovaries is followed in adult women by *sterility* and persistent *amenorrhœa*, and these are the only two constant effects which can be attributed to it.

The amenorrhœa is practically an artificial menopause, and is usually accompanied by that peculiar vaso-motor phenomenon characteristic of the "change of life" familiar



to climacterics as "flushes." The influence of double ovariectomy on the sexual passion is hard to estimate, and cannot be taken into account when the life of the individual is directly concerned. Women have lived happily with their husbands after removal of both ovaries; and facts are accumulating which tend to show that the ovaries are not the seat of the sexual passion. The nubility of women after double ovariectomy is a difficult question. It is certain that many women have married after removal of both ovaries. Some cases have been recorded by competent observers in which women have undergone bilateral ovariectomy, and years afterwards have given birth to living children. Many

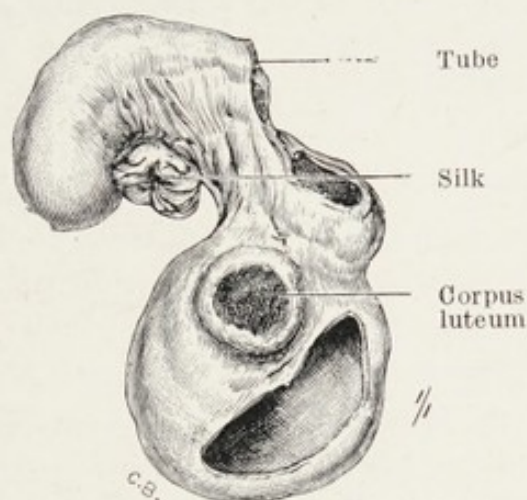


FIG. 149.—STUMP OF FALLOPIAN TUBE AND FRAGMENT OF OVARY WITH CORPUS LUTEUM, LEFT AFTER A SUPPOSED COMPLETE DOUBLE OÖPHORECTOMY.

cases have also been reported in which menstruation has continued after bilateral oöphorectomy. However, careful inquiry, and in many cases a second operation, has proved that a fragment of ovary was left (Fig. 149). Such a retained portion of ovary is sufficient to maintain not only menstruation but ovulation, and it will form corpora lutea. Irregular uterine hæmorrhages occur sometimes after complete double oöphorectomy performed for septic salpingitis. Such bleeding is sometimes severe enough to demand hysterectomy for its relief. Hæmorrhage of this kind is in no sense menstruation.

There is no evidence that complete removal of both ovaries in a mature woman leads to any unusual development of the secondary sexual characters or atrophy of the



breasts. It may cause obesity in a woman who has a tendency to form fat. Women are liable after an "artificial menopause" to the same peculiar mental depression and irritability which characterize the normal "change of life."

Further observations on this subject will be made in Chap. LXIII, when discussing the after-results of abdominal operations.



## CHAPTER LX

### OPERATIONS ON THE UTERUS

#### **ABDOMINAL MYOMECTOMY AND ENUCLEATION; HYSTERECTOMY; HYSTEROPEXY; AND CÆSAREAN SECTION**

**Abdominal Myomectomy.**—*This signifies the removal of one or more pedunculated subserous fibroids, through an incision in the abdominal wall, preserving the uterus, ovaries, and Fallopian tubes.*

The preliminaries and instruments for operations on the uterus are those recommended for ovariectomy. It is of the greatest advantage to have the patient in the Trendelenburg position. The abdomen is opened in the situation and manner and with the same precautions as for ovariectomy. The intestines are carefully protected with a warm compress, and the tumour is withdrawn through the incision and its pedicle examined. When the stalk is narrow it may be transfixed and secured with silk sutures like an ovarian pedicle. When broad and short the tumour may be shelled out and its capsule used as a pedicle. When the transfixing ligatures are securely knotted, and the redundant portions cut away, it is useful to bring the opposed edges together with a continuous suture of fine silk.

Myomectomy is an excellent operation, though it has a limited application. The after-results are admirable, as the surgeon leaves not merely the ovaries and tubes, but the uterus. When age and environment are favourable, the patient may conceive. In several cases pregnancy has occurred, and terminated successfully.

**Abdominal Myomectomy by Enucleation.**—*In this operation a sessile fibroid is shelled out of its capsule; the uterus, ovaries, and Fallopian tubes are preserved.*

The uterus and tumour are exposed as directed in



myomectomy, and the capsule freely incised; the tumour is then shelled out of its bed. During this process the bleeding is controlled by grasping the uterus firmly with the left hand; on relaxing the uterus blood freely issues from the vessels in the capsule, and they are seized with hæmodynamic forceps and ligatured with thin silk. When the oozing is controlled the cut edges of the capsule are secured with interrupted sutures of silk. The incision is then closed in the usual manner.

In some cases, especially with a large fibroid, the edges of the capsule are secured by sutures to the margins of the parietal incision, and the bed of the tumour stuffed with gauze. It is often an advantage to incise the capsule so as to establish a communication with the cavity of the uterus. This allows any blood or serum which oozes to escape by the vagina. It has, however, the drawback of opening the way to sepsis if the endometrium be infected.

It is admitted by all operators that enucleation is the ideal method of treating uterine fibroids so large as to require coeliotomy, because the uterus is preserved as well as the ovaries. This sounds reasonable, but when carefully considered the advantages are really not very important. It has already been pointed out that most fibroids arise after the childbearing period, that is, when the uterus has become functionless; in these circumstances its retention is a matter of sentiment, and it is unwise unduly to risk a woman's life in order to preserve a useless organ. In the case of a patient under thirty, especially a single woman anticipating marriage, there is some reason in advising her to submit to increased risk in the hope that she may become a mother. The chances are small, but with interstitial and subserous tumours they are sometimes realized.

It is important to bear in mind that a large fibroid has been enucleated and a small one has remained undetected; this subsequently grows and necessitates hysterectomy (see Latent Fibroids, p. 281). Experience, however, teaches this stern lesson: *After the enucleation of a fibroid in the procreative period of life a woman is more likely to grow fibroids in her womb than to conceive successfully.*

In exceptional cases enucleation is a desirable measure,



but as a routine method in the surgical treatment of uterine fibroids requiring coeliotomy conservative hysterectomy is easier, safer, and quicker.

**Hysterotomy.**—*This signifies the removal of a submucous fibroid through an incision in the walls of the uterus which opens the uterine cavity.*

The operation is carried out on exactly the same lines as in abdominal enucleation, but the uterine incision is closed as in Cæsarean section (see p. 536).

**Subtotal Hysterectomy** (*Supravaginal Hysterectomy*). *This term signifies the removal of the uterus with a variable portion of the supravaginal segment of the cervix.*

*The Incision.*—The abdomen is opened by a free cut in the linea alba between the navel and the symphysis pubis. With a large tumour the incision will often require extension above the umbilicus; it is necessary to cut cautiously in the neighbourhood of the pubes to avoid wounding a displaced bladder.

On gaining the peritoneal cavity the intestines should at once be protected by means of a warm flat dab. The tumour is then examined, and the relation it bears to the uterus determined, also the presence or absence of complications, such as the co-existence of ovarian tumours, visceral adhesions, or distended tubes. The operator then proceeds to ligature the bloodvessels, and as this is one of the most important steps in the operation it requires to be considered in detail. The arteries and veins of the uterus follow four distinct routes, and each route is easily accessible to, and capable of being controlled by, a ligature.

When possible the tumour is drawn out of the pelvis, and each mesometrium is transfixed with a pedicle needle armed with a thread of plaited silk so as to secure the ovarian vessels on the inner or outer side of the ovary, according as it is decided to remove or leave this organ. In some cases, apart from the physiological advantage, it is safer and more convenient to secure the ovarian artery in the mesosalpinx on the uterine side of the ovary. The silk is firmly secured, and the tissues between it and the uterus are divided, and any bleeding vessel is secured with hæmostatic forceps.



In many cases a fibroid intrudes between the Fallopian tube and the round ligament, and so separates them that they cannot be safely included in the same ligature. In these circumstances it is prudent to ligature the round ligament separately; it is sometimes necessary to adopt this course on account of the large size of the ligament, for it often shares in the hypertrophy of the uterine tissues.

When the mesometria are divided the uterus becomes freer, and is easily manipulated. At this stage the uterine vessels may be detected in the vascular tract at the side of the uterus; the surgeon seizes each uterine artery with forceps.

