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**GYNÆCOLOGY
FOR NURSES
AND
GYNÆCOLOGICAL
NURSING**

COMYNS BERKELEY, M.A., M.D.



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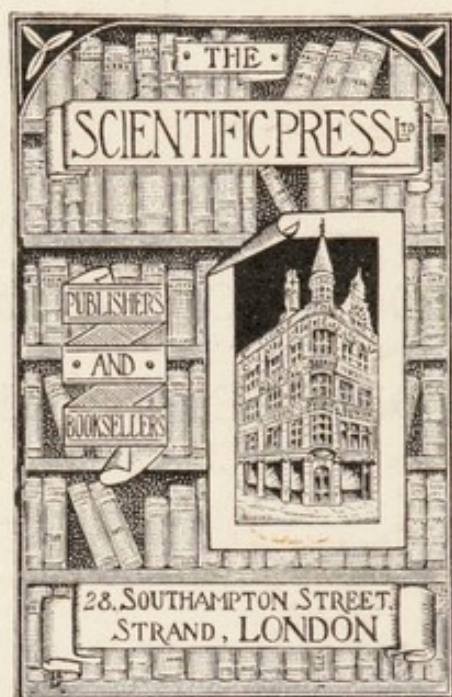
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GYNÆCOLOGY FOR NURSES AND
GYNÆCOLOGICAL NURSING



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AND

GYNÆCOLOGICAL NURSING

BY

COMYNS BERKELEY

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OBSTETRIC AND GYNÆCOLOGICAL SURGEON TO THE MIDDLESEX HOSPITAL
SENIOR OBSTETRIC SURGEON, CITY OF LONDON LYING-IN HOSPITAL
SURGEON TO IN-PATIENTS, CHELSEA HOSPITAL FOR WOMEN
SURGEON-IN-CHARGE, MIDDLESEX WAR HOSPITAL, CLACTON-ON-SEA
EXAMINER IN MIDWIFERY AND DISEASES OF WOMEN TO CAMBRIDGE AND LONDON
UNIVERSITIES, AND TO THE CENTRAL MIDWIVES BOARD
LATE EXAMINER IN MIDWIFERY AND DISEASES OF WOMEN TO OXFORD AND
LEEDS UNIVERSITIES, TO THE CONJOINT BOARD OF ENGLAND

THIRD EDITION, ENTIRELY REWRITTEN

WITH 38 ILLUSTRATIONS

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PREFACE TO FIRST EDITION.

THE following pages contain the substance of the lectures it has been my privilege to deliver to the senior nurses of the Middlesex Hospital and the Chelsea Hospital for Women during the past twelve years. In these lectures I have endeavoured to set forth the principal facts concerned with the more common diseases peculiar to women and the chief points to be observed in gynæcological nursing, a knowledge of which is so essential to any properly trained nurse.

The subjects chosen have not been in any way exhaustively dealt with, but I think their discussion must have served a useful purpose, since this small volume is published at the request of many nurses who have attended the course of lectures it embodies.

C. B.

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PREFACE TO THE THIRD EDITION.

THE third edition of this book has been completely revised and re-arranged, while most parts of it have been re-written. In addition, much new matter has been inserted, and chapters have been included on venereal diseases, microbes, immunity, and the practical aspects of immunity reactions.

A good deal of the matter in Part II. has no direct bearing on gynæcology or gynæcological nursing. Nevertheless, it is impossible for a nurse to realize properly the importance of many of the precautions she is taught to take, unless she has an elementary, though accurate, knowledge of microbes and their methods of causing disease. It is hoped that the short account here given may be sufficient to encourage the nurse to take an intelligent interest in the routine preparation of the room and patient for operation, assisting thereat, and nursing the patient afterwards.

Some of the old illustrations have been deleted,

and several new ones have been inserted—many of which have been specially drawn by Dr. Dupuy.

I have to thank Messrs. Allen & Hanbury for supplying entirely new illustrations of the instruments used in gynæcological operations, and Messrs. Bell & Croyden for those showing the arrangements of the theatre, patient, and nurses, for major and minor gynæcological operations, also for the two illustrations of sterilized outfits.

I am greatly indebted to Dr. Frank Taylor for advice in relation to the subject-matter of Part II., and to Miss E. Mitchell for many valuable suggestions, and for kindly reading the proof-sheets.

C. B.

WIMPOLE STREET, W. 1,

1918.

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GYNÆCOLOGY FOR NURSES AND GYNÆCOLOGICAL NURSING.

PART I.

GYNÆCOLOGY.

CHAPTER I.

ANATOMY OF THE FEMALE GENITAL AND URINARY ORGANS, AND RECTUM.

THE genital organs of a female may be divided into external and internal.

External Genital Organs.

The external organs of generation which are together spoken of as the vulva comprise the following structures:—

Mons Veneris.—The mons veneris is a pad of fat in front of the pubic bones, and is after puberty covered with hair. It forms the anterior border of the vulva, and should be shaved or otherwise denuded of its hair prior to an abdominal or vaginal operation.

Labia Majora.—The labia majora, or greater lips, are composed of skin, fat, unstriped muscle, blood-vessels, and connective tissue. They form the lateral boundaries of the vulva. Their inner surfaces are smooth, and after puberty their outer surfaces are covered with hair which should be removed before any gynæcological operation.

The labia majora are continuous in front with the mons veneris and behind with the perineum, and are connected at their posterior extremities by a fold of skin known as the fourchette which itself forms the posterior border of the vulva. On each side, situated in the posterior part of the labia majora, is a small gland called after the anatomist, Bartholin. The gland secretes a clear fluid which escapes by a small duct through an orifice just outside the hymen.

Labia Minora or Nymphyæ.—The labia minora, or lesser lips, are situated between the upper portions of the labia majora and are seen when these structures are separated. They vary in size in different women, and if larger than normal they project beyond the labia majora. The posterior extremities of the labia minora gradually blend with the inner surfaces of the labia majora at their lower third. In front each lip divides into two folds, which, uniting with those of the opposite side, surround the clitoris. The nymphyæ are hairless.

Clitoris.—The clitoris is an erectile and very sensitive structure situated at the apex of the vestibule and surrounded by the folds of the labia minora. Care should be taken, when passing a catheter, to avoid touching this body.

Vestibule.—The vestibule is a smooth triangular surface situated at the anterior part of the vulva. Its apex is formed by the clitoris, its sides by the labia minora, and its base by the hymen. Just above the centre of the base can be seen the urethral orifice. The nurse should always remember to swab the vestibule with some antiseptic solution just before passing a catheter.

Hymen.—The hymen can be seen on separating the labia as a thin septum of mucous membrane perforated in its centre. In abnormal conditions the hymen may be perforated in more than one place or, and this is a serious malformation, it may not be perforated, thus leading to the retention of the menstrual discharge. The hymen forms the boundary between the external and internal genital

FIG. 1.

FIG. 2.

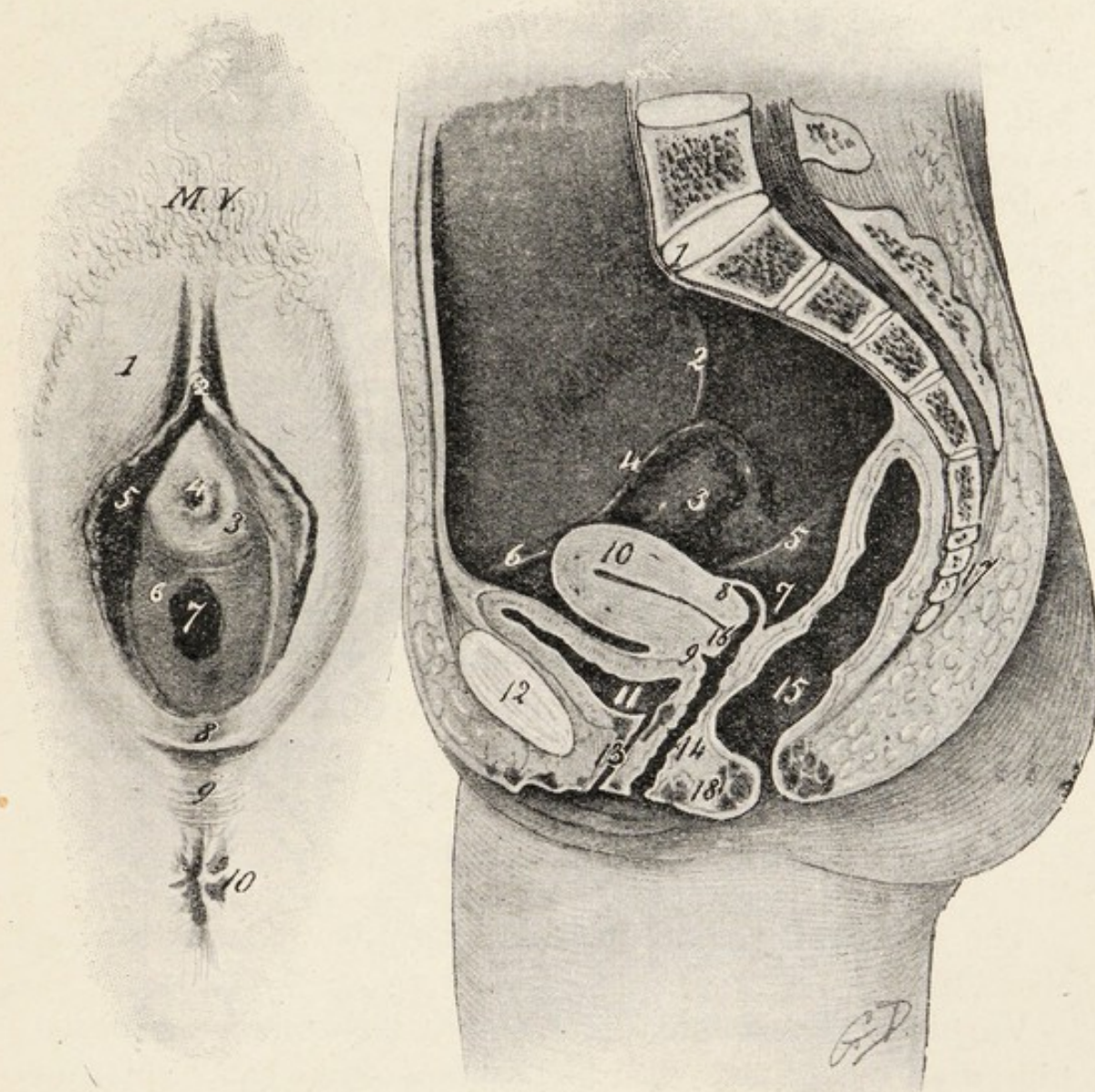


FIG. 1.—EXTERNAL GENITAL ORGANS.

- | | |
|----------------------|---------------------|
| M.V. Mons veneris. | 6. Hymen. |
| 1. Labia majora. | 7. Vaginal orifice. |
| 2. Clitoris. | 8. Fourchette. |
| 3. Vestibule. | 9. Perineum. |
| 4. Urethral orifice. | 10. Anus. |
| 5. Labia minora. | |

FIG. 2.—SAGITTAL SECTION OF THE PELVIC ORGANS.

- | | |
|------------------------------|----------------------------|
| 1. Promontory of the sacrum. | 9. Anterior lip of cervix. |
| 2. Ovario-pelvic ligament. | 10. Body of the uterus. |
| 3. Ovary. | 11. Bladder. |
| 4. Fallopian tube. | 12. Symphysis pubis. |
| 5. Utero-sacral ligament. | 13. Urethra. |
| 6. Round ligament. | 14. Vagina. |
| 7. Pouch of Douglas. | 15. Rectum. |
| 8. Posterior lip of cervix. | 16. Perineum. |

organs. As a result of childbirth, the hymen is split up into small pieces called *carunculæ myrtiformes*.

That part of the vulva between the attachment of the hymen and the fourchette is known as the *fossa navicularis*, and it is on this surface that the primary sore of syphilis is frequently found in an infected woman.

Perineal Body.—The perineal body is a triangular structure, somewhat over an inch in length, composed of skin, connective tissue, blood-vessels, and muscle. Its apex is situated at the point where the rectum and vagina first meet, and its base is the skin stretching between the orifices of the vagina and anus and is called the perineum. The lower inch of the vagina is closely attached to the anterior surface of the perineal body, and the lower inch of the rectum to its posterior surface.

The perineal body may be torn or stretched during childbirth, and, as it forms part of the pelvic floor which helps to support the uterus, this injury favours prolapse of the uterus, or falling of the womb as it is commonly termed.

Internal Genital Organs.

The internal genital organs comprise the following structures:—

Vagina.—The vagina is, unless it is distended, a closed muscular tube, lined with membrane somewhat similar to skin and plentifully supplied with blood-vessels and nerves. Its posterior wall measures three and a half inches, its anterior one inch less. Its relations to the structures in its neighbourhood are very important from a nursing point of view. At its lower end is situated the hymen, at its upper end the neck of the uterus to which it is attached. In front the urethra is closely united to the vagina at its lower part, and the base of the bladder is more loosely attached to its upper part.

Behind, the lower inch of the vagina is attached to the perineal body, its upper inch lies next to the lowest part of the peritoneal cavity which is known as Douglas's

FIG. 3.

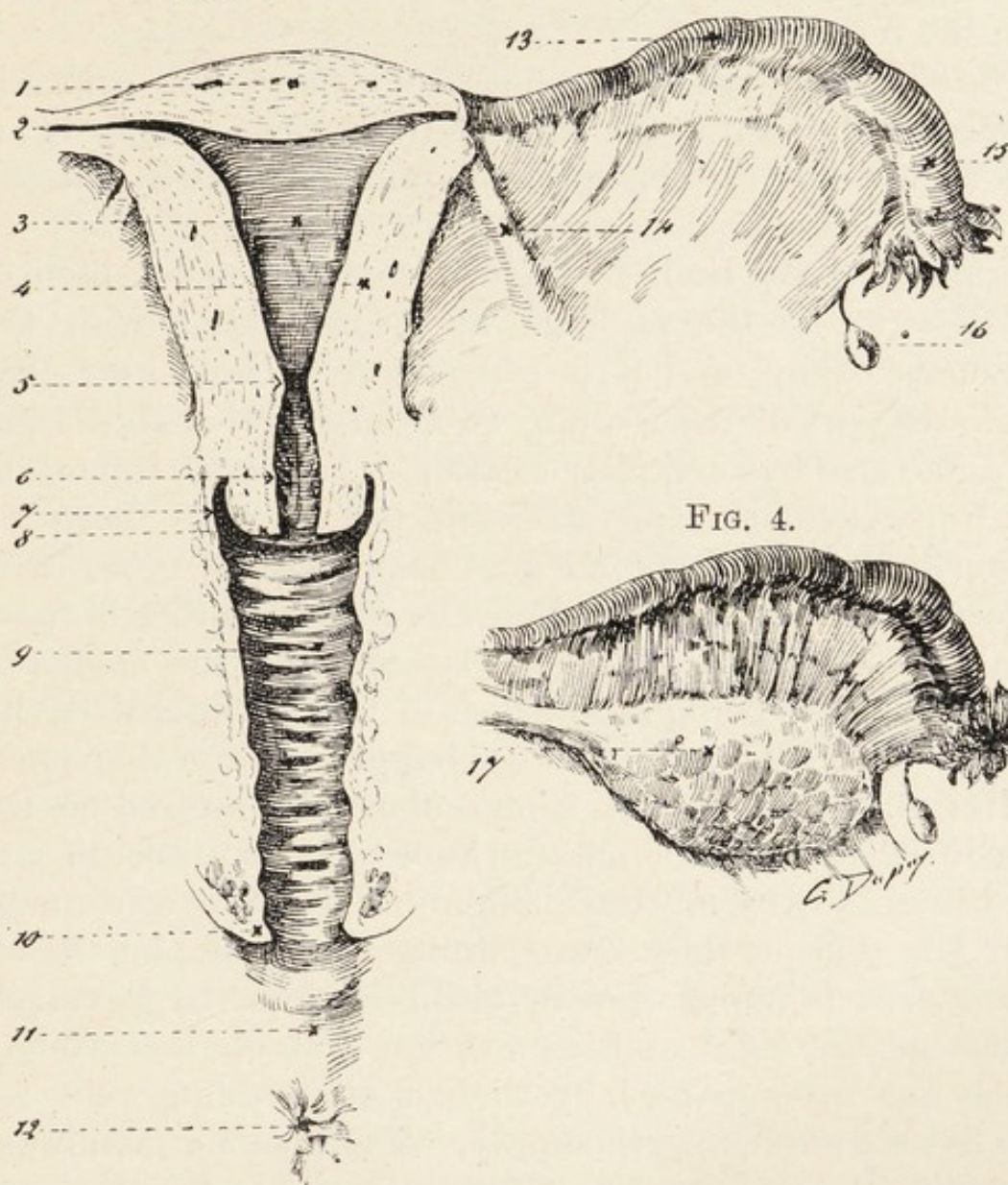


FIG. 4.



FIG. 3—UTERUS—VAGINA—FALLOPIAN TUBE.

- | | |
|---------------------------------------|---------------------------------------|
| 1. Fundus. | 9. Vagina. |
| 2. Uterine orifice of Fallopian tube. | 10. Vulva. |
| 3. Cavity of the uterus. | 11. Perineum. |
| 4. Uterine wall. | 12. Anus. |
| 5. Internal os. | 13. Fallopian tube. |
| 6. Cervical canal. | 14. Round ligament. |
| 7. Lateral fornix. | 15. Fimbriated end of Fallopian tube. |
| 8. External os. | 16. Hydatid of Morgagni. |

FIG. 4.—FALLOPIAN TUBE—OVARY.

17. Ovary.

pouch, and the intermediate inch and a half is in relation with the rectum.

The direction of the vagina from the vulva orifice is upwards and towards the back of the patient. This is an important point for the nurse to remember when passing the vaginal douche-nozzle.

It has already been mentioned that the upper inch of the posterior of the vaginal wall is in relation with the peritoneal cavity, and it is convenient to note here that the lower part of the rectum, two and a half inches from the anus, also has a similar relation. It is most important that nurses should remember this fact, because there is a danger that a douche or enema-nozzle may, by gross carelessness, be forced through the walls of one or other of these canals, especially if they are diseased, and the enema or douche-solution being injected into the peritoneal cavity death results. This accident has happened more than once.

Uterus.—The uterus is a muscular tube covered on the outside by a shiny membrane known as peritoneum and lined internally by mucous membrane, which is continuous with the mucous membrane lining the Fallopian tubes. The uterus is supplied with blood by four large vessels known as the right and left ovarian and uterine arteries, which are accompanied by their corresponding veins; it also has a complex nerve supply. The mucous membrane is termed the endometrium, and consists mostly of gland-tissue which secretes a fluid, that from the endometrium lining the body being clear like water, and that from the endometrium lining the neck, glairy like white of egg. The uterus is pear-shaped, and is, in order that its functions may be more properly understood, always described as consisting of two parts, the upper, called the corpus or body, and the lower, the cervix or neck.

Corpus (Body).—The body of the uterus is the expanded portion. Its cavity is triangular in shape with the base uppermost, and has opening into it three canals, the two Fallopian tubes at its upper and outer angles, and the cervical canal at its lower angle. Its cavity measures one and a half inches in length.

That portion of the body of the uterus above the level of the Fallopian tubes is known as the fundus.

Cervix (NECK).—The cervical canal is one inch long and is cylindrical in shape. Its lower end opens into the vagina through the external os, its upper end into the cavity of the body by the internal os.

The uterus leans forward somewhat on itself, so that whilst the body looks forwards, the neck looks downwards and backwards, that is, the uterus normally occupies a position of anteversion (turned forwards). The uterus may also assume in certain abnormal circumstances other positions, such as those of anteflexion (bent forwards), retroversion (turned backwards), retroflexion (bent backwards), or prolapse (descent), and one or more of these may be combined.

The uterus is kept in its normal position by certain ligaments, the pelvic floor, and the intra-abdominal pressure.

Ligaments.—There are eight ligaments. Four in front known as the utero-vesical and round ligaments which pass between the uterus and bladder, and the uterus and abdominal wall respectively; two at the sides, the broad ligaments between the uterus and the side walls of the pelvis, and two at the back between the uterus and sacrum, the utero-sacral ligaments.

These ligaments consist of folds of peritoneum enclosing unstriated muscle and fibrous tissue. They may roughly be compared to the halyards which keep the mast of a ship in position, and if they are stretched they will facilitate a malposition of the uterus.

The broad ligaments being attached to the sides of the uterus and pelvis keep the uterus in its central position, and allow it to swing backwards and forwards according to the amount of urine in the bladder. The round ligaments are attached to the uterus just by the Fallopian tubes, and the utero-sacral ligaments are attached at the level of the internal os. Thus by the aid of the former the body of the uterus is pulled forwards, and of the latter the cervix is pulled backwards, and so they help to keep the uterus anteverted.

If the uterus is retroverted, its position may be rectified by an operation termed "shortening of the round ligaments."

Pelvic Floor.—The position of the uterus is also maintained by its attachment to the pelvic floor (vagina, perineal body, certain muscles, etc.), and this attachment may be roughly compared to the relation between the deck of the ship and the mast to which it is fastened. If the pelvic floor is stretched or torn, the uterus will obviously be encouraged to slip down, or prolapse.

Intra-Abdominal Pressure.—The intra-abdominal pressure acts on the back of the uterus, and so helps to keep this organ in its normal position of anteversion.

If the uterus has been pushed backwards by a very full bladder (partial retroversion), as it can be, and the woman suddenly strains, the intra-abdominal pressure will be applied to the front of the uterus, and forcing this organ still farther back may cause acute retroversion.

Fallopian Tubes.—The Fallopian tubes, named after the anatomist Fallopius, are two hollow structures composed mostly of muscle, lined with mucous membrane, and covered with peritoneum. They are attached to the upper part of the uterine body, one on each side. They are four and a half inches long, and their outer or free ends are fringed, and are known as the fimbriated extremities. It is very important to remember that as this outer end opens into the peritoneal cavity, there is in women a direct channel from the vulva to the peritoneal cavity, and it is by means of this channel (vagina, uterus, and Fallopian tubes) that micro-organisms (septic and gonorrhœal) can infect the peritoneal cavity, causing death or lifelong invalidism. On the contrary, in man, there is no direct channel opening into the peritoneal cavity. The results, therefore, of an attack of gonorrhœa, in man, are not likely to be nearly so serious, and it is very seldom directly responsible for his death.

Ovaries.—The ovaries are two solid bodies about the size and shape of an unshelled almond. They are sup-

ported beneath the Fallopian tube by a fold of peritoneum, and they are attached to the uterus by a small ligament. The ovaries are the structures in which the ova or eggs develop. It is calculated that there are in each ovary at birth the germs of 100,000 ova, and at puberty this number has decreased to 30,000.

The ovaries secrete a fluid which has certain beneficial effects on their owner. When this fluid is no longer secreted, either as a result of ovarian atrophy through age, or removal of the ovaries by operation, certain changes take place in the female which are collectively known as the menopause or "change of life," and which will be dealt with under this heading.

Urinary Organs.

Bladder.—The bladder is a muscular organ and forms a cistern for the urine which is being continually secreted from the kidneys, until sufficient has accumulated to induce the desire for micturition. It is lined with mucous membrane, and lies in front of the uterus, behind the pubic bones and above and in front of the upper part of the anterior vaginal wall. As the urine accumulates, the bladder pushes the uterus somewhat backwards, and eventually rises out of the pelvis, forming an elastic swelling just above the symphysis pubis. In the condition known as *retention* of urine, so great may be the amount retained that the bladder forms a well-marked abdominal tumour rising at times as high as the umbilicus. The capacity of the bladder is very considerable, and over ten pints of urine have been drawn off in cases of prolonged retention.

Urethra.—The urethra is a muscular tube, one and a half inches long, and is lined with mucous membrane. Internally the urethra opens into the bladder, externally on to the vestibule, and it forms the canal by which the urine escapes from the bladder.

Ureters.—The ureters are two muscular tubes, fourteen inches long, situated one on each side of the body. They

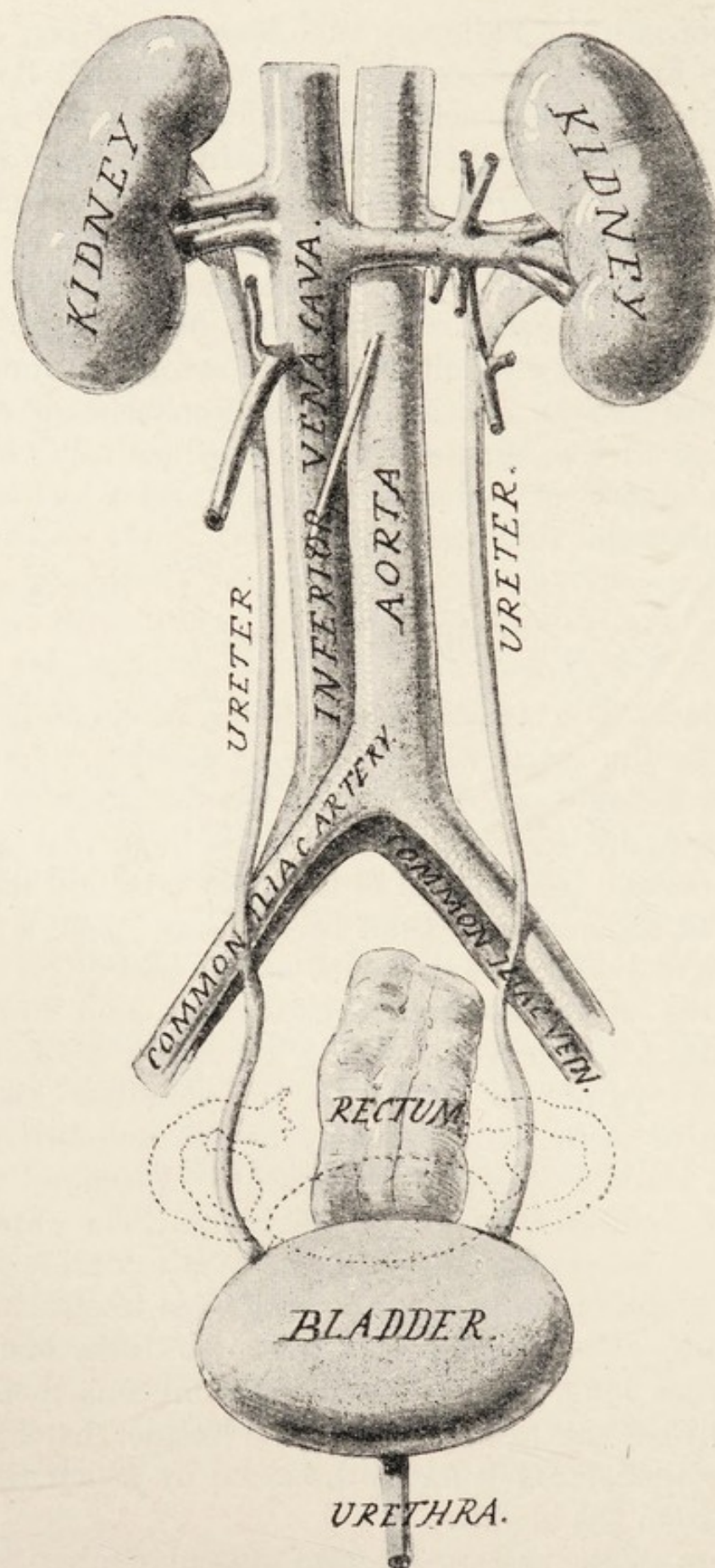


FIG. 5.—URINARY ORGANS.

The relations of the urinary organs to structures in their immediate neighbourhood. The fundus of the uterus, the ovaries, and the Fallopian tubes are dotted in, in outline.

convey the urine from the kidneys to the bladder and are lined with mucous membrane. Occasionally in cystitis the inflammation spreads along this mucous membrane to the kidneys with a fatal result.

Kidneys.—The kidneys are two glandular organs, situated one in each loin. Each kidney is about four inches long, two and a half inches wide, one inch thick, and weighs four to five ounces. They are very plentifully supplied with blood-vessels, and are able, when healthy, to extract from the blood, as it passes through them, water, certain waste products which are harmful to the body, and which together form the urine.

If the kidneys are diseased this power may be seriously hampered or even abolished, the latter complication being called *suppression* of urine.

The Rectum.

The rectum is a muscular tube lined with mucous membrane. It forms the terminal portion of the large intestine and measures, as a rule, six inches in length. The last one and a half inches, below the tip of the coccyx, are bent back, the aperture of exit being called the anus. This orifice is kept closed by a strong sphincter muscle. In front of the lower part of the rectum is the perineal body. The middle part is in relation with the vagina, and the upper part with that portion of the peritoneal cavity known as the pouch of Douglas.

The blood-supply of the rectum comprises hæmorrhoidal arteries and veins, and the latter when they become varicose form hæmorrhoids.

The rectum acts as a temporary reservoir in which the fæces should accumulate for a short time prior to their expulsion from the body. Owing, however, to careless habits the fæces are often retained in this portion of the intestinal canal far longer than they should be.

CHAPTER II.

PHYSIOLOGY OF THE FEMALE GENITAL ORGANS.

Puberty.—Puberty marks the time when the ovaries and uterus first become active, and indicates the commencement of the child-bearing period of the female. The age at which this important event occurs varies in different races, but has nothing to do with the longitude and latitude in which the girl lives. In this country the average age is fourteen.

Puberty is marked in the female by a change in behaviour and temperament, so that she becomes quieter, retiring, and probably bashful. The external appearance also of the girl changes, so that her shape now commences to approach that of a woman, her breasts become developed, the axillæ, the mons veneris and labia majora are gradually covered with hair, the hips broaden, and the buttocks increase in size. Ovulation and menstruation commence.

Ovulation.—The process by which an ovum becomes ripe and is then discharged is known as ovulation. The ovary contains thousands of cells, some of which eventually become the ova. The ovary is surrounded by a covering of these cells, and the process of ripening consists in one of these external cells sinking into the substance of the ovary, and then rising again to the surface, becoming converted meanwhile into a Graafian follicle, which consists principally of the ripe ovum surrounded by fluid. When the fluid has increased to a sufficient extent, it bursts through the covering of the ovary, and the ovum is then discharged into the peritoneal cavity where it may be

caught by the fimbriated end of the Fallopian tube, and conveyed along the tube into the uterus, to be discharged or retained according to whether it has been fertilized or not.

Ovulation occurs, at any time between puberty and the menopause, in either ovary, except when the woman is pregnant, when it ceases. Ovulation also, as a rule, ceases when the woman is nursing her child, but not always, and certainly not if she nurses it beyond the proper period, a custom which is not uncommon among some females and which is often pursued with the false idea that it prevents further impregnation.

Menstruation is the physiological manifestation that the mucous membrane of the uterus is being renewed so that any fertilized ovum which comes in contact with it may have the best chance of developing. It is characterized by a periodic discharge of blood and mucus from the uterus, due to the rupture of small blood-vessels in the mucous membrane, with the result that part of its superficial layer is torn away. The blood together with mucus from the uterine glands and shreds of mucous membrane is then expelled, the mixture of all three constituting the menstrual flow.

In addition certain constitutional and local symptoms, such as depression, tiredness, headache, irritability, back-ache, tenderness of the breasts, and nausea, mark its incidence in some women. In the United Kingdom menstruation first occurs, in the majority of cases, at about fourteen years of age. Rarely it commences before twelve, or after twenty. The "period," "the flow," or "being unwell," as it is variously termed, recurs as a rule once a month, and in most instances twenty-eight days from the commencement of the previous period. Individuals may, however, present considerable variation from this and yet be perfectly healthy; thus some healthy women menstruate regularly every three weeks, and others every five.

In most instances the flow lasts from three to six days.

The quantity of blood lost, which varies widely in different women, is on an average five ounces: but when considering this point in any particular patient the amount she generally loses must be ascertained and a comparison made with that, since some women in perfect health regularly lose an amount that in others would be considered quite excessive. Normally the discharge is dark red, and is not clotted because of its mixture with mucus from the uterine glands. If, however, the loss is excessive, then it is bright red in colour, and clots may be present. Menstruation ceases if the ovaries are not functioning. Thus if the woman is pregnant, if the ovaries are totally destroyed by disease, if these organs are removed, or if the general state of the patient's health reacts on her ovaries she will not menstruate.

The fertilized ovum does not completely fill the cavity of the uterus till the end of the third month. Up to this time, therefore, there is a cavity which is lined with the decidua (the name given to the uterine mucous membrane modified by pregnancy). In some pregnant women small blood-vessels in this decidua may rupture at the time when menstruation would occur; there is, in consequence, some bleeding, and this has been erroneously termed menstruation. In such circumstances there may be a loss for the first three months, but most commonly only for the first. After the third month, there being no cavity from which the blood can flow, any loss must be due to a threatened miscarriage, as, in most cases, is any loss during the first three months. Miscarriage is more likely to occur when the period would have come on, since there is increased congestion of the pelvic organs at this time. Menstruation as a rule does not take place during lactation, provided the latter is not protracted beyond the ninth month.

There is no truth in the popular superstition that it is dangerous for a woman to take a bath during menstruation. On the contrary, it would be much better if all women did so. Excessive exercise during the period is not advisable.

The Menopause, Climacteric or "Change of Life" takes place in the majority of women between the ages of forty-eight and fifty, though it may occur earlier or later than this.

Rarely, "the period," which has been quite regular, fails to come on at the proper time and never appears again. More commonly, menstruation is altered both in its regularity and amount: the intervals between the periods may become longer, so that several months may elapse before the appearance of the last period; on the other hand, the frequency may be increased, so that the periods, for a short time, come on more than once a month. The same irregularity is noticed in the amount lost. In some the quantity becomes progressively less, in others there may be one or more profuse losses, or again, after missing several periods the woman may have a final and profuse loss.

Accompanying these changes in menstruation, certain symptoms of a well-recognized character supervene. The woman complains of hot flushes or cold sensations; nausea, sickness, dyspepsia, constipation, headache, giddiness, mental depression, irritability, neuralgia, backache, or pains in various parts of the body; she may become stouter, and there is a disinclination for exercise.

The menopause is a dangerous time of a woman's life, not because the cessation of menstruation at this time is inimical to good health or is the cause of any definite disease, but because it is then that cancer most commonly occurs. Also, since in many cases the menopause supervenes with some irregularity of menstruation, any increase in frequency or loss about this time is apt to be put down to the "change of life" when in reality it may be due to some serious disease, the early recognition of which might have been the means of saving the woman's life.

It is, therefore, a safe rule to disregard the fact that at the menopause the periods may become more frequent and profuse, without there being any discoverable cause, *and to advise any woman who is complaining of these symptoms to seek medical advice.*

Premature Menopause.—In certain women the menopause appears much earlier than it should. In some patients no cause for this can be determined; others will give a history of a severe illness or shock to the nervous system, and occasionally after the birth of a child the menopause supervenes.

Fertilization.—Fertilization consists in the process by which the male cell or spermatazoon is deposited in the vagina and then passes by its own movements along the vagina, through the external os, along the cervical canal, through the internal os up the uterine cavity, through the opening of the Fallopian tube where it normally meets the ovum which it penetrates and thus fertilizes. Very rarely the spermatazoon will pass through the Fallopian tube into the peritoneal cavity and then enter a Graafian follicle and fertilize the ovum *in situ*, giving rise to the dangerous condition known as an *ovarian pregnancy*.

Development of the Fertilized Ovum.—The fertilized ovum passes down the Fallopian tube into the uterus, and there by means of its outside covering bores its way into the decidua. After penetrating the decidua for some distance the fertilized ovum comes to rest, and then at one of its poles chorionic villi develop, forming the foetal part of the placenta. Changes also take place in the decidua, with which this pole is in contact, with the result that the maternal part of the placenta is formed. The placenta is the organ through which the child is nourished till its birth.

At times, for some cause not known, the fertilized ovum does not get into the uterus, but develops in the Fallopian tube. Such a complication is very dangerous, and is known as a *tubal pregnancy*.

CHAPTER III.

PATHOLOGY OF THE FEMALE GENITAL ORGANS. CERTAIN GYNÆCOLOGICAL SYMPTOMS.

CERTAIN symptoms, some of which may be functional and all of which are common to many gynæcological diseases, are known by the terms amenorrhœa, menorrhagia, metrorrhagia, dysmenorrhœa, leucorrhœa, and pruritus vulvæ. These will now be discussed.

AMENORRHŒA.

The term amenorrhœa signifies absence of menstruation when this function should be present, that is between puberty and the menopause, except when the woman is pregnant or nursing her child. It has also, by custom, been given to certain conditions in which, although menstruation takes place, the discharge cannot escape from the genital passages.

Amenorrhœa may therefore be classified as follows: real amenorrhœa, apparent amenorrhœa.

Real Amenorrhœa.

By this term we mean that the woman does not menstruate.

CAUSES. —

1. Physiological.
2. Constitutional disease.
3. Local disease.
4. Congenital.
5. Emotional.
6. Operative.

Among these causes are some which give rise to amenorrhœa from the first, such as ill-developed genital organs, and anæmia, and these are classed by some writers under primary amenorrhœa, whilst the term secondary amenorrhœa is reserved for those cases of amenorrhœa in which the woman has previously menstruated on one or more occasions, and these include the great majority.

1. A woman who is pregnant does not menstruate. The amenorrhœa of pregnancy is in most cases sudden; that is, up to the time of fertilization the woman has been quite regular; or, to put it another way, supposing a woman has been quite regular, and menstruation does not appear when it is due, then be she married, or a widow, or single, rich or poor, the most likely cause of her amenorrhœa is pregnancy. Rarely women become pregnant when suffering from amenorrhœa due to some constitutional cause, and very rarely girls will become pregnant before menstruation has ever appeared.

As a rule a woman does not menstruate while she is suckling her baby, supposing lactation is not continued beyond the proper time—nine months. In a certain percentage of women menstruation reappears after a few months' nursing; nevertheless, if the child thrives and keeps its weight, and the mother is healthy, there is no necessity to discontinue this important function. When lactation is continued over the normal period, menorrhagia not infrequently results.

It is not at all uncommon for women to become pregnant in spite of the fact that they have been suckling their babies for eighteen months or longer, and in whom menstruation has not reappeared since the birth of their last child.

2. The commonest constitutional causes of amenorrhœa are constipation, chlorosis, and anæmia. In these cases the cessation of the menstrual function takes place, as a rule, gradually—that is, the amount lost at successive periods decreases until amenorrhœa results. Among other causes are tuberculosis, the acute specific fevers, and insanity.

In fact, any serious constitutional disease may cause amenorrhœa, and it is interesting to note that in women suffering from mental disease improvement is often ushered in by the reappearance of menstruation.

3. Of the various local diseases of the genital organs which cause amenorrhœa, ovarian tumours are the most common, but then only when both ovaries are destroyed. Regular menstruation is quite common if one ovary or part of an ovary is intact.

4. If the uterus or ovaries are absent menstruation cannot take place. This abnormality is, however, very rare. On the other hand, there is a condition in which the uterus and ovaries do not develop at puberty, but remain similar in size and shape to those of an infant, and amenorrhœa results.

In a woman with an infantile uterus and ovaries the other signs of sexual maturity may be absent. The breasts remain small, the vulva and mons veneris ill-developed, and the pubic hair is very scanty. The woman may also approximate to the male type, hair appearing on the upper lip, the voice becoming harsh, and the pubic hair reaching towards the umbilicus.

Closely associated with these causes are those in which the genital organs do not develop as quickly as they should and menstruation is delayed, perhaps beyond the twentieth year, until they have become more normal.

5. Fright, grief, the fear of pregnancy, or the desire to become a mother, the latter especially in elderly childless women, are well-known causes of amenorrhœa.

6. If the uterus is removed (hysterectomy) permanent amenorrhœa results, and also if the ovaries are ablated. If, however, during some operation necessitating its removal some portion of ovary has escaped the surgeon's notice and the uterus is left, menstruation may continue.

Apparent Ammenorrhœa.

CAUSES.—

Congenital.—In rare cases the vagina is closed at some spot, generally just at its entrance, by a membrane

stretching across it; more rarely the hymen has no orifice piercing it, rarer still some portion, or even the whole, of the vagina, may be absent; and, lastly, the cervical canal may be absent.

In all these malformations the body of the uterus may be healthy, and therefore at puberty menstruation may commence. Owing, however, to the obstruction, the menstrual discharge is retained. The result is that although the girl is said, by those in charge of her, not to menstruate she really does so, and therefore the condition has been given the name of apparent amenorrhœa.

SYMPTOMS.—

Taking the commonest cause of this condition, a septum across the lower end of the vagina, the history one obtains is very instructive.

The girl complains once a month of abdominal pain, backache, and the other general symptoms of menstruation. In due course, if the mother is careless and delays seeking medical advice, the girl's abdomen will gradually, month by month, become more prominent. This alteration in size is due to the formation of a swelling caused by the gradual accumulation of the menstrual fluid in the vagina and uterus.

Lastly, some girls are so uncomplaining, and some mothers so ignorant, that advice is not sought until the accumulation of menstrual fluid in the vagina has become so great that the urethra is pressed upon, and retention of urine results.

Acquired.—In this variety of apparent amenorrhœa the cervical canal or some portion of the vagina has become obliterated by inflammation. Such inflammation may be due to one of the acute specific fevers occurring in a child, the local condition remaining unnoticed on account of the severity of the general symptoms. It may also be due to the vagina or cervix being torn and bruised during labour, or to an operation on these parts, when, if sepsis follows, the inflamed surfaces may become adherent, and the canal is consequently closed.

The symptoms of acquired amenorrhœa will be similar to those described under the congenital variety except that menstruation may have once been normal, and there will be a history of some cause.

TREATMENT.—

There are a large number of patent medicines advertised for the cure of real amenorrhœa, but few of these are of any value, and many are positively harmful.

The only safe method of treating amenorrhœa is first to discover the cause by a careful examination of the patient. A patient suffering from amenorrhœa should therefore consult a medical practitioner.