*The Peritoneal Flaps.*—At this stage the sides of the uterus have been exposed by division of the mesometria. It is now necessary to determine the relation of the bladder to the uterus. The surgeon then divides the peritoneum on the anterior and posterior surface of the uterus in such a way as to make the incisions continuous with the opening in each mesometrium. These flaps are then carefully turned down. It is a great advantage to have plenty of flap, and the way the muscular tissue in the subserous tissue wrinkles them up is often very astonishing.

*Amputation of the Uterus.*—The uterine arteries being secured with forceps, the uterus with its tumours is cut away. If the vessels have been properly secured the cut surface of the cervical stump is usually white and dry; but small vessels in the peritoneal flaps may bleed and require ligatures.

In the case of a **cervix fibroid** the operation is somewhat modified, thus—

The ovarian and uterine arteries are secured as described in the preceding section, and the expanded cervix with the tumour is drawn as far out of the pelvis as possible. The cervix is then incised, and the capsule of the tumour freely opened to allow the tumour to be shelled out, but leaving the vaginal portion of the cervix like a shallow cup with a central perforation (the external os). The edges of the peritoneum and the cut margins of the cervix may be brought into apposition with the same sutures.

When the cervix fibroid is of moderate dimensions and



not tightly impacted, total hysterectomy is a more satisfactory, simpler, and safer operation than enucleation.

*Adjustment of the Peritoneal Flaps.*—The pelvis is cleared of blood and the parts are carefully scrutinized to ascertain that all vessels are properly under control. Two or three interrupted sutures are then employed to fix the cut edges of the peritoneum over the stump, then the flaps are carefully brought together by a thin continuous silk suture from the ovarian pedicle of one side to that on the other. In suturing the flaps care must be exercised in order to avoid pricking the bladder. The pelvis is sponged dry, and the omentum is drawn over the intestines and spread behind the stump in the pelvis. The dabs and instruments are counted; the wound is then secured in the usual manner.

**Total Hysterectomy** (*Panhysterectomy*).—*This signifies the removal of the uterus and its neck through an abdominal incision, and differs from the preceding method in that it leaves no stump.*

The patient is prepared as for ovariectomy, but in addition the vagina is carefully made aseptic. The early stages are the same as for the preceding method, and the broad ligaments are secured with silk ligatures. The bladder is stripped from the uterus, and the surgeon makes his way downward along the anterior aspect of the cervix into the vagina.

The posterior connections of the vagina and cervix are severed with scissors, and at the lateral angles the uterine arteries may be secured with ligatures before division, or they may be caught with forceps and divided, the cut end being securely ligatured with silk. The cervix is then detached from the lateral aspect of the vagina and removed. Any spouting vessel is secured with forceps, and the margins of the peritoneum and broad ligaments are brought into position with sutures, thus occluding the abdominal end of the vagina.

This operation is sometimes modified in the following manner: Before opening the abdomen the patient is placed in the lithotomy position, and the cervix freed from the bladder and vagina as in the first stages of vaginal hysterectomy; then the patient is placed in the Trendelenburg



position, and the operation completed through the abdomen. This is a clumsy method, and we neither recommend nor practise it. It cannot be too strongly impressed on all surgeons who undertake hysterectomy that the two sets of factors which have enabled this operation to vanquish oöphorectomy in the treatment of fibroids are **rigid asepsis** and **perfect hæmostasis**.

*After-treatment.*—This is the same as after ovariectomy (see p. 514).

**Radical Abdominal Hysterectomy** (*Wertheim's*).  
*This operation was devised for the removal of the uterus when its neck is the seat of cancer which has extended beyond the cervical tissues into the parametric connective tissue or the vaginal walls.*

As a preliminary the cancerous cervix is treated by scraping, cauterizing, and disinfectants. It is an advantage to carry out these measures a few days before the operation. The Trendelenburg position is indispensable. The abdomen is opened by a free median subumbilical incision. After isolating the intestines with dabs, the *ureters* are exposed by incising the posterior layer of the broad ligament; they are then traced through the parametrium. It is necessary to avoid disturbing the vascular network which surrounds them, or they will slough.

The bladder is then separated from the uterus. The *infundibulo-pelvic*, the *broad* and *round ligaments*, are ligatured and divided. The order in which they are dealt with is not a matter of consequence.

The uterine vessels are secured in the following manner: The index finger is pushed along the ureter through the parametrium towards the bladder; the vessels are then raised on the finger, which covers the ureter so as to protect it whilst the vessels are ligatured and cut. As soon as the uterine vessels are divided the vesical segments of the ureters are exposed, cleaned if necessary, and separated from the cancerous cervix.

The posterior layer of the peritoneum is divided, and the rectum separated from the vagina. At this stage the uterus is sufficiently isolated from the surrounding structures to allow of removal. This is effected in the following way—



The two layers of the parametrium are taken off as close as possible to the pelvic wall, and the vagina, closed with bent clamps, is divided below them. These clamps are used to prevent soiling the operation area with cancerous cells.

In order to extirpate the infected *lymph glands*, the peritoneum is divided upwards and the iliac vessels laid bare. Every enlarged gland from the bifurcation of the aorta to the obturator foramen is removed, and the oozing vessels carefully secured.

The peritoneal edges are brought together from one side to the other, covering in the base of the broad ligaments and the top of the vagina. The final step is the closure of the abdominal incision.

The *after-treatment* is similar to that followed after hysterectomy for fibroids; but the bladder requires very careful attention, as it is often paralysed for some days. The patient gets up two to three weeks after the operation, according to her progress.

The immediate mortality of these extensive abdominal operations for cancer of the neck of the uterus is very high: according to the latest statistics it is about 15 to 18 per cent.

The chief risks of the operation are sepsis, cancer-infection, and injury to the ureters.

The ureters have proved a fertile source of trouble because they are deliberately exposed in the course of the operation, and they are sometimes accidentally divided. It is not uncommon to find a ureter completely blocked by cancer, and occasionally the ureter, after being bared by the operator, undergoes necrosis a few days later.

Wertheim points out that in some instances ureteral fistulæ due to necrosis may be induced to close by the application of iodine or sulphate of copper. It is, however, unfortunately true that many patients with ureteral fistulæ after the radical operation have been obliged to undergo nephrectomy.

The radical operation for cancer of the neck of the uterus is still on its trial. The operative mortality is very high, and no reliable returns concerning the remote results are at present available.

**The Risks of Abdominal Hysterectomy.**—The



dangers are the same as those which beset ovariectomy, but the special risks are hæmorrhage, injury to one or both ureters or to the bladder, and infection of the peritoneum from the cervical canal in cases of subtotal hysterectomy, or the vagina in total removal of the uterus.

In the operation of complete removal of the uterus through the abdomen the bladder and ureters are particularly liable to injury. For instance—

1. The **bladder** is apt to be cut in making the primary incision, for it is often displaced by an enlarged non-pregnant uterus.
2. It is sometimes torn in the process of separating it from the supravaginal cervix.
3. It is liable to be punctured in suturing the peritoneal covering of the cervical stump.
4. An abscess may form in the cervical stump, and the pus, with a ligature or even the stump itself, may perforate the bladder wall.

Injuries to the ureters are discussed in Chap. LXI.

**Hysteropexy.**—*This term implies the fixation of the uterus by means of sutures to the anterior abdominal wall.*

This operation is performed for two conditions: severe retroflexion of the uterus and prolapse of the uterus. The instruments required are those necessary for incising the abdominal wall as for cœliotomy, plus some curved needles of various sizes and degrees of curvature.

1. **RETROFLEXION OF THE UTERUS.** *The Steps of the Operation.*—The patient is placed in the Trendelenburg position, and the abdomen is opened as for ovariectomy, except that the incision is shorter. On entering the cœlom, the operator determines with his fingers the position and condition of the body of the uterus. If it be free, it is then straightened, and the condition of the ovaries and the tubes ascertained.

In a fair proportion of cases of severe retroflexion of the uterus much of the distress depends upon a prolapsed ovary. Should the surgeon deem it necessary to remove the painful ovary and tube in such a case, he can secure the uterus in position by transfixing the pedicle (left after the removal of the ovary and tube) by a silk suture and fixing it to



the edges of the wound; this retaining suture should pass through the muscle and fascia, as well as the peritoneum.

When it is undesirable to interfere with the ovaries or tubes, then a curved needle, armed with a silk thread, is passed through the aponeurosis and adjacent peritoneum on one edge of the wound, then through the anterior surface of the uterus near the bladder reflexion, and finally through the peritoneum and aponeurosis on the opposite edge of the incision. When this suture is tightened, it will be found to draw the uterus to the anterior abdominal wall, and at the same time approximate the edges of the wound. Three or more sutures should be introduced. In patients who have had children care should be taken not to pass the needle so deeply into the uterus that the suture traverses the superficial parts of the endometrium. If so, the suture is liable to become septic and establish a sinus. In patients of a childbearing age it is specially important that the sutures should be passed as low as possible in the anterior uterine wall, and so leave the fundus free to expand in the event of subsequent pregnancy. The wound is then carefully closed in single, double, or triple layers, according to the habit of the operator.

2. PROLAPSE OF THE UTERUS.—When hysteropexy is needed for a large, bulky, and prolapsed uterus, the steps of the operation are the same as for retroflexion, but it is necessary to introduce a greater number of retaining sutures. Further, as the uterus tends to slip downward into the vagina, it is an advantage, as soon as the fundus of the uterus is drawn into the wound, to transfix it with a stout suture of silk, in order that the assistant may use it as a tether to keep the uterus in position whilst the surgeon introduces the main sutures. In some cases, where the uterus is very large, it may be requisite to employ four, five, or even six sutures to secure it to the abdominal wall.

In all cases of hysteropexy the uterus is of necessity sutured to the lower angle of the wound, and is, therefore, in close relation to the bladder. It facilitates the operation to introduce the lowest sutures first and then gradually work up to the fundus. The wound is then closed and dressed as described for *cœliotomy*.



*After-treatment.*—This is conducted on exactly the same lines as after ovariectomy.

**The Risks.**—When hysteropexy is performed by surgeons experienced in abdominal work it should have no mortality. In a small percentage of cases it has been followed by difficulties during labour. These risks are small when the attachments are made as directed above.

When the fundus of the uterus is secured to the anterior abdominal wall by an aseptic suture, lymph is exuded from the contact surfaces of the peritoneum. This effused lymph

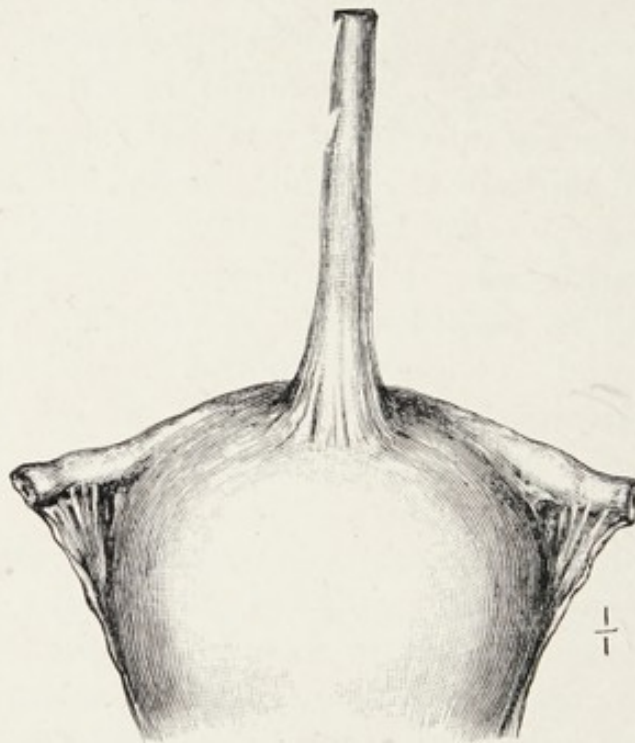


FIG. 150.—THE FUNDUS OF THE UTERUS AND ADJACENT SEGMENTS OF THE FALLOPIAN TUBES.

A long fibrous cord arises from the fundus as a result of hysteropexy (ventrofixation) performed nearly five years previously for inveterate retroflexion.

organizes into a tenacious tissue, and when, as not infrequently happens, there is great strain on the retaining suture, either from the shortness of the uterus, as happens in virgins, or from the actual weight of the organ when hysteropexy is performed for prolapse, the sutures gradually cut or erode their way out of the uterine fundus, but the plastic material effused around the sutures slowly stretches as the uterus descends into the pelvis and produces the tendon-like structure (Fig. 150) which is sometimes called the “artificial fundal ligament.”



**Cæsarean Section.**—*This signifies the removal of a fœtus and placenta from the uterus through an incision involving the abdominal and uterine walls.*

This operation is required when delivery is obstructed by narrowness of the pelvic outlet due to rickets in early life, or osteomalacia, by cervix-fibroids, or fibroids growing from the lower segments of the body of the uterus. Occasionally it is required when ovarian tumours are incarcerated by a strongly contracting uterus; and in cancer of the neck of the uterus, and cancer of the rectum. It has been needed in cases of malformation of the vagina. Some obstetricians advocate it in eclampsia and placenta prævia.

When it is known some days beforehand that the patient will be submitted to this operation, she should be prepared as for ovariectomy, the vulva and the vagina being thoroughly washed and douched. Often it happens that the operation is undertaken after labour has commenced, and in circumstances which make time very precious. Even then the abdomen, pubes, and vulva can be thoroughly washed with warm soap and water, lightly rubbed with ether and cotton-wool and painted with Iodine.

*Instruments.*—A scalpel, probe-pointed knife, volsella, twelve pressure forceps, scissors, suture-needles (curved and straight), catheter, and sterilized ligature silk.

*The Abdominal Incision.*—After the patient is under the influence of ether and the bladder emptied with the catheter, an incision is made in the linea alba from the umbilicus to the pubes. The belly wall of a woman advanced in pregnancy is very thin; and, unless the surgeon be cautious, the knife will come in contact with the uterus before he is aware of it.

The uterus lies just under the incision, and the operator ascertains that it lies centrally (often the uterus is somewhat rotated to the right or left), and then makes a free incision through the uterine wall and extracts the fœtus and placenta; as the uterus contracts, he slips his left hand behind the fundus, grasps the uterus near the cervix, and effectually controls the bleeding. The assistant passes a large warm flat dab into the belly to restrain the intestines and omentum. The uterine cavity is sponged out, and the



finger passed through the os uteri into the vagina in order to insure a free passage for blood and serum.

We now come to the most important stage of the operation—namely, suture of the uterine incision. The wall of the uterus has an inner layer of mucous membrane, then a thick stratum of muscle tissue, and finally an outer layer of peritoneum. The wound is first closed with a series of sterilized silk sutures which involve the mucous and adjacent half or thereabouts of the muscular layer. These sutures should be fairly close together, for they not only bring the parts into apposition, but serve to restrain the bleeding. A second row of silk sutures is now inserted, including the serous coat and adjacent half of the muscular layer. These threads should not be tied too tightly, as the tissues of a gravid uterus are soft, and easily tear. In closing the uterine incision the surgeon should not spend time vainly in endeavouring to stanch the bleeding from the edges of the incision; this is best effected by dexterously inserting and securing the sutures.

The recesses of the pelvis are carefully cleaned by gentle sponging, and the parietal wound closed as after ovariectomy. The dressing varies according to the fancy of the operator; whatever its nature, it is secured by a firmly adjusted bandage.

**Sterilization.**—When Cæsarean section is performed the uterus is preserved, and after convalescence the patient is in a position to reconceive. There may be conditions in which the patient is desirous to produce more children, even with the terrible risk before her of having them extracted by Cæsarean section. Some obstetricians have performed Cæsarean section on the same woman three, and even four, times.

On the other hand, women, knowing the great risk they run, ask that steps may be taken to prevent what they consider a catastrophe. This is a very simple matter, and in order to sterilize the patient the surgeon may perform double oöphorectomy, or adopt a simpler method and pass two silk ligatures around each Fallopian tube by transfixing the mesosalpinx, and after tying them firmly divide the tube between the ligatures. Any measure short of this is



useless; conception has on several occasions taken place when the tubes have been secured with a single thread on the plan employed in the ligature of an artery in continuity.