In cases of apparent amenorrhœa the operation necessary for its relief will depend upon the nature of the obstruction. When the membrane has been incised to evacuate the retained fluid, the nurse must be most particular and careful that the fluid does not remain in contact with the vulva and diapers for any length of time, since the great danger of this operation is that septic microbes on the vulva or soiled diapers may infect the genital tract. In pre-antiseptic days death from this cause so frequently followed this operation that, simple as it was, many surgeons refused to perform it.

MENORRHAGIA—METRORRHAGIA.

Menorrhagia signifies a loss of blood from the uterus during menstruation which is more than usual. The normal loss for different women varies from two to nine ounces, but each case must be judged on its own merits, for obviously, if a woman having usually lost two to three ounces, commenced and continued to lose eight or nine she would be suffering from menorrhagia. The amount of blood lost by women suffering from menorrhagia varies with the cause. For instance, a patient with a fibroid tumour of the uterus may lose so much that she nearly dies of hæmorrhage. A serious loss is commonly termed "flooding."

Metrorrhagia signifies a loss of blood from some part of the genital passage in the interval between the periods. Menorrhagia and metrorrhagia in the majority of cases own the same cause, the condition that gives rise to too profuse a period being likely also to cause bleeding between the periods; and it is therefore not customary, when dealing with these symptoms, to separate them. Nevertheless there is one important point of difference between these two symptoms in respect to their cause—since, whereas menorrhagia may be due to some cause other than local disease of the genital organs, metrorrhagia can only be due to such disease. It will therefore be best to enumerate the causes of these symptoms under three headings: Menorrhagia only; Metrorrhagia only; Menorrhagia and Metrorrhagia.

Menorrhagia only.

CAUSES.—

1. Diseases of the liver and kidneys.
2. Purpura, anæmia.
3. Alcohol and rich living.
4. Constipation, abdominal tumours.
5. High altitudes, hot climates.
6. Puberty, menopause.

1. With liver and kidney disease venous congestion may occur in different parts of the body, and among them the uterus, so that when menstruation ensues an increased loss results.

2. Although anæmia is most often associated with amenorrhœa, yet in certain cases the opposite obtains.

3. Alcohol and rich living tend to cause flushing of the pelvic organs, and so congestion of the uterus.

4. Constipation and abdominal tumours, by pressure on the pelvic veins, give rise to venous congestion in the uterus, and so at times to increased loss.

5. Congestion of the uterus may occur in women living at high altitudes or in hot climates.

6. At the two extremes of the reproductive period the loss

at menstruation may be profuse. But whereas with respect to puberty the increased loss need not cause any undue alarm and a local examination is not, as a routine, necessary, it is always safer to regard menorrhagia at the menopause as due to local disease till the contrary has been proved. It is unfortunately a fact that the majority of women suffering from cancer of the uterus do not apply for advice early enough for any radical operation to be undertaken, because the increased loss from which they have suffered has been attributed to "the change of life."

Metrorrhagia only.

CAUSES.—

1. Ulceration of the vulva due to malignant disease, tubercle, or syphilis.
2. Ulceration of the vagina due to malignant disease, tubercle, syphilis, foreign bodies, or prolapse of the uterus.
3. Ulceration of the cervix due to prolapse of the uterus, malignant disease, tubercle, syphilis.
4. Erosion of the cervix.
5. Malignant disease of the urethra.

In some of these instances bleeding may only take place when the diseased part is touched. The commonest foreign body to cause ulceration is a pessary which the woman has neglected to have removed and cleaned at the end of three months, either through carelessness, or ignorance because the doctor did not impress upon her that this was necessary. There is a case on record in which a pessary was retained without being changed for over forty years. In former times it was not very uncommon for a neglected pessary to ulcerate either into the bladder or rectum, causing a fistula and giving rise to a stinking discharge which was mistaken for cancer.

Menorrhagia and Metrorrhagia.

Women suffering from the following diseases may at first complain only of menorrhagia, but most of them, if not cured by medical or surgical treatment, have metrorrhagia after a time.

CAUSES.—

1. Malignant disease of the uterus.
2. Fibroid tumours of the uterus.
3. Polypus of the uterus.
4. Inversion of the uterus.
5. Misplacement of the uterus.
6. Inflammation of the mucous membrane of the uterus (endometritis).
7. Subinvolution.
8. Inflammation of the Fallopian tubes (salpingitis).
9. Inflammation of the pelvic peritoneum (perimetritis).
10. Inflammation of the pelvic cellular tissue (parametritis).

Very rarely, hæmorrhage may occur from the genital tract before puberty, in which case it is nearly always due to malignant disease. Nurses should be careful therefore not to attribute such loss to an early puberty, but should advise the mother at once to take her child to a doctor.

TREATMENT.—

It is the duty of a nurse to advise any woman who may be suffering from menorrhagia or metrorrhagia to consult a doctor forthwith, since it may be that on recognition of its cause early treatment will be the means of saving the woman's life.

Hæmorrhage due to Pregnancy.

Hæmorrhage occurring in intra-uterine pregnancy does not need discussion here, but it should be remembered that in extra-uterine pregnancy there is an important symptom, the irregular discharge of a small quantity of brown-coloured blood. With this discharge pieces of the lining of the uterus (decidual cast) will be mixed, and the nurse must be most careful to save any such pieces for the doctor to examine.

DYSMENORRHŒA.

Dysmenorrhœa signifies painful menstruation, but it

is customary to apply this term also to pain in the genital region during the week before the flow appears.

Seventy per cent. of women complain of pain during or just before menstruation, but in only 10 per cent. is the complaint of a serious nature, or does it interfere with the customary avocation of the woman.

It has to be remembered that tolerance of pain varies within wide limits in different women, what one finds comparatively easy to bear another finds intolerable, but as there are no means of accurately estimating the severity of any particular case of dysmenorrhœa, each one has to be treated on its own merits.

It is a common observation that the majority of those women who complain the most of their dysmenorrhœa have the least to think about, and the pain is more easily tolerated by those who have to earn their own living.

Women who suffer from dysmenorrhœa may be divided into three groups :—

1. Those in whom the pain is intermittent and colicky in nature.

2. Those in whom the pain is continuous and dull-aching in character.

3. Those in whom with a dull-aching pain there are intermittent periods of sharp intensity. This class is a combination of the first two.

1. Colicky Dysmenorrhœa.—*Local Disease Present.*—

In the majority of cases the reason why the painless or slightly painful contractions of the uterus are substituted for those of a sharp and painful character is easily discovered. The uterus contains some substance which it is endeavouring to expel, either blood-clot, mucous membrane, or a tumour.

Blood collects in the uterus during menstruation, and clots when the flow is excessive or when the cervical canal is narrowed. In either case the blood does not escape quickly enough. Clots having formed, the uterus has to contract harder to expel them. Any disease, there-

fore, in which menorrhagia is a symptom or in which the cervical canal is narrowed, such as atresia, cancer, or a fibroid, may give rise to colicky dysmenorrhœa.

A reference to the remarks on normal menstruation will remind the reader that only a small portion of the mucous membrane is shed during this period, and then only in small pieces. In the disease known as *membranous* dysmenorrhœa the mucous membrane is so altered that it does not break up into little pieces, but is detached by the hæmorrhage either in large pieces or even as a cast of the whole uterus. To expel these large pieces the uterus has to contract strongly, hence the pain.

Lastly, if there is a polypus in the uterus it contracts from time to time, in its endeavour to expel it, and these contractions become especially marked during menstruation.

Local Disease Absent.—In a minority of cases no adequate cause can be found for the uterine colic, and the condition is then known as *spasmodic* dysmenorrhœa. The pain in these cases has been thought to be due to a neurosis, but it is often present in women in whom such a diagnosis could not be entertained. In many cases the shape of the uterus has not changed with puberty, and corresponds to that found in the infant, so that it is markedly anteflexed, and its cervix has a pin-hole os and is conical in shape. It has been thought, therefore, that the pain may be due to this peculiarity, but such a shape is found very well marked in women with painless menstruation. It may be that some cases are due to a neurosis and others to a maldevelopment.

2. Congestive Dysmenorrhœa.—In all women the genital organs become congested during the week preceding the flow as a result of the extra amount of blood which flows to them at that time. This blood is accommodated by the genital organs becoming somewhat stretched or distended, and so long as they are not the seat of any disease this congestion, in most cases, causes but little discomfort.

Local Disease Present.—When the internal genital organs are in a state of chronic congestion, or are inflamed, such as in perimetritis, parametritis, salpingitis, endometritis, fibroids, fibrosis, and fibro-adenoma of the uterus and displacements of this organ, the additional amount of blood flowing to them causes increased pressure on their nerves and pain results. If the uterus, ovaries, or Fallopian tubes are bound down by adhesions, and unable to become distended or stretched with the congestion, pain also results.

Local Disease Absent.—This variety of congestive dysmenorrhœa is common in young people. It is impossible satisfactorily to account for the cause of the pain. For want of a better explanation it has been thought that the nerves supplying their genital organs are unable to withstand this premenstrual flushing without originating a dysmenorrhœa. This variety is not so common in those women who have to earn their own living.

3. Colicky and Congestive.—Many women who suffer from colicky dysmenorrhœa acquire, as time goes on, the congestive variety in addition. There is no need to discuss this third variety separately since its symptoms and signs are a combination of the first and second.

DIAGNOSIS.—

The character of the pain will indicate whether the dysmenorrhœa is of a colicky or congestive variety. As to the cause, that must be left for the doctor to determine.

The commonest variety of dysmenorrhœa in young girls is colicky in nature, and is known as *spasmodic*. In this the pain appears as the flow commences, and lasts a varying period up to the first twenty-four hours or so. It is the severest variety of dysmenorrhœa known, at times causing the patient to vomit, perspire, or even to faint. Whilst the pain is on, the flow is generally scanty.

Spasmodic dysmenorrhœa is not uncommonly associated with sterility.

TREATMENT.—

The only proper method of treating dysmenorrhœa is to

ascertain, if possible, the cause, which may necessitate a pelvic examination, and then to treat it. A nurse cannot from her training be expected to arrive at a proper diagnosis.

It is as well to mention here that the treatment of dysmenorrhœa by opium or hot alcohol is to be condemned, the relief obtained may lead to a habit of taking these drugs. The nurse, should opportunity occur, must therefore endeavour to prevent the use of such drugs unless they have been prescribed by a fully qualified and responsible medical practitioner, a most unlikely event.

Spasmodic dysmenorrhœa can often be controlled by appropriate drug treatment; if this fails dilatation of the cervix will in most cases effect a cure or at any rate much relieve the pain. The operation has this additional advantage, that if sterility is complained of it will, in a certain percentage of cases, cure that also.

Congestive dysmenorrhœa can in some cases be relieved by rest, hot bottles, and saline aperients.

LEUCORRHŒA.

Leucorrhœa signifies a condition generally known as "the whites." The term is not restricted to a white discharge, but is applied also to one that is green, yellow, or watery.

CAUSE.—

Leucorrhœa, which is a symptom of many abnormal conditions, is due to—

1. An increased secretion of the mucous membrane lining the genital passages resulting from overgrowth, congestion, or inflammation.
2. Ulceration of some tumour of the genital organs or of some portion of the genital tract.
3. A combination of the causes enumerated in the two preceding paragraphs.

The importance of leucorrhœa from a diagnostic point of view depends on the character of the discharge and the

age and civil state (married or single) of the patient. Its causes can be most easily arranged under the following classes: from infancy to puberty; from puberty to marriage; from marriage to the menopause; after the menopause.

From Infancy to Puberty.—Before puberty the vagina, uterus, and Fallopian tubes, being undeveloped, are very rarely the seat of disease. In most instances, therefore, under this heading the discharge flows from the vulva, and may be associated with dirt, threadworms, anæmia, debility, or due to injury, or gonorrhœa. Rarely the vagina may be at fault, in which case the discharge is due to inflammation, caused by scarlet fever, measles, smallpox, or gonorrhœa. Foreign bodies which have been inserted into the vagina by the child, such as hairpins, pebbles, fruit-stones, may also be a cause.

In a large number of instances no apparent cause can be found for the discharge.

Gonorrhœa may be due to assault, or it may be caused by infection from towels which have been soiled by some adult suffering from this disease. There are on record several outbreaks of this disease which has been spread in this way in Institutions for girls.

It is also well to remember that mothers, especially in the poorer classes, are wont at times falsely to accuse men of assaulting their daughters, because the latter are suffering from leucorrhœa.

From Puberty to Marriage.—From puberty onwards a number of females suffer from leucorrhœa a day or two before, or a day or two after menstruation. This is due to congestion of the uterus, and is so common that it may almost be accounted as normal.

Other causes may be anæmia, chlorosis, diabetes; constipation; tumours of the genital organs; misplacement of the uterus; erosion of the neck of the uterus; endometritis; foreign bodies in the vagina; or a chill giving rise to congestion.

By far the commonest causes in young women are

chlorosis, anæmia, and constipation, which, in fact, account for nearly all the cases. In diabetes the sugary urine trickling over the vulva gives rise to intense irritation, and, as a result of the scratching to relieve this, an eczematous condition results.

In constipation the loaded rectum presses on the pelvic veins, and causes congestion.

With advancing age comes the increased liability to tumours of the genital organs, such as cancer, fibroids, and ovarians, which cause congestion, inflammation, or ulceration.

Misplacement of the womb (retroversion and prolapse) is much commoner after childbirth, as is also erosion, an overgrowth of the mucous membrane of the neck of the uterus, incorrectly termed "ulceration." Nevertheless, these conditions do occur in single women. The secretion comes from the increased number of glands due to the overgrowth of the lining of the uterus.

"Foreign bodies may be placed in the vagina by hysterical girls; by women to prevent conception; as the result of some brutal assault; to hide stolen property, or by feeble-minded females," and the following comprehensive list of articles that have been removed from the vagina is given by Bland-Sutton and Giles¹: "sponges, cotton-wool, pomade-pots, pewter-pots, cotton-reels or spools, candle-extinguishers, small indiarubber balls, pessaries, pipe-bowls, thimbles, clock-weights, gems, bank-notes, jewellery, pocket-books, a rose-bud, a small bust of Napoleon the Great, a cork, a rag, a needle-case, a boot-lace, and on one occasion, in which a patient was admitted to the Middlesex Hospital suffering from a fœtid discharge for "stone cancer," a piece of brick was removed from the vagina. In most cases the articles have been removed from married women.

From Marriage to the Menopause.—After marriage leucorrhœa, although it may be due to one or more of the causes already mentioned, is most commonly due to the results of child-birth, such as subinvolution of the uterus

¹ "Diseases of Women." Rebman, Limited, 1907.

and vagina ; misplacements of the uterus and vagina ; septic infection, or puerperal fever as it is termed. It may also be due to gonorrhœa.

The term subinvolution of the uterus means that this organ has not returned to its normal condition and proper size after the birth of the child. As a rule six to eight weeks are required for complete involution to take place, and when this does not occur, the increased area of mucous membrane accounts for the leucorrhœa.

In misplacement the discharge is due to congestion and the increased size of the organ, or to ulceration of the vagina and neck of the uterus, should they protrude outside the vulva.

In puerperal fever microbes gain access to the genital tract, and set up inflammatory changes, which may become chronic.

In gonorrhœa the discharge, which is profuse and yellow or green, is composed of pus, and is due to the acute inflammation.

It must be remembered that cancer, fibroids, and erosions are much commoner in married women.

After the Menopause.—In addition to many of the conditions mentioned above, leucorrhœa at this age may be due to inflammatory conditions of the uterus and vagina known as senile endometritis and senile vaginitis.

It is, however, most important to remember that the menopause is the commonest time for malignant disease of the genital organs to appear, and that, therefore, any woman who at this time of life is suffering from a leucorrhœal discharge should at once consult a doctor.

While the doctor must of necessity diagnose the cause of the leucorrhœa, some idea of its source of origin may be gathered from the character of the discharge, thus :—

A clear watery non-offensive discharge as a rule comes from the body of the uterus.

A clear glairy tenacious discharge, resembling the unboiled white of egg, comes from the neck of the uterus, but if it is mixed with vaginal discharge it will not be so clear.

A thick non-tenacious white discharge comes from the vagina.

A purulent discharge, green or yellow, is due to inflammation of the genital tract.

A stinking watery discharge points to cancer or ulceration.

TREATMENT.—

The treatment which varies with the cause comes under the province of the doctor. It may include some form of vaginal douching, according to its cause, and the nurse may be directed to carry this out (see page 137).

At times the discharge flowing over the vulva will give rise to such irritation that some local treatment will be necessary. Especially is this so in malignant disease of the genital tract. Useful remedies are to smear the vulva with vaseline, or with equal parts of castor oil and zinc ointment, or to place in the vagina a small plug of cotton-wool, which will soak up the discharge between the intervals of douching.

PRURITUS VULVÆ.

Pruritus vulvæ, which is characterized by severe itching of the vulva, is a very distressing complaint. It may be primary or secondary to some local condition.

Primary Pruritus Vulvæ.—

No cause can be found for primary pruritus vulvæ. It is due to a neurosis.

Secondary Pruritus Vulvæ.—

CAUSES.—

1. Congestion.
2. Parasites.
3. Leucorrhœa.
4. Urinary diseases.
5. Skin disease.
6. Menopause.

1. The congestion of the vulva caused by pregnancy or during the few days preceding menstruation may give rise to pruritus vulvæ, as also may that due to pressure on the veins of the pelvis by ovarian and fibroid tumours.

2. Threadworms, pediculi pubis, and scabies will cause pruritus.

3. As already mentioned, a discharge from any part of the genital tract flowing over the vulva may cause intense irritation.

4. Cystitis will cause pruritus, as also may diabetes. It is most important to remember the latter, which is a frequent cause of pruritus in young girls.

5. Eczema, herpes, and leukoplakia. The latter is a very important condition to recognize, as it is a forerunner of cancer.

6. The pruritus which at times appears with the onset of the menopause, and lasts till the symptoms of the latter have subsided, may or may not be associated with senile inflammation of the vulva.

SYMPTOMS.—

The itching may be paroxysmal in character, or more or less constant. It is generally worse at night or after exercise, when the patient is warm. It tends to become gradually more troublesome, and the scratching, which the sufferer finds necessary for her relief, only makes matters worse.

The irritation may become so intolerable that the patient will shun all society and even keep to one room, whilst there are cases on record in which the patient became insane and committed suicide, apparently from the great distress and loss of sleep occasioned by the constant irritation.

TREATMENT.—

In most cases if a cause can be found, the appropriate treatment will give very satisfactory results; but in pruritus due to the menopause, old age, or neurosis, in which no cause can be discovered, the effect of treatment is often most disappointing, and excision of the whole or portion of the vulva has on occasion been found necessary.

It is most important that the urine of any female who suffers from pruritus vulvæ should be examined, owing to the fact that it may be the first symptom of diabetes.

CHAPTER IV.

A SUMMARY OF GYNÆCOLOGICAL DISEASES.

THE genital organs of the female may be subject to inflammation and displacements, or they may be the seat of tumours, injuries, and malformations. The details of such conditions will be found discussed under the chapters dealing with the respective genital organs. There is, however, a certain advantage in briefly considering these conditions as they affect the genital organs as a whole, before dealing with each organ separately.

PELVIC INFLAMMATION.

Inflammatory disease of the genital tract is the most frequent cause of sterility, and is responsible for more suffering and disablement in the aggregate, and the loss of more lives than any other disease of a gynæcological nature.

The serious nature of infection, of any one portion of the genital tract in a woman, is due to the marked tendency it has to spread to other portions, and as her genital apparatus forms a patent canal leading from outside her body into her peritoneal cavity, the great danger to life that may result from such infection is obvious. In this respect the male genital organs entirely differ, since the peritoneal cavity of the male is closed, and inflammation of these organs, therefore, has not the same dangers or disabilities.

The channels of infection are two: the vulva and vagina, and the bowel.

Vulva and Vagina.—As the result of infection introduced from without and spreading along the mucous mem-

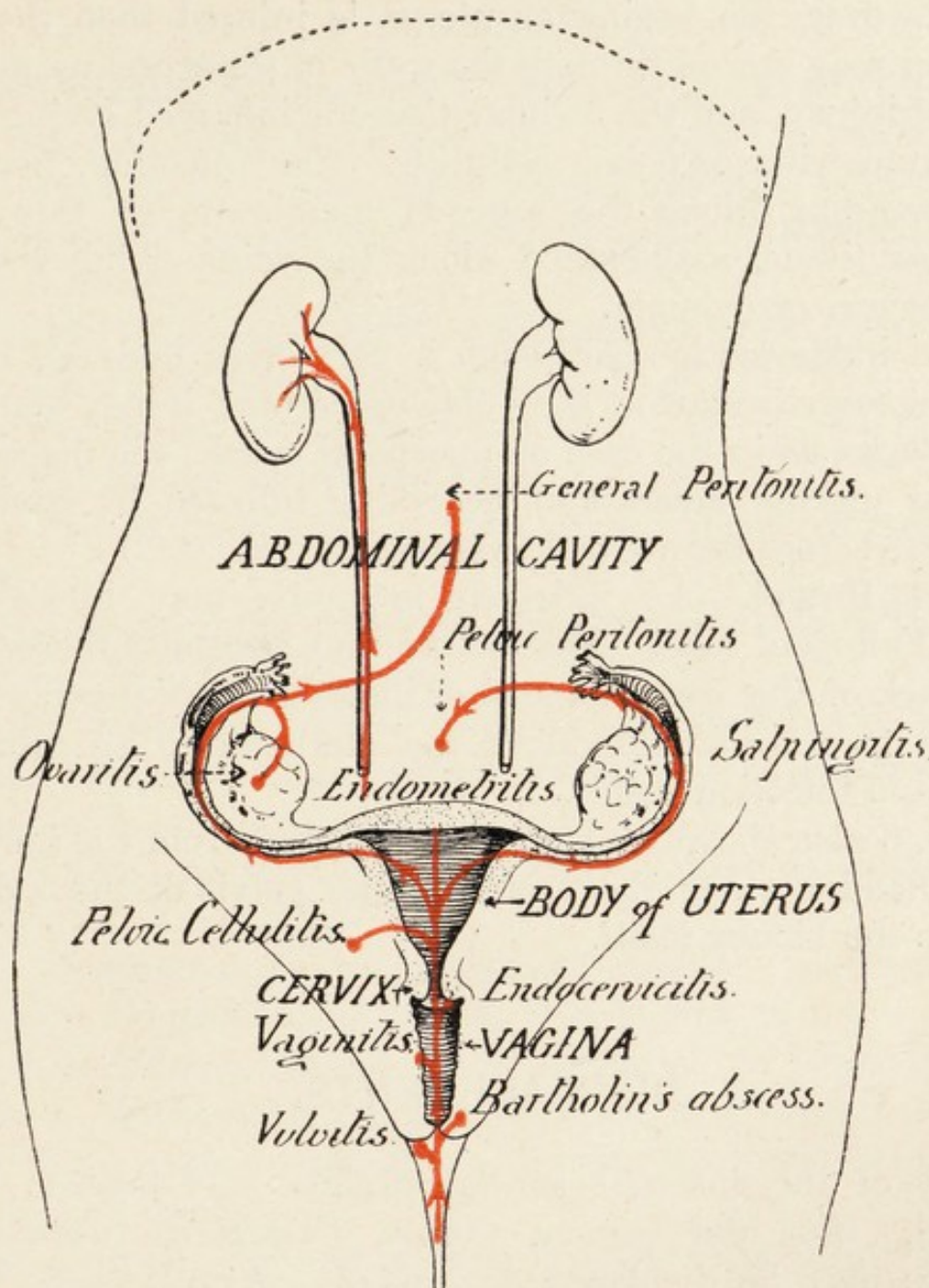


FIG. 6.—Diagram showing the path of infection from the vulva to the peritoneal cavity, and the various diseases that may result. The ureters, cut short, and the kidneys are also depicted showing the path of infection that may result from a cystitis, causing ureteritis, pyelitis, and pyo-nephritis.

brane of the genital canal, the following diseases may result:—

Vulvitis.	Salpingitis.
Bartholinian Abscess.	Ovaritis.
Vaginitis.	Pelvic peritonitis.
Endometritis.	General peritonitis.

If, however, the vagina or uterus is injured then the infection may spread through the walls of these organs, at the site of injury, and the cellular tissue is inflamed giving rise to parametritis or pelvic cellulitis. The infection, instead of spreading along the mucous membrane or into the cellular tissue, may extend along the veins giving rise to septicæmia or pyæmia.

The inflammation, although it very often does so, need not necessarily start at the vulva or vagina; it may start in the uterus, as in the case of puerperal sepsis, the placental site or uterine lacerations becoming infected by bacteria conveyed from the vulva or vagina.

The Bowel.—An inflamed appendix may infect the right Fallopian tube. The rectum may become adherent to the back of the uterus, a coil of intestine may become adherent to a fibroid tumour of the uterus or to an ovarian cyst, and infection result.

Fig. 6 also shows an ascending infection from the urethra and bladder along the ureters to the pelvis of the kidney and to the kidney itself.

DISPLACEMENTS.

Any of the internal genital organs may become displaced, thus the vagina, uterus, Fallopian tubes and ovaries may be displaced downwards or prolapsed. The uterus may also be displaced in other directions, thus it may be turned back or retroverted, bent back or retroflexed, turned forward or anteverted, and bent forward or anteflexed, and these various displacements may be combined, or associated with displacements of other pelvic organs. For instance, prolapse of the anterior vaginal wall is generally associated with prolapse of part of the bladder and the resulting swelling is known as a cystocele. Similarly part of the rectum may be associated with prolapse of the posterior vaginal wall, the swelling being called a rectocele.

TUMOURS.

The tumours of the genital organs may be cystic or solid, and they in their turn may be innocent or malignant. The ovary is the organ most usually affected with cystic tumours, the uterus that most commonly affected with solid tumours.

Cystic Tumours.—Cystic tumours are found :—

In the vulva as Bartholin's cysts.

In the vagina as vaginal cysts.

In the ovaries as ovarian cysts.

In the Fallopian tubes as a hydro, pyo, or hæmeto-salpinx.

The cysts in the first two are innocent and in the last they may also be malignant.

Solid Tumours.—Solid tumours may be found in all the genital organs, they are known as fibroma, carcinoma, and sarcoma.

A fibroma or fibroid is composed of fibrous tissue and muscle.

A carcinoma is a malignant tumour composed of squamous epithelial cells when it is known as a squamous-celled carcinoma, or columnar epithelial cells when it is called a glandular carcinoma, or adeno-carcinoma.

A sarcoma is a malignant tumour composed of cells of connective tissue.

In addition the uterus may be the seat of an adenomyoma which is a solid tumour composed of muscle and gland-tissue, and of a polypus which may be composed of fibrous tissue and muscle, the fibroid polypus; of glandular tissue, the mucous polypus; or of placental tissue, the placental polypus.

INJURIES.

The perineum, labia, vagina, and uterus may be torn during childbirth. The vulva and vagina may be injured by assault. The vulva may be injured by an accident.

The vaginal walls may be ulcerated by a pessary or malignant disease and a hole thus made into the bladder,

known as a vesico-vaginal fistula, or into the rectum, known as a recto-vaginal fistula.

The Fallopian tube may be torn as a result of pregnancy occurring therein.

MALFORMATIONS.

The internal genital organs are developed partly from certain cells found in the embryo each side of its spine, and partly from two tubes named the Mullerian and Wolffian ducts, which extend from the region of its kidney to its pelvis.

The cells become either ovaries or testes according to the sex. The upper parts of the Mullerian ducts form the Fallopian tubes and then uniting form the uterus. The Wolffian ducts unite to form the vagina.

The external genital organs are formed by certain folds and dimples to the skin.

Malformations of the genital organs are of two kinds, either the sexes may be combined, or the organs peculiar to one sex or the other may not become properly developed.

Combination of the Sexes.—Owing to some error in development, either in the cells or in the tubes, or in the foldings of the skin, an individual may have the internal genital organs of a woman and the external genital organs of a man or vice versa. Such individuals are often called hermaphrodites, but true hermaphrodites must have a complete set of male and female genital organs. In the human race, however, no case has been reported in which in addition to all the other genital organs there were present ovaries and testes. In all cases reported there have only been one set of these organs present, either ovaries or testes, and the proper term for such an individual is a pseudo-hermaphrodite.

Genital Organs not Properly Developed.—It is only necessary here to discuss the result in females. If the Mullerian and Wolffian ducts do not join at all, then the woman has a double uterus and vagina.

If the ducts join first at the level of the vagina then she has a double uterus.

The internal and external genital organs become connected by the Wolffian ducts growing downwards towards the dimpling which forms the vulva. The membrane where these two meet, just before the one opens into the other, is the hymen, and by its perforation the vulva leads into the vagina. If this perforation does not take place the condition known as imperforate hymen results, which leads to the menses being retained from the onset of puberty (see page 19).

Lastly, if the cells or ducts develop true to sex but not completely, the ovaries, Fallopian tubes, uterus or vagina may be very small and unable to perform their functions.

CHAPTER V.

DISEASES OF THE VULVA.

THE most frequent cause of a swelling of the vulva is one of the following conditions: cyst; abscess; hæmatoma; inguinal hernia; malignant disease; varicose veins, and inflammation. The latter will be dealt with in the section on gonorrhœa. The vulva may also be the seat of other diseases of which only leukoplakia will here be described.

Bartholin's Cyst.

The commonest cyst of the vulva is known as Bartholin's cyst, from the name of the anatomist who first described the gland that is affected.

The swelling is situated in one or other labium majus, just posterior to the corresponding labium minus, and may attain the size of an unshelled walnut.

CAUSE.—

The duct leading from Bartholin's gland becomes obstructed as the result of inflammation, and the mucous secretion being unable to escape, accumulates in the gland, and converts it into a cyst.

SYMPTOMS.—

Discomfort in sitting or walking, and pain. In some cases the cyst becomes inflamed and suppurates, a condition known as a Bartholinian abscess.

TREATMENT.—

The whole of the cyst wall must be dissected out, otherwise the condition may recur.

Bartholinian Abscess.

CAUSES.—

This is most commonly due to gonorrhœa, but it may rarely be due to septic infection, perhaps following a blow, or other injury to the cyst.

SYMPTOMS.—

Redness and œdema of the surrounding parts.

Pain, heat and tenderness in the swelling.

Very great pain on walking or sitting.

TREATMENT.—

The abscess will be treated by incision, scraping, and then swabbing its lining with pure carbolic acid. The cavity is packed with gauze, and hot fomentations are applied if there is much œdema.

Hæmatoma of the Vulva.

CAUSES.—

A swelling in any part of the vulva, caused by an extravasation of blood due to the rupture of some vessel by a kick or fall, or by the pressure of the foetal head during delivery.

SYMPTOMS AND SIGNS.—

There will be a history of injury.

The swelling is tender and discoloured. Rarely it suppurates.

In labour a hæmatoma of the vulva may form a serious obstruction to birth of the child.

TREATMENT.—

The doctor will order cold lead compresses to be applied to the swelling.

Inguinal Hernia.

SIGNS.—

This is characterized by a swelling which appears at the anterior end of the labium majus.

It disappears when the patient lies down.

There is probably an impulse on coughing.

The swelling, as a rule, can be pushed back into the abdominal cavity and kept there by a truss. Occasionally the bowel gets nipped and gives rise to symptoms of strangulated hernia, which if not relieved will kill the patient.

TREATMENT.—

The condition should be cured by operative treatment.

Varicose Veins of the Vulva.

CAUSES.—

Pregnancy ; pressure of abdominal tumours on the veins of the pelvis.

SYMPTOMS.—

This condition is easily identified, and, as a rule, it does not cause much trouble, except an aching, and occasionally pruritus.

If the patient becomes pregnant, however, the varicose veins may be a source of great danger, for they may burst, and the woman bleed to death before help can be obtained, or they may cause difficulty with childbirth.

SIGNS.—

During pregnancy the veins may become very enlarged, forming cords as large as the little finger, stretching up on to the abdomen and down on to the thighs, and in some cases obscuring the vulva.

TREATMENT.—

Labour may have to be terminated prematurely, lest the veins should cause an obstruction during labour, or bursting give rise to furious hæmorrhage. In the non-pregnant woman the varicose veins must be excised if they cause trouble.

Leukoplakia Vulvæ.

Leukoplakia vulvæ is a chronic inflammatory condition of the vulva and the skin adjacent.

CAUSE.—

The cause is not known. It occurs most frequently in married women at or about the menopause.

SYMPTOMS.—

The most marked symptom of leukoplakia is itching of the vulva which may be very intense and persistent. As the disease progresses the patient will complain of local pain due to one or more ulcers or fissures.

SIGNS.—

When well developed, leukoplakia can be diagnosed without much difficulty by a nurse. The whole of the vulva, except the vestibule, may be attacked. The inner surfaces of the labia majora are smooth as if ironed out, and have the appearance of being covered by a thin layer of milk. The colour is parchment-like. In addition, when the disease is more advanced, fissures or small ulcers may develop which are very tender. In a large number of cases, if the disease is not arrested, malignant disease supervenes.

TREATMENT.—

The nurse should counsel the patient to at once seek medical advice, because if the disease is efficiently treated the complication of malignant disease will be avoided.

For slight cases, the treatment will consist in the application of various lotions and ointments. If one fails another may succeed. The application of X-rays will at times lead to a cure.

When in spite of such treatment the disease is persistent, and especially if ulcers or fissures are present, the affected area should be excised so as to prevent cancer supervening. In fact, many authorities maintain that leukoplakia should always, in the first instance, be treated by excision, regarding it as a pre-cancerous condition.

Cancer.

As a rule cancer of the vulva first appears when the woman is between fifty and sixty years of age.

SYMPTOMS.—

The first symptom generally noticed is pruritus. Later when the growth ulcerates there will be pain, bleeding, and an offensive discharge. Towards the termination of the disease additional symptoms will be associated with the

bladder and rectum due to ulceration of these organs by the growth. What with the loss of sleep from the pain, anæmia from the bleeding, septic absorption from the ulceration, and inability to take food, patients in the last stages of this disease are the subjects of abject misery.

SIGNS.—

The disease first commences as a nodule most commonly on a labium majus. Prior to the appearance of this nodule the vulva has in nearly all cases, if not all, been affected with leukoplakia. Later the cancer ulcerates and the glands in the groin enlarge.

In the last stages ulceration spreads over the vulva on to the groins, abdomen, and thighs. The bladder and rectum may be involved with resulting fistulæ, or the growth may obstruct the urethra causing retention of urine.

TREATMENT.—

The patient should consult a medical practitioner at the earliest moment, with a view to operative treatment, as this is her only chance of cure.

Unfortunately either from ignorance of the presence of the growth, carelessness or disinclination to seek advice, such cases do not come under the care of the surgeon in their early stages. The nurse should always advise a patient suffering from leukoplakia, which is not difficult to diagnose, to seek medical advice.

CHAPTER VI.

DISEASES OF THE VAGINA.

VAGINITIS.

CAUSES.—

Inflammation of the vagina may be due to the following.

1. Gonorrhœa.
2. Sepsis due to a sloughing polypus, or following labour, abortion, or a vaginal operation.
3. Irritation of foreign bodies, generally neglected pessaries.
4. The chemicals in a vaginal douche being too strong.
5. A vaginal douche being too hot.
6. Advancing years—senile vaginitis.

SYMPTOMS.—

Feeling of heat and pain in the vagina.

Discharge which may be offensive.

Simple vaginitis is not a very troublesome disease, and a few days' rest in bed, together with vaginal douches, is generally sufficient to cure it.

Gonorrhœal vaginitis, however, is a much more serious condition. Unless efficiently treated, it is dangerous because it may spread up through the uterus into the Fallopian tubes, thence to the peritoneum, and so cause death from general peritonitis—this is rare. More commonly the inflammation stops at the Fallopian tubes and causes salpingitis and pyosalpinx. In fact, after sepsis due to labour or abortion, gonorrhœa is by far the commonest cause of salpingitis and its attendant ills.

There are some marked differences in the symptoms and signs between a simple and gonorrhœal vaginitis, and from these alone a very shrewd idea may be gathered as to the cause (see page 95).

CHAPTER VII.

DISEASES OF THE UTERUS.

DISPLACEMENT OF THE UTERUS.

THE uterus is kept in its normal position by certain ligaments, the pelvic floor, and the intra-abdominal pressure, any injury to or abnormal conditions of which tend to cause its displacement (see pages 7 and 8).

The uterus may be displaced backwards, forwards, downwards or sideways. By far the commonest misplacements are backwards and downwards, and these only will be dealt with.

Backward Displacements (Retroversion, Retroflexion).

Retroversion means that the uterus is tilted backwards as a whole, the body and neck keeping in one straight line.

Retroflexion means that the body is bent backwards, and the neck remains in its normal position; consequently there is a flexion between the body and neck.

The commonest variety of backward displacement is a combination of the two, in which the body is bent backwards and the neck tilted forwards.

CAUSES.—

1. Stretching or laceration of the pelvic floor and ligaments due to labour.
2. Increased weight of the uterus from subinvolution or a tumour.
3. Pressure on the front of the uterus from a tumour.
4. Fixation due to salpingitis and perimetritis.
5. Sudden fall or strain.
6. Congenital.

SYMPTOMS.—

Certain symptoms due to a resulting congestion may be complained of. These are backache and bearing-down pain, dysmenorrhœa, leucorrhœa, and menorrhagia.

In addition there may be constipation and painful defæcation due to pressure of the body of the uterus on the rectum, and frequency of micturition due to pressure of the cervix on the neck of the bladder.

Sterility.

Congenital retroversion, apart from any other complication, does not, as a rule, give rise to any symptoms, and is generally discovered accidentally.

If the backward displacement is complicated by salpingitis the additional symptoms mentioned under that disease will be present.

TREATMENT.—

In many patients backward displacement of the uterus causes no symptoms, in which case treatment is unnecessary. In others the treatment depends on the cause. Some patients are relieved by a Hodge or ring pessary. In others shortening the round ligaments or stitching the uterus to the anterior abdominal wall (ventro-suspension) must be done. These operations are most indicated in those cases in which the body of the uterus is very congested and tender, and the patient cannot tolerate a pessary.

A woman should not wear a pessary more than three months without having it taken out and cleaned or if necessary a new one fitted. Whilst the pessary is in position a daily douche should be used to keep the instrument and vagina clean.

Neglected pessaries have been the source of much suffering. Some careless women forget they are wearing pessaries, or will not be troubled to have them seen to. Such people run the risk of vaginitis being set up from the irritation, and even of the pessary ulcerating from the vagina into the bladder or rectum, causing a vesico-vaginal or recto-vaginal fistula.

Pregnancy in a Retroverted Uterus.—

Backward displacement, besides being the cause of a good deal of distress, may, should the woman be pregnant, become a source of positive danger. In such a case one of three things will happen :—

1. The uterus will right itself and pregnancy will continue.
2. The patient will miscarry.
3. Pregnancy will proceed, the uterus keeping in its abnormal position.

In this last case some time between the third and fourth month the body of the uterus gets caught under the sacral promontory, and no longer is able to expand upwards. Consequently it continues to expand in other directions, and soon commences to fill the pelvic cavity.

SYMPTOMS.—

The first warning of this incarceration, as it is called, is that the patient complains of pain on micturition, or inability to pass any urine (retention), or the frequent passage of a small quantity of urine (incontinence of retention).

This incontinence of retention is due to the fact that the cervix has been pressed forward against the urethra, which then becomes occluded. Retention results, and the pressure of the retained urine in the bladder rises to such an extent that at last a little forces its way past the obstruction, and it is for this frequency that the patient most commonly seeks relief.

In addition to the trouble with micturition, the patient will give a history of three months' amenorrhœa, morning nausea, swelling of the breasts, and an abdominal tumour.

The abdominal swelling is the distended bladder, and if a catheter be passed an average of about five pints of urine will be drawn off. As many as thirteen pints have been evacuated.

TREATMENT.—

After the bladder is empty the doctor will, as a rule, be able to replace the uterus, and having inserted a pessary to keep it in position, pregnancy will generally continue quite normally.

Rarely the uterus cannot be pushed up, even after a rest in bed for two or three weeks, and in this case it has to be emptied to prevent death from sepsis or kidney disease.

Sudden Backward Displacement.—

This variety of backward displacement is rare, and occurs most frequently in young unmarried women, or married women who have never had children.

CAUSE.—

As a result of a sudden strain or fall, such as falling off a bicycle or fence, the bladder being full at the time, the uterus is thrown backwards, and is held in that position by the tight utero-sacral ligaments.

SYMPTOMS.—

Great pain and faintness is caused at the time, and this is succeeded by continual aching in the pelvis, severe pain on defæcation, and when the period supervenes dysmenorrhœa.

TREATMENT.—

The uterus has to be replaced under an anæsthetic.

Downward Displacement (Prolapse).

In prolapse of the uterus this organ has descended till the cervix reaches the vulval orifice.

Procidentia is the term used when the whole uterus and vaginal walls have escaped through the vulval orifice and project outside.

CAUSES.—

1. Stretching or laceration of the pelvic floor or ligaments, due to labour. This is the common cause.

2. Increased intra-abdominal pressure, due to a tumour pressing on the uterus, or the constant bearing-down efforts called into action by chronic constipation, hard manual work, or chronic bronchitis.

3. Wasting disease.

SYMPTOMS.—

Backache and bearing-down pain.

Constipation and hæmorrhoids from pressure on the rectum.

Frequency of micturition or inability to empty the bladder unless the prolapse is first pressed up with the fingers.

Leucorrhœa due to congestion, and, when there is procidentia, to ulceration of the cervix and vagina through rubbing against the clothes.

The feeling of a swelling at the vulval orifice. Difficulty in walking or sitting, because of the protrusion.

In some cases, although procidentia is present, the patient makes no complaint.