The advantage of sterilization by ligature and division of the tube over double oöphorectomy is that young patients are spared the inconveniences which almost always result from an artificial menopause.

Cæsarean section twenty years ago was one of the most fatal operations in surgery, in consequence of septic infection of the peritoneum through the uterine wound. Since the introduction of antisepsis and accurate methods of suturing the uterine incision the mortality varies from 4 to 13 per cent., according to the skill and experience of the operator. But the operation of hysterectomy has become so successful, and has such a low risk, that in cases where Cæsarean section and *sterilization* of the patient are indicated it is preferable to remove the uterus.

**Porro's Operation.**—This clumsy method of removing the pregnant uterus is now replaced by that described under the title of Subtotal Hysterectomy (p. 527).



## CHAPTER LXI

### INJURIES TO THE URETERS IN PELVIC OPERATIONS, AND THEIR TREATMENT

THE ureters are liable to injury in the removal of cysts and tumours which burrow deeply between the layers of the broad ligaments. Since the vulgarization of hysterectomy, and more especially in the operation of total hysterectomy, vaginal hysterectomy, and the so-called "radical" operation for cancer of the neck of the uterus, the vesical segments of the ureters are very liable to suffer injury.

The injuries to which the ureters are liable in the course of hysterectomy are the following—

1. One or both ureters are sometimes included in the ligatures applied to the uterine arteries.
2. One or both ureters have been cut or completely divided with scissors or knife in removing the uterus.
3. A segment of a ureter measuring as much as seven centimetres has been accidentally exsected.
4. One or both ureters have been compressed by clamps applied to restrain bleeding in the course of vaginal hysterectomy, and subsequently sloughed.
5. Ureters exposed in the course of "radical" operations for cancer of the neck of the uterus often slough.
6. A ureter is sometimes transfixed by a needle and thread when sewing together the layers of the broad ligament in the course of a subtotal hysterectomy.
7. A cystic or solid tumour arising from the lower part of the pelvis will sometimes involve the corresponding ureter and carry it upwards in such a way that it crosses the tumour like a strap, and in this condition is often mistaken for an adhesion, and cut.



The method of treating an injured ureter varies greatly, and will depend not only on the extent of the damage, but also on the time at which it is recognized. When the surgeon recognizes the injury in the course of the operation he deals with it at once. This we may term *immediate* treatment. The more difficult cases are those in which the injury is unrecognized at the time of the operation, and only becomes obvious a few days later. The treatment in such circumstances may be called *secondary*.

The primary treatment of an injury to a ureter in the course of a pelvic operation will depend in a large measure on the ability, judgment, and experience of the surgeon, as well as on the extent of the injury. For example, if the ureter be partially divided, the opening may be closed with sutures of thin silk. When the duct is completely divided, the cut ends may be invaginated, the upper into the lower, and retained in position by suture. When five centimetres or more of the ureter have been accidentally excised none of these methods is applicable. In such circumstances several plans have been tried. Of these the simplest is ligature of the proximal end with the hope of inducing atrophy of the kidney. In several recorded instances this has proved successful. The surgeon who adopts this method should satisfy himself that the patient has another kidney, and that it is, as far as he can ascertain at the time, healthy. Some surgeons who have divided a ureter have promptly removed the corresponding kidney; others have secured the proximal end in the upper angle of the abdominal incision and removed the kidney subsequently.

The most promising method of dealing with a divided ureter when the cut ends cannot be safely joined consists in engrafting the proximal end into the bladder. Many cases have been successful, but later observations indicate that when a ureter has been engrafted into the bladder its walls become sclerosed by chronic ureteritis and its lumen is gradually closed.

In cases where an injury to a ureter has been overlooked in the course of an operation many difficulties may arise before the true conditions are appreciated. If both ureters



are divided or ligatured or clamped the resulting anuria soon causes the accident to be appreciated. Several such cases have been recorded. The abdomen has been reopened, and the accident repaired with success (Purcell, Lockyer).

When a ureter is injured in the performance of total hysterectomy, urine escapes by the vagina, and at first there may be some doubt whether the leak is due to an injury to the bladder or to the ureter. In such conditions the quantity of urine voided from the bladder is compared with that which escapes from the vagina. If the quantities are equal or nearly equal the leak is in a ureter. When a vaginal leakage occurs a few days after a vaginal hysterectomy it is probably due to necrosis and sloughing of a ureter, or the duct may have been included in a ligature which has separated by sloughing.

As soon as the surgeon clearly establishes the existence of a ureteral fistula he is beset with the necessity of deciding which duct is the seat of damage. Some years ago, when it was the practice to remove the kidney for a persistent ureteral fistula, the decision involved the surgeon in a grave responsibility, for the removal of the wrong kidney could only be regarded as a catastrophe for the patient. Serious accidents of this kind are less likely to happen now, because the surgeon can avail himself of the cystoscope and ureteral catheter. With these instruments it is possible not only to decide with certainty which ureter is injured, but also to determine the position and extent of the damage.

It is important to remember that every ureteral fistula does not require an operation. It is always advisable to wait a little—certainly six weeks—when it has been clearly established that a woman has a leaking ureter, for many fistulae of this kind will gradually close. It is a good rule to remember that every ureteral fistula should be allowed a good opportunity of closing spontaneously.

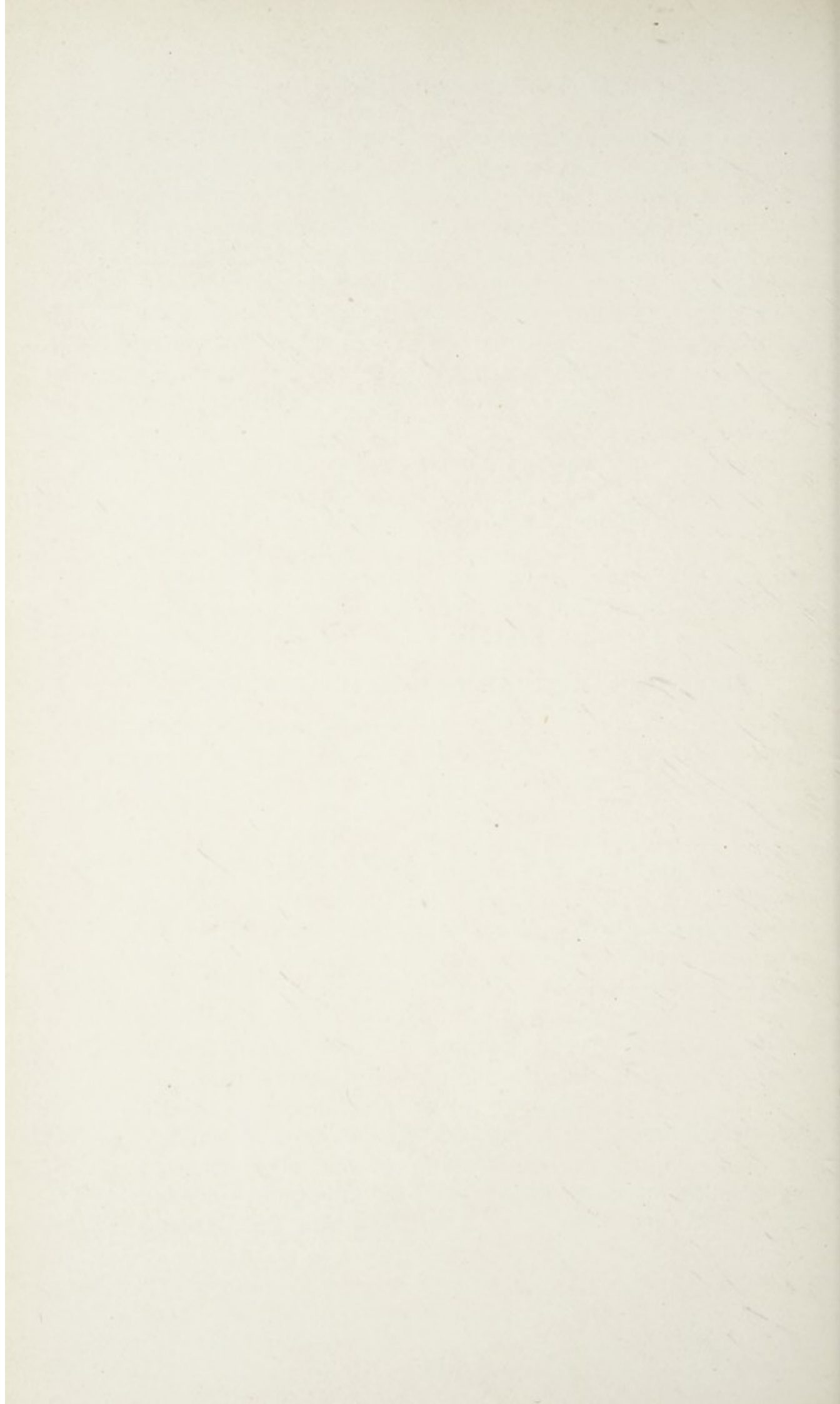
Even when a ureteral fistulae heals spontaneously, the patients' risks are by no means at an end, for they are liable to temporary attacks of suppression of urine, septic pyelitis, and fatal pyæmia.