SIGNS.—

The signs that the nurse will be able to detect will depend upon the severity of the prolapse. In the early stages only a swelling will be noticed at the vulval orifice on the woman bearing-down. If the swelling is in front it is called a cystocele, and it is formed of part of the anterior vaginal wall and a portion of the bladder in relation therewith. If the swelling is behind it is termed a rectocele and it consists of part of the posterior vaginal wall and rectum. In more severe cases the cervix may be seen projecting through the vulva. In procidentia a tumour is found between the legs, consisting of the vaginal walls and the uterus, only the cervix of the latter being seen.

TREATMENT.—

In many cases a ring pessary will suffice to keep the uterus in position, though perhaps a preliminary perineorrhaphy may be necessary. If this fails there are various patterns of cup-and-stem pessaries, which will suffice, the best perhaps being Napier's. Pessaries, however, are troublesome, and younger women do not tolerate them very well. Many operations have therefore been devised for the relief of this troublesome complaint. Ventro-suspension, with removal of as much vaginal wall as possible (anterior and posterior colporrhaphy), and a portion of the cervix if necessary, gives the best results.

SUBINVOLUTION.

The term subinvolution of the uterus denotes that this organ has not returned to its proper size after childbirth or miscarriage.

On the completion of labour the uterus measures seven and a half inches in length and weighs two pounds. In six weeks' time it should decrease to three inches in length and weigh a little over two ounces.

CAUSES.—

Not suckling the baby; backward displacement of the uterus; antepartum hæmorrhage; post-partum hæmorrhage; serious constitutional disease; pelvic inflammation; puerperal fever; fibroid tumour; retained placenta.

SYMPTOMS.—

Menorrhagia; leucorrhœa; backache.

These symptoms are due to the fact that the uterus is larger than it should be, and there are consequently more vessels to rupture at menstruation, and there are more glands to increase the amount of secretion between the periods.

TREATMENT.—

The medical attendant will probably prescribe rest, ergot, and hot douches, and if these do not relieve the condition the patient should be curetted.

ENDOMETRITIS.

Inflammation of the lining membrane of the uterus is, in all cases, the result of bacterial infection. As a rule the organism is a streptococcus or the gonococcus, but the infection may be due to other bacteria.

The disease may be acute or chronic, the latter variety resulting from an acute attack or being chronic from the first.

CAUSES.—

In nearly all cases the inflammation is due to puerperal or gonorrhœal infection, the bacteria gaining entrance by the vagina. More rarely it may follow an operation upon

the genital organs, or may occur as a complication of one of the zymotic diseases.

SYMPTOMS.—

In the acute puerperal variety the symptoms are of great severity. The temperature rises rapidly and there may be a rigor accompanying it. The pulse-rate is quick, and the patient is very ill and complains of abdominal pain. There is a purulent discharge. The further symptoms depend upon the progress of the case, for the infection may not remain localized but may spread to the cellular tissue or peritoneum, and septicæmia not infrequently results.

If the endometritis is due to a gonorrhœal infection the general symptoms are, as a rule, not so severe. There is a profuse purulent discharge, which is very irritating, and an increase in the amount of menstrual loss, whilst menstruation often becomes irregular.

The chief symptoms of chronic endometritis are menorrhagia, leucorrhœa, and backache.

TREATMENT.—

The treatment of acute endometritis will depend partly on the nature of the infecting organism and may include the administration of vaccines.

Chronic endometritis is generally treated by curettage.

POLYPI OF THE UTERUS.

The following varieties of polypi may be found in the uterus:—

Fibroid. Mucous. Placental.

Fibroid Polypus.—

This condition will be dealt with under fibroids of the uterus.

Mucous Polypus.—

The internal lining of the uterus consists of mucous membrane. In some cases the amount and thickness of this membrane becomes much increased, and sometimes this increase may be more marked at certain spots than others, with the result that a small projection of mucous

membrane is formed, which is called a mucous polypus. There may be one or more of these projections, which may be situated in the body or in the neck of the uterus.

Placental Polypus.—

If a piece of placenta is retained at childbirth, and remains in the uterus, the subsequent events depend greatly upon whether it dies or not.

If it dies, microbes infect it, and sapræmia results. On the other hand, if it is adherent and well nourished by blood-vessels from the uterine wall, it need not die. Then, from time to time, the blood trickling over this piece of placenta becomes deposited on it, and at last a small polypus is formed.

SYMPTOMS.—

Menorrhagia ; metrorrhagia ; leucorrhœa ; dysmenorrhœa.

In the case of a fibroid polypus there will be the other symptoms of fibroids, and with placental polypus the complaint will date from labour or abortion.

TREATMENT.—

The only treatment of any avail is removal of the polypus.

FIBROID TUMOURS OF THE UTERUS.

Exactly how often the uterus of a woman is the seat of a fibroid tumour it is difficult to say. Authorities vary in their estimates, but the statistics of the dead-house show that 40 per cent. of women over fifty years of age have fibroid tumours.

These statistics, however, include small fibroids not larger than a pea which never cause their owner any trouble, and which are only found on the routine inspection of the operating or post-mortem room.

Fortunately in the large majority of women, whose uteri are thus affected, the tumour is small, symptoms are absent, and its presence remains undetected.

On the other hand, both by growth and by changes taking place in them, fibroids may be directly responsible

for the termination of life. The majority of fibroids giving rise to symptoms first cause trouble between the ages of thirty and forty-five.

According to their position fibroids are classified as: pedunculated-subperitoneal, subperitoneal, interstitial, submucous, and pedunculated-submucous (fibroid polypus).

By a pedunculated-subperitoneal fibroid is meant a fibroid which is projecting into the abdominal cavity, and is attached to the external surface of the uterus by a stalk.

A subperitoneal fibroid is a fibroid growing on the external surface of the uterus, just under the peritoneum, so that the latter is pushed up, and the outer surface of the uterus is uneven.

An interstitial fibroid is one growing in the wall of the uterus, and not projecting beyond either its external or internal surface.

A submucous fibroid projects towards the cavity of the uterus pushing the mucous membrane before it, and causing the internal surface to be irregular.

A pedunculated submucous fibroid—or, as it is generally termed, a fibroid polypus—is in reality a later stage of a submucous fibroid. The tumour now covered with mucous membrane is expelled from the uterine wall into the cavity of the uterus, all except a small portion which forms a stalk.

SYMPTOMS.—

Menorrhagia; metrorrhagia; leucorrhœa; dysmenorrhœa; sterility, and those of pressure.

Menorrhagia, Metrorrhagia.—The amount of hæmorrhage caused by fibroids varies greatly in different women.

The bleeding is due to the rupture of blood-vessels in the mucous membrane lining the cavity of the uterus, which is enlarged in all cases of bleeding fibroids, in some instances by several inches. The vessels are also likely to rupture because they are diseased.

In some the loss is only a slight increase at the periods, in others the menorrhagia and metrorrhagia are so marked

that the term "flooding" is very commonly given to the great hæmorrhage, which may be directly the cause of death.

It is only very rarely, however, that a woman dies from hæmorrhage due to these tumours, and then only, as a rule, because the loss has been spread over a long period, and the patient has been allowed to become ex-sanguinated by inefficient treatment.

On the other hand, hæmorrhage may be responsible for a large amount of suffering, and, in former times especially, patients were allowed to spend many years as invalids, each month of their life being divided into two cycles, one in which they were bleeding and the other in which their medical attendant was endeavouring by drugs and rest to patch them up for their next bleeding, and so things went on in a vicious circle until death, the menopause, or some enterprising surgeon, relieved them of their misery.

The different kinds of fibroids vary in the amount of bleeding they are likely to cause, thus, the pedunculated-subperitoneal and subperitoneal varieties do not give rise to any bleeding. A fibroid polypus, as a rule, causes more hæmorrhage than any other variety. The interstitial and submucous fibroids often cause serious bleeding.

If a fibroid becomes septic, cystic, or malignant, the amount of blood lost will be increased.

Leucorrhœa.—This may be due to several causes. As the amount of mucous membrane lining the cavity of the uterus is greater, the number of glands in the membrane is considerably increased, with the result, therefore, that there is much more secretion. Then the leucorrhœa may be due to congestion, or it may be due to a sloughing fibroid polypus, when the discharge will be horribly offensive, and the case may be mistaken for one of cancer. The leucorrhœa may also be due to the mucous membrane of the uterus being inflamed (endometritis).

Dysmenorrhœa.—The pain at the periods associated with fibroids may be due, very rarely, to the fibroid obstructing the escape of blood from the uterus (colicky

dysmenorrhœa), but most commonly it is due to congestion (congestive dysmenorrhœa). As a rule dysmenorrhœa due to fibroids first makes its appearance between the ages of thirty to forty.

Sterility.—Fibroids large enough to be detected on examination, and which give rise to any symptoms, are a hindrance to impregnation, but the combination of fibroids and pregnancy is not an uncommon one. Fibroids develop in married women more frequently than in those unmarried.

Pressure Symptoms.—

Pressure on the Bladder and Urethra.—Pressure on the bladder will cause frequency of micturition, and on the urethra retention. A very significant symptom of a fibroid in a woman is retention of urine for a few hours or a day before the period ensues. A history such as this makes it practically certain that a fibroid is filling the pelvis all but a very little, and will soon be exerting very injurious pressure on the surrounding structures. The extra amount of blood that flows to the uterus and tumour, a few days before the period is due, causes the tumour to swell sufficiently to occlude the urethra and so retention results.

Pressure on the Ureters.—A fibroid that is lodged tightly in the pelvis—impacted, as it is termed—will press on the ureters, as may also a very large fibroid reaching up into the abdomen. The kidney will then become diseased by the backward pressure of the urine which has difficulty in getting into the bladder, and the patient may eventually die of uræmia if the tumour is not removed.

Pressure on the Bowel.—The large intestine may be nipped against the brim of the pelvis by a heavy tumour. The small intestine may become twisted round the stalk of a pedunculated-subperitoneal tumour, and the rectum may be obstructed by an impacted fibroid. In the latter case constipation results, and in all three intestinal obstruction or perforation of the intestine with fatal peritonitis may occur.

Pressure on the Veins.—As a result the patient may suffer from hæmorrhoids, œdema of the legs, varicose veins of the leg, or thrombosis in the femoral veins.

Pressure on the Nerves.—This may give rise to neuralgia, bearing-down pain, backache, or sciatica.

Pressure on the Diaphragm.—With very large tumours—and tumours over 100 pounds in weight are recorded—the action of the diaphragm is impeded so that the heart and lungs cannot properly perform their functions.

Secondary Changes in Fibroids.—

A fibroid tumour may become septic, cystic, malignant, or undergo red degeneration.

Septic Fibroid.—A septic fibroid is a very dangerous tumour. The patient is likely to die of peritonitis if the sepsis spreads to the peritoneal cavity, or she may die of septicæmia. A fibroid may become inflamed from disease of the bowel, of the appendix, or of the Fallopian tubes. It may become septic from pressure during labour, or it may be infected in a case of puerperal fever after labour. Lastly, a fibroid polypus becomes septic by microbes infecting it from the vagina.

Submucous fibroids and fibroid polypi at times becoming septic, suppurate, and are then discharged, so that a cure results, but the patient may become so dangerously ill during the process that she will die before the tumour can be expelled.

SYMPTOMS.—

The patient will have a high temperature, a rapid pulse, perhaps a very foetid discharge, the amount of bleeding will increase, the fibroid will be tender, and there will be marked abdominal pain.

Cystic Fibroid.—In this complication the solid tumour becomes converted into a cyst, and has thus often been mistaken for pregnancy or an ovarian tumour.

SYMPTOMS.—

The size of the tumour increases rapidly, and it becomes softer. There is severe pain, and the amount of blood lost is increased.

Malignant Fibroid.—Very rarely a fibroid may become malignant.

SYMPTOMS.—

Such a complication would be indicated by very rapid growth, marked bleeding, severe pain and emaciation.

Red Degeneration.—In this the fibroid becomes very red in colour. It is a condition nearly always associated with pregnancy, and may cause trouble then or after labour.

SYMPTOMS.—

The patient complains of pain, tenderness, and of the symptoms of fever which is present.

Fibroids may Endanger Life in many Ways.—

By hæmorrhage, by sepsis, by pressure, by becoming malignant, by twisting of the pedicle, and by complicating pregnancy, labour, or the puerperium.

The dangers of some of these complications have already been discussed.

Twisting of the Pedicle.—The stalk of a pedunculated-subperitoneal fibroid may become twisted in the same manner as that of an ovarian cyst. Pain results, and the tumour may become inflamed.

Effect of Fibroids on Pregnancy.—The pressure symptoms of pregnancy may be more marked, vomiting more troublesome, and in some cases the tumour may possibly favour the occurrence of albuminuria, and so eclampsia. Pregnant women with fibroids may miscarry from uterine contractions or bleeding set up by the tumours, or because the uterus has become retroverted, and in some cases also impacted. Accidental hæmorrhage is at times due to a fibroid.

Effect of Pregnancy on the Fibroid.—The fibroid grows more rapidly, and in some cases the dangerous change known as red degeneration may take place in it.

Effect of Fibroids on Labour.—A fibroid may cause obstruction to labour, and so, if unrelieved, rupture of the uterus, by being situated below the presenting part and narrowing the passage, or by causing malpresentation of the foetus. A fibroid may also cause inertia and post-partum hæmorrhage as a result of this inertia, or because it prevents the proper retraction of the uterus.

Effect of Labour on Fibroids.—The fibroid may be so bruised owing to the passage of the child that it becomes inflamed. Also the stalk of a pedunculated subperitoneal fibroid may become twisted.

Effect of Fibroids on the Puerperium.—Fibroids are a cause of subinvolution. They may also give rise to secondary post-partum hæmorrhage, and if they become septic they may cause septicæmia.

Effect of the Puerperium on Fibroids.—A submucous fibroid may, as the uterus shrinks, become converted into a fibroid polypus, and if septic may then become expelled. A fibroid may also undergo red degeneration at this time, and have to be removed. A fibroid may become infected as a result of sepsis due to the introduction of germs during labour.

Although the above is a serious list of complications which may ensue should a woman with a fibroid conceive, yet, as a matter of experience, it is found that in a very large majority of cases no harm results either during pregnancy, labour, or the puerperium, and, therefore, unless some complication does arise, no operative treatment is necessary.

It is far different, however, in the case of an ovarian cyst, complicating pregnancy, labour, and the puerperium. In this case there is a very real danger, so much so that the tumour should be removed as soon as possible.

TREATMENT.—

Fibroids need treatment either because they are causing serious hæmorrhage, because they are endangering life by pressure, because some complication arises in them, or very rarely because of their size.

In the olden days bleeding fibroids were treated with drugs and rest, together with as much nourishing food as the patient could afford. In addition the sufferer was buoyed up with the assurance that at the menopause all would be well.

The results of such treatment in some cases were disastrous, and the patients died of bleeding and exhaustion

before the advent of the promised relief. In other cases the results were almost as bad, the patient having to lead the life of an invalid all the best years of her life, every month spending a fortnight or more in bed or resting on a couch. The only exception to this method of treatment was in the case of a fibroid polypus, which was removed.

Nowadays the treatment of bleeding fibroids has undergone a great change. It is recognized that it is no longer fair or right to allow a woman to remain a chronic invalid from a continual loss month after month and year after year.

We may divide cases of bleeding fibroids into three classes :—

1. In which the hæmorrhage is so bad that a surgical operation, most frequently hysterectomy, is required to save life. Rare.

2. In which the hæmorrhage is severe, but not so severe as to directly threaten life. Fairly common.

3. In which the hæmorrhage is comparatively slight, and can be controlled by drugs. Common.

The treatment of those cases that come under the second class has of late years been most open to discussion. On the one hand a large number of authorities think that these women should be restored to an active and healthy life by some operative procedure, most commonly removal of the uterus, and they argue that it is better for the woman to run the slight risk which attends the operation performed by skilled operators than to lead the life of an invalid for many years.

On the other hand, unfortunately, there are still many doctors who consider that a woman should not be subjected to the danger of hysterectomy unless the bleeding is imperilling her life.

In those cases in which bleeding due to fibroids starts within a year or two of the menopause, and the patient is averse to operation, so long as the bleeding is not imperilling life, drug treatment may be tried. It must always be remembered, however, that the menopause in such

cases is apt to be postponed for some time, and also that *increased bleeding in a woman with fibroids near the menopause may be due to cancer arising in the uterus, or to some change in the fibroid.*

Poor patients, who have to earn their own living, should be strongly advised to submit themselves to operation, since if they have to stay away from work four or five days in each month their employer will probably dismiss them.

In the majority of cases the proper treatment for a bleeding fibroid that makes a woman a semi-invalid is hysterectomy, unless, of course, any less severe operation will serve the same purpose.

The mortality is so low, and the improvement in health, as a result of the radical operation, is so striking, that it is now an everyday experience for women with bleeding fibroids to consult medical men with a view to operative procedure.

If a fibroid is endangering life by pressure it should be removed—every one is agreed upon this; but a difference of opinion arises when life is not endangered, and the difficulty is to decide whether a fibroid which is not bleeding, but is of a fair size, should be removed. Many surgeons think that such a fibroid should be removed because it is a mistaken policy to wait until pressure symptoms have developed, since then the patient will not be so well able to withstand the operation, which itself will be much more difficult and severe than if the fibroid had been removed at an earlier date. On the other hand, many medical men do not pay much attention to the size alone.

If, on repeated examination, a non-bleeding fibroid is found to be steadily increasing in size, then it will be in the best interests of the patient to remove it before pressure symptoms have developed, otherwise her chance of recovery will be lessened, not only because of the damage that has already been done, but also because of the more severe nature of the operation.

If a fibroid becomes septic, cystic, or malignant, it should

be removed forthwith. These complications are rare. If a patient is under medical observation their onset will be detected, and the tumour can be removed.

The mortality of hysterectomy for fibroids is, with skilled operators, less than 5 per cent. If the results of all operators were collated, the mortality would be found to be considerably higher. But even supposing that the death-rate from hysterectomy for non-bleeding fibroids, by operators skilled in this special branch of surgery, was no greater or even a shade less than if these cases were left alone, this would be no good reason for the dictum that all non-bleeding fibroids should be removed as a precaution against the chance of the tumour becoming the seat of some secondary change, since, if such treatment became recognized and was carried out by doctors not having special experience in this class of work, the operative mortality would at once very seriously increase, and be out of all proportion to the risk incurred by leaving the tumour.

If a fibroid tumour is by its size causing distress, and prevents the patient getting about, it should be removed. In the case of an unmarried woman the fibroid from its size may lead to a suspicion of pregnancy, in which case she would be justified in demanding its removal.

CANCER OF THE UTERUS.

Out of every 100 women who die during the year in England and Wales four die of cancer of the uterus, and in nearly one-third of the total number of deaths from cancer in women this organ is affected. More women die of cancer than of consumption.

The disease may appear first in the body of the uterus or in the neck. Cancer of the body is fairly rare, most patients suffering from it are between fifty and sixty years of age, and many of them have not had any children.

Cancer of the neck is in comparison with cancer of the body very common, it occurs in the majority of women between thirty-five and fifty, and most of the patients have given birth to five or more children.

The local irritation due to a laceration of the cervix at childbirth is probably a predisposing cause to the cancer.

SYMPTOMS.—

Hæmorrhage; leucorrhœa; pain; cachexia.

Hæmorrhage.—This is the earliest symptom both in cancer of the body and cervix.

Such hæmorrhage may declare itself first as menorrhagia, or, in the case of cancer of the neck, it may come on between the periods as a result of exertion, of douching or of coitus. Hæmorrhage after the menopause is most likely to be due to cancer of the body.

At times the hæmorrhage is severe, but only seldom is it the immediate cause of death, and then only at a late stage when the ulceration has extended into the uterine artery. As a rule the bleeding is due to rupture of the small blood-vessels in the tumour.

Leucorrhœa.—This is at first due to congestion, and is not offensive. In the later stages it is due to ulceration of the growth, and the discharge is horribly offensive. Unfortunately it is often only when the offensive discharge appears that women apply for advice, and then it is frequently too late for any radical treatment to be attempted.

Pain.—This is a variable symptom. In cancer of the neck it does not appear till late in the disease, and is due to the growth spreading to surrounding structures. In cancer of the body, on the other hand, pain is much earlier, as this structure is more sensitive.

Cachexia signifies the yellow earthy appearance that patients suffering from cancer have in the last stages of the disease. It is accompanied by other symptoms of wasting, loss of appetite, and exhaustion.

DIRECTION IN WHICH THE CANCER SPREADS.

Downwards.—On to the vagina, implicating the urethra, and so causing painful micturition and eventually retention of urine.

Upwards.—To the peritoneum.

Forwards.—Into the bladder, causing a vesico-vaginal fistula.

Backwards.—Into the rectum, causing a recto-vaginal fistula.

Outwards.—Into the broad ligaments fixing the uterus and implicating the ureters.

CAUSES OF DEATH.—

The commonest cause of death is exhaustion. After this uræmia claims the greatest number of victims, and is due to the cancer growing into the ureters and preventing the proper flow of urine from the kidney.

The remaining causes of death are hæmorrhage, septicæmia, embolism, peritonitis, intestinal obstruction, and secondary deposits in the brain, lungs, liver, and other organs. When compared with the first two causes, the remainder are rare.

TREATMENT.—

The treatment is either radical or palliative.

Radical Treatment.—If the patient is seen sufficiently early, removal of the uterus, the cellular tissue in its neighbourhood, the local lymphatic glands, and the upper part of the vagina (Radical Hysterectomy) is the proper treatment and will almost certainly cure the patient. Unfortunately most of the patients are seen first by the surgeon when the disease is so far advanced that a cure is problematical, or an operation cannot be attempted.

There are various reasons why this delay occurs. To begin with, cancer very commonly appears about the menopause, and the patient thinks, or is told by her friends, and even, unfortunately, in many cases by a nurse or her doctor, that the bleeding she complains of is nothing to be alarmed at, and that it is due simply to the “change of life,” and so precious time is wasted.

Then many patients only bleed a little and they are not alarmed till the offensive discharge appears, when it is often too late for treatment of a radical nature. Pain, again, in most cases is a very late symptom; whilst many women shrink from consulting a doctor from the dread of

a local examination; and, lastly, others have the fixed idea that cancer is incurable, so are not anxious to learn the worst. Patients are generally ignorant of the early symptoms of cancer.

It is now proved beyond doubt that cancer of the uterus is curable if only the patient is operated upon at an early stage of the disease.

A number of operators all over the world have records of patients who have lived ten, fifteen, and twenty years after an operation performed in the early stages of cancer.

Every nurse, therefore, should know the symptoms of cancer of the uterus, so that when she meets a woman complaining of any of them she can advise her to at once consult a doctor.

Palliative Treatment.—This consists in remedies for the bleeding, discharge, and pain.

For the bleeding the doctor will prescribe ergot and other drugs, or he may curette the growth or insert radium into it. The nurse may be called upon to treat a sudden severe hæmorrhage, in which case she should give hot douches (110° F.), and if this does not stop the bleeding the vagina may have to be plugged.

Leucorrhœa will be treated by various douches, those helping to destroy the odour, such as iodine, sanitas, or permanganate of potash, being most often used. The growth may be curetted.

The discharge may also cause pruritus, which can be treated first by douching and then by smearing the vulva with a mixture of equal parts of castor oil and zinc ointment, or by placing a wool-plug just in the vagina to soak up the discharge.

The best method of diminishing the odour in advanced cases is found to be scrupulous cleanliness (the pads, sheets, nightgowns being changed whenever soiled), douching and plenty of fresh air in the room. In addition, saucers containing charcoal, and sheets with carbolic lotion sprinkled on them can be placed in the room, but these will seldom be necessary if the other directions are carefully observed,

Pain is a troublesome complaint. It is best treated by changing the nature of the analgesic directly it commences to lose its effect. Towards the end injections of morphia will generally be found necessary. As a routine treatment it has been found in the Middlesex Hospital Cancer Wing that aspirin gives the most relief.

What with the pain, bleeding, discharge, emaciation, disorders of micturition and defæcation, and perhaps bed-sores that attend these pitiable cases in their last stages, only a thoroughly trained nurse is capable of properly looking after them.

CHAPTER VIII.

DISEASES OF THE FALLOPIAN TUBE.

SALPINGITIS.

OF the serious diseases that are peculiar to women, salpingitis or inflammation of the Fallopian tubes occurs most frequently.

CAUSES.—

Sepsis after labour or abortion; gonorrhœa; sloughing fibroids; cancer of the uterus; tubercle; sepsis due to the use of dirty instruments (sounds, dilators).

The large majority of cases are due to the first two causes in the order named.

Salpingitis is much commoner among the poor than the rich. In fact, it is a comparatively rare disease among the well-to-do, the reason being self-obvious.

The disease is due to a microbe, which in most cases first causes an endometritis and then infects the tubes. The tubes may then become merely inflamed (salpingitis) or their abdominal opening may become closed, and pus collecting, a pyosalpinx is formed.

The inflammation often spreads from the tubes to the surrounding structures, and rarely acute peritonitis may supervene with a fatal result.

More commonly the intestine, ovary, and uterus become bound together by adhesions and fixed, and because of these adhesions the removal of the tubes, later on, may be very dangerous and difficult.

SYMPTOMS.—

The symptoms depend mostly on whether the case is an acute or chronic one.

Acute.—In this instance the onset is sudden, the temperature rises to a high degree (103° F. or more), the illness may be ushered in by a rigor, the patient complains of severe abdominal pain, and the belly is distended and very tender. The condition is nearly always due to sepsis after labour or abortion, and more rarely to gonorrhœa. The abdominal symptoms are due to pus escaping from the Fallopian tube before its fimbriated end is sealed by the inflammation.

Chronic.—The chronic cases are much the commoner. In these the inflammation gradually spreads through the walls of the tube, the abdominal opening having been closed by inflammation. The patient complains of menorrhagia, metrorrhagia, dysmenorrhœa, leucorrhœa, painful defæcation, and perhaps a frequency of micturition. Salpingitis is a common cause of sterility.

A usual history in these cases, especially when there is pus present, is that the patient has for years been living the life of a semi-invalid, and hardly, if ever, feels quite well, is unable to do much work, and any extra exertion is likely to bring on what she calls an attack of "inflammation of the bowels," for which she has to go to bed for a few days. These attacks, which gradually increase in frequency, are due to the fact that microbes have escaped from the tube and are setting up fresh inflammation.

A pyosalpinx, which is due to pus collecting in the Fallopian tube and distending it, in some cases to the size of a banana or even larger, may rupture into the abdominal cavity and cause general peritonitis, or it may rupture into the rectum, bladder, or vagina, giving rise to great misery.

TREATMENT.—

In the acute variety, if there is general peritonitis an operation must be performed and the tubes removed. If there is only a local peritonitis it is safer to wait till the inflammation has quieted down.

The treatment of the chronic form will depend upon the history and the condition found on local examination. If there have been several attacks of inflammation, then the

proper treatment is to remove the tubes. If on local examination the surgeon does not find a distinct lump he will treat the patient with rest, douches, and tampons, which treatment is very often successful.

If, however, any distinct and tender swelling can be detected, then it should be removed.

EXTRA-UTERINE GESTATION.

An ovum can become fertilized in the Fallopian tube or ovary and develop to a certain stage in these situations. Ovarian gestation is, however, so extremely rare that it need not further be discussed.

Tubal Gestation.

Tubal gestation is due to the fact that the ovum in its passage from the ovary to the uterus having become fertilized in the Fallopian tube is there arrested and continues to develop. Why the fertilized ovum becomes arrested in the tube and does not travel down into the uterus is unknown.

Investigators are divided into two groups, those who think the Fallopian tube must be healthy, and those that it must be diseased. It is therefore apparent how very little is known on the subject of causation.

Tubal gestation is a very serious and interesting condition. Supposing a fertilized ovum remains in the tube and continues to develop, the following complications may occur:—

1. It may burst through the walls of the tube, the result being that the ovum perishes and the mother may die, or, on the other hand, live with a condition known as a pelvic hæmatocele, which signifies a collection of blood in the pelvic cavity.

2. It may abort through the abdominal opening of the tube with similar results to the above.

3. It may erode through the walls of the tube, that is to say, gradually bore its way through the tube without

injuring any large blood-vessel, in which case the ovum becomes adherent to intestine or omentum and continues to develop even in some rare cases to term. The mother at the time of the tubal erosion may experience some slight abdominal pain, but nothing more.

4. It may absorb, having died in the tube, and the mother remain well.

Of all these events tubal rupture is the commonest, then tubal abortion, whilst tubal erosion is rare.

It is interesting to note what may happen subsequent to a tubal erosion :—

1. The foetus may die and become dried up and converted into a mummy. The dead foetus may become impregnated with lime salts and what is known as a lithopædion results. The foetus may remain in one of these states for many years ; in fact, the woman may live to old age and die of some other condition.

2. The mummy or lithopædion may, however, become infected by microbes from the intestine and suppuration result, the pus and bones escaping into the bowel, bladder, vagina, or through the abdominal wall, the patient dying or not as the case may be.

3. The sac surrounding the foetus may rupture and furious internal bleeding take place, the foetus being destroyed and the mother dying unless rescued by immediate operation.

4. The foetus may continue to develop till term when a false labour will take place. Then either the foetus will die and the further changes will be similar to those described above, or the sac will rupture, and the result will be similar to that mentioned above.

SYMPTOMS.—

Before Tubal Rupture or Abortion.—Tubal rupture or abortion takes place before the twelfth week of pregnancy, as a rule between the sixth and the tenth week. It has taken place ten days after impregnation.

The woman in the majority of cases will give a history of having missed one or two periods, perhaps of a little morning nausea, and maybe of the breasts having become

tender and a little swollen. In addition she will certainly complain of pain in the lower abdomen on one or other side.

At Tubal Rupture or Abortion.—A history similar to that noted above may be obtained: in addition the woman is suddenly seized with great abdominal pain, and she will most likely faint and break out into a cold perspiration. On recovering consciousness she may be sick.

Her pulse will be very rapid, feeble, and soft. She will be deathly white, her temperature may be subnormal, and she may be restless. She will complain of faintness, noises in the ears, and perhaps of want of breath—"air hunger."

She has a feeling of sinking through the bed, respiration may be hurried and of a sighing character, the surface of the body is cold; in fact, all or many of the signs and symptoms of serious internal hæmorrhage may present themselves.

So great can the loss of blood be that the patient may suddenly fall back dead, or she may die in a few minutes, or in less marked cases she may die in a few hours unless rescued by operation.

Just before, or at tubal rupture or abortion, a dark brown discharge may flow from the uterus, and if special care is taken to examine carefully all that comes away, a membrane, which is the lining of the uterus, will be found either whole or in pieces.

The identification of this membrane is most important, as at times the diagnosis between tubal gestation and an ordinary miscarriage may be very difficult to determine, and the examination of the piece of membrane will settle the matter. The nurse must therefore be careful to save anything that is passed from the vagina for the inspection of the doctor.

After Erosion.—The symptoms will be those of pregnancy corresponding to the period to which the foetus has developed, together with, as a rule, some abdominal pain, and the woman may seek advice because "the child is all on one side."

If during any time the sac ruptures, then all the signs and symptoms of internal hæmorrhage will be present.

If the pregnancy goes to term a false labour comes on with regular pains and discharge.

TREATMENT.—

Tubal gestation is a very dangerous disease. There is still a great difference of opinion as to the best treatment under certain conditions, as much difference as may be found concerning the treatment of fibroids.

If the condition is diagnosed before rupture or abortion every one is agreed that the diseased tube should be removed in order that none of the aforementioned complications may take place.

If the patient is apparently dying of internal hæmorrhage, all are agreed that an immediate operation is necessary.

The great difference of opinion exists in cases of pelvic hæmatocele, in which the first shock has passed off and the patient is apparently getting better.

Some authorities consider all these patients should be operated upon, because, as they rightly say, there is no knowing for certain whether the ovum is dead, and if not it may continue to grow and an extension of the tubal rupture result, or if tubal abortion is taking place the ovum may not have escaped from the tube, and further hæmorrhage will occur before it does so. Others consider that these patients should be left to recover naturally unless any further complication arises, because they contend that the mortality with this treatment is not so great as if all these cases were operated upon.

Whilst it is true that if operated upon the patient will have a scar, nevertheless she will probably be well a month earlier than if she were treated by rest. Moreover, she may in the end have to be operated upon if the effused blood is not absorbed, even if some further complication does not compel operation before that time.

There is no doubt that the danger of leaving a woman who has had the signs and symptoms of a ruptured tube or tubal abortion is a very real one, and most gynæcologists

have come across cases in which the patient has been left, and during some part of her supposed convalescence a further hæmorrhage has taken place which has killed her, or would have done so if an immediate operation had not been performed.

Taking all these points into consideration, therefore, the safest treatment is to operate.

CHAPTER IX.

DISEASES OF THE OVARY.

OVARIAN TUMOURS.

TUMOURS of the ovary are either cystic or solid. The solid tumours in comparison with the cystic variety are rare.

Tumours of the ovary, whether cystic or solid, may be cancerous or non-cancerous.

CYSTIC OVARIAN TUMOURS.

The different kinds of cystic ovarian tumours may be divided into simple, glandular, dermoid, and papillomatous, the difference depending upon their structure and the nature of the fluid they contain.

Simple Ovarian Tumours.—These tumours do not grow to any large size, the fluid they contain is limpid and clear like water, and is as a rule straw-coloured.

If any of this fluid escapes into the peritoneal cavity no harm results, and many of these tumours are cured if they burst.

Glandular Ovarian Tumours.—These tumours are more complicated in structure. The walls of the cyst are partly composed of glands, and the fluid they secrete (mucus) is thick, tenacious, and greenish in colour, if not altered by inflammation or bleeding, when it may be yellow from the presence of pus, or red, chocolate-coloured, or black from mixture with blood. Should the mucus fluid escape into the peritoneal cavity from rupture of the cyst, it does no immediate harm, but as the glands in the cyst-wall continue to secrete, the mucus, escaping into

the peritoneal cavity, gradually distends the abdomen to such an extent that life is endangered from the pressure the fluid exerts.

A certain proportion of glandular ovarian cysts are malignant. The cancer, however, has not always started in the ovary. It may have started, for instance, in the breast or stomach and affected the ovary secondarily.

Dermoid Ovarian Tumours.—These tumours are very peculiar, inasmuch as they may contain teeth, hair, bones, breast-tissue on which may be situated nipples, nervous-tissue, skin, mucous membrane, sweat and fat glands. Of these, teeth are most commonly present, as a rule only two or three, but over a hundred have been found. The length of the hair varies; generally it is short, but it has been found several feet long. The colour does not correspond with that of the patient's hair, but it becomes grey with old age.

The fluid is liquid fat, and if it escapes into the peritoneal cavity severe inflammation may be set up (peritonitis), causing the death of the patient.

Papillomatous Ovarian Tumours.—These tumours contain little growths having the appearance of warts, hence their name. If these wart-like structures escape into the peritoneal cavity they become adherent to the viscera, and continue to grow, causing fluid to accumulate in the peritoneal cavity from their irritation.

These warty growths are of two varieties, cancerous and non-cancerous. The former continue to grow till the patient dies. The latter only live a certain time and then disappear; but as their place is taken by others the result, if the tumour is not removed, is the same as if they were cancerous. On the other hand, if the tumour is removed, then in the non-cancerous variety the patient recovers, because the growths that are adherent to the viscera at the time of the operation disappear soon afterwards and there are no fresh ones to take their place.

In the case of the cancerous variety removal of the tumour will not cure the patient if any of the papillomatous

growths have once escaped from the cyst and become implanted elsewhere, since, although no fresh ones can become engrafted, yet those already present continue to grow.

SYMPTOMS.—

Enlargement of the Abdomen.—

Amenorrhœa.—Apart from its being due to depreciation in health, amenorrhœa results only when all the ovarian tissue on both sides is destroyed. After the menopause ovarian tumours may cause a loss of blood from the uterus.

Pressure.—Pressure on the bladder and rectum gives rise to frequency of micturition, constipation, and hæmorrhoids; on the stomach to indigestion; on the diaphragm it impedes the action of the heart and of the lungs, and on the veins it causes œdema of the legs and ascites.

Emaciation.—If the disease is advanced, or if suppuration has taken place in the cyst, the patient becomes emaciated, as also she does if the cyst is malignant.

METHODS BY WHICH OVARIAN TUMOURS ENDANGER THE LIFE OF THE PATIENT.

By their size.

By the complications of rupture, inflammation, twisting of the pedicle or hæmorrhage.

By their being cancerous.

By their association with pregnancy, labour, or the puerperium.

By pressure on the ureters.

By intestinal obstruction.

Size.—

It is unusual nowadays to meet with ovarian tumours of any large size, the reason being that since aseptic surgery has made it possible to remove these growths with safety, this is generally done as soon as they are detected.

In olden days tumours of enormous size were quite common, and even nowadays in out-of-the-way places where there are no doctors, among uncivilized nations, or in women who refuse to consult a doctor or listen to his advice, very large tumours may occasionally be found.

One of the largest on record weighed 227 pounds, the fluid it contained measuring 88 quarts.

Rupture.—

CAUSES.—

An ovarian cyst may be ruptured by the wall becoming so thin from pressure of the contained fluid that it tears, or the wall of the cyst may become diseased and give way. Rupture may also be caused by blows or falls, especially against some sharp object such as the edge of a table, during labour, by twisting of the pedicle, by compression of the tumour by the abdominal muscles and contents during laughing, coughing, or stooping to button the boots, and during examination by the doctor.

A case is on record in which a patient with an ovarian cyst was descending in a lift, the machinery of which broke. The concussion, caused by the lift falling, burst the cyst, and the patient recovered.

SYMPTOMS.—

The symptoms attending the rupture of an ovarian cyst may be divided into immediate and remote.

Immediate Symptoms.—Sudden pain in the abdomen and disappearance of the abdominal swelling; in addition there may be symptoms of internal hæmorrhage.

If the cyst is entirely situated in the pelvis, the second symptom enumerated will be absent, and only if a blood-vessel is severed and remains patent when the cyst wall is torn will the last symptom be present.

Remote Symptoms.—These depend on the nature of the fluid contained by the cyst. For instance, in a simple cyst no harm may result; in a glandular cyst the mucus which is secreted will gradually fill the abdominal cavity, and kill the patient if it is not removed; in a dermoid cyst the contents are likely to set up peritonitis, which may be fatal. In a warty cyst the growths, becoming scattered, cause a large amount of fluid to collect in the abdominal cavity.

In the olden days when ovariectomy was not performed, patients were tapped when the accumulation of fluid became

too great. As an idea of how much fluid can be secreted by an ovarian cyst, the following is an account of a specimen preserved in the museum of the Royal College of Surgeons: "The patient was twenty-seven years old when the disease commenced, after a miscarriage of her first child. Between the year 1757 and August, 1783, when she died, she was tapped eighty times, and a total of 6631 pints, or over thirteen hogsheads, were removed from her." Just before her death the fluid accumulated at the rate of three and a half pints a day.

If the patient recovers from the effects of the rupture, then the tumour, in most cases, refills.

Inflammation.—

CAUSES.—

In the days when ovarian cysts were tapped, inflammation therein was not uncommonly set up by the doctor using a septic trochar and cannula.

An ovarian cyst may become infected from the intestine, vermiform appendix, or Fallopian tube if these structures are diseased, in which case they are commonly adherent to the cyst.

A patient with an ovarian cyst and suffering from typhoid fever may have the cyst infected by the typhoid bacillus. An ovarian cyst may be pressed upon during labour and then inflame. The commonest cause of inflammation of an ovarian cyst is twisting of its pedicle.

If the inflammation is acute the cyst becomes filled with pus, and unless this bursts through into the intestine, bladder, vagina, or through the abdominal wall, she must die, unless the tumour is removed. Even if the pus does escape through one of these channels the patient will eventually die unless the tumour is removed.

In less acute cases adhesions are formed so that the cyst is bound down to any structure in its neighbourhood, and its removal becomes a highly dangerous procedure.

SYMPTOMS AND SIGNS.—

The symptoms of inflammation are great abdominal pain, and those of fever. The pulse-rate is rapid, the temperature

high with marked intermissions, the abdominal swelling is very tender and tense, and there is emaciation.

Twisting of the Pedicle.—Ovarian cysts are attached to the uterus and broad ligaments by a stalk of tissue made up of several structures, and this stalk is called the pedicle. Under certain conditions this pedicle becomes twisted, with the result that several well-defined symptoms appear.

CAUSES.—

Twisting of the pedicle is due to a rotatory movement of the ovarian cyst. This may be brought about by the resistance of swellings in its immediate neighbourhood, such as an enlarged pregnant uterus or a fibroid tumour of the uterus, or another ovarian cyst. Twisting of the pedicle has also been thought by some to be due to the alternate filling and emptying of the bladder and rectum, and its occurrence after labour is probably due to the rapid decrease in size of the uterus.

When the pedicle is twisted, the veins in it are occluded, whilst the arteries remain patent. Blood which is pumped into the cyst-wall is therefore unable to escape, with the result that the cyst soon becomes very congested.

The next thing to happen is that some of the small vessels in the wall of the cyst bursts, and blood is extravasated. In addition, a larger vessel may rupture when blood escapes into the cyst cavity, which may then become so distended that its wall bursts.

SYMPTOMS AND SIGNS.—

Sudden and great abdominal pain, accompanied by vomiting, in a woman with an ovarian cyst indicates twisting of the pedicle. In addition, if any large blood-vessels have ruptured there may be the symptoms of internal hæmorrhage.

In a certain percentage of cases there will also be present in a day or two symptoms of inflammation of the cyst. The signs are those of rupture, inflammation, or hæmorrhage as the case may be.

Hæmorrhage.—**CAUSES.—**

Bleeding from the wall of an ovarian cyst may be due to its rupture, to twisting of its pedicle, to suppuration into a blood-vessel, to a warty growth opening a blood-vessel, and in the olden times death was sometimes due to the trocar puncturing a large vessel.

SYMPTOMS AND SIGNS.—

The symptoms and signs of bleeding from an ovarian cyst are those of internal hæmorrhage, together with pain, and if the cyst has ruptured then in addition the symptoms of that complication.