## PART V

### PROGNOSIS—RESULTS AND AFTER-RESULTS







## CHAPTER LXII

### PROGNOSIS—THE IMMEDIATE RESULTS OF GYNÆCOLOGICAL OPERATIONS

**Prognosis.**—This means the forecast of what is likely to happen to the patient. Speaking generally, we may say of gynæcological conditions that when the correct treatment is carried out, the forecast is very favourable, because, in a very large proportion of cases, patients suffering from these conditions recover completely.

The question of prognosis has been touched upon in describing the different diseases, and a recapitulation of what has been said about each case would be an unnecessarily lengthy affair. It will be sufficient here to review broadly the question of prognosis in different groups of diseases.

**Malformations.**—Malformations cannot be altered, except in the direction of opening up occluded passages, as in cases of atresia, and occasionally removing displaced or doubled organs. We may be asked to make a forecast as to the possibilities of menstruation, marriage, and childbearing. From this point of view, malformations may be divided into the following groups—

1. Malformations that preclude or are unfavourable to childbearing, but allow menstruation and marriage.

In this category are cases of under-development of the uterus of minor degree, and cases of congenital occlusion of the Fallopian tubes. The latter would only be discovered in the course of an abdominal operation.

2. Malformations that preclude childbearing and menstruation, but not marriage.

These are cases with a normal vagina, but marked under-development of the uterus, such as a rudimentary or infantile uterus.

3. Malformations that preclude childbearing and marriage,



but not menstruation. In this class are cases of stenosis of the vaginal orifice. Surgical interference may avail in so far as to render marriage possible, but we should be very guarded in making any statement as to the possibility of pregnancy following.

4. Malformations that preclude menstruation, marriage, and childbearing. These are cases in which there is no vaginal orifice, and they fall into two categories: in the first the condition is in a measure remediable, for example, atresia of the vaginal orifice. By incising the occluding membrane, marriage may become possible, and menstruation may be established: childbearing, however, remains unlikely.

In the second category the condition is irremediable, namely, in the case of absence of the vagina.

5. Malformations that allow of menstruation, marriage, and pregnancy, but may be attended by complications.

In this group are cases of uterus unicornis, where the risk is that pregnancy may occur in the undeveloped horn, and run the course of an extra-uterine pregnancy; cases of double uterus; and cases in which there is persistence of both longitudinal and transverse septa, that is to say, double uterus and vagina with atresia of one half of the vagina.

**Cutaneous Diseases.**—Most of these run a favourable course to recovery. The principal exceptions are—

Tuberculosis of the vulva: here the results are doubtful, but in a certain proportion of cases there is a cure.

Kraurosis vulvæ: the disease is progressive, leading in some cases to complete atrophy of the vulva, with intolerable pruritus going on for years; and in other cases to the development of squamous-celled carcinoma.

**Injuries.**—Injuries to the vulva become quite healed, and the consequences are hardly ever severe.

Injuries to the vagina may prove fatal if the peritoneal cavity be involved. If the rectum or bladder be involved, very troublesome fistulæ may result, but in most cases these can be remedied by operative treatment.

In some cases, extensive injury to the vagina is followed by marked cicatricial contraction, which may prevent



intercourse or lead to serious obstruction during labour. To a certain extent such contractions may be remedied by plastic operations.

Injuries to the uterus are apt to be fatal when attended by sepsis; this is specially the case with injuries during labour, and with those produced in attempts at criminal abortion. Even in bad cases, however, prompt surgical intervention may save the patient. Injuries to the uterus with clean instruments during an operation—for example, perforation of the uterus with a sound or dilator—are commonly attended by no evil consequences.

Injuries limited to the cervix do not endanger life; but they predispose to ill-health due to “erosion” of the cervix, and when they are deep and bilateral they induce a definite predisposition to miscarriage.

**Displacements.**—When these are untreated, they do not endanger life, but they lead to a great deal of suffering and ill-health. The suffering induced takes the form of inability to walk, bearing down, and leucorrhœa and menorrhagia due to congestion; with a cystocele there is often difficulty in holding water. When there is marked backward displacement the ovaries become prolapsed, and there is iliac pain and dyspareunia. With pronounced procidentia the cervix and vaginal walls become excoriated and ulcerated owing to the friction of the clothes.

When displacements are treated by means of properly fitting pessaries there is marked relief of symptoms; and many such patients go on for years wearing a pessary and leading a life of comparative comfort. The chief drawback is the necessity for periodic examinations for the renewal of the pessary.

Downward displacements are never cured by wearing a pessary; by this we mean that as soon as the pessary is removed the displacement returns and the symptoms recur.

Backward displacements, on the other hand, are sometimes cured: that is to say, that when a pessary has been worn for some months, the uterus will sometimes retain its normal position after the removal of the pessary.

When displacements are treated by operative measures, the outlook is very good; for although in a small



proportion of cases (under 5 per cent.) there is a tendency to return of the displacement, in the great majority of cases (over 95 per cent.) the condition is permanently remedied.

**Inflammations.**—When inflammation is limited to the lower genital tract, namely, the vulva, vagina, and vaginal cervix, the prognosis is very good when proper treatment is carried out. If this be neglected, the condition at the best remains chronic and may give trouble for years; and at the worst, the inflammation spreads to the upper genital tract.

Inflammation of the upper genital tract, when left untreated, is usually serious; for although in some cases the inflammation may subside, leaving organs that are functionally useless but otherwise harmless, in most cases there is pus-formation, which leads to adhesion of the tubes and ovaries to adjacent portions of bowel; this in turn is followed by ulceration and perforation of the bowel. Even at this stage, nature may effect a cure, by the discharge of pus through the bowel; in other cases the bowel-organisms set up a fresh and more virulent infection which may prove fatal. Sometimes the pus will track along the planes of cellular tissue and ultimately find an exit on the surface of the skin; troublesome sinuses are apt to be the outcome of this course of events.

When inflammations of the upper genital tract are treated surgically the prognosis is good; for though a few cases succumb to septic infection, the great majority make good recoveries. Sometimes, however, the recovery is slow, particularly when the bowel is involved, because a fæcal fistula may be present for a time, retarding convalescence.

With tuberculosis of the genital organs, prognosis must always be guarded. Many patients recover under surgical treatment, often without complications; but sometimes any intervention is the signal for a flare-up of tuberculous infection, to which the patient rapidly succumbs.

When a woman has contracted gonorrhœa, she should not marry until at least six months after all traces of the disease have disappeared.

**Extra-uterine Pregnancy.**—When this condition is not interfered with, the patient runs very grave risks, of



which the most serious is the danger of free and fatal hæmorrhage into the peritoneal cavity. The patients that escape this urgent danger run later risks, due to septic infection of the gestation sac and its contents. When the expectant plan of treatment is followed systematically, a certain proportion of the cases make tedious but eventual recoveries; but operation becomes imperative in the remaining cases, and owing to its being undertaken late, the operative mortality is very high. These points were clearly established by Champneys' statistics in dealing with cases at St. Bartholomew's Hospital.

When cases of extra-uterine pregnancy are treated by early operation the prognosis is very good, as the mortality in such cases, as we shall see later, does not amount to more than three per cent., and the recoveries are rapid.

**Tumours.**—A few tumours and cysts may be left untreated without serious detriment; in this category are lipomas and myxomas of the vulva, hydrocele of the canal of Nuck, and vaginal cysts. But even the last-named are not free from the liability to septic infection.