Cancer.—**SYMPTOMS AND SIGNS.—**

Whether an ovarian cyst is malignant or not can only be determined for certain by a microscopical examination of the tumour after its removal. The fact that the tumour has grown rapidly, that the patient has emaciated, and that there is marked ascites and œdema of the legs should awaken suspicion.

Associated with Pregnancy.—

The pressure symptoms of pregnancy become more marked. Vomiting is likely to be more troublesome. Albuminuria and eclampsia are predisposed to. The cyst may cause retroversion of the uterus, which may then become incarcerated. Miscarriage may occur.

The cyst grows more rapidly. It may rupture, its pedicle may become twisted, it may inflame, or it may become jammed down below the uterus and impacted, so interfering with micturition and defæcation.

Associated with Labour.—

The cyst may cause obstruction, either by being in the pelvis and so preventing the head from descending, or by being in the abdomen and so causing some malpresentation of the fœtus. As a result of this obstruction the uterus may rupture. The cyst may cause inertia of the uterus so that labour is delayed and postpartum hæmorrhage likely.

The contracting uterus may cause twisting of the pedicle, it may rupture the cyst, or it may injure the cyst so that later it inflames.

Associated with the Puerperium.—

As a result of twisting of the pedicle or bruising during labour the cyst may become inflamed. The patient then becomes septic, and if the tumour is not discovered the condition is put down to puerperal fever, and the patient dies. There have been many cases of such a mistaken diagnosis.

The pedicle of the cyst may become twisted, or in cases of septicæmia the cyst may become infected and suppurate.

Pressure on the Ureter.—

In very large cysts or in a cyst tightly impacted in the pelvis the ureters may become dangerously pressed upon.

As a result albuminuria is likely to arise, and later, if the tumour is not removed, the kidneys become irretrievably damaged, and the patient dies from uræmia.

Obstruction of the Bowels.—

The bowels may be obstructed by becoming adherent to the tumour or by a portion of them becoming caught in the pedicle when it twists.

TREATMENT.—

Every ovarian tumour should be removed as soon after its discovery as possible, for the following reasons:—

With the rare exception of its bursting and becoming cured, the cyst will certainly kill the patient in the end. It is liable to serious complications. The longer it is left the more dangerous may be its removal. It may be cancerous, when the only chance the woman has is in its removal before the cancer has spread to other structures.

This rule admits of but very few exceptions, which are, if the patient is so desperately ill that an anæsthetic or operation would kill her, the tumour must be tapped, and if the tumour does not obstruct labour, this may be terminated first and the tumour removed a few days later.

There are a large number of cases on record in which

an ovarian tumour has been removed during the various months of pregnancy, during labour, and during the puerperium, without in the first case disturbing the pregnancy, and in the last interfering with the patient's recovery in any way.

SOLID OVARIAN TUMOURS.

Solid ovarian tumours are very rare compared with the cystic varieties. Like the latter they may be malignant and non-malignant. The commonest non-malignant variety is a fibroid tumour similar to that found in the uterus.

SYMPTOMS.—

Solid ovarian tumours do not give rise to much trouble in their early stages. They are generally discovered accidentally, except in the case of the malignant forms which after some time, owing to their invasion of adjacent structures, and effect on the general health of the patient, cause her to seek advice.

TREATMENT.—

Solid ovarian tumours should be removed at the earliest opportunity.

CHAPTER X.

DISEASES OF THE PELVIC, PERITONEUM, AND CELLULAR TISSUE.

PELVIC PERITONITIS.

PELVIC peritonitis or perimetritis, as it is also called, signifies inflammation of the peritoneum covering the pelvic cavity and the organs contained therein.

CAUSES.—

The peritoneum may become infected by direct extension along the genital canal, the commonest causes of which are septic infection following labour, or abortion, or gonorrhœa. Other rarer causes are sloughing fibroids and cancer.

The pelvic peritoneum may also become directly infected by a diseased vermiform appendix.

SYMPTOMS.—

In the acute stage the patient is in very great pain, and is unable to bear the weight of the bedclothes on her abdomen. She has the symptoms of fever, and often complains of great pain on micturition, due to the movement of the inflamed peritoneum covering the bladder.

SIGNS.—

The abdomen is distended, rigid, and tender. The breathing is thoracic, and the patient lies with her legs drawn up. The temperature and pulse-rate are raised.

RESULTS.—

The disease may end in absorption of the inflammatory products, and the patient quite recovers.

An abscess may form, and after a severe illness, unless properly treated by operative measures, the pus escapes by the bowel, bladder, or vagina. More rarely, the patient dies.

The inflammatory products may become organized into fibrous tissue (adhesions), which bind together the pelvic viscera, and cause trouble for years after. A common termination.

TREATMENT.—

Hot douches, abdominal fomentations, and drugs to relieve the pain and regulate the temperature may be prescribed.

With the knowledge, however, that pelvic peritonitis is generally due to appendicitis or salpingitis, most surgeons operate at once, with the result that many lives are now saved which were formerly sacrificed.

PELVIC CELLULITIS.

CAUSES.—

Inflammation of the cellular tissue of the pelvis or parametritis as it is also termed, may be due to infection of some wound caused by labour, or during an operation on the genital organs.

SYMPTOMS.—

These correspond to those of perimetritis, but in an average case they are not so severe.

The tenderness and abdominal pain is much more local, occurring on one or other side just above the groin.

RESULTS.—

The disease may end in absorption when the patient recovers without any bad symptoms.

In at least half the cases an abscess results, which, if not opened through the abdominal wall, bursts after about two months, as a rule just above the groin. The patient will not be well for four or five months.

Organization may result when the inflamed tissue becomes fibrous, and fixing the uterus may cause trouble for years after.

TREATMENT.—

Cases of pelvic cellulitis should be treated by the palliative measures indicated under pelvic peritonitis. When there is any indication that pus is present an incision should be made at the appropriate spot.

CHAPTER XI.

DISEASES OF THE URINARY ORGANS.

THE urinary organs may be the seat of inflammation, tumours, misplacements or injury.

It will not be necessary here to discuss these in any detail, with the exception of inflammation of the bladder and urethral caruncle.

Inflammation of the bladder has a distinct interest for nurses, since by their carelessness they may be the cause of it.

CYSTITIS.

CAUSES.—

Cystitis may be due to a variety of causes in all of which bacteria are the infecting agents. These bacteria may reach the bladder, from a diseased kidney, through the blood supply, or by way of the urethra. In addition, the mucous membrane of the bladder must have been injured by disease, instruments, or a stone.

A common cause of cystitis is retention of urine. Bacteria being conveyed to the retained urine decompose it, and the ammoniacal urine then affects the mucous membrane so that the bacteria are able to inflame it.

The nurse must never forget the great danger to the patient of passing a catheter which has not been rendered aseptic by boiling.

Cystitis may be acute or chronic.

Acute Cystitis.—

SYMPTOMS.—

The patient complains of pain in the perineum and over

the pubes. The bladder is very irritable owing to its inflamed mucous membrane. Directly, therefore, urine commences to stretch the bladder, pain results and there is a desire to empty it at once. The contraction of the bladder necessary to empty it brings about further pain. The patient thus suffers from great frequency of micturition accompanied by very severe spasmodic pain. The symptoms of fever are present, more or less severe.

SIGNS.—

The urine is alkaline, and contains blood and pus. It is extremely offensive, the odour resembling that of decomposing fish.

TREATMENT.—

The patient must be kept in bed, hot fomentations may be applied to the lower abdomen, and she must be encouraged to drink large quantities of barley water. Among other measures prescribed may be that of washing out the bladder.

Chronic Cystitis.—

Chronic cystitis is more common than the acute variety.

SYMPTOMS.—

The patient has a constant desire to pass water and does so several times during the day and night. As a rule there is no pain to speak of.

SIGNS.—

The urine is alkaline, offensive, and contains a variable amount of mucus and pus which settles as a deposit on standing.

There is a variety of cystitis due to infection with the bacillus coli, which at times supervenes after an abdominal section. In these cases the urine is acid and there is often a trace of pus present (see page 242).

Results of Cystitis.—

Cystitis is a dangerous condition because of the possibility of the infection, spreading up to the kidney by way of the ureters, giving rise to pyelitis (inflammation of the pelvis of the kidney) or nephritis (inflammation of the kidney substance) which may have a fatal termination.

TREATMENT.—

The doctor will, if possible, ascertain the cause and treat that. He will certainly order the bladder to be washed out daily, and this the nurse must be able to do (see page 143).

URETHRAL CARUNCLE.

A urethral caruncle is a small growth at the orifice of the urethra.

CAUSE.—

The cause is not known, but the evidence is in favour of its being due to infection of the entrance of the urethra. It occurs most commonly in middle-aged married women.

SYMPTOMS.—

The patient may not know of its existence or she may complain of pain on micturition or when the caruncle is touched.

SIGNS.—

Projecting from the orifice of the urethra will be seen a bright red growth generally about the size of a split-pea, and resembling a miniature cockscomb. It is composed of small blood-vessels and veins. Caruncles vary in their sensitiveness, some are exquisitely tender, others can be touched without the patient feeling any pain, and a few bleed on being touched.

TREATMENT.—

The urethral caruncle is removed by excision and cauterization. Unless it is entirely removed it is apt to return.

CHAPTER XII.

DISORDERS OF MICTURITION.

THE following disorders of micturition will be briefly discussed: retention, incontinence, frequency, suppression, and pain. Although such disorders are found associated with other diseases, they may have a distinct bearing on diseases of a gynæcological nature.

RETENTION OF URINE.

If a woman is unable to micturate (pass her water) although her urine is being secreted by her kidneys into her bladder, the latter organ becomes distended, and the condition is known as "retention of urine."

CAUSES.—

Hysteria.—This condition is common in young girls who crave for sympathy, and whose nervous system is in an unstable condition. There is no local disease to be found.

Pain in the Urethra or Bladder.—If the act of micturition gives rise to severe pain the woman will prevent its repetition as long as possible, and in this way retention sometimes results. The following are some of the conditions which may act in this way: inflammation of the urethra, generally due to gonorrhœa; urethral caruncle; cancer of the urethra or of the cervix or vagina implicating the urethra; pelvic peritonitis, and fissure of the neck of the bladder.

Shock to the Central Nervous System.—Retention of urine is very common after operations, especially those on the abdomen, vagina, perineum, and rectum. The reten-

tion is due to that portion of the spinal cord which controls the act of micturition being temporarily affected by the shock of the operation.

Over-distension of the Bladder or Abdominal Walls.—If a woman holds her water too long, and the bladder becomes over-stretched, then when she desires to micturate the bladder-muscle may be unable to contract, and retention results, which has to be relieved by a catheter. After labour it is not uncommon during the first day or so for the woman to have retention of urine, because the abdominal muscles have been so stretched by the pregnant uterus that they cannot press on the bladder and so assist this organ to contract.

Obstruction of the Urethra.—The urethra being the canal through which the urine leaves the bladder, it is evident that if anything blocks this canal retention must result. The urethra may be pressed upon and so the flow of urine obstructed by the following: a retroverted pregnant uterus; an ovarian tumour; a fibroid tumour; a collection of fluid in the pelvic cavity behind the uterus which may be blood, serum, or pus; a fibroid polypus filling the vagina. The lumen of the urethra may also be occluded by cancer or by a stone.

Disease of the Central Nervous System.—Locomotor ataxy; lateral sclerosis.

TREATMENT.—

For hysterical retention relief by catheter may be necessary on the first occasion, but every means should be taken to prevent a further continuance of its use. If a strong purge be given, micturition usually takes place when the bowels act. Another method is to seat the girl in a bath with hot water reaching to the hips, and then, without any warning, to empty a pailful of cold water over her head and body.

For the remaining causes of retention appropriate treatment will be prescribed by the medical practitioner.

INCONTINENCE OF URINE.

Incontinence of urine is a term denoting the dribbling away of urine from the bladder irrespective of any wish of the patient. The urine may also constantly dribble away in cases in which the ureter has been injured in a hysterectomy and its cut end has become engrafted into the top of the vagina. The following varieties of incontinence may be met: true incontinence; incontinence of retention; nocturnal incontinence and false incontinence.

False Incontinence.—

False incontinence is a condition in which the urine escapes from the bladder on the slightest exertion. The patient will say that if she coughs, sneezes, laughs or strains in any way she is apt to “wet herself.” Such a condition most commonly follows childbirth and is due to stretching of the sphincter of the bladder.

TREATMENT.—

The treatment is surgical or electrical.

True Incontinence.—

CAUSES.—

In this condition the urine cannot collect in the bladder because there is a hole in it, a vesico-vaginal fistula as it is called, or because the sphincter of the urethra has been damaged. The urine is, therefore, always dribbling away, causing much soreness, irritation, and offensive odour.

The hole in the bladder may be due to ulceration of the vagina and bladder from pressure of the head of the foetus during labour, or from cancer, tubercle, syphilis, or a neglected pessary. It may also be due to injury of the bladder during the delivery of the foetal head with forceps, or due to some operation in its neighbourhood.

Stretching of the sphincter of the urethra results from childbirth. In this case the urine only escapes when the woman sits or stands up or strains.

TREATMENT.—

If the fistula is due to injury it can be cured by a plastic operation. If due to disease and this can be cured, the fistula will heal.

Incontinence due to a stretched urethra is best treated by electricity. If this fails a plastic operation may be tried.

Incontinence of Retention.—

In some cases of retention the pressure becomes so great that a little urine trickles past the sphincter at the neck of the bladder, and thus gives rise to the condition known as "incontinence of retention."

This is really a more dangerous condition than absolute retention, since the nurse, if she is careless and does not notice that only a small quantity of urine is being passed at a time, is apt to regard the condition as one of frequency only and fails to report the matter as soon as she should do.

Nocturnal Incontinence.—

In this condition, which generally occurs in young children, the urine is passed while the child is asleep and without its knowledge.

CAUSE.—

It is due to irritation of that part of the spinal cord which governs the act of micturition. In some patients no cause can be discovered for the irritation; in others it seems to be due to the presence of worms, stone in the bladder, polypus of the rectum, infection with the colon bacillus, inflammation of the vulva, or very acid urine.

TREATMENT.—

The treatment of nocturnal incontinence must depend upon the cause.

In the absence of any cause being discovered, the patient should sleep on a hard bed with very light clothing. If young she should be roused when her parents go to bed and made to empty her bladder. Very little drink should be allowed with the last meal of the day. A large reel of cotton may be tied round the waist so that it rests on the spine. This will prevent the patient lying on her back, a position which seems to favour the involuntary expulsion of urine in these cases. Cold baths and a cold douche to the spine are often helpful.

For the medicinal treatment a doctor must be consulted.

FREQUENCY OF MICTURITION.

CAUSES.—

Excessive Quantity of Urine.—Hysteria, diabetes, chronic Bright's disease.

Pressure on the Bladder.—Pregnant uterus, ovarian tumour, fibroid tumour, pessary.

Misplacement of the Bladder.—Cystocele, with or without prolapse of the uterus. An indication that a cystocele may be the cause is the fact that the urine escapes from the bladder on the slightest exertion, such as laughing or sneezing. When the patient is at rest there is no frequency.

Disease of the Bladder.—Cystitis.

TREATMENT.—

The passage of an excessive quantity of urine is in most cases a serious symptom, and a doctor should be consulted at once. The nurse must be careful to remember that frequency of micturition is also a sign of retention.

PAINFUL MICTURITION.

Painful micturition may be due to the presence of a urethral caruncle, to a fissure at the neck of the bladder, or to cancer of the urethra. It may also be due to cystitis or to pelvic peritonitis.

TREATMENT.—

The treatment of these conditions has already been referred to.

SUPPRESSION OF URINE.

Suppression of urine is a condition in which the kidney is not acting properly. It may be partial or complete. In the latter case no urine is secreted, and, therefore, the bladder having been emptied, remains so.

CAUSES.—

Suppression of urine may be due to disease of the kidney or to occlusion of the ureters by a tumour or by a ligature

accidentally applied during some operation in its neighbourhood. Suppression may follow the ligature of one ureter.

Partial suppression for the first twenty-four hours after a severe operation involving a good deal of shock is not an uncommon occurrence. It must be remembered, however, that the quantity of fluid drunk by the patient for some hours prior to and after the operation is much less than normal.

SYMPTOMS.—

The patient is apparently all right for the first few days. She then becomes drowsy and probably passes into coma, with perhaps convulsions. Constant vomiting is usual.

SIGNS.—

The quantity of urine that should be passed is much diminished, or the bladder may be empty on repeated catheterization.

TREATMENT.—

Apart from operative causes, the doctor will order hot-air baths, purges, dry-cupping to the loins, and perhaps will transfuse the patient with an intra-venous saline, and inject pilocarpin.

CHAPTER XIII.

VENEREAL DISEASE.

THERE are three forms of venereal disease—gonorrhœa, syphilis, and the soft sore ; they are all due to infection by a microbe, and all three may be found in the same patient, though not commonly. The nurse must never express the opinion or even hint that her patient has venereal disease. By so doing she may expose herself to legal action.

GONORRHŒA.

CAUSE.—

Gonorrhœa is due to infection by the gonococcus, one of the lowest forms of vegetable life.

SYMPTOMS.—

As a rule the disease generally first affects the vulva, and in an acute case the external genital organs are very tender so that the patient is unable to walk or sit with any comfort. In addition she will complain of a profuse yellow discharge and of pain in her groins. In chronic cases, more especially if the vagina is first affected, symptoms, beyond that of a discharge, may be absent.

SIGNS.—

The vulva will be swollen, œdematous, and tender, the labia are very inflamed and the presence of a profuse, purulent discharge is noted. The lymphatic glands in the groin will be tender and swollen and may form an abscess. In less acute cases the only sign may be a discharge.

DIAGNOSIS.—

The disease is diagnosed by the detection of the gonococcus in the discharge. Unless, however, the discharge is

examined in an early stage of the disease, the presence of this organism may escape detection. The reason for this is that the gonococcus finds it very difficult to remain for any length of time in the vulval or vaginal tissues owing to the toughness of the epithelium covering these structures, and the organisms are therefore soon swept away by the inflammatory discharges and the vaginal douches which have most likely been employed before the patient sought advice. Apart from the absolute indication afforded by the presence of the gonococcus there are a few points in the history, symptoms, and signs of this disease which are extremely suggestive:—

Thus if the attack commenced suddenly, if the inflammation is very acute and the discharge profuse, if there is pain on micturition and the lymphatic glands in the groins are swollen and tender, the vulvitis or vaginitis will almost certainly be of gonorrhœal origin.

RESULT.—

Gonorrhœa, if treated in its early stage and efficiently, can be cured. A large number of patients, however, especially those of the female sex, do not seek medical advice till the disease has been present for some time and has had an opportunity to spread. In this way the disease may spread from the vulva or vagina to the uterus, Fallopian tubes, ovaries, and pelvic peritoneum, and rarely to the general peritoneum, or it may spread *via* the urethra to the bladder, ureters, and kidneys.

The blood may become infected with the gonococcus, in which case gonorrhœal rheumatism, septicæmia, or ulcerative endocarditis may result. If the organism contaminates the mucous membrane of the eyelids, gonorrhœal ophthalmia supervenes, which may easily destroy the eyesight.

Gonorrhœa may be the cause of puerperal fever, and one of its commonest complications is an abscess of Bartholin's gland.

The most frequent of the serious diseases of a gynæcological nature is that of inflamed ovaries, Fallopian tubes,

and pelvic peritoneum, commonly called salpingo-oophoritis. This complication is a cause of great misery and of more or less disablement, besides being responsible for a large percentage of the major operations of a gynæcological nature performed on females. Gonorrhœa is responsible for a large proportion of the total sterility in women.

TREATMENT.—

Gonorrhœa can be cured by early and skilled treatment.

Rest in bed is absolutely necessary, and in the majority of acute cases the patient will be ordered to sit in a hot bath, three or four times a day, for twenty minutes. In a few days when the vulva and vagina are less tender various douches will be prescribed. Horse riding and cycling will hinder recovery.

As the danger of the disease spreading is so great, and as its results may be so disastrous, many surgeons think the best treatment is to douche thoroughly, under an anæsthetic, the vagina and vulva with 1 in 4000 biniodide of mercury, and then to apply carbolic acid with a view of killing the gonococcus.

The nurse must be most careful to use every precaution when nursing a case of gonorrhœa, lest she convey the disease to herself or some other person. Extreme cleanliness is necessary; thus she should wear india-rubber gloves, all dressings which have been in contact with the discharge should be burnt, soiled linen should be dipped in carbolic solution 1 in 20, and bed-pans and the douche apparatus should be thoroughly cleansed and sterilized after use. Many epidemics of gonorrhœa have arisen in families through children using the same towels as their infected mother, and in Institutions through the use of towels or utensils which have been contaminated in the first place by some adult.

Gonorrhœa is a contagious disease. So long as there is any discharge, however slight in amount, no matter how long it has lasted, the patient is liable to convey the disease to others.

During treatment condiments must be avoided and large

quantities of simple fluids should be drunk. Indulgence in alcoholic drinks seriously interferes with the efficiency of treatment and often brings back the discharge after apparent recovery.

SYPHILIS.

Syphilis is a contagious disease, and if untreated, or if the right treatment is neglected, may last several years.

It was estimated by the Royal Commission on Venereal Diseases that not less than 10 per cent. of the whole population is infected with syphilis. That 17 per cent. of insanity, 34 per cent. of congenital blindness, and 25 per cent. of congenital deafness is due to syphilis.

It is the chief cause of paralytic strokes occurring before middle age. It leads to the birth of diseased children, many of whom die in childhood. It is responsible for a large proportion of still-births. It is a common cause of softening of the brain.

CAUSE.—

Syphilis is due to infection by the *spirochæta pallida*, one of the lowest forms of animal life.

COURSE.—

When left untreated or inefficiently treated the disease passes through three stages, known as primary, secondary, and tertiary syphilis. The first two are infectious, the third not. Between the time of infection and the appearance of tertiary signs, there are three intervals of time, during which the patient may be unaware that he or she has the disease. During the first two intervals the patient is infectious, during the third, generally not.

FIRST INTERVAL.—

Between the date of infection and the appearance of the primary lesion. This is called the incubation period and averages from three to five weeks, more often the latter.

SECOND INTERVAL.—

Between the development of the primary lesion and the appearance of the secondary lesions. During this period,

which averages four to eight weeks, the disease is becoming disseminated through the system.

THIRD INTERVAL.—

Between the disappearance of the secondary lesions to the appearance of the tertiary, during this interval, which varies from three to many years, the disease has become chronic.

Primary Syphilis.

SYMPTOMS.—

As a rule there is no pain or inflammation and the only symptom noted is some itching at the site of infection, generally the vulva.

SIGNS.—

At the site of infection a small, round, copper-coloured, flat, superficial ulcer appears, called a hard chancre. This takes two or three weeks to become fully developed and three to five weeks to disappear. There is marked hardening of the tissues, or induration as it is termed, round the chancre, which feels like a small button inserted just below the surface of the skin.

Although the commonest site for the appearance of the hard chancre is, in the female, the vulva, owing to this being the usual place of infection, yet a hard chancre may be found anywhere on the body where there is a crack and the spirochæte has found entrance. Thus it may be found on the lips and mouth of an innocent person, from kissing, from the use of infected glasses, forks, spoons, or pipes, or upon the fingers of a doctor or nurse who has not taken proper precautions when examining or nursing a patient suffering from this disease.

In about fourteen days the lymphatic glands which drain the site of the primary infection become enlarged and hard, but are painless.

A hard chancre in a woman, like gonorrhœa at the outset, often escapes detection, because it frequently disappears without its presence having been noticed, or the inconvenience it causes is so slight that the woman fails to seek advice.

Secondary Syphilis.

SYMPTOMS.—

The patient complains of loss of appetite, sore throat, pains in the bones and muscles, and a general feeling of weakness.

SIGNS.—

At the onset there is fever. The patient is anæmic. The throat is red, and on the tonsils and mucous membrane of the mouth can be seen greyish-white patches, known as mucous patches. Similar patches, but rather more raised and moist, may be found in the region of the vulva and anus and are known as condylomata. The lymphatic glands in various parts of the body become enlarged, the hair falls out and the nails become brittle and may ulcerate. Skin rashes simulating every form and variety of skin disease may make their appearance, the most common and first rash to appear being more of a red flush and lasting only a short time, so that its presence may be missed. There is no itching of these rashes, which assume a ham raw-coloured hue. Inflammation of the iris, and of the bones and joints may also occur.

Tertiary Syphilis.

This stage is predisposed to by overwork or alcoholic excess.

SYMPTOMS.—

The patient feels very ill and further symptoms will depend upon the part of the body affected.

SIGNS.—

Tumours known as gummata may appear in various parts of the body and lead to the destruction of tissue in their neighbourhood.

Ulceration of the face may occur leading to frightful disfigurement. The nervous system may become affected, leading to locomotor ataxy or general paralysis of the insane. The aorta may become dilated forming an aneurysm, or the heart may become diseased.

TREATMENT.—

Syphilis can be cured if promptly and systematically treated. The disappearance of outward evidence of the disease after treatment has begun is not certain evidence that the disease is cured. *Neglect of treatment in these circumstances may be highly dangerous. Treatment should not be stopped until the doctor says this is safe.*

During treatment the teeth should be cleansed night and morning. If the mouth is not kept clean treatment may have to be stopped. The patient should dress warmly, live simply, and avoid wine, beer, or spirits.

If after treatment has been stopped, rashes on the skin, sore throat, or any other evidence of ill-health appears, a doctor should at once be consulted and informed of the previous treatment. *This is extremely important.*

No one who has had syphilis should marry unless a doctor, after going fully into the facts, states that this is safe; otherwise the disease will probably be given to wife or husband and any future children.

The treatment of syphilis in the primary and secondary stages consists in the injection into the blood, through a vein, of a solution of arsenic called salvarsan, which kills the spirochæte. In addition mercury in some form is given. The nurse may have to get the instruments and utensils ready for such an injection and must see that they are properly sterilized. The nurse must always remember the highly contagious nature of syphilis in its primary and secondary stages. She must therefore, whilst she is attending a patient afflicted with this disease, wear india-rubber gloves which should be boiled before and after use, otherwise if she has the slightest abrasion on her hands or fingers she may become infected. The spoons, forks, knives, glass, crockery, sponges, towels, bed-pans, etc., used by the patient should all be kept for her separate use, and should never be removed from the room until they have been boiled or soaked in a strong disinfectant, for such articles being contaminated may easily be the source of disease in others. For a similar reason such a patient should not be allowed

to kiss any other person or marry until the disease has been cured. It has been stated that in more than half the cases syphilis has been contracted innocently.

SOFT SORE.

CAUSE.—

The soft sore results from infection by a bacillus. It is purely a local affection and remains so.

SYMPTOMS.—

Within five days of infection the patient will complain of pain, heat in, and a profuse discharge from the vulva.

SIGNS.—

A sharply cut deep ulcer appears, the surface of which is greyish-white. More than one soft sore may be present, opposite sides of the vulva being commonly affected. The ulcers secrete a purulent discharge. The lymphatic glands in the groin become enlarged, inflamed, and painful.

TREATMENT.—

Soft chancres are cured by local treatment. The nurse must take every precaution when attending to these cases.

Venereal disease is responsible for so much ill-health and so many deaths that the Local Government Board decided in 1916 to take steps to deal with it efficiently. For this purpose "Centres" have been formed in the various large towns where patients can get free advice and treatment by doctors specially qualified for this purpose.

The Nursing of Venereal Diseases.

When nursing patients suffering from gonorrhœa, soft sore, or syphilis, the nurse should realize that infection is only by actual contact with the sore or discharge. The routine methods of disinfection and precaution practised when nursing septic patients will therefore, if conscientiously carried out, protect the nurse from any risk of infection. Moreover, when attending a patient known to be suffering from one or other of these diseases, the nurse will have the added safeguard of being aware of the danger, instead of

dealing with it, all unrecognized, as so frequently happens, in the many obscure ways in the general wards.

The nurse should bring to her work a large amount of sympathy, which she should seek to make practical by a wider understanding of the social conditions that are to a great measure accountable for this social evil.

Many women are innocent victims and call for the tenderest pity; others fall victims through the temptations and dangers to which unprotected girls are exposed, the lack of home discipline, their ignorance of ethics, the grey-ness and hardships of their struggling lives.

The nurse will thus treat these unfortunate sufferers who are under her care with a wise compassion that will give ready and sympathetic help when required, and should exert a quiet influence that will strengthen their moral nature and restore their self-respect.

With practical common sense, the nurse may lead women suffering from these diseases to realize the danger to the community of their condition and the terrible consequences to innocent lives. A nurse has here a great mission and a real duty to her sex, her country, and the world at large.

PART II.

CHAPTER XIV.

MICROBES.

A MICROBE is a minute living body which can only be seen with the aid of a microscope. It belongs to the lowest form of life, and consists of a single cell.

A microbe is either a vegetable cell when it is called a bacterium, or an animal cell when it is known as a protozoon. Pathogenic microbes are those which affect adversely the health of animals or plants, and according to our present knowledge, there are only a very few varieties that act in this way on the human body. The majority of microbes are harmless to human beings, and indeed, in the absence of some varieties, animal and vegetable life would be impossible. Microbes were first discovered some 250 years ago. Their importance, however, was not appreciated till about 1850, when Pasteur proved that certain diseases were due to special kinds of bacteria. Following on this discovery, and because of it, Lister invented his method of antiseptic surgery, by which, together with its more recent improvement of aseptic surgery, such an infinite amount of suffering, and so many millions of lives, have been and will be saved.

BACTERIA.

A bacterium can only be seen with the highest powers of the microscope. If, however, bacteria are added to certain substances from which they can obtain nourishment, such as blood-serum, broth, or a slice of potato, they will increase

at a prodigious rate, with the result that they alter the appearance of these substances in such a way that bacteriologists can, in many cases, detect the variety of bacteria growing in them.

Varieties of Bacteria.—Bacteria are divided into three classes.

1. Bacilli or straight bacteria. The tubercle, leprosy, influenza, diphtheria, colon, tetanus, typhoid, and plague bacilli being examples.
2. Cocci or spherical bacteria. Streptococci and staphylococci, the cause of septic infection; gonococcus, the cause of gonorrhœa; and meningococcus, the cause of cerebro-spinal meningitis, being examples.
3. Spirilla or twisted bacteria. The spirillum of relapsing fever and of cholera, being examples.

Action of Bacteria.—Those bacteria which are commonly found in air and water, and which will not grow at the body temperature, are harmless.

Those bacteria which cause fermentation and putrefaction, and they form the majority, are beneficial or harmful, as the case may be. Such bacteria are called saprophytes and obtain their nourishment from dead animal or vegetable matter.

The action of saprophytic bacteria upon dead organic matter outside the body is absolutely essential for the continuance of life, producing as they do in the process carbon compounds and nitrogen compounds which are necessary for vegetable growth, without which the animal kingdom could not exist.

Those bacteria which can only exist and increase in living tissues are known as parasitic bacteria, and include among their members nearly all those that are the cause of disease. Certain pathogenic bacteria are both saprophytic and parasitic. Thus in certain circumstances they can harm the individual, by means of their poisons which are absorbed, without gaining entrance to the tissues or blood-stream. In other circumstances they can invade the tissues or blood-stream and by means of their poisons injure the individual in this way. Examples of bacteria

which can be both saprophytic and parasitic are those causing sepsis.

Other bacteria are entirely parasitic, as, for instance, the tubercle, typhoid, and diphtheritic bacilli.

Bacteria cause disease in the human body by means of their secretions. These poisons, or toxins as they are called, which are absorbed by the tissues of the body, are of two kinds, exo-toxins and endo-toxins.

The saprophytic bacteria living on dead organic matter and certain parasitic bacteria, such as the diphtheria and tetanus bacillus living in the tissues, liberate poisons which are called exo-toxins.

The majority of parasitic bacteria, however, only liberate their poisons into the blood-stream when they die or are killed and their toxins are called endo-toxins.

Pathogenic bacteria may remain local, or may become distributed through the tissues by the medium of the blood-stream.

Bacteria may invade the body by contagion, inhalation, ingestion or inoculation, examples of which are the following:—

1. Contagion, as in small-pox, scarlet fever, and gonorrhœa.
2. Inhalation, as in tuberculosis, whooping-cough, and diphtheria.
3. Ingestion, as in typhoid fever and cholera, through the medium of liquid or solid food.
4. Inoculation, as in general and local sepsis, and tetanus through a wound, or by the bite of a rat-flea as in plague.

In many diseases the bacteria may gain entrance by more than one of these routes.

Universal Distribution of Bacteria.—Wherever air and dust find entrance there can bacteria be discovered, and they are, therefore, always to be found on the skin and in the mouth and the respiratory passages. By means of drink and food they are also conveyed to the alimentary canal. The uterus and Fallopian tubes are normally free of bacteria, but microbes are always present in the vagina.

The Reproduction of Bacteria.—A bacterium reproduces itself by dividing into two, then into four, then into eight and so on, with the result that in a very short time if there is sufficient food, moisture, and warmth available, the one bacterium will have increased to millions ; in fact only an unfavourable environment will check their indefinite increase.

Certain varieties of bacteria, which are nearly all included in the bacillus group, when their surroundings are not conducive to their increase, pass into what is called a "resting stage." In this condition the contents of the cell become transformed into an oval body known as a "spore," which has the power of retaining its vitality, under adverse conditions, for long periods of time. In favourable circumstances the spores return to their original shape and the bacteria renew their activities. These spores are very difficult to kill, and some of them will escape destruction even when heated to a temperature of boiling water or over.

Bacteria, like other living things, require for their well-being food, moisture, and warmth, but most of them grow better in the dark. Whether in addition they require free oxygen depends upon what kind of bacteria they are. Thus there are aerobic bacteria which must have free oxygen, and anaerobic bacteria which grow in its absence, having the power of appropriating the oxygen of unstable organic combinations. To some the presence or not of free oxygen is, however, immaterial.

Food.—Bacteria find the food they require in the dead, or living, vegetable or animal matter surrounding them. Thus the bruised and sloughing edges of any wound form a favourable site for the propagation of saprophytic bacteria, whilst the parasitic bacteria obtain nourishment, from the blood-serum, by passing through a wound into the bloodstream.

Moisture.—Bacteria require moisture for their growth ; they are harmless if they are dry. When getting ready a room in a private house for operation, therefore, unless there is time to prepare it thoroughly, clean sheets should be placed over any articles of furniture with which the nurse or doctor may come in contact.

Warmth.—Some bacteria for their growth require more heat than others. Pathogenic bacteria grow best at the body temperature.

Light.—Prolonged exposure to sunlight kills most bacteria. The wisdom, therefore, of choosing, for an invalid, a room which can be well flooded with light, is obvious.

PROTOZOA.

A protozoon can only be seen with the highest powers of the microscope. Protozoa, of which there are many varieties, vary in size and shape much more than do the bacteria, while to many of them are attached different shaped appendages, which enable them to move about, or perforate animal tissues in their immediate neighbourhood.

Action of Protozoa.—Those varieties of protozoa which are known to cause disease in man are few in number and are parasitic in nature, but there are a large number of species which are the cause of disease in animals and plants used by man. The majority of protozoa are saprophytic. It is not known how protozoa cause disease.

Varieties of Protozoa Pathogenic to Man.—

Protozoa are divided into four classes :—

1. Flagellata—with a whip-like appendage.

Trypanosomes, the cause of sleeping sickness, and spirochætes, the cause of syphilis, being examples.

2. Sarcodina—without any capsule.

Amœbæ, the cause of dysentery, being an example.

3. Sporozoa—sporulating forms.

Plasmodia, the cause of malaria, being an example.

4. Ciliata—with cilia attached.

Balantidium coli, a cause of diarrhœa, being an example.

Protozoa invade the body by inoculation or ingestion.

1. Inoculation—either through a breach of surface, as in syphilis, or by the bite of a mosquito, as in malaria.
2. Ingestion—through liquid or solid food, as in amœbic dysentery.

Distribution of Protozoa.—Protozoa are distributed

very widely, being found in sea-water, stagnant fresh water, and in moist soils. Some varieties which can form spores may be found in a dry state, but the active forms are never present in the air.

Reproduction of Protozoa.—In some species of protozoa the method of reproduction is as simple as that which obtains in bacteria, but in others it is very complicated, so that although a protozoon may live in one animal, it has to be conveyed into another, by the bite of some insect, to enable it to reproduce itself. Protozoa do not increase at such a rapid rate as bacteria, and they cannot, for the most part, be reproduced outside the body, although a few varieties can be cultivated in such a way for two degenerations. Protozoa live on other organisms, mostly bacteria.

ULTRA-MICROSCOPIC ORGANISMS.

The microbes causing certain infectious diseases have not been identified, even with the highest powers of the microscope.

These diseases include :—

Small-pox, Scarlet fever, Measles, Mumps, Hydrophobia, Infantile paralysis, Yellow fever, and Typhus.

That such diseases are due to ultra-microscopic microbes seems to admit of very little doubt for the following reasons :—

1. Some of these diseases can be transmitted to a healthy animal by injecting into it blood or secretion from an animal known to be suffering from the disease. If this blood or secretion, however, is first heated to a certain temperature it has no effect when injected. Obviously, therefore, some living substance has been destroyed by the heat.
2. The disease can be transmitted, although the blood or secretion has been passed through a porcelain filter with such small holes that they would prevent the passage of the smallest visible microbe. Therefore the disease cannot be due to any microbe which can be seen by the microscope.
3. All the diseases are highly contagious or infectious.

CHAPTER XV.

IMMUNITY.

THE power of an individual to protect itself against the results of bacterial invasion is due to the presence in its blood of two factors :—

1. Certain substances called antibodies, secreted by cells of the body. Such antibodies are probably always present in the blood-serum in minute quantities, but become markedly increased when the person is attacked by bacteria.
2. Certain cells derived from the tissues of the body called phagocytes.

If an individual runs the risk of catching a certain contagious or infectious disease and does not do so, he or she is said to be immune to that disease. Such immunity, which may be permanent or temporary, is either natural or acquired. Natural, if the individual has such a supply of healthy phagocytes and such a quantity of antibodies that it is able to kill the bacteria, or neutralize their poisons, and acquired, if by a previous attack of the disease, or by artificial means to be indicated later, it acquires a similar power. It must be remembered, however, that the phagocytes cannot act efficiently unless aided by the antibodies. Although it is known that some of these antibodies combat disease, what the action of the remainder may be in this respect, if any, is not known. Further, bacteria, under certain conditions, by a protective mechanism of their own, prevent the body-fluids and body-cells acting on them.

To better understand the theory of immunity it is necessary to consider a little more in detail the antibodies and phagocytes.

Antibodies.—

The antibodies which can be found in the blood-serum of an immunized animal may be divided into two groups:—

1. Antibodies whose action in disease is known: Antitoxins, Opsonins, Bacteriolysins, Complement.
2. Antibodies whose action in disease, if any, is not known: Agglutinins, Precipitins.

It must be remembered, however, that there are different sorts of antitoxins, opsonins, and bacteriolysins, and that the antitoxins resulting from the infection of one variety of bacteria, for instance, will not be of any use for immunization purposes against another variety of bacteria.

Antitoxins are antibodies found in the blood-serum of an animal as the result of the injection into that animal of bacterial toxins. The serum of the blood drawn off from the animal is called antitoxic serum. The remaining antibodies are due to the injection of bacteria, the serum drawn off being called antibacterial serum.

Antibodies whose Action in Disease is Known.—

Antitoxins.—If certain bacteria invade the body of an animal which is not immune they increase at a prodigious rate and secrete poisons which are absorbed into the system of the animal. These poisons are called toxins, and if their amount is sufficiently large the animal dies.

Such toxins can be obtained in a test-tube by growing the bacteria in broth for some days and then filtering the broth. That the filtrate contains the toxins can be proved by injecting a certain quantity of it into an animal when it will die. The smallest quantity which will cause death is called the minimum lethal dose. It has been found, however, that if a much smaller quantity than the minimum lethal dose is injected, and then with repeated injections this quantity is gradually increased, it is possible in time to inject doses of toxin far greater than the minimum lethal dose, without harming the animal, and the animal is said to be immunized. If some blood-serum from an animal thus treated, is now taken and mixed with a lethal dose of the toxin, the mixture can be injected into another animal, with impunity. Obviously, therefore, the blood of the immunized

animal must contain an antidote to the toxin and this is called an antitoxin. In other words the injection of repeated and increasing doses of toxin stimulated the body-cells of the animal, when it was being immunized, to produce antitoxins, and to produce such a quantity that there was more than sufficient to neutralize the amount of toxin injected, and finally a surplus remained in its blood-serum.

Unfortunately, it is not every variety of bacteria that stimulates the body-cells to produce antitoxins. Only a few do this, the commonest being the bacilli of diphtheria and tetanus, in which diseases the bacilli do not as a rule invade the blood, but are fixed in the throat or wound respectively, their toxins only being absorbed.

If a person is attacked by one of these diseases and recovers, his body-cells have produced sufficient antitoxin to neutralize the toxins, if he dies the quantity is too small. In the light of the experiment recorded, it should be possible by injecting a sufficient quantity of antitoxin, either to protect a person against the disease, if he be subjected to the risk of acquiring it, or to cure the patient if he has the disease, and up to a point this can be done.

Opsonins.—An opsonin is an antibody which makes the bacteria palatable for the phagocyte, and this fact can be demonstrated by experiment.

Bacteriolysins, Complement.—Bacteriolysins are antibodies which shrink or break up bacteria. They cannot do this, however, without the assistance of the complement, but the two together will, in some cases, cause bacteria to shrivel up and disappear.

In addition, the knowledge of the presence of a particular bacteriolysin is very important from the point of view of diagnosis. Thus if the disease from which a patient is suffering cannot be diagnosed, but it is found that his blood-serum will lyse a particular variety of bacterium, it may be taken for granted that he is infected with this microbe.