Of tumours and cysts in the pelvis we may say generally that the prognosis, when they are left untreated, is bad, although in varying degrees. In all cases they lead to serious invalidism, particularly in the later stages; but all are not equally fatal. Carcinoma and sarcoma are, of course, the worst, as they all cause death within periods varying from one to three years. Ovarian tumours and uterine fibroids may go on for many years; nearly all ovarian tumours and a large proportion of fibroids cause death eventually. In a few cases fibroids become quiescent, but it is impossible to make any forecast as to which cases will do so. The causes of death with ovarian tumours, and the modes in which fibroids imperil life have been dealt with fully when describing these tumours.

When tumours of the female pelvic organs are treated in the proper way, that is, surgically, by free removal, the prognosis is very good in all cases except the malignant ones. With these, the outlook always remains doubtful, and a source of anxiety. With ovarian tumours and with uterine fibroids the results of operative treatment form one



of the brightest pages in the achievements of modern surgery.

**The Immediate Results of Gynæcological Operations.**—By the “immediate result” of an operation is understood the recovery or death of the patient. Some operations, such as those that we have described as vaginal, are uniformly followed by the recovery of the patient, when they are carried out properly and with strict aseptic precautions. Abdominal operations entail a certain risk; and when a large number of cases of a particular operation are examined, the percentage of deaths expresses what is called the mortality of such an operation.

In order to give the reader an idea of the mortality of gynæcological operations, we have analysed the results of all the operations, of the kinds described in Part IV, that were performed at the Chelsea Hospital for Women during the ten years 1905 to 1914.

The vaginal operations were as follow—

Perineorrhaphy . . . . .	380 cases
Excision of the Vulva for Carcinoma . . . . .	14 „
Excision of Bartholinian Cyst. . . . .	34 „
Excision of the Clitoris for Carcinoma . . . . .	1 „
Anterior Colporrhaphy . . . . .	40 „
Operation for Vesico-vaginal Fistula . . . . .	8 „
Amputation of the Cervix . . . . .	16 „
Trachelorrhaphy . . . . .	33 „
Dilatation and Curetting . . . . .	1505 „
Vaginal Myomectomy . . . . .	116 „
Vaginal Hysterectomy . . . . .	26 „
Posterior Colpotomy . . . . .	4 „
Total . . . . .	<u>2177 cases</u>

Among all these cases there were no deaths.

We must mention that in many cases perineorrhaphy, anterior colporrhaphy, trachelorrhaphy and curetting were carried out in conjunction with abdominal operations, especially with hysteropexy and shortening of the round ligaments; and such vaginal operations are not counted in the above list.

We may conclude that, save for complications that may be regarded as accidental and quite exceptional, vaginal



operations correctly performed are unattended by any mortality.

The abdominal operations are given in the following list. It does not comprise all abdominal operations performed at the Hospital, as we have not included exploratory cœliotomies and operations on the bowel, kidney, etc. We are concerned here only with the mortality of abdominal operations on the female pelvic organs.

	Cases.	Deaths.	Mortality.
Ovariectomy for Ovarian Tumours, Unilateral . . . . .	365	7	1·91 per cent.
Ovariectomy for Ovarian Tumours, Bilateral . . . . .	62	1	1·60 „
Removal of Appendages for Inflammatory Disease . . . . .	649	13	2·00 „
Removal of Appendages for Extra-uterine Pregnancy . . . . .	108	3	2·77 „
Myomectomy . . . . .	78	1	1·28 „
Hysterectomy for Uterine Fibroids . . . . .	993	21	2·11 „
Hysterectomy for Uterine Fibrosis . . . . .	92	1	1·08 „
Hysterectomy for Carcinoma of the Uterus . . . . .	91	7	7·70 „
Wertheim's Hysterectomy for Carcinoma of the Cervix . . . . .	70	13	18·50 „
Hysteropexy and Intra-abdominal shortening of the Round Ligaments . . . . .	966	4	0·41 „
Cæsarean Section . . . . .	9	0	0·00 „
Total . . . . .	3483	71	2·03 per cent.

In the myomectomy group were six cases, including the fatal one, of myomectomy during pregnancy.

It will be observed that the only cases with a high mortality are those of hysterectomy for carcinoma, especially Wertheim's radical operation. The mortality of hysteropexy and allied operations should theoretically be nil; in exceptional cases some unforeseen factor may come in and produce a fatal result; for example, broncho-pneumonia, sudden heart failure, or pulmonary embolism. In one of the above cases the patient died of diabetic coma.

The remaining operations, viz. ovariectomy, the removal of the appendages for inflammatory disease or extra-uterine pregnancy, abdominal myomectomy, and hysterectomy for fibroids and fibrosis have a mortality a little over or under two per cent.; in the above list there are 2347 such



operations with 47 deaths, which works out exactly at two per cent. There is no doubt that there is a marked tendency for the mortality of these operations to diminish year by year, as the result of greater experience and better technique. This point is well brought out by a comparison of the above operations in the first five years and the last five years of the period under review. Excluding the cases of Wertheim's operation, which were not being done in the first five years, we have the following table—

	1905 to 1909.			1910 to 1914.		
	Cases.	Deaths.	Mor- tality.	Cases.	Deaths.	Mortality.
Ovariectomy, Single . . .	171	4	2·34	194	3	1·54 per cent.
Ovariectomy, Double . . .	38	1	2·61	24	0	0·00    "
Diseased Appendages . . .	321	5	1·56	328	8	2·43    "
Extra-uterine Pregnancy . .	57	3	5·26	51	0	0·00    "
Myomectomy . . . . .	28	1	3·57	50	0	0·00    "
Hysterectomy for Fibroids .	466	12	2·57	527	9	1·70    "
Hysterectomy for Fibrosis .	36	0	0·00	56	1	1·78    "
Hysterectomy for Carcinoma	46	7	15·21	45	0	0·00    "
Hysteropexy, etc. . . . .	361	2	0·55	605	2	0·33    "
Cæsarean Section . . . . .	4	0	0·00	5	0	0·00    "
Total . . . . .	1528	35	2·29	1885	23	1·22 per cent.

The groups of ovariectomy, removal of the appendages for inflammatory disease or extra-uterine pregnancy, myomectomy, and hysterectomy for fibroids and fibrosis show the following figures for the two periods : 1905 to 1909, 1117 cases, 26 deaths, mortality 2·32 per cent.; 1900 to 1914, 1230 cases, 21 deaths, mortality 1·70 per cent.

We may say, therefore, that the average mortality of these operations at the present time is somewhat under two per cent.



## CHAPTER LXIII

### THE AFTER-RESULTS OF ABDOMINAL OPERATIONS

IN order to estimate the after-results of abdominal operations it is necessary to investigate a large number of cases and follow up the history of the patients for several years.

One of us<sup>1</sup> carried out such an investigation some years ago, and for the present purpose we may quote the conclusions that were arrived at.

The cases were considered in the following groups—

1. After-results of the removal of the appendages of one side.
2. After-results of the removal of both appendages.
3. After-results of hysterectomy for fibroids.
4. After-results of myomectomy.
5. After-results of hysterectomy for carcinoma.
6. After-results of operations for uterine displacements (hysteropexy).
7. After-results of abdominal operations in general.

### I. AFTER-RESULTS OF THE REMOVAL OF THE APPENDAGES OF ONE SIDE

#### SUMMARY OF CONCLUSIONS

1. Speaking generally, operations for the removal of the appendages of one side have no detrimental effect on the general health, the cases where ill-health could be traced to the operation numbering not more than five per cent. About 90 per cent. of cases were actually better after the operation than they were before.

2. The relief of symptoms is well marked after these

<sup>1</sup> *A Study of the After-Results of Abdominal Operations on the Pelvic Organs, based on a Series of 1000 Consecutive Cases*, by Arthur E. Giles. London: Baillière, Tindall & Cox, 1910.



operations. About 87 per cent. of patients were free from pain afterwards, or experienced less pain than before the operation; whilst a further five per cent. were free from pain for a time, and developed pain later from other causes. Dyspareunia, dysmenorrhœa, menorrhagia, and leucorrhœa were relieved in a number of cases.

3. The removal of the appendages of one side was followed by irregularity, diminution, or cessation of menstruation in a small number of cases (eight), and in six cases there followed a diminution of the sex-instinct.