Antibodies whose Action, if any, in Disease is Not Known.—

Agglutinins, Precipitins.—Agglutinins are substances

which make certain bacteria stick together, "clumping" as it is technically called. That this antibody is present in the serum of an immunized animal, can be proved by adding its blood-serum to fluids containing bacteria similar to those with which the animal was immunized, and then placing a drop of the mixture under a microscope, when the bacteria will be seen to clump. It is not known what part the agglutinins play in immunity. As far as can be ascertained they do not tend to protect the animal since such an animal may be immune although the bacteria do not clump, and relapses in typhoid fever may occur in a patient when the agglutinating power of his blood-serum is at its highest.

This antibody is, however, of use in diagnosing typhoid fever and cerebro-spinal meningitis. It may be taken as a working rule, the exceptions to which we need not concern ourselves, that if the blood-serum of a patient, diluted to a certain strength, clumps the micro-organism, causing typhoid fever or cerebro-spinal meningitis, the patient has that disease. This experiment, as far as typhoid fever is concerned, is known as the "Widal reaction." Theoretically it should be possible to diagnose other diseases by similar methods, but at present the technical difficulties have proved insurmountable.

Precipitins.—Precipitins are substances, found in the blood-serum of an animal immunized against bacteria, which produce a precipitate in a clear solution of the filtrate from a test-tube culture of the same variety of bacteria. They are also found in the blood-serum of an animal immunized by the injection of animal or vegetable albumins, and cause a precipitate to be formed in solutions of the same variety of albumins contained in a test-tube.

It is not known what part precipitins take in protecting the animal, but they are of very great importance from a medico-legal point of view. Thus, after a rabbit has been treated by repeated injections of human blood, its blood-serum will precipitate the albumin in a solution of human blood in a test-tube, but it will not precipitate the albumin in a solution of the blood of any other animal.

If, therefore, blood-stains are found on the clothes of a person suspected of murder, he may maintain that the blood came from some other animal, if, for instance, he is a butcher, from an ox or sheep. Supposing now a solution is made of the blood on his clothes and some blood-serum from an animal, immunized against human serum, is added and does not cause a precipitate to form, he is telling the truth and vice versa. By similar methods it is possible to determine whether a particular sausage is made of pig, horse, cat, or dog.

Phagocytes.—

The name phagocyte was given by Metchnikoff to certain white corpuscles found in the blood, and the process by which these phagocytes absorb bacteria he called phagocytosis. The phagocytes can be seen, under the microscope, enveloping and digesting the bacteria. Normally there are in a drop of blood about the size of a pin's head 7000 to 8000 leucocytes. In bacterial diseases this number may increase up to 40,000, which is an indication of how the tissue-cells of the body assist in combating the disease. This bactericidal power is only properly developed in co-operation with the antibodies.

In connection with the question of immunity, however, it is important to remember that, in many cases, if the bacteria invading the body are not destroyed at once, certain of them may escape destruction later, either by secreting substances called aggressins which will paralyse the phagocytes, or by forming a capsule round themselves which prevent the phagocytes destroying them. In other words the bacteria themselves have become immunized.

An interesting example of this in connection with the protozoa is syphilis. In this disease a person who has passed through the primary stage is practically immune to a fresh attack of syphilis, and yet the spirochaetes which escaped destruction are now very resistant microbes, and continue, in spite of the natural protective measures of the patient, further to affect her in the secondary and tertiary stages.

CHAPTER XVI.

THE PRACTICAL ASPECT OF IMMUNITY REACTIONS.

THE knowledge gained of the immunity reactions may be put to practical use in the case of bacterial invasion in two ways, curative and diagnostic.

The Curative Aspect of Immunity Reactions.—

Natural Immunity.—The natural immunity of a person which is due to race, family, or age, is increased by nourishing food, temperate habits, cleanliness, fresh air, a proper amount of exercise and rest, and a healthy environment. On the other hand, deficient nutrition, alcoholism, dirt, excessive work, unhealthy surroundings, or some chronic disease will diminish it. To take an example, the bacillus which causes pneumonia is constantly present in the mouths of healthy people without causing any harm. Supposing, however, that some person who harbours the pneumococcus is exposed to cold and rain for a long time, during which he has to work very hard with insufficient nourishment, then he is very liable to an attack of pneumonia. Again, a nurse, fresh from her annual holiday, may prick her finger without any untoward result. At the end of a year's hospital work, however, when her health is sure to be somewhat "run down," that is when her resisting power is lowered, such an accident has many times resulted in death, or in a very serious illness.

Artificial Immunity.—The power of the body-cells and body-fluids to protect their owner against a disease, or to modify that disease if it is present, may be increased artificially in a passive way or in an active way.

Passive Immunity.—Passive immunity signifies the results obtained by supplying a patient with antibodies from the blood-serum of another animal. If the body-cells of the patient do not secrete antibodies quickly enough or in sufficient quantities, then he succumbs. The treatment by passive immunity aims at supplying these antibodies quickly and in sufficient doses to cure the patient by having them prepared and ready for use.

Such a passive immunity may be induced :—

1. By the injection of antitoxic serum.
2. By the injection of antibacterial serum.

This treatment of infectious diseases by the method of passive immunity has only been successful in a few cases, but in these such success has been attained that if the correct antibodies could be isolated for each disease, there is no doubt success should invariably result if the patient is treated early enough. The want of success in all cases is due to the fact that but few bacteria cause disease by the secretion of exotoxins, that is without themselves being destroyed.

In the majority of cases the toxins are only set free on the death of the bacteria, and up to the present no satisfactory methods have been devised by which the antitoxins resulting from the production of these endotoxins can be collected.

Production of Passive Immunity by the Injection of Antitoxic Serum.—This method of producing passive immunity has been very successful in the case of diphtheria and has met with some measure of success in tetanus.

The injection of diphtheritic antitoxic serum has lowered the mortality of diphtheria in a very striking way, and tracheotomy, which formerly was such a common operation in this disease, is now a rare one.

The injection of tetanus antitoxic serum as a curative agent in tetanus has not been nearly so successful, although the mortality of this disease, as proved in the present war, has also been lowered. The reason for this is perhaps that tetanus cannot be diagnosed from the local condition as

can diphtheria, and so the patient is poisoned seriously before the necessity of injecting antitetanic serum is realized. As a prophylactic measure, however, the experience of the Great War has shown that it is a proved remedy of great value.

Production of Passive Immunity by the Injection of Antibacterial Serum.—This method of producing passive immunity is not nearly so successful, because there is no means of knowing whether the correct antibodies are being injected. It may be that bacteria which appear to all known tests to be identical, are in reality different. Thus there may be many varieties of streptococci or staphylococci although they all appear to be similar. The antibodies secreted by the body-cells of an animal immunized with one strain of streptococci may, therefore, be different from those immunized with another strain, although both strains appear the same.

Obviously an antibacterial serum will only do good if the person is suffering from a disease due to the same strain of bacteria. An endeavour has been made to overcome this difficulty by immunizing a horse with bacteria taken from different patients suffering from the same disease, the resulting serum drawn off from its blood being given the name of polyvalent serum. The assumption that the theory given above may be correct is partly justified at any rate, since in some cases in which the injection of ordinary antibacterial serum has caused no improvement, an injection of polyvalent serum has apparently led to a cure.

Examples of this method of treatment are the injection of antimeningococcus serum for cases of cerebro-spinal meningitis which is often successful, and also of anti-streptococcic, antityphoid, antiplague, and antianthrax sera, the results of which are more uncertain.

Active Immunity.—Active immunity signifies the results obtained by stimulating the body-cells of the patient to produce their own antibodies.

Such an active immunity may be produced :—

1. By a previous attack of the disease.
2. By inoculation with living bacteria.
3. By inoculation with dead bacteria.

It is not necessary here to discuss the first of these methods.

With regard to the second and third methods, they are of value mostly as prophylactic measures in the treatment of bacteria invasion, since as they take some time to bring about the desired result, the patient may have died, or recovered, from the disease before they can act.

Production of Active Immunity by the Inoculation of Living Bacteria.—There are two diseases only, small-pox and hydrophobia, in which the inoculation with living bacteria has met with any success, but, in these, the results clearly show that in suitable cases this method is of great value. The particular microbe causing these two diseases is ultra-microscopic, so that some substance which is known to contain the causative agent, namely, the secretion from a pustule of cow-pox or some emulsion of the spinal cord of a dog immunized against hydrophobia must be used.

Small-Pox.—Cow-pox is supposed to be the modified form of small-pox in the cow. Some of the pustules are situated on its teats. Jenner noticed that if a milkmaid, with scratches on her hand, milked a cow suffering from cow-pox, she did not suffer beyond having a slight local inflammation on her hands, and, what was more striking, she did not catch small-pox, or if she did, she had it in a modified form. In other words, the passage of the small-pox virus through the cow alters the virus in such a way that if a human being is infected with some of this virus, a small pustule at the seat of inoculation results, and as a rule nothing more, whilst the individual is immune to small-pox, or if he acquires it will only have it in a modified form.

Jenner published his discovery in 1789, a discovery leading to vaccination, which has almost stamped out small-pox.

Hydrophobia.—The microbe causing hydrophobia is also unknown, but its virulence can be increased by inoculating a rabbit with an emulsion of the spinal cord of a mad dog, and then by inoculating another rabbit with an emulsion of the spinal cord of the first rabbit, and so on. Likewise its virulence can be decreased by drying the spinal cords of the rabbits over caustic potash for varying periods. By injecting into a dog emulsions of these spinal cords, commencing with the weakest and leading up to the strongest, it can be immunized against hydrophobia. If then emulsions of the dried cord of this immunized dog is injected into a person who has been bitten by a mad dog, the chances of the patient not having the disease or of recovery if he has are very greatly increased. By these means the mortality of hydrophobia has been reduced from 16 to $\frac{1}{2}$ per cent.

Production of Active Immunity by Inoculation with Dead Bacteria.—Bacteria, from a patient suffering from an infective disease, are procured and grown under suitable conditions in an incubator as it is called, which is a kind of oven. When sufficient bacteria have grown they are mixed with normal saline and then killed by heat. The solution of dead bacteria is then standardized and put up in hermetically sealed glass flasks, each containing the equivalent of a certain number of bacteria, 5, 10, 20, 50, 100 million as the case may be. Persons injected with such solutions may be immunized or partially immunized, the best known examples being the inoculation with anti-typhoid serum which has almost stamped out typhoid fever in the Army, and even in those persons who have acquired the disease the mortality has been most strikingly decreased. Similar inoculation is used for cholera and plague, in puerperal fever and other diseases. This method has also been employed as a curative agent, but not so successfully, and in such cases it is considered best that the solution should be autogenous, that is prepared from the bacteria already infecting the patient.

Unfortunately, immunization with dead bacteria is not

by any means always successful. Such failures, however, are almost certainly not due to the method employed, but are probably due to the fact that the exact variety of bacteria cannot always be determined, and also because the illness is due to a mixed infection, the particular bacteria causing the disease influencing the harmless bacteria which commonly frequent the body in some way which is not known, and so causing them to become harmful.

The Diagnostic Aspect of Immunity Reaction.—This has already been touched upon when discussing certain of the antibodies. To give a few examples:—

The presence of typhoid and paratyphoid fevers and cerebro-spinal meningitis may be inferred if the blood-serum of the patient who is ill clumps emulsions of the bacilli causing these diseases—the *agglutinin test*. The presence of syphilis may be detected by the *Wassermann test*. Infection by a particular bacterium can be inferred if the blood-serum of the patient lyses similar bacteria in solution so that typhoid and paratyphoid, for instance, can be differentiated—the *bacteriolysin test*. The question whether certain blood is human, or a particular sausage contains other than pork meat, can be detected—the *precipitin test*. The presence of suppuration can be inferred from the number of phagocytes present—the *phagocyte test*.

The foregoing remarks on immunity refer more particularly to the results of bacterial invasion.

Owing to the practical impossibility of growing pathogenic protozoa outside the body, hardly anything is known about the immunity reactions, as the result of their invasion of the body. In a few instances certain of these reactions have been found useful for diagnostic purposes, such as the Wassermann reaction in syphilis, but no advances have been made in the direction of treatment on the lines of inducing passive or active immunity by the methods described for bacterial invasion in the previous pages.

Other methods, however, have been devised by which

the protozoa circulating in the blood-stream can be killed. These methods are all concerned with the injection into the circulation of the infected person of a chemical poison. Their danger lies in the fact that it is extremely difficult to obtain a poison which will be strong enough to destroy the protozoa without harming the body-cells and so either killing the patient or injuring him for life. After many experiments, chemical poisons have been found which can be used with a fair margin of safety and the use of which is justified, considering the terrible nature of some of the diseases.

The chemical poison most in use at the present time is salvarsan or 606, so numbered because 605 preparations were made and discarded before a satisfactory one was discovered, and it is contended that some of its derivatives, such as neo-salvarsan which is numbered 914, are quite safe. In the majority of cases the treatment of syphilis by this chemical poison is said to result in a cure.

Sleeping sickness has been successfully treated by similar means. Streptococcal infection is also, in many cases, successfully treated, or apparently so, by injecting eusol into the circulation. Quinine has been used as an injection for malaria.

PART III.

GYNÆCOLOGICAL NURSING.

THE BEARING OF A NURSE.

A FULLY trained nurse is one who has developed and brought to a fine art the care and management of the sick, having a sympathetic and intelligent grasp of the theory and practice of nursing.

To have reached such a stage, a nurse must have spent at least three years in a recognized training-school where all her faculties should have been exercised to the perfecting of each detail of her work, in no way overlooking the fact that this training is useless unless her character has developed along sound and strong lines, and she has cheerfully responded to the stern discipline which alone can make productive those qualities which are essential to her calling. Taking character as the foundation of a good nurse, an implicit and unquestioning obedience to all instructions received from those in authority is required, together with absolute loyalty, a wise energy, and a forgetfulness of self in the love of the work she has undertaken.

Such a nurse will perform her duties with a freedom from self-consciousness and a quiet reserve which cannot fail to elicit the respect of those with whom and for whom she works, and in so doing will uphold the status of the profession she represents.

Manners are often overlooked in a nurse's training, due probably to the rush of her work, and she may be in danger of losing the confidence of her patient through an

appearance of hurry which must therefore be wholly foreign to her nature.

Towards patients and strangers alike she should be at all times courteous, sympathetic, and helpful, but in every way free from familiarity.

The essential qualities then of a fully-trained nurse are sympathy apart from sentimentality; an intimate knowledge of all the details of her work which will serve to inspire confidence in patients and doctors alike; a cheerful self-forgetfulness, holding sacred any information confided to her by doctor or patient, ever avoiding all conversation of a personal nature; and lastly, accuracy and minute attention to detail. These latter qualities a nurse only acquires in her probationer days, when her habits are being formed and her powers of observation developed by the routine ward-work, rough and heavy though it may have seemed, for only by such work can she become alert, quick, and have gained that observant and practised eye by which all details of a sick-room and all wants of a doctor are grasped without effort.

The natural outcome of such attributes will be punctuality, neatness, quietness, cleanliness even to the minutest detail, method and order.

All this is but an outline of what might almost be described as a limitless subject, on the bearing of a nurse towards her patients, doctors, fellow-workers, and the public at large.

CHAPTER XVII.

METHODS OF STERILIZATION.

STERILIZATION can be effected by means of heat or chemicals.

Heat.—

Heat may be used for sterilizing in two ways, either in the form of dry heat or moist heat, the latter being employed in the form of water or of steam.

Baking.—Dry heat at a temperature of 150° C. will kill spore-forming bacteria if exposed to it for an hour. Its application for this object has, however, the disadvantage that it does not penetrate well, and so bacteria in the middle of an article may escape destruction. For gynæcological purposes this method is not a useful one, since the oven will only take small articles, and cotton, linen, and flannel goods will be scorched.

Boiling.—For articles that can be used directly after being boiled this is the most convenient method of sterilization. Instruments, sutures, and india-rubber gloves are usually so treated, whilst towels and swabs can be if steam is not available. The articles must be boiled for 15 minutes.

Steaming.—Steam under pressure is the best method for sterilizing such articles as towels, dressings, swabs, operating-gowns, masks, etc. Bedding and clothing are also most efficiently sterilized by this method. Leather, felt, skins, and mackintoshes cannot be steamed.

A useful and efficient method of sterilizing dishes, trays, etc., is to pour into them a small quantity of methylated spirit. The spirit is then set alight and allowed to burn itself out.

Chemical.—Too much reliance must not be placed upon the uncertain action of chemical substances. It has been proved beyond question that these materials, in the strength employed in antiseptic surgery, may not kill, within any reasonable time, the more resistant forms of even non-sporing bacteria. The following chemicals among others are used for sterilizing purposes :—

Mercury. Carbolic acid. Lysol.

Mercury.—This is used in the form of its salts, the perchloride or biniodide. Perchloride or biniodide of mercury is very poisonous and is decomposed by lead, tin, and copper ; it corrodes metals and becomes more or less useless in the presence of albumen, forming with it an insoluble compound.

It is the strongest chemical suitable for the purpose known, but care must be taken in its use. As albumen is contained in blood and other discharges from a wound, these substances must be washed away before the perchloride of mercury can kill the bacteria. Likewise soap must not be allowed to contaminate the mercurial solution.

Owing to the poisonous nature of perchloride of mercury its solutions must be prepared with the greatest care.

If a patient is poisoned with preparations of mercury she will complain of a metallic taste, sore gums, colic, and nausea. She will suffer from salivation and diarrhoea. Her breath may be very offensive, and there may be blood in the motions. In bad cases the pulse is small and rapid, the patient has an anxious expression, her skin is cold and clammy, and she may have suppression of urine.

For the catheter, douche-nozzle, vulva, and hands a solution of biniodide or perchloride of mercury, 1 in 2000, may be used. For the vagina and uterus a strength of 1 in 4000 is generally sufficient. Many doctors order a douche of saline to be given after an intra-uterine or vaginal douche of mercury, to avoid the possibility of poisoning.

Carbolic Acid.—Carbolic acid is an uncertain chemical for sterilizing purposes unless it is used at such a strength that it will injure the tissues. It is, however, a good dis-

infectant. It has the advantage of not injuring the instruments or combining with albumen, so that it can be used in the presence of that substance. The first sign of carbolic acid poisoning is that the urine becomes green or greenish-black.

Carbolic acid is very useful for sterilizing mackintoshes, dishes, and porringers, for which purpose its strength should be 1 in 20 (one ounce to a pint of water). For the skin, instruments, and hands 1 in 40 is strong enough.

Lysol.—Belongs to the carbolic acid group of chemicals. It is, however, not so poisonous, and rather more efficacious in its bactericidal properties.

For the skin, hands, and instruments it can be used at a strength of 1 in 160 (a teaspoonful to a pint of water), and for the vagina and uterus 1 in 320.

Because of the poisonous nature of these chemicals the nurse must remember to prepare the solutions for douching in strict accordance with the doctor's orders, and, in addition, when she is giving a vaginal douche, she must be sure that none of it is retained, and to this end after the douche-nozzle is withdrawn she can pull back the perineum and press upon the abdomen.

One of the most important lessons a nurse has to learn is that of surgical cleanliness. A thorough knowledge of the conditions of asepsis and antisepsis will certainly help her a good deal in this, but she must be able to carry into practice what she has learnt. One has often seen a nurse, whose knowledge of the principles of surgical cleanliness has been quite sufficient, fail in this respect through lack of care and strict routine. Thus a nurse will sterilize all the instruments and appliances, will dress herself in appropriate apparel, will scrub her hands and soak them in an antiseptic afterwards, but will then proceed to touch some object which has not been sterilized, be it the patient, a piece of furniture, or even her cap! after which she may, unless admonished, continue to help at the operation without again rendering her hands as aseptic as possible.

A nurse must remember when assisting with the instruments or swabs at the operation, that after having once rendered her hands and forearms as aseptic as possible she must not touch anything that has not been sterilized till the operation is finished. Very rarely with insufficient assistance this may be impossible, in which case the nurse must again prepare her hands, or if, as she should be, she is wearing india-rubber gloves, it is better for her to put on a new pair.

How to Disinfect a Room.

The nurse may be called upon to disinfect the room after it has been occupied by some septic case. The disinfection should be carried out as follows with the additional help that is necessary:—

All the linen that can be boiled should be placed in a solution of carbolic acid 1 in 20, or lysol, 1 in 160, and then removed from the room.

The windows and fireplace should now be pasted up with brown paper so as to prevent any air from entering the room. Next the blankets, mattress, and bolsters should be spread out, and all the drawers and cupboards should be opened so that their contents are exposed as much as possible.

A formalin lamp (which can be hired at a moderate charge from most chemists) should now be placed in the centre of the room, and after the lamp is lit the room should be left as quickly as possible, the door closed, and the key-hole and the junction of the door with its frame pasted over with strips of brown paper.

At the end of twelve hours the door, windows, and fireplace should be opened and the room exposed to the fresh air for some time.

Everything as far as possible should be sent to the wash.

The room and its contents must then be thoroughly scrubbed with soap and water. If the walls are papered it is better that they should be stripped and afterwards washed with some disinfectant. If distempered or painted

the walls should be sprayed with formalin and then washed down.

Books and papers should be burnt as they cannot be disinfected unless exposed to a degree of heat which would spoil them.

If a formalin lamp cannot be obtained, the room can be less efficiently disinfected with rock sulphur. Three pounds of this should be placed on a shovel with some red-hot cinders, the whole being placed over a bath of water, so that if any cinders should fall there will be no danger of fire. Sulphur candles are sold for disinfecting purposes.

CHAPTER XVIII.

POSITION OF THE PATIENT FOR EXAMINATION OR OPERATION.

IN gynæcological practice the nurse will be told by the doctor to place the patient in various positions according to the nature of the examination to be made, the treatment to be carried out, or the operation to be performed.

The nurse must be sure to make herself conversant with these various positions, and should be able, without any delay or hesitation, to place the patient in the required position. It is very irritating to the doctor to discover, either that the nurse does not know what he means or, if she does, that she is not capable of carrying out his directions. Nevertheless it is not at all uncommon, in private practice, to find the nurse ignorant of such things, and an interrogation will elicit the fact that such ignorance is more often due to the nurse not having been trained in this respect than to forgetfulness.

For Examination and Treatment.

Recumbent Position.—Doctors examine their patients when suspecting any disease of a gynæcological nature by a routine method. First an external examination of the breasts and abdomen is made, then an external examination of the vulva, and lastly, if necessary, an internal examination of the vagina, uterus, ovaries, and Fallopian tubes.

The recumbent position is therefore the first to be assumed by the patient in whom such an examination is necessary.

In this position the patient lies on her back with her head

and shoulders supported by a pillow. If in bed her night-gown should be drawn up as far as the breasts, and the lower part of her body covered with the sheet only which should be drawn down so that it just covers the pubic hairs.

Nearly every nurse, when asked to get ready a patient for examination in the recumbent position, forgets to turn down the blankets and bed-cover or quilt.

If the patient is not in bed she should remove her corsets and also her skirt, after which the strings of her petticoats and drawers should be loosened so that the abdomen can be bared, or if combinations are worn these should be unbuttoned.

Left Lateral Position.—In the left lateral position the patient lies on her left side, her head on a pillow with her knees drawn well up towards her chin, and her back somewhat arched. Her buttocks should be brought right to the edge of the bed and the sheet or petticoat should be arranged so that it can be drawn up easily so as to expose the vulva (Fig. 7). As a general rule the nurse does not bring the buttocks of the patient near enough to the edge of the bed, when placing her in this position.

The patient is placed on the left side because most doctors are right-handed.

In this position the vulva can be well inspected, a bimanual examination can be made, pessaries can be inserted, and minor treatment to the vagina or cervix carried out.

Semi-prone Position.—The semi-prone position was invented by an American gynaecologist named Marion Sims, and is therefore often called after his name. On the patient assuming such a position, if the doctor separates the labia the air enters the vagina and distends the vaginal walls, and by this means, and with the aid of the duck-bill (Sims's) speculum the vaginal walls and cervix can be efficiently examined. It is also a good position for replacing an incarcerated retroverted gravid uterus (Fig. 8).

The patient lies well over on her left side with her face and breasts on the pillow, her left arm hanging behind her over the edge of the bed or couch; whilst her pelvis and

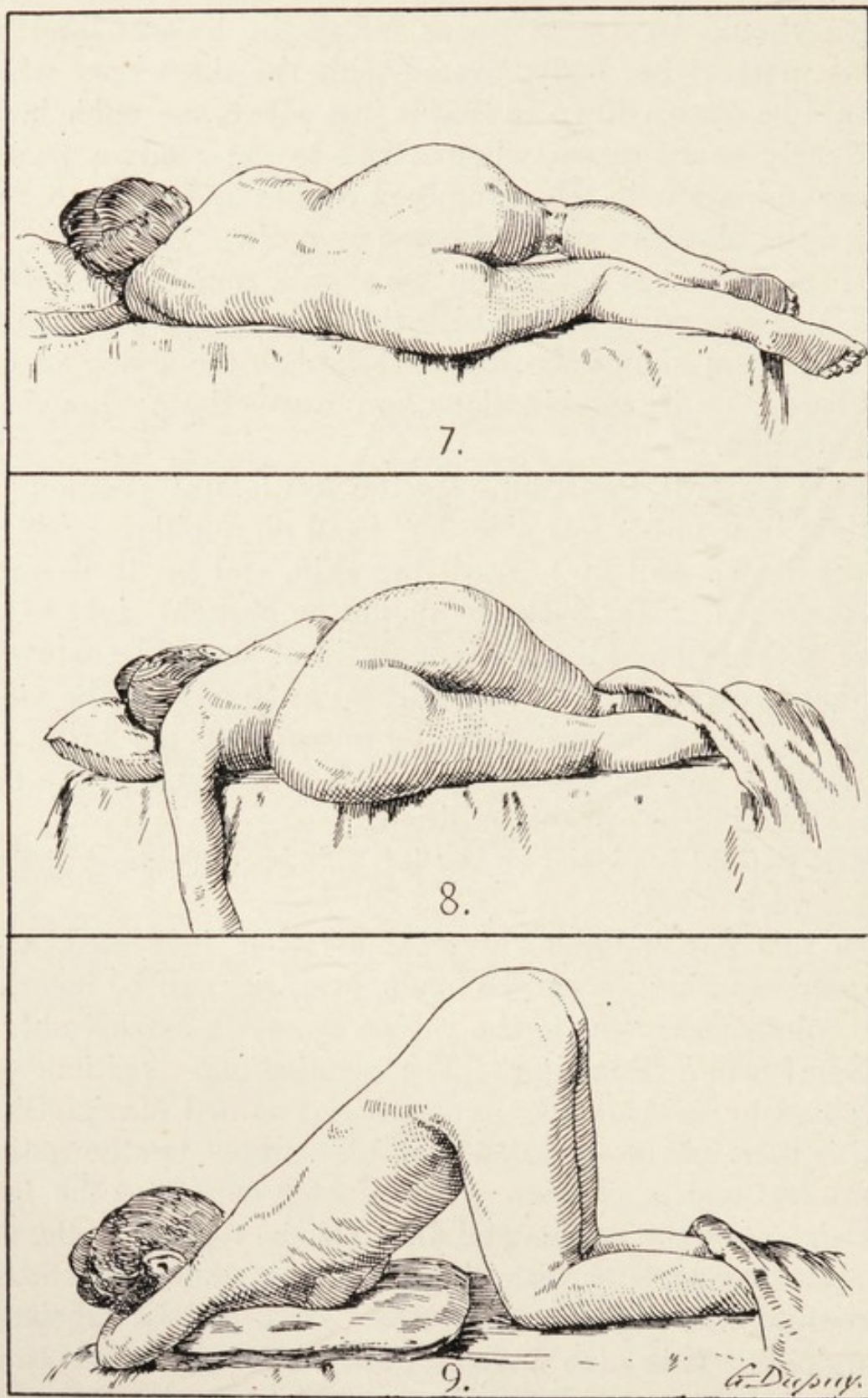


FIG. 7.—Left Lateral Position. FIG. 8.—Sims's Semi-prone Position.
FIG. 9.—Knee-pectoral Position.

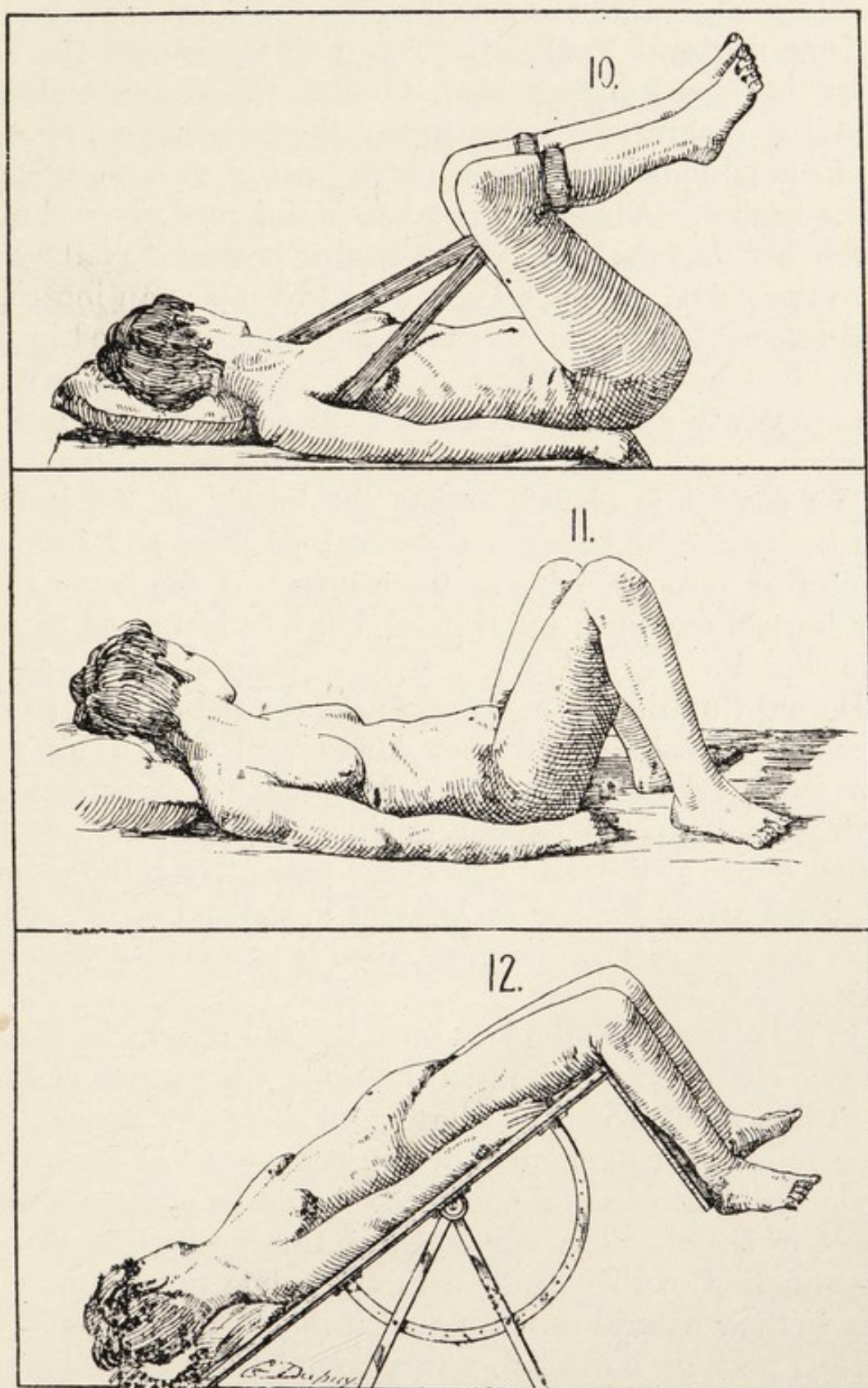


FIG. 10—Lithotomy Position.

FIG. 11.—Dorsal Position.

FIG. 12.—Trendelenburg Position.

thighs are kept in the left lateral position, the right thigh being flexed somewhat more than the left.

Knee-pectoral Position.—This position causes the air, when the labia are separated, to enter the vagina and distend it to its greatest limits, in fact there results a pressure of fifteen pounds to the square inch (that of the atmosphere) in the vagina. Advantage is taken of this pressure and also of the fact that the viscera tend in this position to fall away from the pelvis, when endeavouring to replace an incarcerated retroverted gravid uterus or a tumour impacted in the pelvis, but as these conditions are of infrequent occurrence the nurse will not often be asked to place the patient in this position.

The patient is placed so that she kneels on the bed or couch, her thighs being in a vertical position and her feet projecting over the edge of the couch. At the same time her breasts rest on a pillow, and her face is turned to one side (Fig. 9).

Dorsal Position.—In this position the patient lies in the recumbent position with her knees well drawn up and separated. Some doctors prefer to make a bimanual examination with the patient in this position. The doctor stands either at the right side of the patient, or if the patient is placed across the bed or brought to the end of the couch with the buttocks overhanging, then he stands between her legs.

In this latter case the legs must be held or may be placed on two chairs, or on extension brackets if the couch is fitted with these. The patient's head and shoulders should rest on a pillow, her nightgown or petticoats must be drawn up under her buttocks and her knees should be covered with a sheet or shawl. The advantage of this position is that an examination can be made with the pelvic organs more or less in their natural position, and if the doctor stands in the second position indicated, a very complete examination can be made of the vulva, whilst treatment to the vagina or cervix can be easily applied. This is also the best position for passing the catheter, in which case the sheet should be drawn up above the pubes (Fig. 11).

One of the most useful positions of all for the bimanual examination, and one which does not expose the patient to such an extent as that last described, is for the patient to lie with the upper half of her body in the recumbent position and with her pelvis and thighs in the left lateral position, or as near to this as she is able.

For Minor and Major Operations.

Recumbent Position.—In this position the patient lies flat on the operating table; it is used when the Trendelenburg position is not required.

Lithotomy Position.—In this position the patient is placed in the dorsal position, and her buttocks are drawn a little over the end of the table. The thighs are then well flexed on the trunk and the legs on the thighs. The patient is kept in this position as a rule by means of Clover's crutch, and the nurse must particularly remember when applying it that *the iron bar is strapped to the legs below the knee, and not to the thighs above the knee*. If an operating table is being used it may have uprights at its end to which the *ankles should be strapped*, which will obviate the necessity of using a Clover's crutch (Fig. 10).

Trendelenburg Position.—The Trendelenburg, named after the surgeon who invented it, is the position in which the patient is most often placed for an abdominal operation on the pelvic organs. The patient is so tilted that her knees are the highest point and her head is the lowest. This position to be perfect requires an operating table that is made to tilt especially for this purpose. *Whilst the patient is being tilted into this position, a nurse must hold her legs at right angles to her thighs to prevent her slipping down the table*. When the requisite tilt has been obtained, the ankles are secured to the frame of the table with bandages. If such a table is not available a modified Trendelenburg may be obtained by resting the back of the patient against a chair turned upside down, allowing her legs to hang over the rail below the seat. The great advantage of the Trendelenburg position is that the intestines and omentum fall

back towards the diaphragm, leaving the pelvis free and exposing the pelvic organs (Fig. 12).

After Operation.

Minor Operations.—The exact position of the patient in bed after a minor operation does not in most cases signify, though after perineorrhaphy the patient will be more comfortable on her side owing to the swelling and tenderness at the site of the operation.

Major Operations.—When the patient is first returned to bed she should be placed upon her back, her legs should be raised and her knees kept flexed by means of a pillow placed under them. In this way strain on the abdominal muscles is prevented. A pillow should also be placed under the small of the back which needs support.

After the shock of the operation has subsided the patient if she wishes may be turned on her side and kept in that position by pillows placed under her shoulder and legs.

Fowler's Position.—In this position the patient is propped up in a sitting posture by means of a bed-rest or pillows. To keep her from slipping down into the bed a bolster rolled in a draw-sheet with long ends is placed under her knees. To keep this bolster in position, bandages are tied to the long ends of the draw-sheet and to the head of the bed on each side. If the patient is heavy and the bolster tends to buckle up, a broom-stick wrapped round with a blanket and draw-sheet will be found a most efficient substitute.

Fowler's position is the very best for the patient to assume after an abdominal or pelvic operation for a septic condition, and when drainage tubes are used. As a matter of experience it is found that this position is also the best for a patient to assume after any abdominal operation. It relieves the backache, diminishes the tendency to flatulence and sickness, and encourages sleep (Fig. 13).

If the patient is very anæmic she must be kept very quiet and must not be allowed to exert herself in any way.

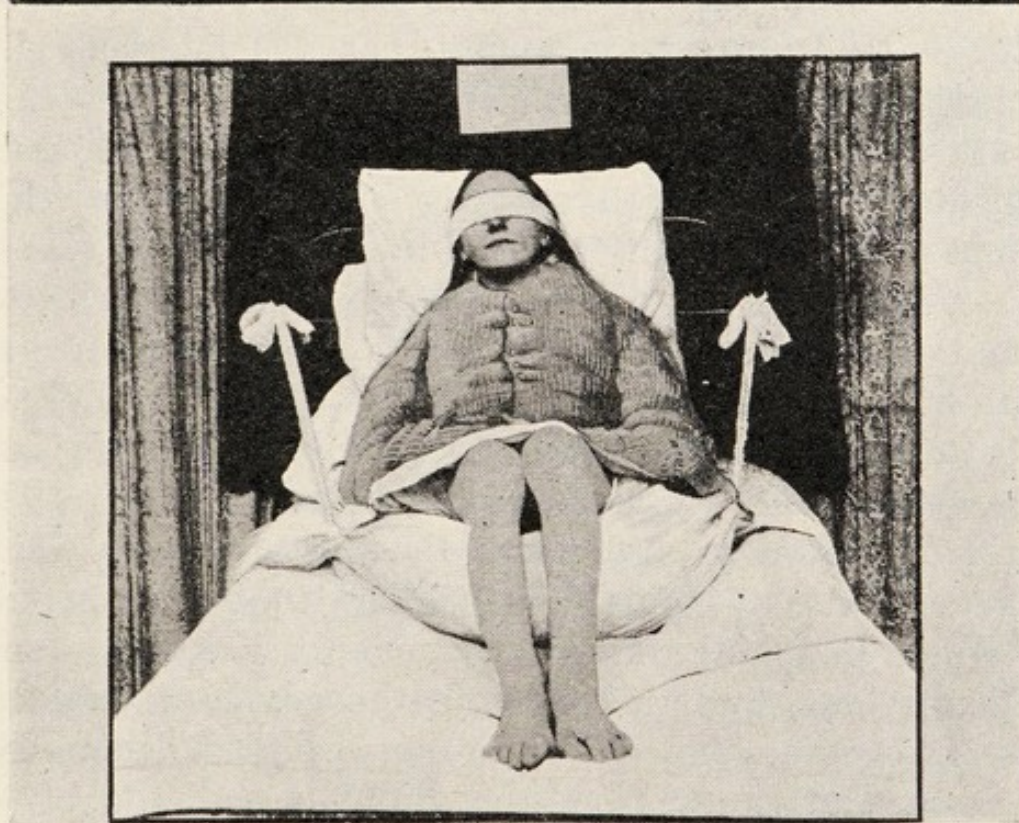


FIG. 13.—Fowler's Position.

CHAPTER XIX.

VAGINAL DOUCHING AND TAMPONADING—CATHETERIZATION—WASHING OUT THE BLADDER—SALINE INFUSIONS.

VAGINAL DOUCHING.

VAGINAL douching, unless employed in suitable cases, does more harm than good. The normal secretion of the vagina is acid in reaction and it has a deleterious effect on most septic and pathogenic organisms.

Nature never intended the vagina to be douched, and to wash away its secretion only encourages the growth of microbes, more especially if the solution used is an alkaline one. Moreover, as vaginal douching causes a certain amount of congestion, it really, if persisted in for any length of time, increases the secretion of the genital organs, tends to make the period more profuse and is, in some cases, the cause of dysmenorrhœa and pelvic pain. It is a matter of everyday observation that as long as a woman continues to use a vaginal douche, her leucorrhœa persists.

Vaginal douching is most commonly used by women for leucorrhœa, and this without the advice of a doctor. When it is remembered that in most cases of leucorrhœa, the discharge comes from the lining membrane of the uterus, and that the solution used in a vaginal douche cannot possibly get into the uterus, unless the cervix is dilated, it is manifest that the only result of vaginal douching, apart from any harm it may do, is in most cases to wash away the discharge that has collected in the vagina. The amount of leucorrhœa will undoubtedly

appear to the woman to be less, but the other symptoms she often complains of may rather tend to get worse.

Vaginal douching may also do harm in other ways. For instance if a woman has a gonorrhœal infection of her vulva, a vaginal douche may be the means of conveying the gonococcus to the vagina or uterus and so to the Fallopian tubes, ovaries, and peritoneum. Again, after the uterus has been curetted, vaginal douching may lead to its infection, and this is perhaps why the result of this operation is, in some cases, so disappointing.

Vaginal douching, however, is definitely indicated in certain cases. Thus the septic condition of the vagina and the offensive discharge associated with cancer, sloughing fibroid polypi, or sloughing after operations or child-birth will necessitate antiseptic and deodorant douches.

Uterine and vaginal hæmorrhage is rightly treated with hot vaginal douches, but the douche must be hot and not warm. Pelvic inflammation, such as pelvic peritonitis and pelvic cellulitis, can in many cases with advantage be treated by warm douches. If a patient is wearing a pessary she should have a vaginal douche once a day for cleansing purposes.

The Administration of Vaginal Douches.

The following articles are required: a douche-can, a douche-pan, a bath thermometer, and a measure.

The douche-can should hold two quarts, should have 6 feet of tubing attached to it, a glass nozzle, and a tap near the nozzle so that the patient can if she likes stop the flow.

As a rule only two quarts of fluid are used at a time, which take about five minutes to run through, and the douche-pan should hold this quantity. If, however, for some reason the doctor wishes the patient to be douched longer, say for fifteen or twenty minutes, then, in addition, a pail will be required to empty the contents of the douche-pan into, or a douche-pan may be obtained to which is affixed a piece of rubber tubing, the free end of which on being put

into the pail carries the douche from the douche-pan into the pail, without the patient having to be disturbed.

The temperature generally employed for aseptic purposes is 110° F., and that for bleeding or inflammation is 115° F. to 120° F. Most patients can stand a temperature of 106° F. to 110° F., but when the temperature rises above this and the douche runs for any length of time some distress may be caused by the fluid, as it escapes into the douche-pan, burning the inner surfaces of the thighs. This can be greatly modified by smearing the parts involved with vaseline.

In the preparation of these douches the nurse must be most careful *that the antiseptic to be added to the water is of the strength ordered and the temperature of the solution the correct height.* A nurse may sometimes be seen to pour in the antiseptic without having the least idea of what the real strength of the douche will be, whilst to gauge the temperature she will make a rough guess by inserting her fingers into the fluid.

Nurses should remember that it is quite easy to poison or scald a patient with a douche improperly prepared.

The douche should always, therefore, be mixed in a separate jug, and the temperature tested before it is emptied into the douche-can. All the appliances for douching should be rendered as aseptic as possible by a thorough washing and boiling. If there is no utensil large enough to boil the douche-can in, it must be swabbed with carbolic acid (1 in 20), and the glass nozzle should be, between whiles, kept in a solution of carbolic acid (1 in 20).

Douching on the Back.—All pillows should be removed in order that the pelvis may be suitably tilted, and the patient should lie flat on her back, with her legs drawn up and separated, her pelvis resting on the douche-pan which has been warmed. A mackintosh is placed under the douche-pan, and the bed-clothes are drawn up. The nurse having placed the douche-can in a convenient place and raised above the level of the patient, then thoroughly washes her hands, cleans the vulva with biniodide of mercury (1 in

2000), and again making her hands as aseptic as possible introduces the nozzle by separating the labia with her left fingers and pushing the nozzle into the vagina with her right hand. The tap is then turned and the douche flows into the vagina and out again into the douche-pan.

Douching on the Side.—The patient is placed in the left lateral position with her buttocks drawn to the extreme edge of the bed, the knees well flexed, the right beyond the left, and both raised at an angle from the bed by a pillow which slopes to the lower hip. A thick pad must be placed between the thighs, the upper end against the pubes to prevent a backward flow of fluid along the groin. The bed-clothing should be sufficiently folded back to leave exposed the necessary parts—vulva and outer border of the buttocks.

A warmed mackintosh with a rolled in border to form a ridge of protection is placed under the hip, so that it slightly lodges on the end of the knee pillow and is well grouped over the edge of the bed to form a gutter into a pail which has been placed on the floor beneath the buttocks. Sterile towels can then be arranged round the parts as desired.

A copious douche can thus be given without disturbing the patient or in any way soiling the bed, and the parts are clearly available for treatment such as plugging the vagina.

Tamponading the Vagina.

Vaginal tampons are prescribed for inflammatory conditions of the vagina, uterus, ovaries, Fallopian tubes, pelvic peritoneum, and pelvic cellular tissue, or as a means of controlling hæmorrhage from the uterus or vagina.

For Inflammatory Conditions.—A vaginal douche should be given both before the tampons are inserted and after they are removed, the vagina being dried very carefully with swabs, and any discharge that may still be clinging to its walls removed, in order that the drug with which the tampon is impregnated may be brought in contact with the inner surface of the vagina.

One method of making a tampon is to take a piece of absorbent wool 12 inches long and 5 inches broad, and to

sew a piece of tape to one end. Whatever solution has been prescribed is poured over this strip of wool and allowed to soak thoroughly into it, the wool is then twisted up like a rope and is ready for use.

Another method is to make several small tampons about the size and shape of a hen's egg, or perhaps a little smaller, to which are attached pieces of silk or tape by which they can be removed.

When using tampons it is most important to see that the whole vagina is carefully packed and everywhere in contact with them.

Before tamponading the vagina, the patient should empty her bladder, or the urine should be drawn off by catheter. Especially is this of importance when the vagina is being plugged for hæmorrhage, in which case the tampons are inserted as tightly as possible and must be left in many hours. If then the bladder contains a fair quantity of urine when the plugging is inserted, the latter will have to be removed sooner than is desirable, in order that the patient may empty her bladder.

Tampons may be introduced either with a Sims's speculum and forceps or by placing the first and second fingers of the left hand in the vagina, separating the labia a little, and then inserting the tampon with the right hand. The fingers of the left hand are then withdrawn, and the tampon pushed up as far as possible with the first finger of the right hand. The tampons should always be carefully and firmly packed round the cervix, gradually filling up the vagina from above downward. The tampon is, as a rule, put in at night, and removed in the morning, and as the secretion caused by the tampon is often rather profuse, a diaper should be worn.

Medicated tampons for application to and around the cervix are best passed through a Ferguson's speculum with swab-forceps.

For Hæmorrhage.—In the case of hæmorrhage from the uterus or vagina a douche at 120° F. should first be given, and then medicated gauze or plain gauze dipped in

biniodide of mercury (1 in 4000) may be packed into the vagina supposing tampons are not handy. If time is of great value and gauze is not obtainable, then it is best to use what is known as a kite-tail tampon. This is made by tying a number of pieces of cotton-wool about the size of hen's eggs to a tape, so that there shall be 4 inches of tape between each piece of wool, and this should be wrung out in an antiseptic solution.

It is preferable if the douching is being used for hæmorrhage to have the patient on her side. The clot can be cleared away and the plugging applied without disturbing the patient (see Fig. 7).

Catheterizing the Bladder.

Although one of the simplest procedures, catheterization may, if carelessly performed, cause the patient many weeks of misery, and perhaps kill her, the great danger being that bacteria may be introduced into the bladder. If this happens cystitis is set up, and the inflammation may then extend up the ureters to the kidneys and kill the patient, or infecting one kidney so disorganize it that its removal is imperative.

To prevent, therefore, bacteria being carried into the bladder, the nurse must thoroughly wash and scrub her hands, and then dip them into a solution of biniodide of mercury (1 in 2000); she must be sure that the catheter is sterile, and, lastly, that the vulva is clean.

In some cases, owing to inflammation of the urethra, a malignant growth, or urethral caruncle, the patient may experience acute pain when the catheter is passed. This complication can be relieved by injecting into the orifice of the urethra, with a glass syringe, a few drops of a 10 per cent. solution of cocain.

The best catheter to use is a glass one; if it is impossible to use this on account of some tumour pressing on the urethra, then a soft rubber one should be used. In either case the catheter should be well boiled before and after use, and in the interval it should be kept in carbolic

acid (1 in 20). Special care must be taken with the soft rubber catheter to see that the eye is quite patent, and in both a stream of water should be passed through after use in order that the channel may be properly sluiced.

The nurse having made her hands as aseptic as possible, the vulva is cleaned as follows: The patient being on her back with her legs drawn up and separated, the labia are held apart by the first and second fingers of the left hand, the wrist resting on the pubes, and the vestibule, containing the orifice of the urethra, exposed. This is well swabbed with biniodide of mercury (1 in 2000), by which means any bacteria contaminating this area may be removed and the risk of their being carried in by the catheter excluded. The nurse again surgically cleanses her hands, and exposing the vestibule once more with her left hand passes the catheter into the urethral orifice with her right hand.

A porringer should be placed between the patient's legs to receive the urine, and the catheter should be held in position with the labia separated until all the urine has passed. On the stream of urine diminishing and the fluid escaping in drops, the catheter is pulled out a little till the stream recommences to flow, and when a second time the drops appear then the bladder is practically empty, and the catheter is withdrawn. The thumb should be kept over the free end so that any urine remaining in the catheter will not be spilt over the patient or bed-clothes, and can be added to the rest of the urine in case of there being any sediment; or the contents of the catheter can be added to a sterile test-tube if the doctor so desires.

The only difficulties that may arise are due to some tumour preventing the passage of the catheter, or, much more commonly, to the nurse, especially if she be inexperienced, failing to recognize the orifice of the urethra and passing the catheter into the vagina. If this happens, it need hardly be said that the catheter should again be sterilized before being used, or a better plan is to prepare two catheters in the first place so that if one is soiled the other is ready for use. To prevent the catheter being

passed into the vagina it is a good plan, especially for probationers, to place a swab in the vaginal orifice before passing the catheter. If the catheter has been used for a septic case it is much safer not to use it for any other.

Nurses should learn thoroughly the position of the urethral orifice which may be difficult to detect if the parts are swollen, as they may be called upon to pass it during an operation.

Washing out the Bladder.

The following articles are required for washing out the bladder: A glass funnel to which is attached 4 feet of

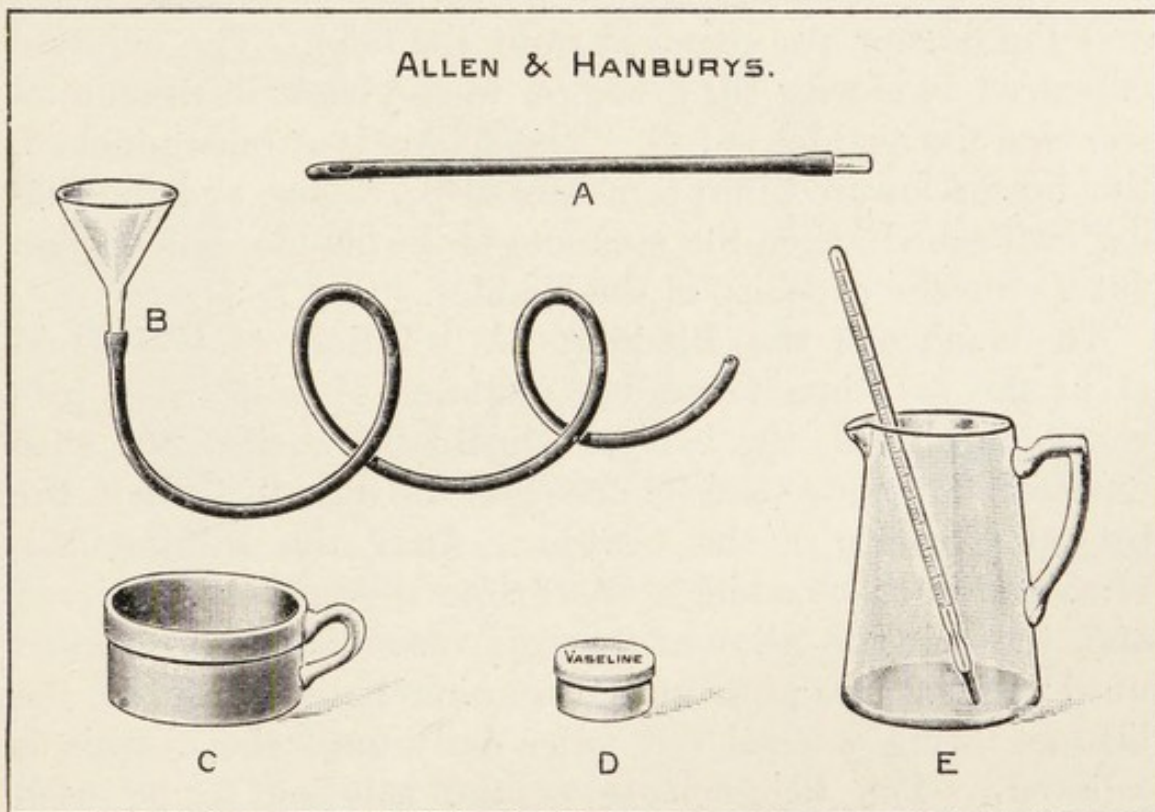


FIG. 14.—ARTICLES FOR WASHING OUT THE BLADDER.

- A. Glass catheter, rubber tubing and glass joint.
- B. Glass funnel and rubber tubing.
- C. Porringer.
- D. Kidney tray.
- E. Glass or other measure and thermometer.

india-rubber tubing, a glass catheter with a small piece of rubber tubing, and a glass joint to which can be attached the tube and funnel. A kidney tray to receive the urine,

a porringer for receiving the return flow from the bladder, and a jug and thermometer for the solution. The apparatus should be sterilized by boiling, and then placed ready on a table by the side of the patient.

Before washing out the bladder its capacity should be gauged.

Method of Gauging the Capacity of the Bladder.—

After the catheter has been passed with the precautions already noted and the urine withdrawn, the tubing and glass funnel which have been filled with sterile lotion to exclude air are attached to the catheter in situ. The tubing is pinched below the funnel which is then emptied, after which the funnel is filled with the prescribed lotion and the fingers are removed from the tube. The solution is poured in slowly till it begins to rise back in the funnel showing the bladder is full. The tubing is at once pinched, the funnel lowered into a measured porringer, and the tubing unpinched, when the contents of the bladder will siphon out giving the capacity of the bladder.

To Wash out the Bladder.—A solution of boric acid (1 in 20) or other prescribed solution, having been previously prepared, the bladder should be washed out with repeated amounts one ounce less in quantity than the proved capacity of the bladder. After the solution has remained in the bladder a short time the funnel is lowered and the solution allowed to run out. This is repeated until at least two pints of the solution have been used, the bladder being washed out twice daily until the cystitis is relieved. The temperature of the solution to be used should be between 100° F. and 105° F.

SALINE INFUSION.

Intravenous.—An intravenous saline infusion is often wanted in an emergency, and it is important, therefore, for the nurse to know what articles are required, since in the circumstances in which such a method of treatment is used the doctor will be attending to the patient in other ways and will have no time to superintend the preparations the nurse will be called upon to make.

The following articles must be procured and when necessary sterilized by the most appropriate method, and then assembled on a table covered with sterilized towels or on a sterilized tray :—

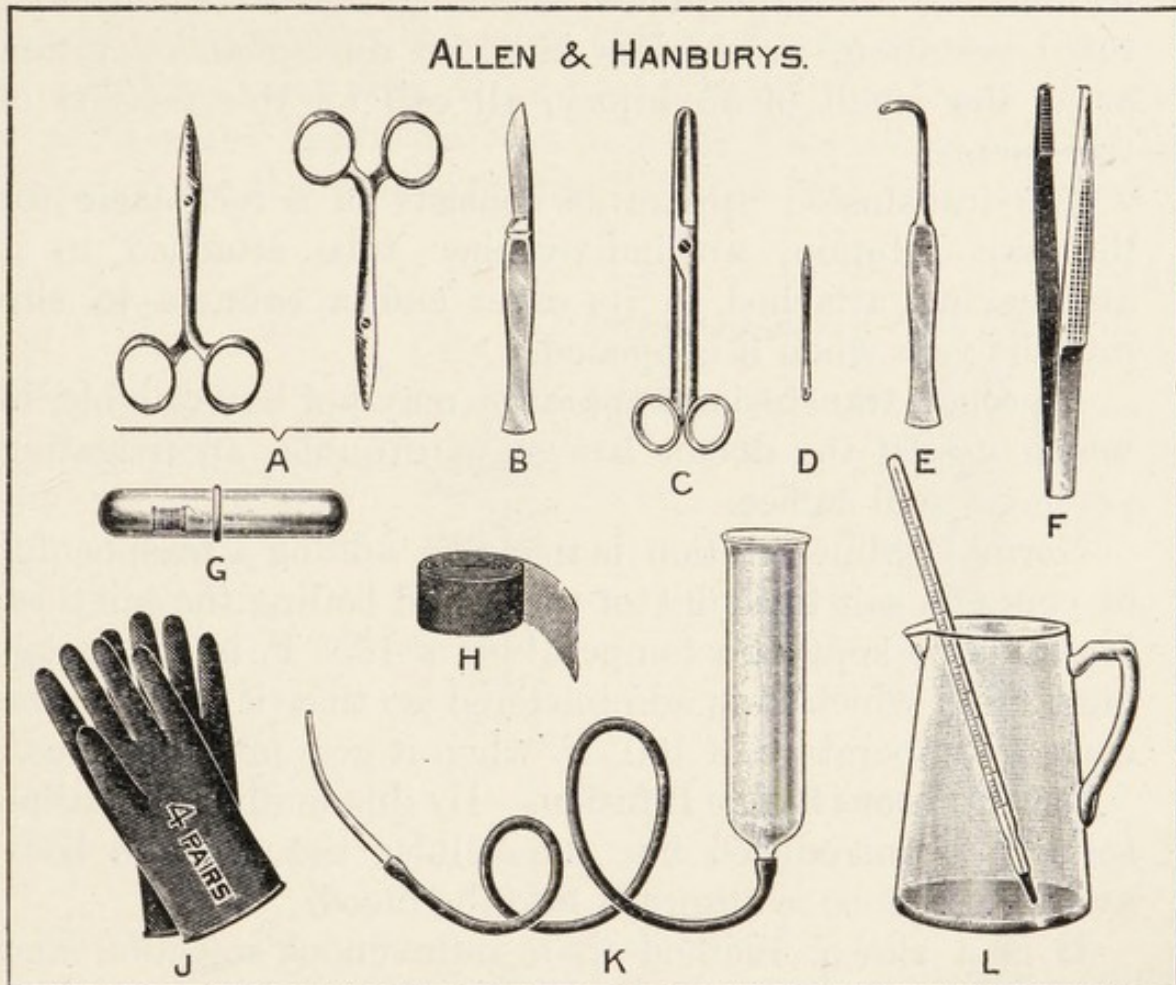


FIG. 15.—ARTICLES FOR INTRAVENOUS SALINE INFUSION.

- A. Two pairs of pressure forceps.
 - B. A scalpel.
 - C. Scissors.
 - D. A suture needle.
 - E. An aneurysm needle.
 - F. Dissecting forceps.
 - G. Catgut, ligatures No. 2.
 - H. A bandage to constrict the upper arm.
 - J. Gloves.
 - K. The transfusion apparatus.
 - L. A measure and a thermometer.
- Sterilized swabs.
Iodine solution.

An intravenous saline infusion is generally used when there has been a severe and rapid loss of blood, and it is necessary to make up the amount of fluid lost as quickly as possible. Such conditions, therefore, as post-partum hæmorrhage, intraperitoneal bleeding due to a ruptured tubal gestation, severe loss of blood during an operation or as the result of an injury, all call for this method of treatment.

The transfusion apparatus consists of a receptacle for the salt solution, an india-rubber tube attached to it and having attached to its other end a cannula to slip into the vein when it is opened.

A proper transfusion apparatus may not be available, in which case if the doctor has got a cannula, an irrigating porringer will suffice.

Normal saline solution is made by adding a teaspoonful of common salt to a pint of water and boiling the mixture. It should be kept at a temperature of 105° F. in the receptacle from which it is administered so that it will be the correct temperature of 100° F. when it gets into the veins.

Subcutaneous Saline Infusion.—By this method the saline solution is introduced into the cellular tissue of the body and from thence is absorbed into the blood.

It is a slower method than intravenous injection and the solution in the receptacle should therefore be hotter. The temperature of the solution as it is introduced should be 105° F.

The solution may be run in under the breasts or into the thighs, other situations sometimes chosen are the axillæ or flanks.

The following articles must be procured and, when necessary, sterilized :—

Iodine solution.

A measure containing normal saline solution.

A glass funnel to which is attached 4 feet of india-rubber tubing.

An aspirating needle.

A thermometer.

Collodion and gauze for sealing the puncture after the needle is withdrawn.

If the nurse is directed to give the infusion, she must remember that whilst she is introducing the aspirating needle she should let a little of the solution run out. About a pint can, as a rule, be run into the cellular tissue without causing any undue distress from the distension. After this amount is absorbed a further quantity may be introduced.

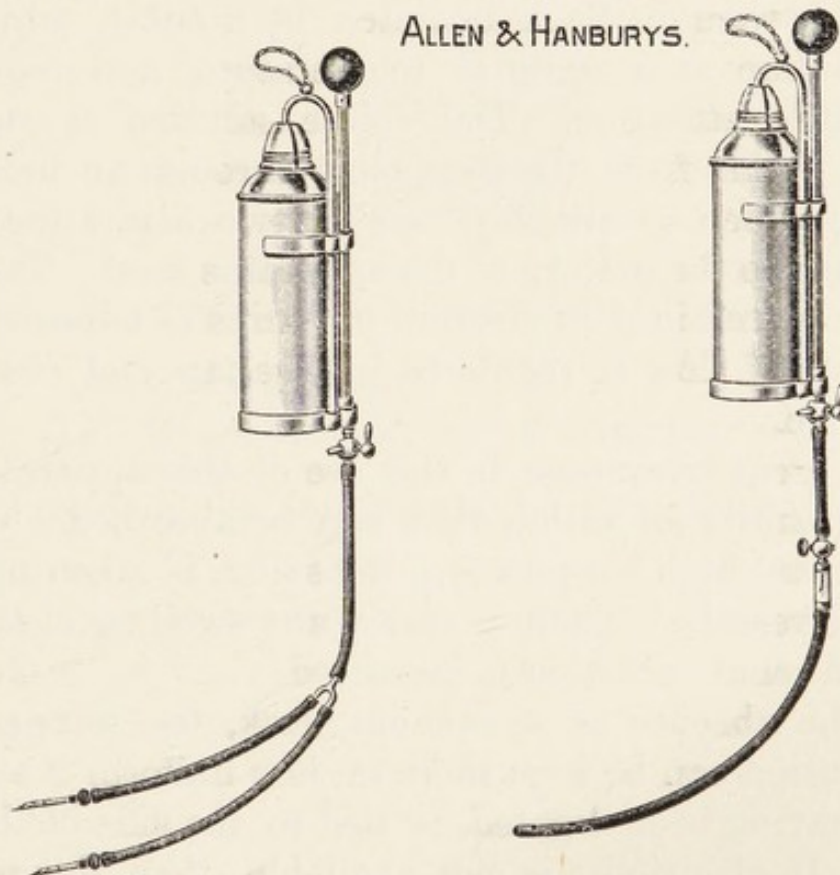


FIG. 16.—SOUTTAR'S "THERMOS" SALINE INFUSION APPARATUS.

1. For subcutaneous infusion.
2. For continuous rectal infusion.

Continuous Subcutaneous Saline Infusion.—This method of treatment is used in cases of shock and of peritonitis or other diseases of a septic nature. It is particularly useful when the administration of fluid by the mouth or rectum is impossible, and it is necessary to introduce large

quantities of solution. By its means from 10 to 20 pints may be introduced in the 24 hours, according to the absorbing powers of the patient. It is not advisable to allow the fluid to enter quicker than 10 ounces an hour owing to the discomfort resulting. Unless a proper instrument is available this is rather a troublesome method to carry out, owing to the difficulty of keeping the temperature of the solution uniform, and of regulating the rate of the flow.

The most convenient and best apparatus is a modification of a vacuum flask invented by Souttar, which keeps the solution at a uniform temperature, and requires but very little attention. The saline solution is run in by siphon action from the receptacle through an india-rubber tube to which is attached one or two aspirating needles, according to the pattern of the apparatus used. The needles should be retained in position by strips of adhesive plaster. The rate of flow is regulated by the tap and observed on the gauge.

The great advantage in the use of this apparatus is the large quantity of saline that can be absorbed. Owing to its constant high temperature the saline is taken up at once into the vessels. There is rarely any swelling of the tissues and the renal excretion is increased.

In the absence of a vacuum flask, the temperature of the solution can be kept more or less uniform if an electric bulb, having been lighted, is tied to the side of the receptacle. If electricity is not available, then the receptacle containing the saline solution must itself stand in a larger receptacle surrounded by water at a much higher temperature, so that the saline solution as it is introduced should be at a temperature of 105° F.

Intraperitoneal Infusion.—At the conclusion of an abdominal operation some surgeons before completely closing the wound in the parieties, pour into the peritoneal cavity two or more pints of saline solution. This is very generally done after the radical operation for cancer of the cervix.

The following articles will be required, and must be sterilized :—

ALLEN & HANBURY'S

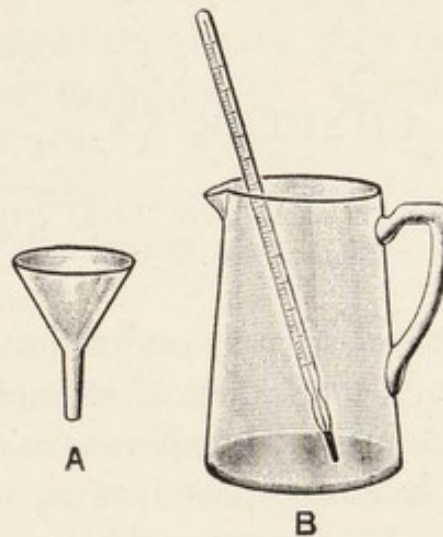


FIG. 17.—ARTICLES FOR INTRAPERITONEAL INFUSION.

A. Glass funnel.

B. Glass measure and thermometer.

The solution in the jug should be at a temperature of 105° F.

CHAPTER XX.

PRE-OPERATIVE EXAMINATION AND PREPARATION OF THE PATIENT.

BEFORE being subjected to any operation the patient must be prepared, and such preparation should include rest in bed, a report on the pulse, temperature, and respiration, douching, shaving, bathing, preparation of the skin over the operation area. In addition, the bowels, bladder, and dress have to be attended to, and the urine should be tested, and if possible the quantity passed measured, whilst the patient must not take any solid food for several hours before the operation.

Rest.—In all cases, if possible, the patient should be kept in bed for the twenty-four hours before the operation. For the operation of posterior colporrhaphy and perineorrhaphy it is better to increase this period to two days at least, so that the bowels may be well emptied. Lastly, patients suffering from cardiac, pulmonary, or renal disease, or from the effects of uterine hæmorrhage, may, when an operation is indicated, require a longer rest than this.

Pulse.—The rate and character of the pulse should have been noted carefully as long as possible before the operation and its frequency charted regularly twice daily. Such a procedure is most important. Nurses are apt to be careless in charting the pulse before the operation, and it may be that during this time the rate has been above or below normal. After the operation a similar rate continuing, the operator may be puzzled as to its cause when after all it may be the normal for that particular patient.

Respiration.—The respiration rate should be charted.

Temperature.—The temperature should be charted twice

daily unless the doctor orders this to be done more frequently. The same remarks apply as to the importance of recording the respiration and temperature before the operation as to that of taking the pulse.

Mouth.—It is most important that the mouth and teeth should be attended to before the operation, so that if the teeth are decayed and, if there is time, a dentist should be consulted. Certainly some cases of septic pneumonia, after operations, can be traced to the filthy state of the patient's mouth.

The patient must be made to clean her mouth and teeth with some efficient mouth-wash, and if she is too weak to do this the nurse must do it for her with dabs of wool soaked in glyco-thymoline and held on forceps.

Urine.—It is very necessary that a proper examination should be made of the urine before the operation. Should this not be done cystitis, if present, may be attributed to the carelessness of the nurse, if she has had to pass a catheter, or albuminuria or other kidney disease may be attributed to the effect of the operation. Also it is highly dangerous to operate on patients suffering from such diseases as diabetes or nephritis, and these can be diagnosed by an examination of the urine.

The following tables will serve as a guide for the examination of urine.

1.—Ascertain the Quantity from which the Specimen is taken.

Normal amount is from 40 to 60 ounces in twenty-four hours.

The quantity of urine is decreased in :—

Fevers.

Heart disease.

Acute nephritis.

Some cases of chronic nephritis.

Peritonitis.

Severe hæmorrhage, vomiting or diarrhœa.

By certain drugs as opium or ergot.

Some surgical diseases of the kidneys.

After an abdominal operation the quantity of urine passed for the first day or two will generally be less than normal, due to the fact that the patient will not be taking much liquid.

In certain cases of shock after operation the quantity of urine passed is markedly reduced. This is especially noticeable after the radical operation for carcinoma of the cervix uteri.

It is increased in :—

Diabetes.

Hysteria.

Most cases of chronic nephritis.

When a quantity of fluid is taken and by the action of certain drugs, such as acetate of ammonia, potassium citrate, digitalis, etc.

2.—Notice the Colour, the Clearness, and the Presence or Absence of Deposit.

A slight cloud due to mucus is normal.

(a) *The specimen is clear.*

Normal urine is a clear straw colour.

It is darkened if the quantity of urine is diminished and pale when the quantity is increased.

Bile colours urine very dark olive green.

Blood either colours it red, almost black, or gives it a smoky appearance, according to the source and quantity of the blood.

Certain drugs colour urine, *e.g.*, carbolic acid turns it olive green.

(b) *The specimen is not clear.*

The cloudiness or deposit may be due to :—

Urates (when the cloud will disappear on boiling).

Pus.

Mucus.

Phosphates.

Blood in quantity.

Urates are usually yellow or brick-red in colour.

Their presence is of little importance.

They occur in febrile states, and in health in concentrated urines.

3.—Test the Reaction.

Acid urine turns blue litmus paper red and has no effect on red litmus paper.

Alkaline urine turns red litmus paper blue and has no effect on blue litmus paper.

Normal urine is acid.

It may be alkaline after a meal, especially of vegetable food; in some cases of cystitis and while taking certain drugs such as citrates, and also from decomposition on exposure to air. If alkaline it must be made acid by a few drops of dilute acetic acid before applying further tests.

4.—Take the Specific Gravity.

See that the urinometer floats and stands clear of the sides of the vessel: read the number with the eye on a level with the surface of the urine.

The normal specific gravity is between 1·015 and 1·025.

A low specific gravity suggests kidney disease, or it may be only temporary.

A high specific gravity with pale urine suggests diabetes.

5.—Examine for Substances in Solution.

These may be:—

Phosphates.

Albumen.

Blood.

Bile.

Grape sugar (also called glucose and dextrose).

The presence of one substance does not preclude that of another.

A. Begin with the heat test.

Fill a *clean* test tube for about three inches with the specimen: hold the tube over a spirit lamp so that the upper half of the urine is boiled, leaving the lower half cool to compare it with. If the boiled portion be *clear* the urine does *not* contain *phosphates, albumen, blood, or pus*. If the boiled portion be *cloudy* it probably contains phosphates or albumen. Add a few drops of dilute acetic, or one drop of nitric acid, when if the cloud is due to phosphates it will disappear, as the acid dissolves phosphates and not albumen.

Phosphates and Albumen become apparent at boiling-point and Urates disappear.

B. If albumen is suspected *and the urine is clear, the nitric acid test may be applied.*

Pour a small quantity of nitric acid into a clean test tube; allow a similar quantity of urine to trickle steadily down the side of the test tube. Where the two fluids meet a layer of coagulated albumen is seen.

The quantity of albumen may be ascertained by Esbach's Albuminometer. This is a graduated test tube. Filter the urine if not already clear, and if alkaline render it slightly acid with dilute nitric acid. If the specific gravity is 1.010 or over dilute the urine sufficiently to reduce the specific gravity below that level. Fill the tube with urine

up to the mark "U." Add the reagent (Esbach's solution of picric acid and citric acid) up to the mark "R." The tube is then gently inverted a few times to allow the fluids to mix, after which it is corked and kept standing upright for twenty-four hours. The albumen is deposited and is read off on the graduated marks, which represent grammes of dried albumen per litre of urine. The percentage of albumen is obtained by dividing by 10. Allowance must be made if the urine has been diluted before the estimation was undertaken.

C. *Test for blood.*

If urine containing albumen is "smoky," red, or coffee-coloured, blood may be suspected. Pour some urine into a test tube and add one drop of tincture of guaiacum, then add an excess of ozonic ether: if blood is present *a blue ring* will form where the fluids meet.

D. *Bile in the urine* in any quantity always colours it. Run a few drops from a pipette on to a white tile and beside them a few drops of strong nitric acid; allow the urine and acid to run together; where the two fluids mix a passing play of colours, of which one *must* be green, will appear if bile be present.

E. *Test for sugar.*

If the urine is pale, increased in quantity, and of high specific gravity, sugar must be suspected.

A small quantity of freshly made Fehling's solution is poured into a test tube and boiled, an equal quantity of urine is then added and heated—an orange-red deposit proves the presence of sugar. Instead of Fehling's solution, its component parts may be used

separately—the liquor potasse and the urine being boiled together and a few drops of sulphate of copper solution then added—the result will be the same.

The test fluid and the urine may be boiled in separate test tubes and allowed to flow together down the inclined tubes.

The quantity of sugar may be estimated by the *fermentation test*. Take the specific gravity and place the urine in a corked bottle with a small quantity of German yeast, leaving a hole in the cork. Leave the bottle in a warm place for twenty-four hours, then use the sugar test to be sure that the sugar has all disappeared, and if such be the case subtract the present specific gravity from that of twenty-four hours ago and the difference is a rough estimate of the number of grains of sugar in each ounce.

The specimen for this estimation must be taken from the collected quantity passed in twenty-four hours.

6.—Examine the Deposit.

Having excluded urates, the deposit may be *pus* or *mucus* (with phosphates), or *blood* in quantity.

Pour the fluid away and to the deposit add an equal quantity of liquor potasse and shake. If pus is present the mixture will become thick and ropy.

Douching.

The method of giving a douche is described on page 137.

Whether the patient should be douched or not, will, of course, rest with the surgeon, many of whom, nowadays, unless the patient is bleeding, or has an offensive discharge, dispense with this treatment and swab the operation site and its immediate neighbourhood with a solution of iodine and rectified spirit instead.

Bath—Shaving—Preparation of the Skin.—See pages 179 to 183.

Bowels.—*Perineorrhaphy.*—Two nights before the operation a strong aperient should be given to the patient, so that her bowels may act thoroughly. Some surgeons prefer castor oil, others some such mixture as the following which is very efficacious :—

Sulphate of magnesia	4 drachms.
Sulphate of soda	1 drachm
Extract of liquorice	20 grains
Essence of peppermint	10 minims
Infusion of senna to	2 ounces

The night before the operation a copious soap-and-water enema is given, and this is repeated on the morning of the operation.

Other Operations.—For any other operation on the genital organs the patient is treated in a way similar to the above, but only one enema need be given and this on the morning of the operation.

Bladder.—*Operations on the Vulva, Vagina, Cervix.*—The patient is directed to pass her urine just before she is taken into the operating room.

Abdominal Operations.—In abdominal operations it is most important that the catheter should be passed *just before the operation*, since if the bladder is not empty there is danger of the operator cutting into it owing to its distended condition; moreover the full bladder will obscure the field of operation.

In some cases a fibroid or ovarian tumour will so press on the urethra that the nurse may have some difficulty in passing the catheter, and, if so, she should always inform the operator of her difficulty, since it often transpires that she has been unable to empty the bladder.

Dress.—The patient should be dressed in a clean night-gown and flannel dressing-jacket; she should have long woollen stockings reaching well up the thighs, and in addition, if possible, a jacket of Gamgee tissue well covering

the chest and which can be made by the nurse beforehand. Her hair should be done up in a plait, and if she has any false teeth these should be removed before she is placed on the operating table.

Food.—If the operation is to be at 9 a.m., at 5 a.m. the patient is given a cup of tea and a rusk and butter. If the operation is to be at 2 p.m., then the tea and food is given at 10 a.m. The condition of the patient will be the guide as to how she should be fed previous to the operation, whether, for instance, on account of weakness, stimulants and extra feeding will be necessary.

CHAPTER XXI.

THE ASEPTIC TECHNIQUE.

THE technique of aseptic surgery is based upon the principle of preventing the infection of wounds by bacteria. The word aseptic means freedom from septic bacteria.

Such a technique can only be perfect if the case is a clean one, that is, if the operation area is not already infected and if everything that comes into contact with the wounded surface is sterile.

In a clean case, however, and with due care, the aseptic technique can be carried out in its entirety, with the exception of the sterilization of the skin. It is most difficult to sterilize the skin, and although, as a matter of fact, if the skin of the operation area is properly prepared the danger of wound infection from this source will be very slight, nevertheless it must be admitted that it may be impossible to destroy all the bacteria which may have got into the sebaceous or fat glands of the skin, without using chemical antiseptics of such a strength that the tissues would be injured.

The aseptic technique will be discussed under the following headings :—

In Hospital.

In a Private House.

ASEPTIC TECHNIQUE FOR OPERATIONS IN HOSPITAL.

The directions and rules given under this heading are, in the main, those followed at the Middlesex Hospital.

The following subjects will be considered :—

1. The operating theatre and its furniture.
2. The preparation of instruments, ligatures, rubber-gloves, sutures, saline solution, swabs, dabs, and dressings.
3. The preparation of the hands of the nurse.
4. The clothing of the theatre and ward sisters and of the theatre nurse.
5. The duties of the theatre sister.
6. The duties of the theatre nurse.
7. The duties of the ward sister.
8. Surgically cleaning the patient's skin, and preparation of the operation site.

THE OPERATING THEATRE AND ITS FURNITURE.

1. The theatre floor is scrubbed and the furniture is washed every morning.
2. The electric light fittings are kept as free from dust as possible, and the shades of the lights over the operating table are washed daily.
3. The doors of the theatre and anæsthetizing rooms are kept closed during the operations.
4. The sinks and wash-basins, both inside and out, and the walls behind them are cleaned every day.
5. The waste-pipes in connection with the sinks and basins are cleaned with a brush.
6. The theatre walls are swept down every day and are washed by the theatre nurse with soap and water as high as she can reach.
7. The instrument and bowl sterilizers are washed inside every day with soda and water, and the outsides of those that are made of brass are polished.
8. The furniture used for the operation is :—

An operating table.

An instrument table.

A swab or dab table.

One or two dressing tables.

Two bowls or tripods for hand lotions.

A surgeon's stool, if necessary.

An anæsthetist's table.

An anæsthetist's stool.

9. The position in which such furniture is placed varies with the choice of the individual surgeon.

A reference to Figs. 35 and 36 shows the positions used by the author for major and minor operations respectively.

10. The theatre floor in the neighbourhood of the operating table, and also the other tables or tripods, if they have been soiled, are swabbed down between each operation.

Preparation of the Instruments, Ligatures, Sutures, Rubber Gloves, Saline Solution, Swabs, Dabs, and Dressings.

Instruments.—

1. All instruments to be used, except the needles, knives, and scissors, are boiled for a period of fifteen minutes just before each operation. The lid of the sterilizer is kept closed while the instruments are being boiled.

2. The needles, knives, and scissors are placed in methylated spirit and kept there for five hours before being used.

3. The same knife is never used for more than one case. It is then boiled for three minutes and sent away to be resharpened. The scissors and needles, after being used, are boiled for three minutes and are then placed in methylated spirit for thirty minutes.

4. All instruments are thoroughly cleaned with cold water and a nail-brush after use and before they are again boiled. Particular care is paid to all the serrations and locks. The flushing curette is sluiced by holding the hole in its handle under fast running water from the tap, after this it is boiled and some methylated spirit is lastly run through it to prevent rusting.

5. All porringers, dishes, and receivers are sterilized by boiling, after which they are placed on a table and covered with sterilized towels.

6. The nail-brushes used by the operators, students, and nurses, are boiled daily.

7. All instruments, except the needles, knives, and scissors, that have been used during the twenty-four hours are boiled for fifteen minutes, in addition to the fifteen minutes they had been boiled for the operation in which they were used.

8. Rubber tubing is boiled for two hours and afterwards kept in a solution of 1 in 20 carbolic. When required, it is removed direct from the glass-stoppered jar with a pair of sterilized forceps. Any portion that is not used, is boiled for ten minutes before it is returned to the jar.

Ligatures and Sutures.—

1. The silk or thread is boiled for an hour and is used fresh for each case.

2. Silkworm gut is boiled for five minutes and then kept in 1 in 20 carbolic.

3. Catgut already prepared and put up in sealed glass tubes is used. The tubes are covered with wool and then completely immersed in a bowl of 1 in 1000 perchloride of mercury for thirty minutes before use.

Rubber Gloves.—

1. The gloves are boiled for fifteen minutes and are then placed in whatever lotion the surgeon directs.

2. After their removal the gloves are well washed inside and out with soap and water and are examined for punctures.

3. After being washed the gloves are boiled for twenty minutes, then well dried and powdered with boric acid.

CAUTION.

Rubber gloves are worn to protect the patient and not the nurse.

All punctures should, therefore, be mended, or failing this, the gloves should be discarded.

Normal Saline.—

1. Concentrated saline solution is kept in a stoppered Winchester quart, and is of such a strength that 1 ounce of the solution to a pint of water makes a normal saline solution.

2. Each day a certain amount of normal saline solution is prepared and is then boiled for twenty minutes and stored in sterilized bottles.

3. The normal saline solution, when required, is poured straight into a sterilized porringer or jug, as the case may be. If any remains in the bottle after the stopper has been removed, it is reboiled before being used.

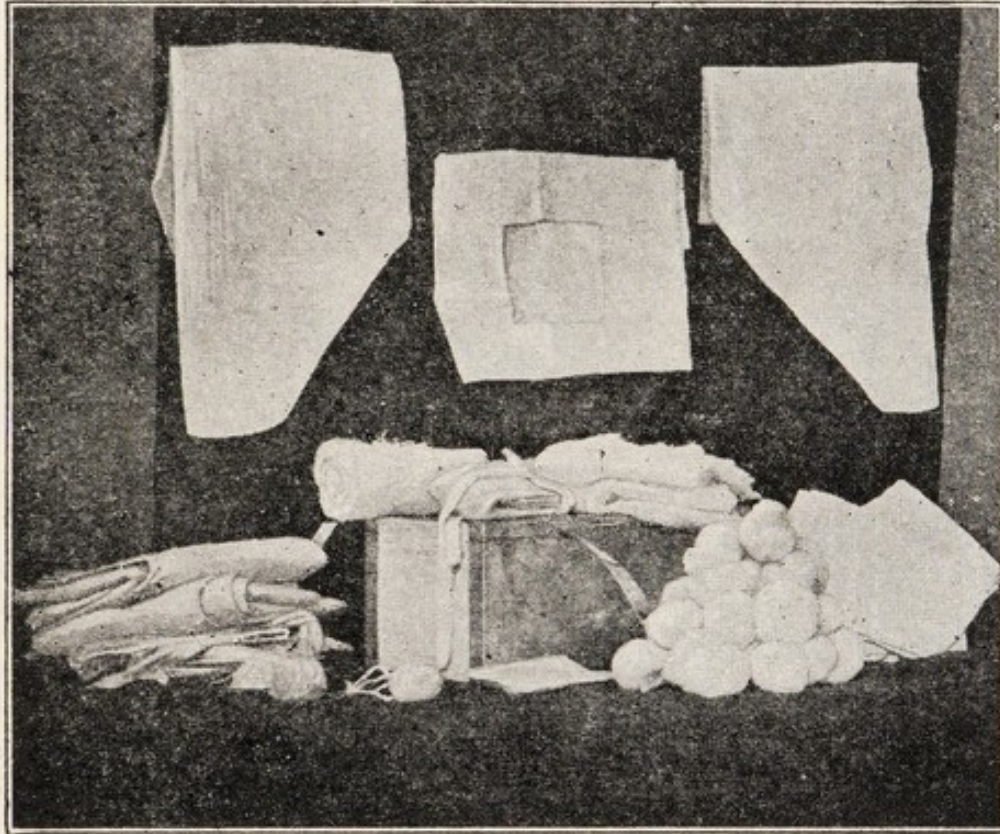


FIG. 18.—MINOR OPERATING TIN OF STERILIZED DABS, DRESSINGS, AND CLOTHING AS PUT UP FOR THE AUTHOR BY MESSRS. BELL & CROYDEN.