4. The chances of the disease developing in the remaining ovary and tube are not very great; such a recurrence took place in about 10 per cent. of cases. Consequently, in view of the definite value of the remaining ovary and tube, it is always worth while preserving them when they appear to be healthy. Soiling of the peritoneal cavity with the contents of an ovarian cyst favours the occurrence of later disease; and, therefore, the interests of the patients are safeguarded by the removal of these cysts (however large) intact, without tapping.

5. The remaining tube and ovary have a considerable value from the point of view of subsequent pregnancy. Thirty-four patients, or 27 per cent. of the married women under forty, became pregnant. Of these, nineteen had full-time deliveries (some repeated), five had miscarriages, and eight had extra-uterine pregnancy, whilst two were pregnant when seen. It would appear that, after the removal of the appendages of one side, there is a greater liability to the occurrence of extra-uterine pregnancy than is the case with normal women.

The nineteen women who had full-time pregnancies bore between them twenty-five children; and four more children were born at full-time when ovariectomy was undertaken during pregnancy.

A study of the sex of these children in relation to the side on which the remaining or active ovary was situated definitely refutes the theory that the right ovary produces boys and the left ovary produces girls. It shows clearly that there is no relation between the side from which the ovum is derived and the sex of the child.



## II. AFTER-RESULTS OF THE REMOVAL OF BOTH APPENDAGES

### SUMMARY OF CONCLUSIONS

1. The removal of both ovaries and tubes has no marked detrimental effect on the subsequent health, for 78 per cent. of the patients were in very good health afterwards, and a further 13 per cent., though suffering in different ways, were better than before the operation, making in all 91 per cent. who were quite well, or at least improved. The condition of the general health is even better than it is after unilateral salpingo-oöphorectomy.

2. The likelihood of later trouble developing in connection with the uterus when the organ is left is relatively small, as such an occurrence took place in only seven cases out of 105. It is, therefore, worth while leaving the uterus in all cases where it appears to be healthy. The removal of the uterus appears to increase the immediate risk of the operation in inflammatory cases.

3. Menstruation continues after these operations in about 40 per cent. of the cases, the proportion being largest in cases where the operation was done for inflammatory disease. When menstruation persisted after ovariectomy for tumours, it was mostly in cases where the tumours were parovarian or intraligamentary. The inference is that some portion of ovarian tissue has remained behind in these cases.

4. The characteristics of the artificial menopause produced by the complete removal of both ovaries are as follows—

- (i) Flushes of heat come on within three months of the operation in 80 per cent. of the cases, and within a month in 55 per cent.
- (ii) These flushes commonly last for several years, and may go on as long as ten years. Probably the average duration would be three or four years.
- (iii) The majority of patients retain their bodily vigour and energy—namely, about 72 per cent.; 28 per cent. are easily tired or complain of lack of energy. This may be partly due to the fact of an abdominal



operation, as distinct from the influence of the menopause.

- (iv) The influence of the artificial menopause in causing mental depression is relatively small, amounting to about 10 per cent. of the cases.
- (v) In a large proportion of cases the sex-instincts are not affected; in 68 per cent. they were either unaffected or increased; in 16 per cent. they were diminished; and in a further 16 per cent. they were lost after the operation.
- (vi) The artificial, like the natural, menopause is followed by some atrophy of the uterus and vagina, but not in all cases: 62 per cent. showed some change within two years, 73 per cent. within five years, and 82 per cent. when more than five years had elapsed. Many patients showed a tendency to obesity, but this effect is not so marked as after the natural menopause. There is no foundation for the view that the removal of the ovaries leads to the development of masculine characteristics, such as growth of hair on the face, atrophy of the breasts, and a deepening of the voice, except, perhaps, in cases where the operation is done before or about the age of puberty.

### III. AFTER-RESULTS OF HYSTERECTOMY FOR FIBROIDS

#### SUMMARY OF CONCLUSIONS

1. The effect on the general health of hysterectomy for fibroids is very satisfactory, inasmuch as 70 per cent. of the patients were in very good health after the operation, and as many as 96 per cent. were better than before the operation.

2. The fate of the cervical stump after supravaginal hysterectomy need cause no apprehension: in 181 cases there was not one that showed any sign of malignancy, and in 98.3 per cent. there was no trouble of any kind. In cases



of fibrosis, however, it is important either to do a panhysterectomy or at least to make sure that the whole of the body of the uterus is removed, as a small portion of the body of the uterus may keep up hæmorrhage.

3. After supravaginal hysterectomy, menstruation, or at least a monthly discharge of blood, may take place if only a small portion of the body of the uterus has been left behind.

4. The cessation of menstruation after hysterectomy with preservation of one or both ovaries is an "apparent" menopause; the constitutional changes incidental to the true menopause, as indicated by heat flushes, are delayed from one to several years in these cases. Nevertheless, the removal of the uterus brings about the true menopause a good deal earlier than the usual time.

5. After hysterectomy with preservation of the ovaries there is some diminution of the sex-instincts in about 20 per cent. of the cases; but the sex-instincts are practically never lost altogether.

#### IV. AFTER-RESULTS OF MYOMECTOMY

##### SUMMARY OF CONCLUSIONS

1. The general health after myomectomy is very good, 85 per cent. of patients being in quite good health, or at least better than before the operation.

2. The likelihood of recurrence of fibroids is relatively small, the cases of recurrence amounting to under 10 per cent.; 90 per cent. were free from recurrence after periods varying from one to seven years.

3. The menstrual loss is moderate or even scanty in about 85 per cent. of cases, many of the patients stating that the loss was less than before the operation.

4. The uterus from which fibroids have been removed may be serviceable for childbearing, three patients out of fifteen married women under forty-five having become pregnant subsequent to the operation; the uterus bears the strain of pregnancy and labour without difficulty.



## V. AFTER-RESULTS OF HYSTERECTOMY FOR CARCINOMA

### SUMMARY OF CONCLUSIONS

The question of the recurrence of the growth after hysterectomy for carcinoma is such a complex one, that its proper discussion would carry us beyond the limits suitable for the present purpose. It will be sufficient to say here that the after-results of carcinoma of the body of the uterus are most satisfactory, as the permanent cures, even after many years, may be put down at over 95 per cent.

With carcinoma of the cervix, the proportion of cures varies considerably as reported by different operators. It is generally held that patients who have remained free from recurrence for five years may be regarded as cured; although recurrence has been known to occur after longer periods than this.

Berkeley and Bonney<sup>1</sup> cite the following figures—

*Cures after Wertheim's Operation*: Wertheim 62 per cent.; Polosson 60 per cent.; Mackenrodt 45 per cent.; Bumm 30 per cent.

*Cures after Vaginal Hysterectomy*: Jacobs 1·2 per cent.; Gusserow 2·5 per cent.; Olshausen 6·6 per cent.; Kustner 9·2 per cent.; Kaltenbach 9·2 per cent.; Leopold 8·2 per cent.; Döderlein 9 per cent.; Pozzi 9 per cent.; Polosson 12 per cent.; Spencer 24 per cent.; Lewers 16 per cent.

It is evident that the value of the information supplied by these figures is discounted by the fact that they do not differentiate between cases where the disease was early and those where it was already advanced at the time of operation. An exhaustive inquiry into after-results based on this distinction would be of great value; but the subject is beset with difficulties, chief among which is that of defining a standard as to what is an early and what is an advanced case.

<sup>1</sup> *A Text-Book of Gynæcological Surgery.*



## VI. AFTER-RESULTS OF OPERATIONS FOR UTERINE DISPLACEMENTS (HYSTEROPEXY)

### SUMMARY OF CONCLUSIONS

1. The effect of hysteropexy on the general health is very good, as 90 per cent. of the patients were better than before the operation, as many as 75 per cent. being in quite good health; whilst among the 10 per cent. who were not better, the cause had nothing to do with the operation in one-half of them.

2. Symptoms are markedly relieved: 90 per cent. of the patients had either no pain afterwards or had less pain than before the operation; fourteen patients were relieved of dysmenorrhœa, twenty-one of dyspareunia, and sixteen of headaches; twenty-two patients got relief from menorrhagia and thirteen from excessive leucorrhœa; thirteen patients found their constipation lessened.

3. As regards the effect of hysteropexy on the bladder, 18 per cent. of patients experienced frequency of micturition, and 77 per cent. had no trouble, or no more than before the operation.