Showing leggings, perineal cover, overalls, masks, towels, dabs, tampons, T bandage, dressings.

Dabs.—

These are made of absorbent cotton-wool wrung out of a solution of mercury (1 in 1000). Dabs will be needed for minor operations upon the vulva, vagina, and cervix. The number required will depend rather on the nature of the operation. Three dozen will probably be sufficient for any case, and if any are left over they can be used later when dressing the patient.

Swabs.—

For abdominal and vaginal sections the swabs are made as follows:—

Some gamgee tissue is cut into square pieces, after which their edges are tucked in and sewn. Two sizes should be made, 12×12 and 6×6 . As a rule 12 swabs will be



FIG. 19.—MAJOR OPERATING TIN OF STERILIZED SWABS, DRESSINGS, AND CLOTHING AS PUT UP FOR THE AUTHOR BY MESSRS. BELL & CROYDEN.

Showing 10 small swabs, 2 large swabs, overalls, masks, body cover, towels, dressings, many-tailed bandage.

quite sufficient for most operations, two 12×12 and ten 6×6 . In many cases not half this number will be used. The squares are sewn together like a mattress. They are sterilized in the high-pressure sterilizer. Some surgeons use squares of muslin only, in which case there must be eight layers sewn together in a similar way to those made of gamgee.

As gamgee is expensive, swabs serving the same purpose can be made by enclosing a layer of absorbent wool between muslin. Very good swabs can also be made of Turkish towelling.

Dressings.—

Perineorrhaphy.—A piece of cyanide, or plain sterilized gauze is placed upon each side of the stitches; over this a pad of absorbent wool, kept in place by a T bandage.

Excision of Bartholin's Cyst, Cancer of Vulva.—A piece of cyanide or plain sterilized gauze is placed over the parts, and then a pad of absorbent wool, which is kept in place by a T bandage.

Curetting.—One or two wool tampons are inserted into the vagina, and in some cases the operator may wish, in addition, to pack the uterus with cyanide or sterilized gauze before placing the tampons in position. In this case he will require the gauze, which should be ready and suitably protected, to be handed to him in a long, continuous strip about 2 inches broad, the pieces being tied together if necessary. Some surgeons prefer not to insert any dressing into the vagina. A pad of absorbent wool and a T bandage completes the dressing.

Excision of Vaginal Cyst or Tumours.—Unless there is any troublesome oozing (when the vagina can be packed for a few hours with gauze or tampons), a pad of absorbent cotton-wool and T bandage is all that will be necessary.

Operations on the Cervix.—As for operations on the vagina.

Vaginal Hysterectomy.—As a rule, most surgeons insert a small quantity of sterilized gauze, which acts as a drain, into the pouch of Douglas.

Abdominal Section.—The wound is dressed with dry dressing, consisting of cyanide gauze, absorbent wool, and a many-tailed binder. Rarely, consequent on some oozing of blood or escape of pus, the operator may wish to drain the pelvis, in which case he will require a drainage tube. A safety-pin which has been boiled will be required to prevent the drainage tube slipping into the abdominal cavity.

The patient should be measured for the binder prior to the day of the operation, in order that it may fit nicely. The author has not for some years used any dressings or binders after abdominal operations, if the pelvis has not been drained.

The wound of the abdominal incision heals just as well without any dressing, and patients who have had two abdominal operations, and for the first had dressings and the second none, assert that they are more comfortable without any dressing. This method results in the saving of great expense to a hospital in which a large number of abdominal operations are performed during the year.

If the patient is very sick it is advisable to adjust some sort of abdominal binder till the attack is over.

Preparation of the Hands of the Nurse.

Before helping in any way with the operation or in preparing the instruments, the hands should be thoroughly washed for a period of three minutes.

Ether soap is first rubbed into the hands and forearms until it is dry. A sterilized nail-brush is then taken and the hands and forearms are scrubbed with water until a good lather is obtained, particular care being given to the nails and clefts between the fingers. When a good lather is obtained, the washing is continued with plenty of soap and hot running water.

If gloves are going to be worn the soap is removed with the running water and the gloves are then applied as directed. If, as in the case of the theatre nurse, gloves are not being worn, the hands are dried on a sterilized towel, which should not be used again for a similar purpose.

CAUTION.

1. All nurses working in the theatre should be quite healthy. Such conditions as sore throats or septic wounds of the fingers are especially dangerous.

2. Rough skin harbours microbes to a much greater extent than smooth skin. It is possible to keep the hands

smooth by not dipping them into too strong an antiseptic solution or by avoiding those antiseptics which experience proves do not agree with the skin of the particular person concerned. In addition, after the nurse has finished her work and her hands have been well dried, a little diluted glycerine should be rubbed into them.

3. The nails should never be cleaned by scraping them with a knife, nail cleaner, or pair of scissors. They should be kept short enough to allow of their being effectively cleaned with the nail-brush.

4. Pus should not be touched with the bare fingers, and dirty dressings should be removed with dressing forceps.

5. All rings should be removed, even if one happens to be a wedding ring. Hospital nurses do not, as a rule, wear rings when on duty, but private nurses have been known to do so.

Clothing of the Theatre Sister, Ward Sister, and Theatre Nurse.

Overalls, Veils.—

1. The theatre and ward sisters and theatre nurse wear clean linen dresses, the sleeves of which can be rolled up above the elbows.

2. The theatre and ward sisters wear sterilized overalls, and veils also if the surgeon elects to wear one. The theatre nurse wears a sterilized overall and some pattern of headdress.

3. The overalls are, before being sterilized, so folded that the surface which will be in contact with the body is outermost.

4. After the overall has been taken from the tin by the person who is going to wear it, it is held so that it becomes unfolded and the arms are then slipped into the sleeves and held out straight in front.

5. The theatre nurse adjusts the overall of the theatre and ward sisters by pulling it into place by means of its tapes which are then tied. The clothes at the back should be completely covered. She also adjusts the veil, which should cover the nose.

Rubber Gloves.—

1. To put on a glove it should be filled with the lotion in which it was placed. It should be then held, fingers pointing downward and away from the bowl of lotion, over a dish or another bowl.

2. The hand corresponding to the glove should now be passed into the glove and, as it displaces the lotion, the hand should be raised and the lotion allowed to escape into the sink or bowl and not over the glove.

3. The cuff of the glove should then be pulled over the cuff of the overall so that the hand, wrist, and arm are covered entirely with sterilized articles. (Fig. 20.)

4. After the operation the gloves should be well washed with cold water before they are removed.

5. A rubber glove is best removed by raising the cuff of the glove, allowing a little water to enter, and then pulling on the cuff so that the glove is turned inside out. There is much less risk of tearing the glove by this method.

CAUTION.

Do not try to eradicate any creases in the fingers of the glove which has been drawn on, by smoothing them out with the bare fingers of the other hand, as by doing so the glove may be infected.

With a little practice the gloves can be drawn on quite easily without causing any creases. If the latter are present they must only be smoothed out by the gloved fingers of the other hand.

The Duties of the Theatre Sister.

1. The nature of the instruments to be used and their number should be most carefully noted, and it is better to make a list for each operation. Such information is necessary because at the end of the operation the surgeon will ask whether the instruments are correct.

To avoid the necessity of another instrument having to



FIG. 20.—NURSE PROPERLY CLOTHED FOR ASSISTING AT AN OPERATION.

Note that the veil covers the nose and that the ends of the sleeves of the overall are covered by the cuffs of the rubber gloves.

be fetched whilst the operation is in progress, the sister should, if she does not know for certain, ascertain from the surgeon or house-surgeon what instruments will be required.

2. Having prepared her hands, and put on her overall, veil, and gloves, she should, during the operation, touch only those articles which have been sterilized.

3. She should cover the instrument table with a sterilized towel.

4. The instruments, ligatures, etc., having been transferred from the sterilizer by the theatre nurse, the theatre sister should arrange them in the operating tray or on the instrument table, according to the wishes of the surgeon, and should then cover them with a sterile towel.

5. All sutures and ligatures should, whilst being cut, be touched, as far as possible, with sterilized forceps only. When the catgut is required, the theatre sister should remove the tube from the antiseptic with a sterilized towel and break the tube in this.

6. Unless otherwise directed, the average length for a ligature is 18 inches, for a mattress suture 12 inches, and for a continuous suture 24 inches.

7. If there is more than one operation the theatre sister should assemble the instruments for the next operation before the previous one is commenced, or, if it is the duty of the theatre nurse to do this, the theatre sister should check the instruments and their number. By doing so, the instruments for the next operation can be sterilized during the progress of the one about to be performed.

8. At the termination of one operation, the theatre sister should remove her gloves, wash her hands, and assemble the instruments for another operation if necessary, as noted in paragraph 7. She should then wash her hands again, and put on a fresh sterilized overall and a pair of sterilized gloves, preparatory to arranging the sterilized instruments for the next operation.

CAUTION.

The theatre sister should never fetch any new instrument herself but should direct the theatre nurse to do so.

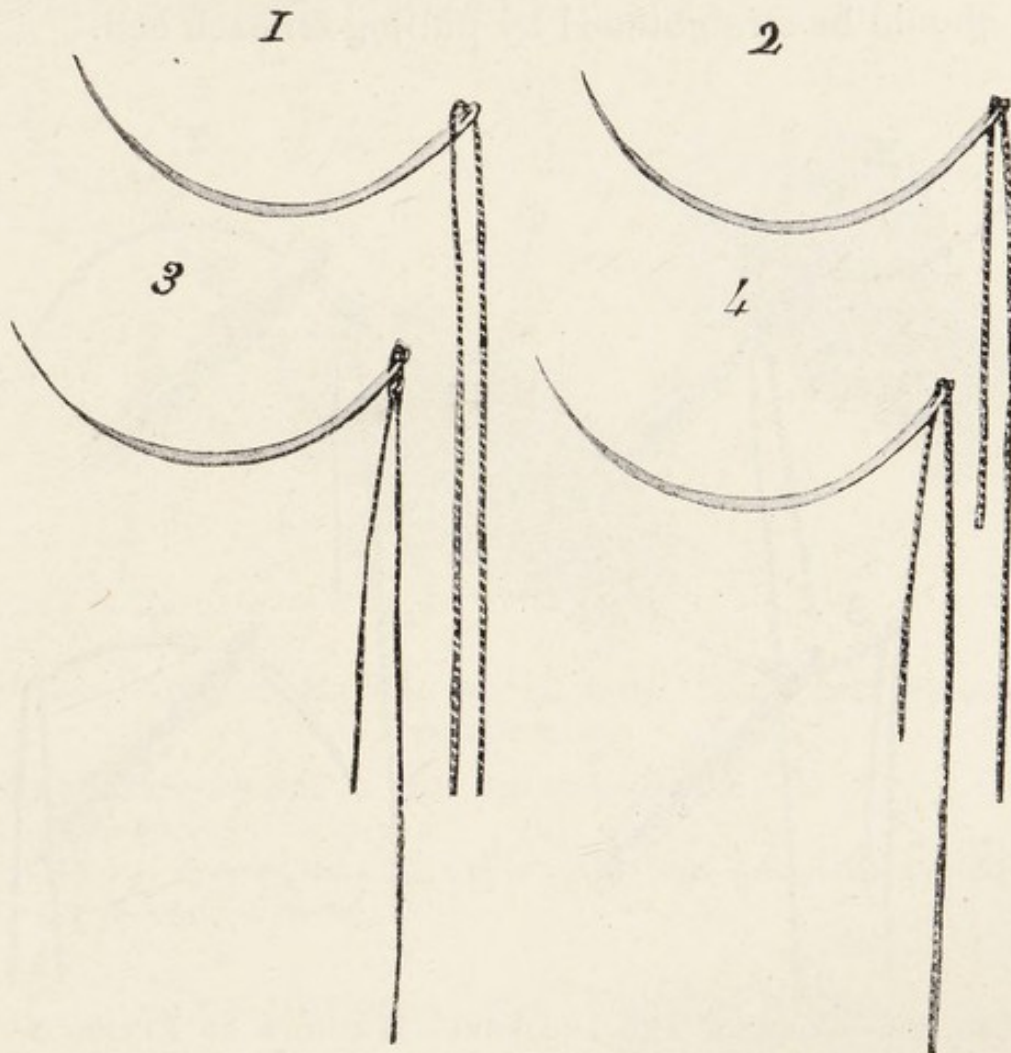


FIG. 21.—CORRECT AND INCORRECT METHODS OF THREADING THE NEEDLE WITH MATTRESS AND CONTINUOUS SUTURES.

Mattress Suture :—

1. Incorrect, both ends the same length.
2. Correct, one end longer than the other.

Continuous Suture :—

3. Correct, tied in with one knot.
4. Incorrect, not tied in.

If a tray is used for the ligatures and sutures, care should be taken when cutting them off not to let them touch the edge of the tray. If a tray is not used, they must not be allowed to touch the edge of the table. Ligatures and sutures should be handed straight to the

operator without allowing them to touch anything but sterilized instruments or gloves.

Sutures or ligatures must never be drawn through the fingers to straighten them, as this increases their chance of being infected. If they happen to be curled, they should be straightened by pulling on each end.

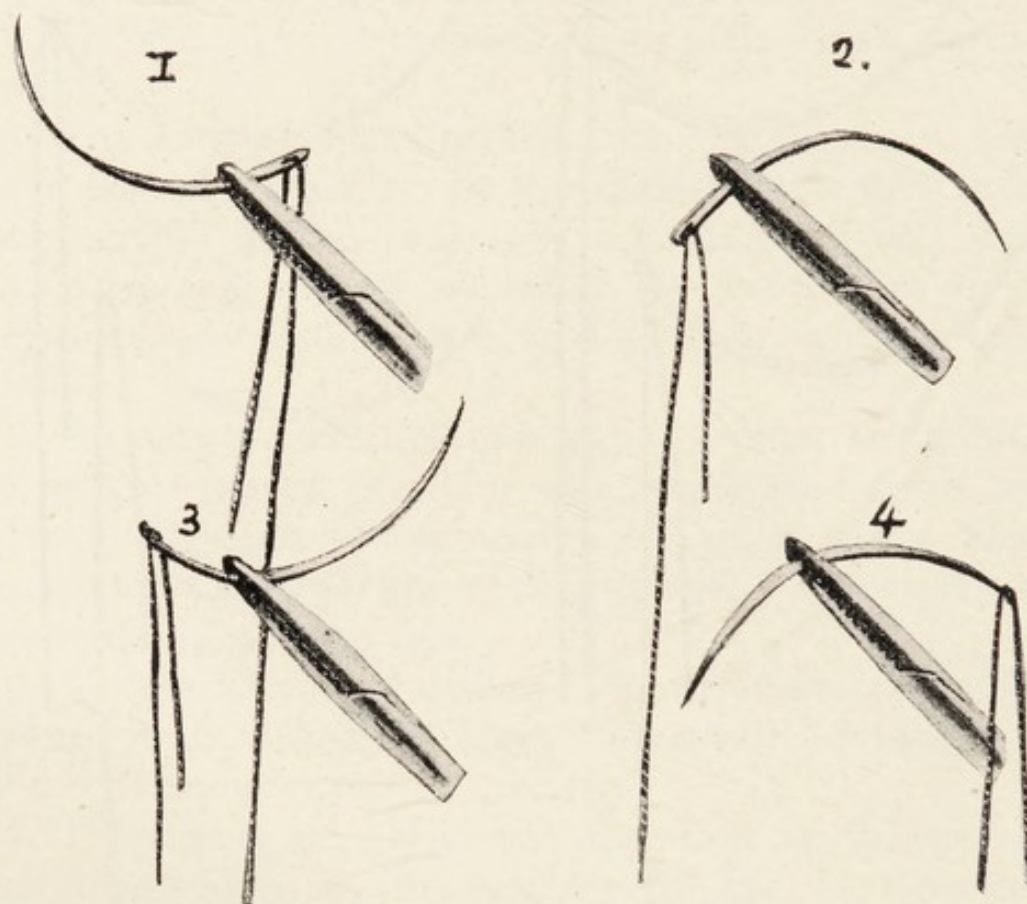


FIG. 22.—CORRECT AND INCORRECT METHODS OF FIXING A THREADED NEEDLE IN A NEEDLE-HOLDER OR PRESSURE FORCEPS.

1. Correct—the sharp point of the needle pointing upwards and towards the surgeon.
- 2, 3, and 4. Incorrect.

A mattress suture should not be tied in the needle, and one end should be left longer than the other when the needle is threaded. Fig. 21 (1 and 2).

A continuous suture should always be tied in the needle with one knot, leaving one end short, about 2 inches. Fig. 21 (3 and 4).

There is a right way and a wrong way of fixing a threaded needle in a needle-holder or pressure forceps,

Fig. 22, and of handing it to the operator, Fig. 23. The surgeon prefers the right way.

If the number of instruments used has not been carefully noted a wrong answer may be given to the surgeon when he enquires if the number is correct, with the result that the instrument may be left in the abdomen.



FIG. 23.—CORRECT METHOD OF HANDING THREADED NEEDLE TO THE SURGEON.

1. In pressure forceps, so that the surgeon can take hold of the end of the forceps.
2. With the fingers, so that the surgeon can grasp the needle with the pressure forceps.

The Duties of the Theatre Nurse.

In many large hospitals there are two theatre nurses, in which case the duties, as here outlined, will be divided.

The theatre nurse helps the theatre and ward sisters during the operation in any way they require and thus prevents them infecting their gloved hands.

In addition:—

1. She should arrange the necessary furniture in its proper position.
2. She should prepare the lotion for the hands, being careful that its strength is correct, and its temperature not too high.
3. She should wheel the instrument table, the top of

which is covered with a sterilized towel, by its legs, to the sterilizer. She should then with a pair of forceps, previously sterilized and kept in a sterilized or antiseptic solution, remove the instruments, etc., from the sterilizer, into the instrument tray or on to the instrument table, as the case may be.

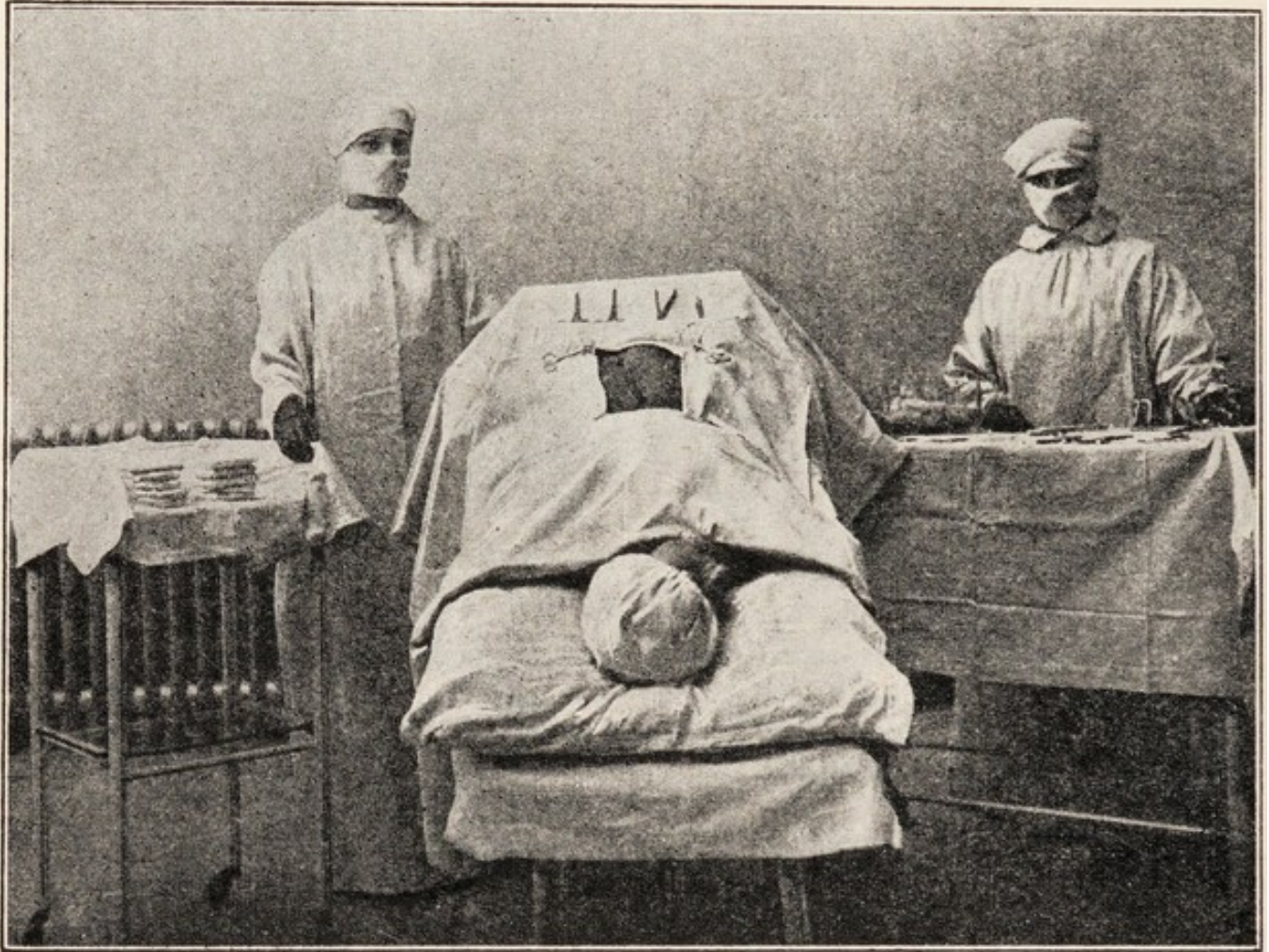


FIG. 24.—TRENDLENBURG POSITION.

Showing the theatre sister and ward sister and the instrument table and swab table in their proper positions. The patient is tilted into the Trendelenburg position and the sterilized body-cover is in place.

Alternatively the theatre sister can thus transfer the instruments, or the instrument table being placed in the position it will occupy during the operation, the theatre nurse can lift the wire tray from the sterilizer, carry it to the instrument table, and turn out the instruments on to it.

4. When the patient has been lifted on to the operating table, the theatre nurse should place her in position as follows: The nightgown having been drawn up to a level with the chest and the blanket below the pubes, the arms of the patient are securely fixed by her side. This is best done by arranging the arms of the patient straight along

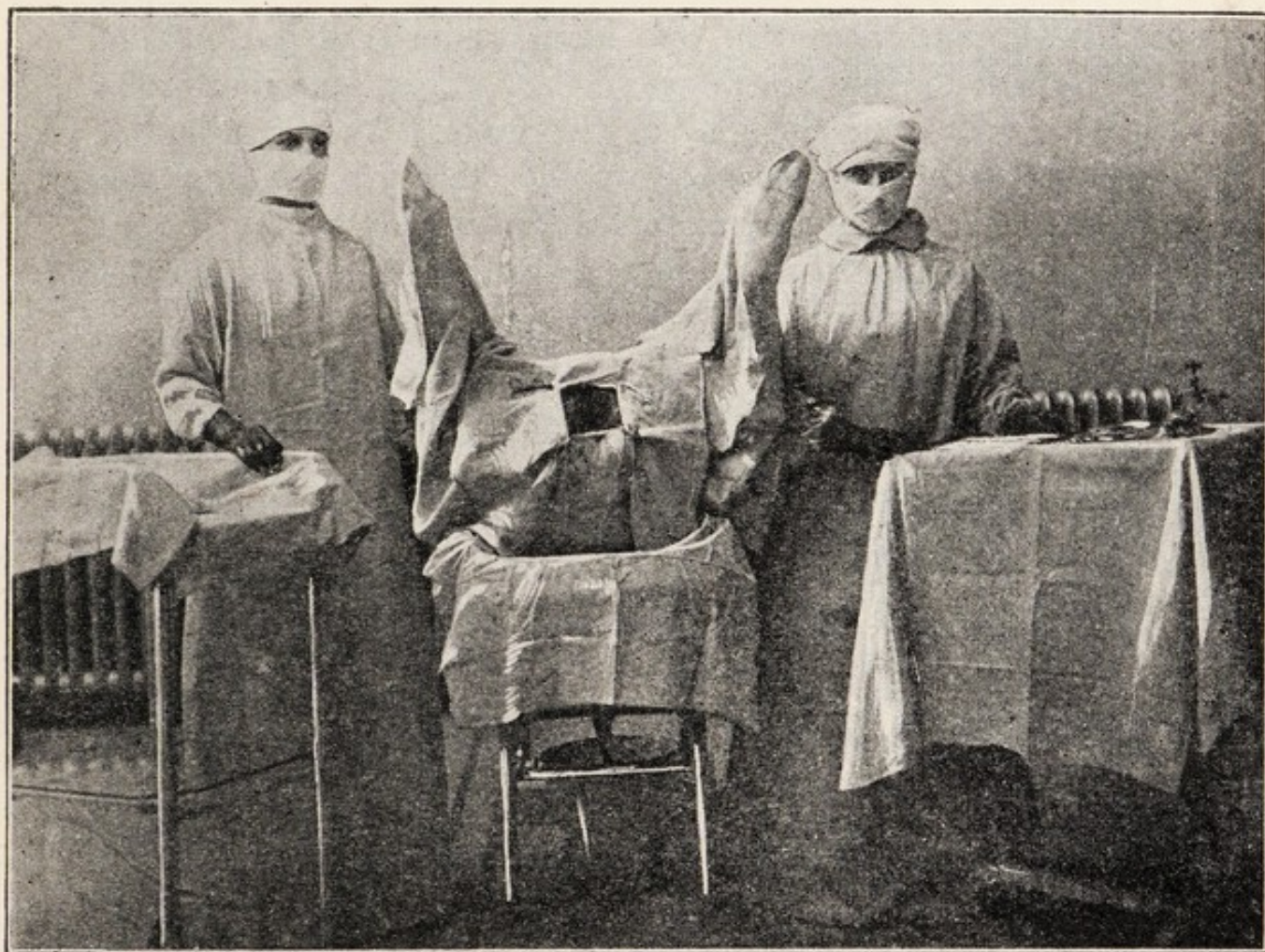


FIG. 25.—LITHOTOMY POSITION.

Showing the theatre sister and ward sister and the instrument table and swab table in their proper positions. The patient is in the lithotomy position with the buttocks well over the end of the table and projecting over the tray. The sterilized leggings, perineal cover, and towel over tray are in place.

her sides under the mackintosh, the palms of her hands in apposition with the table and slightly beneath her.

For the Trendelenburg Position.

If the surgeon wishes the patient to be tilted into the

Trendelenburg position, the legs or ankles must be securely fixed with straps or bandages before the anæsthetist tilts the table (see page 133).

For the Lithotomy Position.

The best way to bring the patient into the lithotomy position is for the theatre nurse to stand at the bottom of the table, and then with one hand under each buttock of the patient to drag her down so that the patient's buttocks project well over the end of the table. The anæsthetist or his clerk can render valuable help by pushing the shoulders of the patient at the same time.

5. She should then, if the surgeon wishes it, paint the skin of the operation site with the iodine solution.

6. She should next open the tin containing the sterilized body cover and towels, if the operation is an abdominal one ; or the sterilized leggings, the perineal cover and towels if the operation requires a lithotomy position, so that the ward sister can gain access to these articles without infecting her hands with the outside of the tin.

7. If during the operation a new instrument is required, she should take it from the instrument case, sterilize it, and then hand it with sterilized forceps, or in the wire tray of the sterilizer, to the theatre sister.

8. If during the operation the surgeon requires a porringer or normal saline solution, she should take one of the porringers or jugs already sterilized and hand it in a sterilized towel.

9. She should not touch anything that has been sterilized, unless so directed, without holding it in a pair of sterilized forceps or in a sterilized towel.

10. At the close of the operation she should hand the tin of sterilized dressings to the surgeon, house-surgeon, or theatre sister as the case may be, having first opened the lid.

11. If the instruments which have already been used are required again during the afternoon for another operation, she should clean them.

12. She should have the necessary articles ready for catheterizing the patient during the operation. If the surgeon wishes this to be done, she should be prepared to pass the catheter if requested.

13. At the close of the operation she should arrange the clothes of the patient in a suitable manner, and cover the patient with a blanket prior to her removal from the theatre. She should also place a porringer and towel near the face of the patient in case she vomits.

CAUTION.

If the antiseptic in the lotion for the hands or gloves is too strong or is not mixed properly, the hands of anyone using it may suffer. This is particularly likely to happen if the surgeon uses a lotion containing carbolic acid, which may have been prepared so strong that it will anæsthetize his fingers. Also if, when the pure carbolic is added to the water, the solution is not thoroughly mixed, some of the drug will accumulate at the bottom of the lotion bowl, and when the hands are placed in the lotion they may be badly burnt or blistered, an occurrence which the surgeon is never likely to forget and will certainly not excuse.

If the lotion is made too hot the hands of the surgeon may easily be scalded. The temperature of the lotion should be taken with a thermometer and should be about 100° F. It is notorious that nurses can place their hands, with impunity, in water at a temperature which would "make the surgeon jump" if nothing more. In judging the proper temperature of the lotion for the hands, therefore, nurses must not be guided entirely by one which they themselves can tolerate.

Any article that has been dropped on the floor should be left for the scrubber to pick up after the operation is over.

The theatre nurse should be very careful not to drop any articles on the floor. The noise occasioned by the dropping of a bowl or porringer, for instance, is apt to

annoy the surgeon considerably and the theatre sister especially.

The Duties of the Ward Sister.

1. The theatre nurse having opened the box containing the sterilized towels and body-cover, or the sterilized towels, leggings, and perineal cover, the ward sister should arrange these articles appropriately on the patient. Some surgeons prefer their house-surgeons to do this.

2. The ward sister having covered the swab table with a sterilized towel, should remove the sterilized swabs or dabs from the tin, which has been handed to her by the theatre nurse with the lid open, and place them on the swab table, counting them very carefully as she does so. Some surgeons prefer the swabs to be taken direct from the tin by the house surgeon or ward sister as required.

She should use a different and newly opened box of sterilized swabs and dressings for each patient.

3. Although the ward sister is not personally responsible for the number of swabs used in a major operation, nevertheless, she should always know exactly how many have been used. If the surgeon, as many surgeons do, always uses the same number of swabs (say two large ones and ten small ones, which are sufficient for any major operation, unless, perhaps, a radical hysterectomy) and the sister is certain of her number in the first instance, there is no difficulty. If the surgeon has no such custom, then the sister will be wise to do the small swabs up in packets of six before sending them to be sterilized.

At anyrate she must know how many swabs have been used, because at the end of the operation the surgeon will ask her, and, although he should count them himself, he may very likely take her word for it.

4. Her further duties during the operation depend upon the wishes of the surgeon. Thus she may be directed to hand the swabs or dabs, to convey ligatures or instruments to the surgeon, or to help in the operation by holding an instrument or swabbing the wound.

5. At the close of the operation she may be directed to help in applying the dressing and in adjusting any bandages.

6. After the operation she should stay by the patient until the ward nurse, who has brought down the next case, is free to take over this duty.

CAUTION.

Never cut a swab in half. The fact that this has been done may be forgotten and a swab consequently left in the abdominal cavity.

Always be certain that the correct number of swabs have been returned before the abdominal cavity is closed.

Never allow any swabs to be removed before the operation is completed.

When assisting at an abdominal operation do not lean on the table, and during an operation with the patient in the lithotomy position do not lean against the patient, as by so doing the patient is tilted sideways.

Attend to your own duties and do not interfere or engage in conversation with others unless absolutely necessary.

A chattering sister or nurse is an abomination.

Preparation of the Patient's Skin.—Before any operation the patient should be shaved, or, have the hair removed by a depilatory, over the operation area; she should also have a bath, and should have the skin in the neighbourhood of the operation site suitably prepared. Whether or not she should in addition be given a vaginal douche depends upon the directions of the surgeon. If there is hæmorrhage or a discharge, douches twice daily before and on the morning of the operation will probably be ordered, otherwise if the operation is on the vulva, vagina, or cervix the surgeon may direct that these parts be swabbed with the iodine solution.

Shaving.—It is much better that the vulva should be shaved before all operations on the genital organs. It is impossible to sterilize the pubic hair; therefore it is better

out of the way. In minor operations upon the vulva, vagina, cervix, the hair covering the mons veneris need not be removed if the patient has any objection; the vulva can be shaved posterior to this. The points to remember in shaving are, first of all, to have a very sharp razor, a blunt razor is much more liable to cut the patient; secondly, to well lather the part for some time, and, thirdly, to dip the razor momentarily into boiling water before using it.

Undoubtedly the best kind of razor to use is a safety razor, since with it all the angles and folds can be very closely shaved by the most inexperienced nurse without any danger of cutting the patient.

In some instances, especially when the patient is fat, the nurse will experience great difficulty in properly shaving the necessary area, and in these cases this can be successfully accomplished either by placing a pillow in the hollow of the patient's back so that the pelvis is tilted, or, better still, by making the patient kneel. When the shaving is finished any excess of soap and loose hairs are removed with swabs of absorbent wool, after which the patient has her bath.

Another method of removing the pubic hair is by means of a powder made up as follows:—

Fresh unslaked lime, grains 190.

Powdered starch, grains 190.

Sodium sulphide crystals, grains 57.

This powder must be *freshly* prepared for each case. It is well mixed with water till a thick paste is formed which is then plastered over the pubes and vulva with a spatula or handle of a spoon. After being left in situ for 5 minutes the paste is rubbed off with a swab taking the hair with it and leaving the surface quite smooth.

The above quantity is just sufficient for one patient.

This depilatory powder causes a good deal of smarting in some patients, especially when applied to the labia. This discomfort can be counteracted to a great extent by smearing the inside of the labia and region round the anus with vaseline.

Bath.—On the afternoon before the operation the patient should, after being shaved, have a hot bath of about 10 gallons of water, to which some surgeons like added 5 pints of a solution of carbolic acid (1 in 20), and she should well scrub and soap herself all over. Of course the nurse should always ask the doctor whether he wishes this bath to be given, because in some cases, in which she will, perhaps, be unable to judge, it may be very dangerous for the patient to be moved out of the bed. Thus, in cases of extra-uterine gestation, when bleeding has taken place internally, or in some acute inflammatory condition, the nurse must wash the patient in bed.

Preparation of the Skin.—

The manner and thoroughness with which this is carried out is of the greatest importance, since, if the skin is properly cleansed, not only will stitch abscess, a troublesome condition which often causes more distress and trouble than the original operation, be rare, but what is of ever so much greater importance, there will be less risk of the operator conveying any septic matter from the skin to the peritoneal cavity, and so infecting the patient with, perhaps, a resulting fatal peritonitis.

The patient having returned from her bath, is put to bed. Her nightdress is rolled up all round to her chest, and the bedclothes covering her are removed with the exception of a blanket which is turned down below the pubes.

As the cleansing of the abdomen will necessitate some exposure, the nurse must see that the temperature of the room is not below 65° F., and that all the windows and doors are closed.

The nurse should then proceed as follows:—

1. She should turn up the sleeves of her bodice above the elbows.
2. She should collect all the materials she will require on a dressing trolley or table, and remove all clothing from the part to be treated.
3. She should wash her hands thoroughly with soap, hot water, and nail-brush.

4. She should spread sterilized towels round the part to be washed, and then proceed as follows :—

5. Rub in ether soap until it is dry in order to obtain its penetrating action on the skin.

6. Scrub the skin gently but thoroughly with sterilized nail-brush and hot sterilized water.

7. Remove the lather with a sterilized swab. Be careful after wiping the outer limits of the cleansed area not to go back over the more central parts.

8. Thoroughly rub the cleansed skin with ether or methylated spirit on a sterile swab, removing any excess with another swab.

9. Spread sterilized lint over the area, seeing that the covering is adequate, and bandage firmly in position.

The skin of the operation area may then be prepared by one of the following methods :—

The area to be painted for an abdominal operation should be included between a line drawn across the body at the level of the epigastrium and one drawn across the thighs below the level of the vulva.

If, however, a body-cover is used an area of 12 inches square will be sufficient in most cases, and this is a consideration when violet-green is used, because of its staining properties.

Violet-Green Method.—

For sterilizing the skin, this method has been proved, by bacteriological tests, to be the most efficacious of any; the skin being sterile after treatment, whereas it is not with the iodine method. This method owes its superiority to the fact that the dye penetrates the superficial layers of skin and into the fat and sebaceous glands and hair-follicles, situations in which organisms are so commonly found, much more readily than iodine, used in such a strength and for such a time that the skin will not be injured.

The solution contains 1 per cent. of a mixture of equal parts of hexa- or penta-methyl violet and sulphate of zinc-free brilliant green, dissolved in equal parts of rectified

spirit and water, the powder being dissolved in the spirit before the water is added. Six hours before the operation the solution is painted over the skin of the operation area four times, and a compress of lint soaked in the same solution and covered by a piece of waterproof batiste is then applied and kept in position by a binder.

The disadvantage of the violet-green method is that it spoils any linen brought in contact with the dye, since the stain cannot be removed without injuring the fabric. The nurse should wear india-rubber gloves, the patient an old night-gown, and the painted area must be so protected that the bed linen is not stained. The dye can be removed from the skin by a solution of 1 per cent. hydrochloric acid in rectified spirit.

Iodine Method.—

This method depends partly upon the power which alcohol possesses of penetrating the deeper portions of the skin. Skin that has recently been wet does not allow this penetration to take place to the same degree that obtains when the skin has previously been kept dry for some hours. If possible three or four hours should elapse between the patient's bath and the application of the iodine solution. The solution commonly employed is one of 2 per cent. iodine in rectified spirit. Two applications are required, one in the morning of the operation, and a second in the theatre.

The nurse should—

Rub the part over three times with a clean sponge soaked in ether or acetone. Apply the iodine with a sterile brush or sponge soaked in the iodine solution. Cover the part with clear dressing or a towel and keep this in position with a bandage.

In the theatre the dressing is removed and the theatre nurse should apply the solution again.

Occasionally iodine causes much irritation of the skin and so annoyance to the patient.

CHAPTER XXII.

SURGICAL INSTRUMENTS THAT WILL PROBABLY BE REQUIRED FOR THE VARIOUS GYNÆCOLOGICAL OPERATIONS.

THE illustrations depicted in this chapter show, and the lists accompanying them enumerate, the surgical instruments that may be required for the performance of the various gynæcological operations. The nurse who is responsible for the instruments, ligatures, etc., must be guided by the special requirements of each individual surgeon. If, therefore, she does not know which particular instruments the surgeon is in the habit of using for any special operation, the nurse must ask him.

It is much better, in case of doubt, to prepare too many instruments than too few. The absence of some instrument which the surgeon requires means a delay in the operation whilst it is taken from the instrument case and sterilized.

On the other hand, there is a distinct disadvantage in putting too many instruments out, since the chance of one of them getting mislaid is greater. There are many cases on record, and a vast number not on record, in which some instrument, such as a pair of dissecting or pressure forceps, a pair of scissors or a towel clip has been inadvertently left in the abdomen. Such an instrument has been recovered later, either at a post-mortem examination, by its discharge through an abscess, or by the operator having to re-open the abdomen, the fact that the instrument was missing being discovered only after he had closed it. The nurse must be very careful, therefore, to count the instruments prior to the operation and at the close, just before

the peritoneum is sutured, so that she may be able to answer the surgeon correctly, when he asks if all the instruments are accounted for.

If any doubt arises after the patient has left the operating theatre, and if the necessary apparatus is available, an X-ray examination of the abdomen will settle the matter.

The nurse will be guided by the wishes of the surgeon as to what material for ligatures and sutures she prepares.

The author uses plaited silk and iodine tanned 30 day catgut, put up in hermetically sealed glass tubes.

It is found by experience that twenty yards of No. 4 silk and six yards of No. 2 silk are more than sufficient for any major operation of a gynæcological nature.

Rubber gloves will be required for the surgeon, his assistant, the instrument nurse, and the swab nurse.