4. The position of the uterus remains permanently good in about 95 per cent. of cases; about five per cent. suffer from partial or complete return or displacement. The results in cases of procidentia are not quite as good as in cases of retroversion or prolapse, but 88 per cent. of cases of procidentia show permanent good results. To obtain the best results in the latter cases combined operations are usually necessary.

5. In the event of pregnancy following hysteropexy, there is a slightly increased tendency to miscarriage if pregnancy follows too soon after the operation. Hysteropexy causes no subsequent complications of labour, as out of forty-four cases of full-time delivery forty had normal confinements, and the remaining four had complications independent of the operation.

6. When pregnancy follows hysteropexy, the position of the uterus is not disturbed thereby, as the results after pregnancy were just as good as in cases where no pregnancy



followed; and the cases of full-time delivery showed only one case of partial return of displacement out of twenty-nine cases. Among these cases, therefore, the uterus kept in good position in 96·6 per cent. of the cases, as against 94·7 per cent. in the case of patients who did not become pregnant.

## VII. AFTER-RESULTS OF ABDOMINAL OPERATIONS IN GENERAL

### SUMMARY OF CONCLUSIONS

1. With regard to the general health after abdominal operations, it was found that 90 per cent. of the patients were better than they were before the operation, 72 per cent. being in quite good health. About six per cent. were either worse, or at least no better, in many cases from causes quite independent of the operation; and a further four per cent. had been much better for a time, and had suffered lately from ill-health due to local or general causes.

2. The period of invalidism after abdominal operations is limited to about three months in 60 per cent. of the cases; 10 per cent. cease to be invalids by the end of the first year, and 30 per cent. remain either invalids or semi-invalids for a somewhat longer period, most of them getting ultimately quite well.

The age of the patient has a marked influence; the younger the patient, other things being equal, the quicker the convalescence. The severity of the operation does not appear to have any direct relation to the rapidity of convalescence.

3. The memory appears to be effected in about 25 per cent. of cases after abdominal operations; further, the deterioration of memory appears to be directly proportioned to the duration of the operation, as in cases of long operations for uterine carcinoma the memory was affected in 50 per cent. of the cases, in short operations for hysteropexy the proportion dropped to 18 per cent., and operations of intermediate duration showed proportionate percentages.

4. Sixty-four cases out of 770, or 8·3 per cent., required further abdominal operations. About three per cent. were

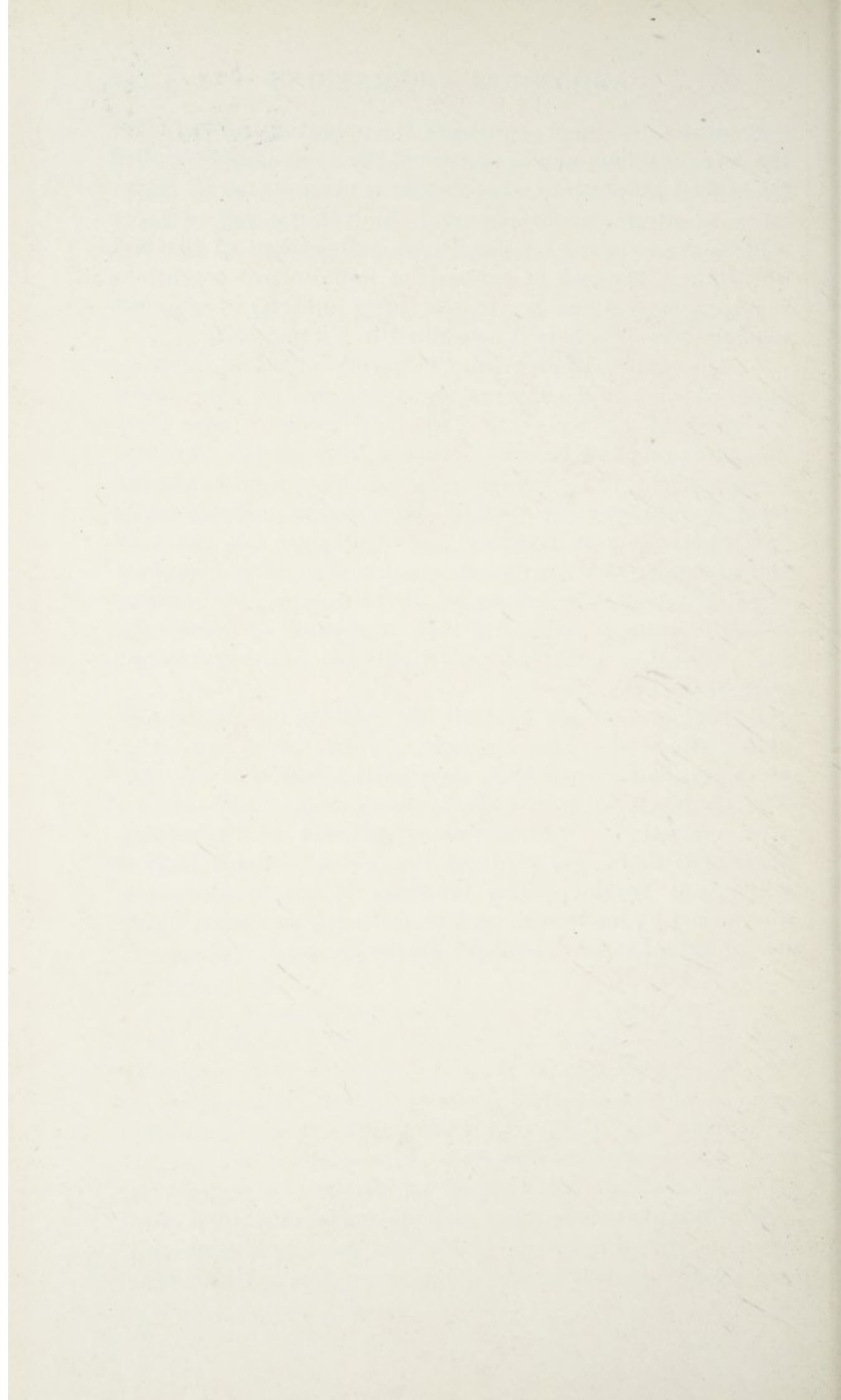


necessitated by direct sequelæ of the operation, and of these the cases of inflammatory disease of the appendages supplied the largest proportion; six cases were necessitated by recurrence of uterine displacements; and thirty-four, 4·4 per cent., were required for conditions independent of the first operation. The risk of subsequent independent conditions requiring operations is greatest after unilateral salpingo-oöphorectomies, where it amounted to 9·5 per cent.

5. The chances of pregnancy following unilateral salpingo-oöphorectomy and conservative operations on the uterus are good, as 33 per cent. of married women under forty among these cases became pregnant afterwards. Seventy-three per cent. of the completed pregnancies went to the full term, there were eight cases of extra-uterine pregnancy, and seven patients were pregnant when they were last seen. Of sixty labours, fifty-five were normal, and five had complications that had no reference to the operation; the chances of labour being normal after these operations are, therefore, just as good as is the case with patients who have had no such operations.

6. Eighty-eight per cent. of the patients had no trouble at all afterwards with the scar, 7·7 per cent. had stitch abscesses, and 3·6 per cent. developed a hernia of the scar. The tendency to both complications is markedly greater after operations for inflammatory disease of the appendages; 90 to 93 per cent. of the "clean" cases had no subsequent trouble. The tendency to stitch abscess is diminished by modern improved methods, and particularly by the use of sterilized rubber gloves during operations.









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IN PREPARATION

# Electro-Therapy in Gynæcology

BY

SAMUEL SLOAN

M.D., C.M. (GLAS.), F.R.F.P.S. (GLAS.)

THIS work deals with the treatment by electrical methods of diseases peculiar to women, including those functional disorders to which women are specially liable. It is based on a personal experience extending over a period of twenty years, and is brought absolutely up to date. The results of much personal research are given, where this may add to the practitioner's interest and give him an assurance of success in his work. The clinical points in practically every case treated are stated. How the reader may avoid difficulties and dangers incidental to the treatment are fully pointed out, and the author is convinced he will be able to prove that the treatment is based on a sure, scientific foundation, as well as being capable of affording gratifying and permanent results which no other form of treatment can yield.

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