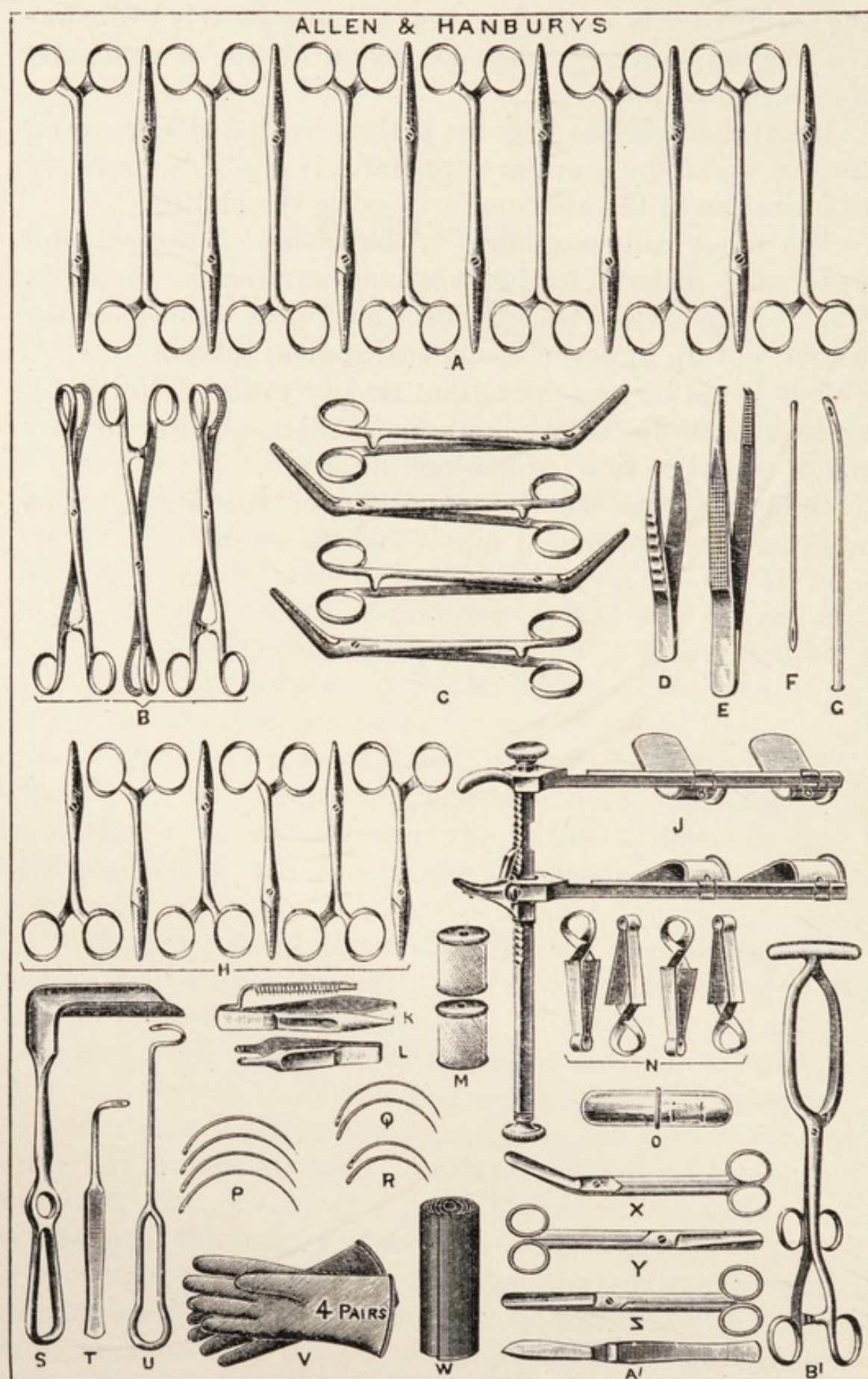


FIG. 26.

The Radical Operation for Malignant Disease of the Uterus.

- A. 12 Long pressure forceps.
- A'. Scalpel.
- B. 3 Ring forceps.
- B'. Vaginal clamp.
- C. 4 Long angular forceps.
- D, E. 2 Dissecting forceps, long and short.
- F. Probe.
- G. Catheter.
- H. 6 Short pressure forceps.
- J. Self-retaining retractor.
- K, L. Michel's clip apparatus.
- M. 2 Reels silk, No. 4, No. 2.
- N. 4 Spring clips.
- O. 2 Tubes catgut, No. 2.
- P. 4 No. 5 half-circle needles.
- Q. 2 No. 9 " " "
- R. 2 No. 13 " " "
- S. Bladder retractor.
- T. Aneurysm needle.
- U. Worrall's needle.
- V. Gloves, 4 pairs.
- W. India-rubber sheeting.
- X. Long scissors—angular.
- Y, Z. 2 Scissors—straight, blunt.

The self-retaining retractor depicted in the illustration, is that devised by the author. The clamp is the Berkeley-Bonney pattern. The angular forceps are Kocher's. Two pairs of dissecting forceps will be required, one long for the operator and one short for the instrument nurse, and two pairs of straight scissors likewise. The spring clips are to keep the body-cover in position. The Michel's clip-apparatus is the author's pattern. The india-rubber sheeting is to protect the wound edges.

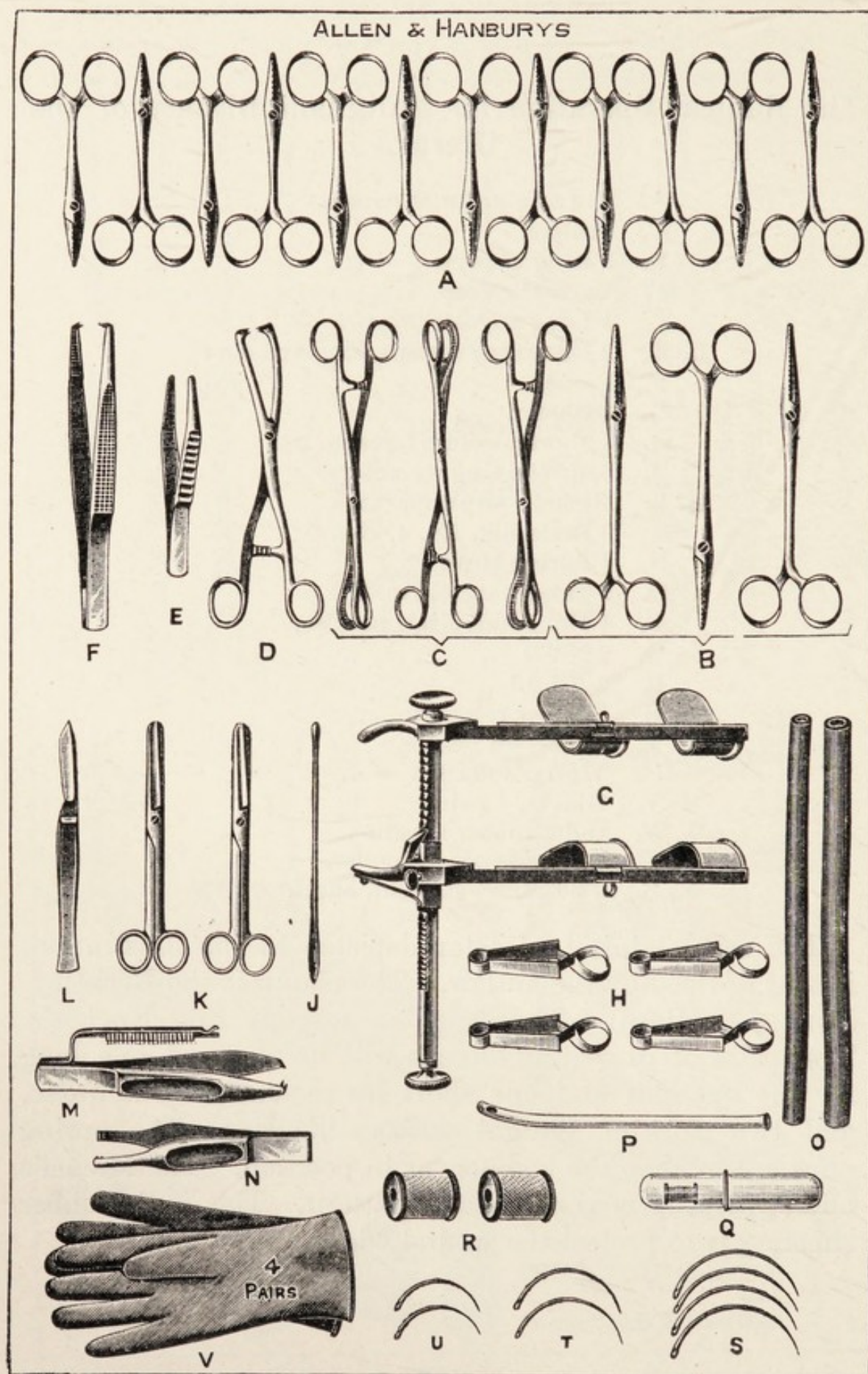


FIG. 27.

Abdominal Hysterectomy Myomectomy Ovariectomy
 —Oophorectomy — Salpingectomy—Salpingostomy
 — Salpingo-Oophorectomy — Ventro-Suspension —
 Shortening of the Round Ligaments—Cæsarean
 Section—Appendicectomy.

- A. 12 Short pressure forceps.
- B. 3 Long pressure forceps.
- C. 3 Ring forceps.
- D. Volsellum forceps.
- E, F. 2 Dissecting forceps, long and short.
- G. Self-retaining retractor.
- H. 4 Spring clips.
- J. Probe.
- K. 2 Scissors, blunt-pointed.
- L. Scalpel.
- M, N. Michel's clip apparatus.
- O. 2 Rubber drainage tubes, $\frac{3}{4}$ in., $\frac{1}{4}$ in.
- P. Catheter.
- Q. 2 Tubes catgut, No. 2.
- R. 2 Reels silk, No. 4, No. 2.
- S. 4 No. 5 half-circle needles.
- T. 2 No. 9 „ „ „
- U. 2 No. 13 „ „ „
- V. Gloves, 4 pairs.

Many surgeons like bowel clamps also to be put out, in case a portion of the bowel has to be resected.

Some of the operations indicated can easily be performed with only a few of the instruments mentioned in this list. A surgeon, however, cannot be certain, until he has opened the abdomen, what will be the exact condition that is disclosed. The author finds it more convenient to work always with the same number and variety of instruments, and with them the most serious, as well as the most simple of the operations enumerated above, can be performed.

The probe is put out in case the appendix has to be removed.

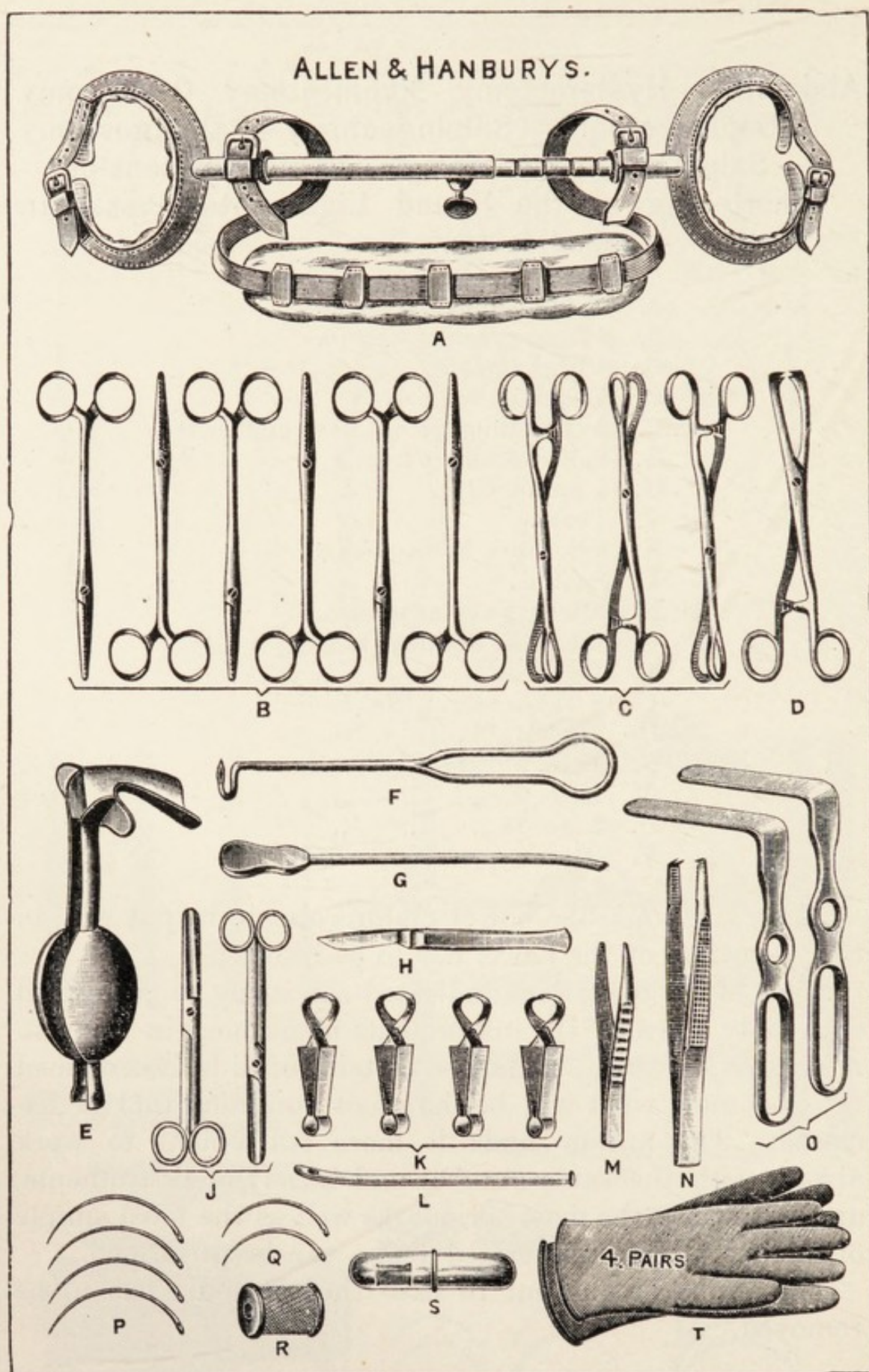


FIG. 28.

Vaginal Hysterectomy—Colpotomy.

- A. Clover's crutch.
- B. 6 Long pressure forceps.
- C. 3 Ring forceps.
- D. Volsellum forceps.
- E. Auvard's speculum.
- F. Worral's needle.
- G. Bladder sound.
- H. Scalpel.
- J. 2 Scissors, blunt pointed.
- K. 4 Spring clips.
- L. Catheter.
- M, N. 2 Dissecting forceps, long and short.
- O. 2 Vaginal retractors.
- P. 4 No. 5 half-circle needles.
- Q. 2 No. 9 „ „ „
- R. Reel silk, No. 4.
- S. 2 Tubes catgut, No. 2.
- T. Gloves, 4 pairs.

For the operation of colpotomy, that is opening the pouch of Douglas by an incision through the posterior vaginal fornix, the instruments indicated above will be required with the exception of the bladder sound, the pedicle needle, the No. 5 half-circle needles, and the silk. Three pairs of pressure forceps will suffice. The ring forceps are used as swab holders.

For this operation and the succeeding operations indicated, a Clover's crutch will not be necessary, if the operation table is provided with steel uprights to hold the ankles.

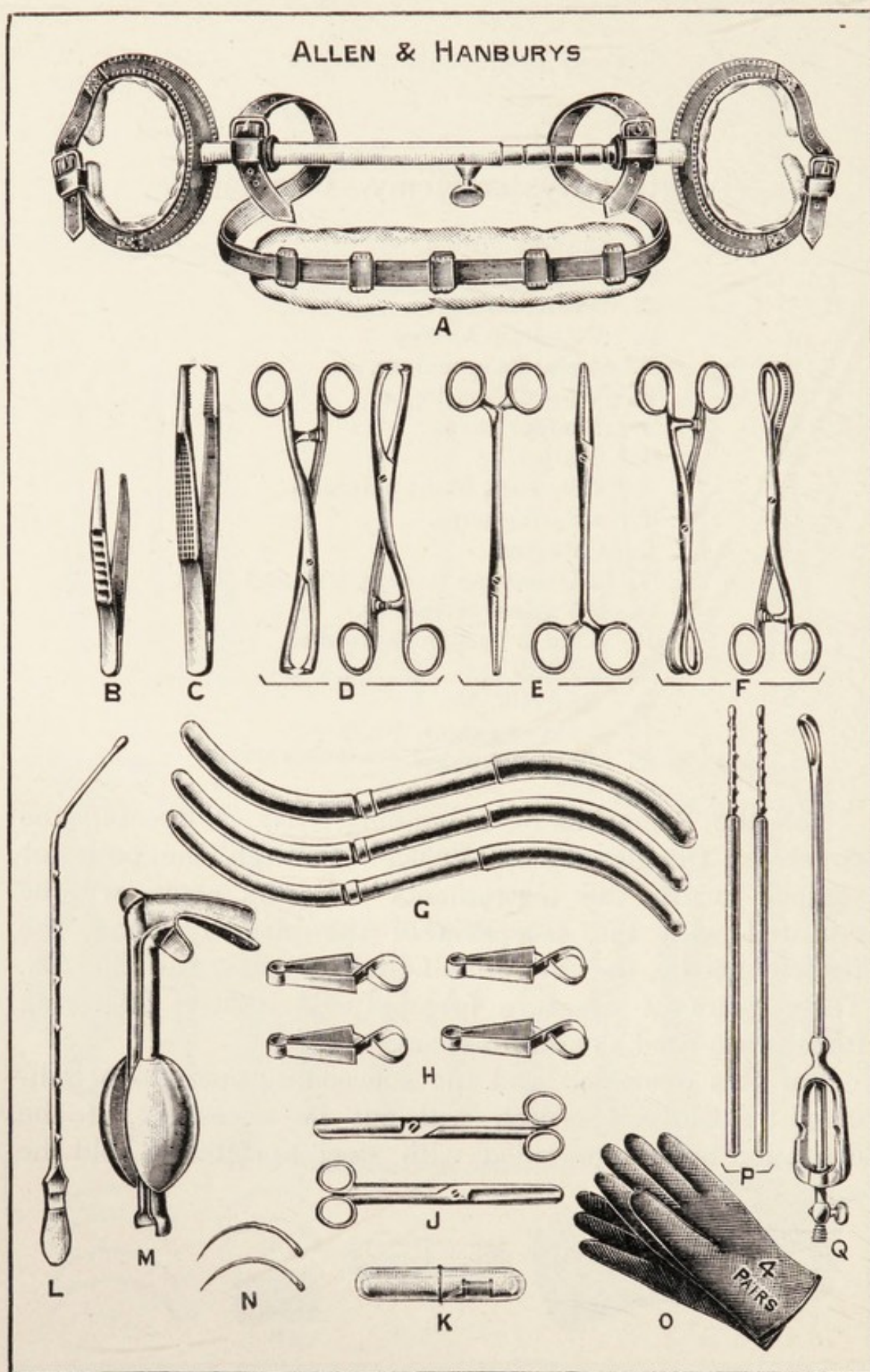


FIG. 29.

Dilatation and Curettage of the Uterus.

- A. Clover's crutch.
- B, C. 2 Dissecting forceps.
- D. 2 Volsellum forceps.
- E. 2 Long pressure forceps.
- F. 2 Ring forceps.
- G. Metal dilators.
- H. 4 Spring clips.
- J. 2 Scissors, blunt pointed.
- K. Tube catgut, No. 2.
- L. Uterine sound.
- M. Auvard's speculum.
- N. 2 No. 9 half-circle needles.
- O. Gloves, 4 pairs.
- P. 2 Playfair's probes.
- Q. Flushing curette.
- Catheter (omitted in illustration).

If during the dilatation the cervix has been lacerated and the bleeding is free, the dissecting and pressure forceps and the needles and catgut will be required for suturing.

The ring forceps are used as swab holders.

The pattern of metal dilator depicted is Fenton's.

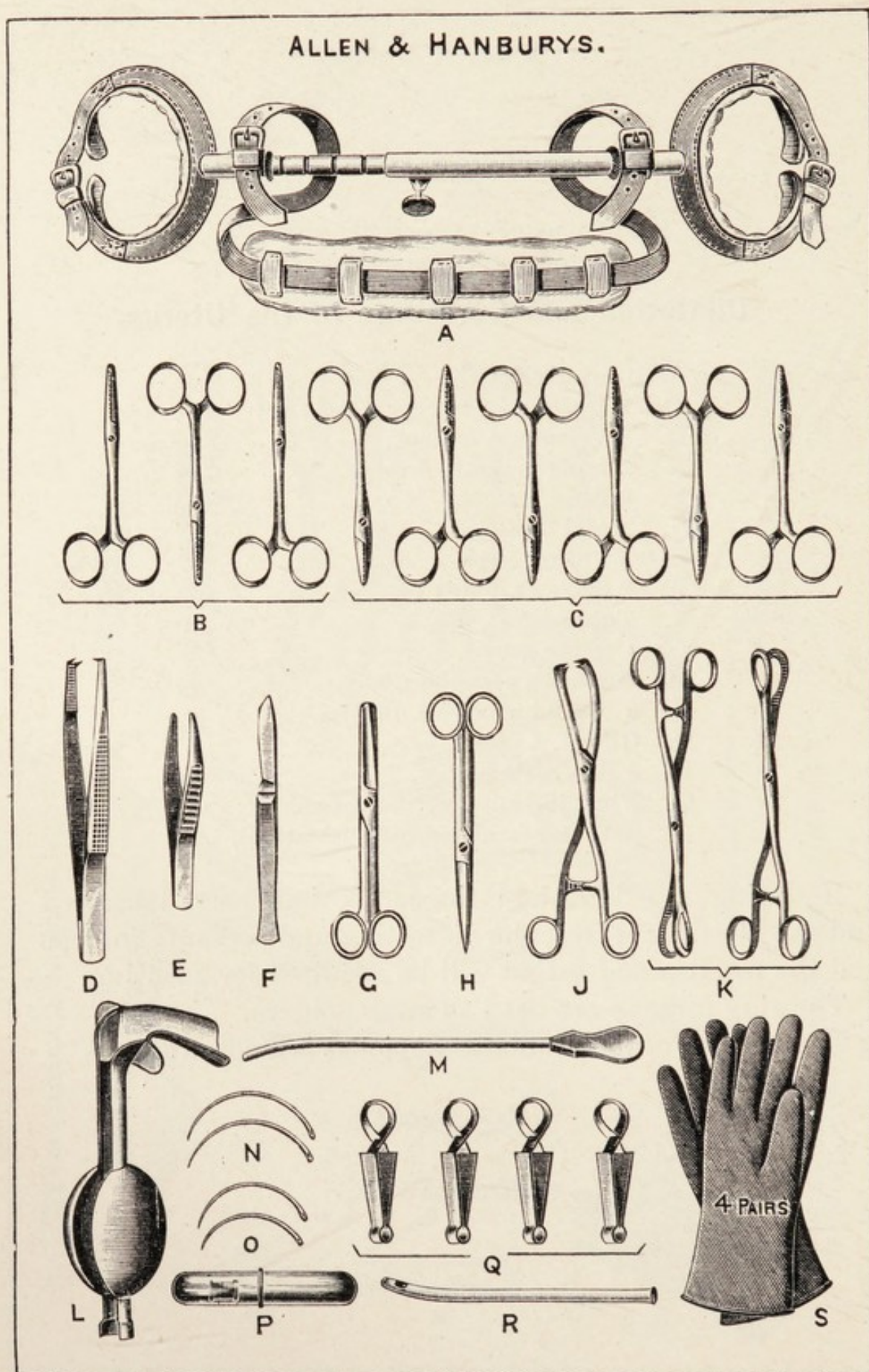


FIG. 30.

**Perineorrhaphy — Colporrhaphy—Trachelorrhaphy—
Amputation of the Cervix—Removal of a Sub-
mucous Fibroid, of a Fibroid and Mucous Polypus.**

- A. Clover's crutch.
- B. 3 Short Kocher forceps.
- C. 6 Short pressure forceps.
- D, E. 2 Dissecting forceps, long and short.
- F. Scalpel.
- G, H. 2 Scissors, sharp and blunt pointed.
- J. Volsellum forceps.
- K. 2 Ring forceps.
- L. Auvard's speculum.
- M. Bladder sound.
- N. 2 No. 5 half-circle needles.
- O. 2 No. 9 „ „ „
- P. 3 Tubes of catgut, 2 No. 2, 1 No. 3.
- Q. 4 Spring clips.
- R. Catheter.
- S. Gloves, 4 pairs.

For the operation of trachelorrhaphy and amputation of the cervix a few metal dilators (1 to 6) will be required.

The ring forceps are used as swab holders.

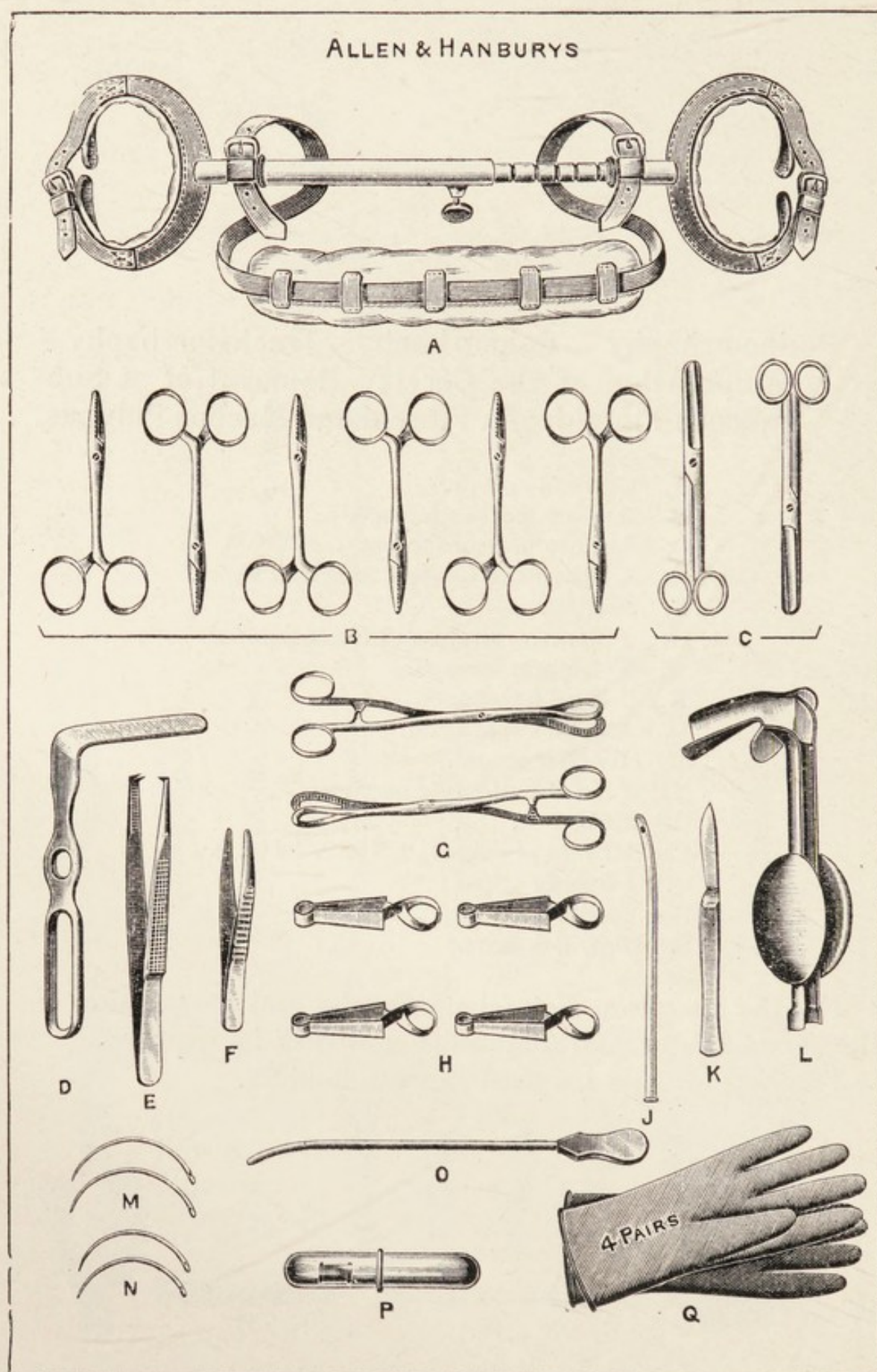


FIG. 31.

Vaginal and Vulval Cysts.

- A. Clover's crutch.
- B. 6 Short pressure forceps.
- C. 2 Scissors.
- D. Vaginal retractor.
- E, F. 2 Dissecting forceps, long and short.
- G. 2 Ring forceps.
- H. 4 Spring clips.
- J. Catheter.
- K. Scalpel.
- L. Auvard's speculum.
- M. 2 No. 5 half-circle needles.
- N. 2 No. 9 " " "
- O. Bladder sound.
- P. 2 Tubes catgut, No. 2.
- Q. Gloves, 4 pairs.

If the cyst is in the posterior wall a vaginal retractor will be required.

The ring forceps are used as swab holders.

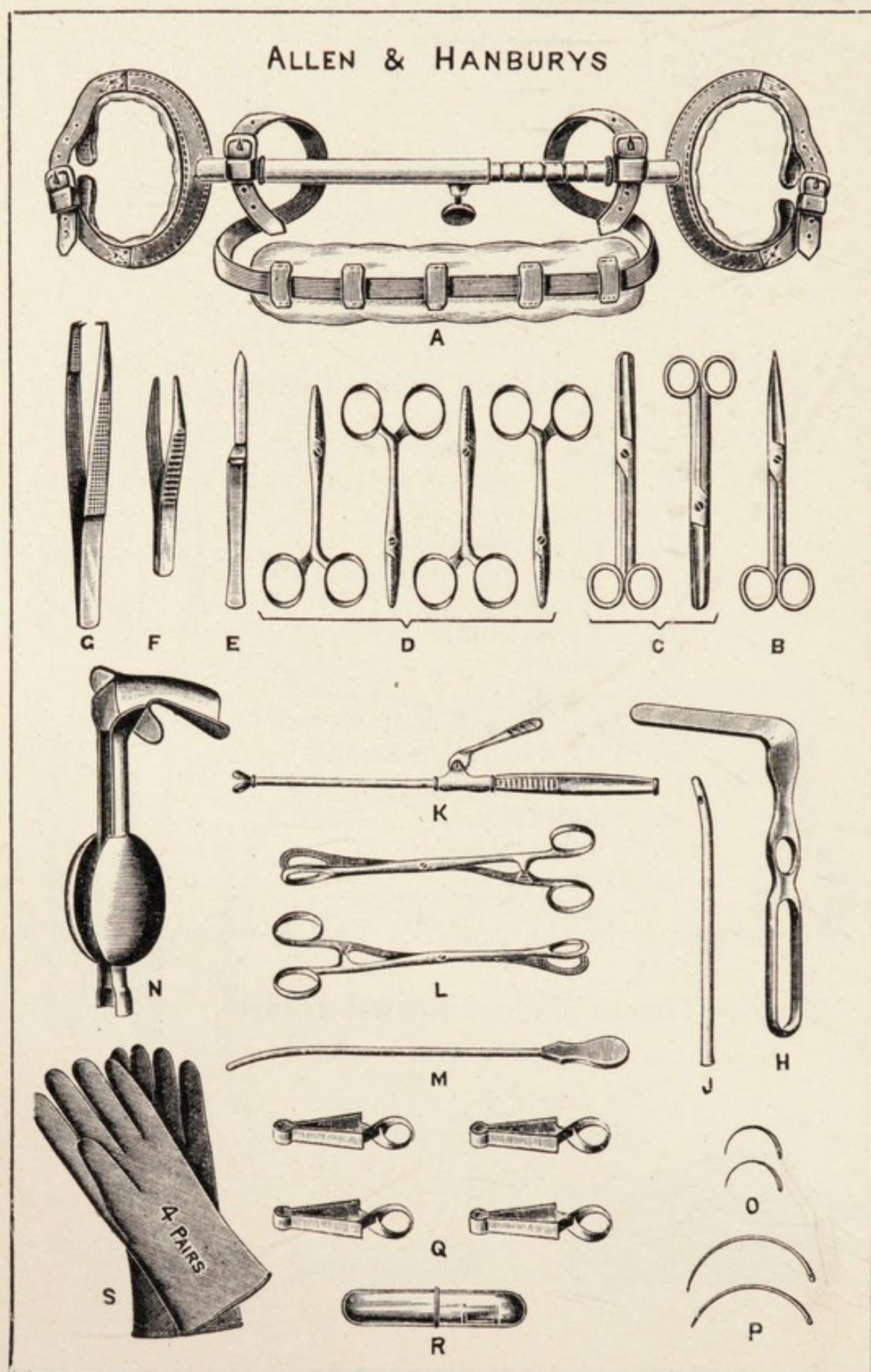


FIG. 32.

Vesico-Vaginal and Recto-Vaginal Fistulæ.

- A. Clover's crutch.
- B, C. 3 Scissors—2 blunt pointed, 1 sharp pointed.
- D. 4 Long pressure forceps.
- E. Scalpel—narrow blade.
- F, G. 2 Dissecting forceps, long and short.
- H. Vaginal retractor.
- K. Cleft palate needle-holder.
- L. 2 Ring forceps.
- M. Bladder sound.
- N. Auvard's speculum.
- O. 2 No. 2 cleft palate needles.
- P. 2 No. 9 half-circle needles.
- Q. 4 Spring clips.
- R. 2 Tubes catgut, No. 1, No. 2.
- S. Gloves, 4 pairs.

In the absence of a cleft palate needle-holder, a long pressure forceps can be used. In a difficult vesico-vaginal fistula, high up in the anterior fornix, it is easier to use cleft-palate knives, forceps, needle-holders, and needles.

The vaginal retractor will be required for a recto-vaginal fistula.

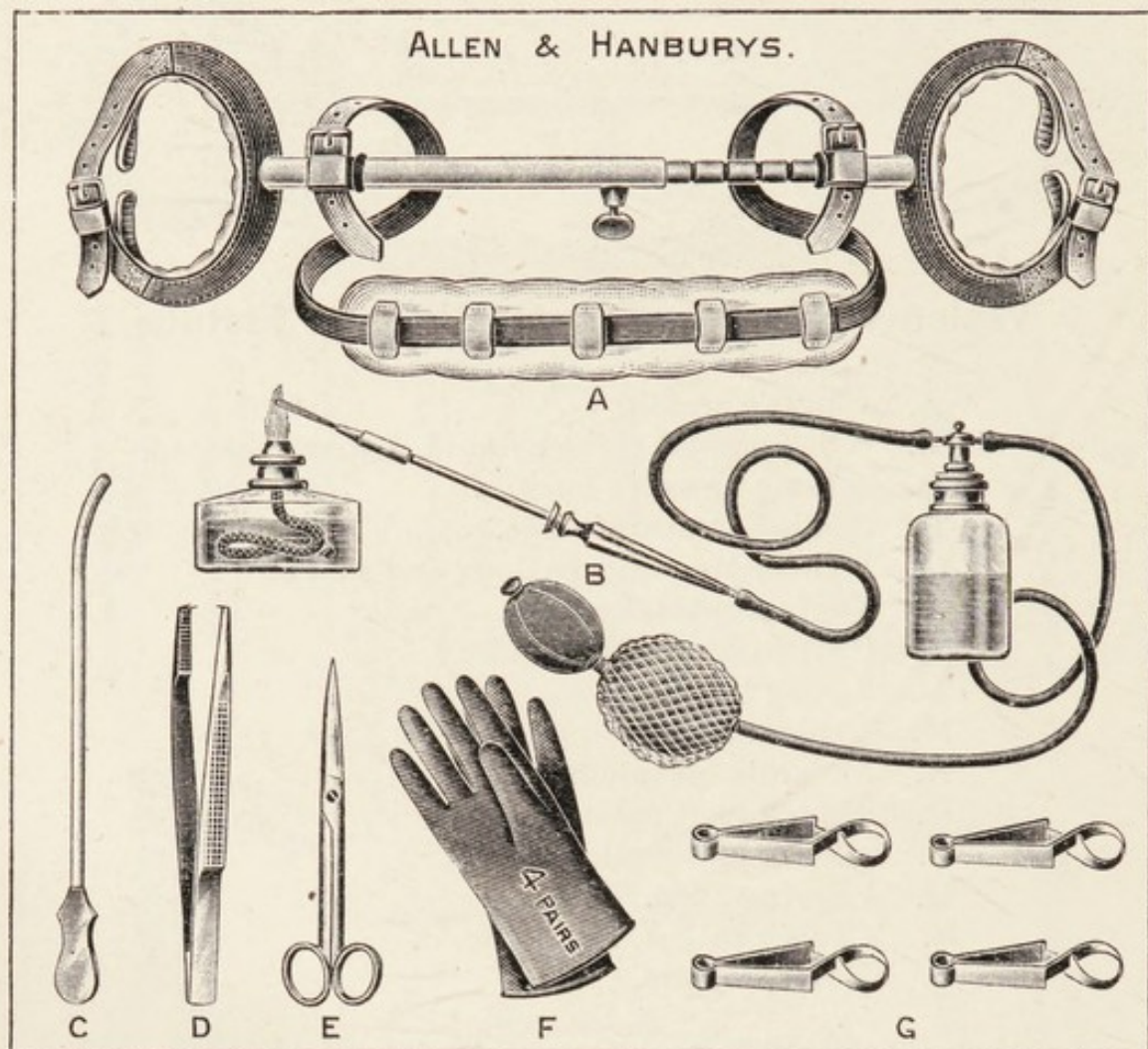


FIG. 33.

Urethral Caruncle.

- A. Clover's clutch.
- B. Actual cautery.
- C. Bladder sound.
- D. Dissecting forceps.
- E. Scissors, sharp pointed.
- F. Gloves, 3 pairs.
- G. 4 Spring clips.

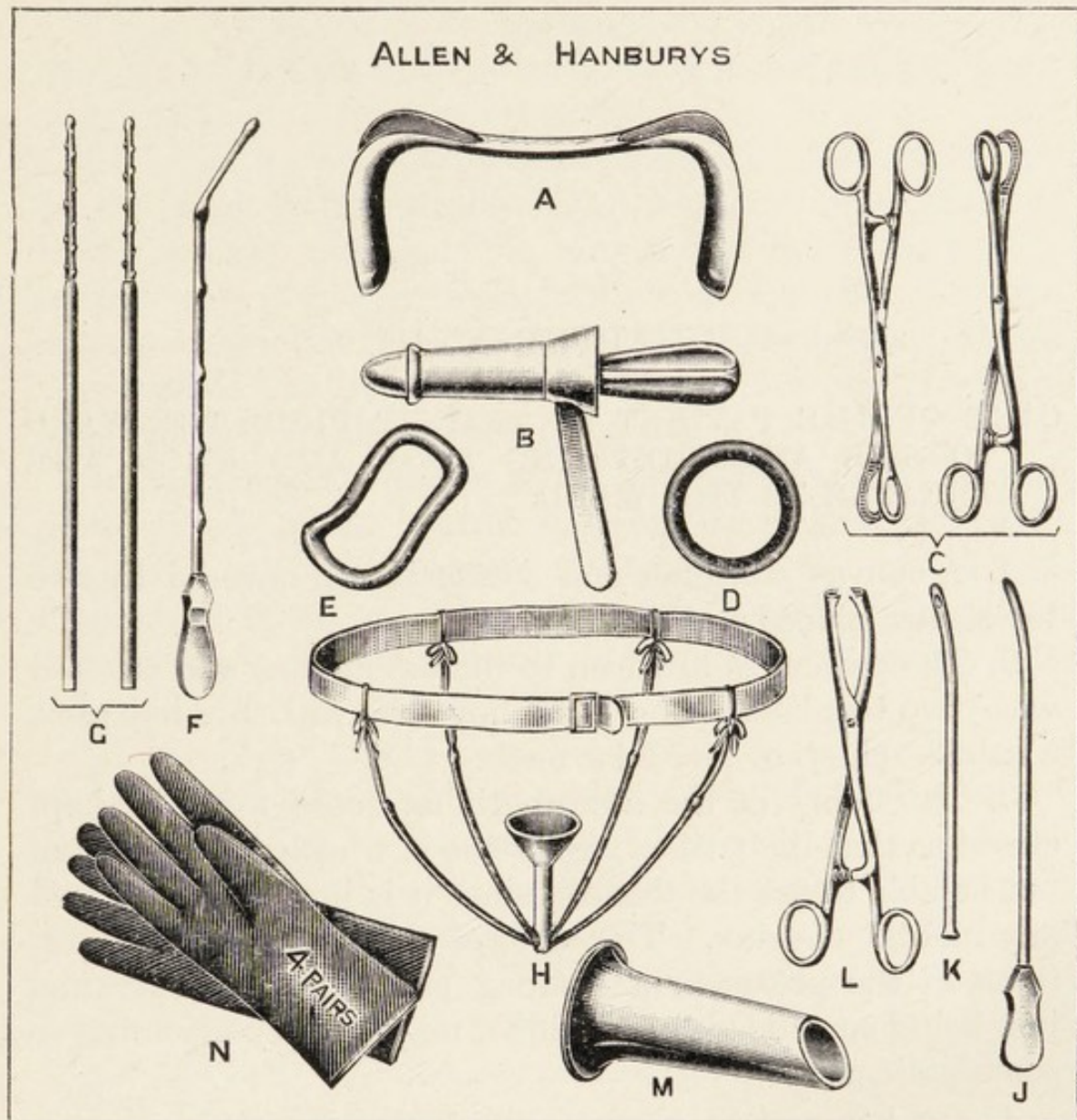


FIG. 34.

Out-Patient Department.

- | | |
|-------------------------|-------------------------------------|
| A. Sim's speculum. | H. Napier's cup and stem pessaries. |
| B. Rectal speculum. | J. Bladder sound. |
| C. 2 Ring forceps. | K. Catheter. |
| D. Ring pessaries. | L. Volsellum forceps. |
| E. Hodge pessaries. | M. Fergusson's speculum. |
| F. Uterine sound. | N. Gloves, 1 pair. |
| G. 2 Playfair's probes. | |

Solution of biniodide of mercury (1 in 2000).

Absorbent wool swabs.

Absorbent wool.

Iodized phenol—carbolic acid, a saturated solution of picric acid in rectified spirit, etc.

CHAPTER XXIII.

CARE OF THE PATIENT IN TRANSIT FROM THE WARD TO THE ANÆSTHETIZING ROOM AND FROM THE THEATRE TO THE WARD.

1. A canvas stretcher and a mackintosh covered by two towels are placed on the ambulance.

2. The patient is lifted on to the ambulance and covered with two blankets. She must not take with her hairpins, a handkerchief, or any false teeth.

3. The doors of the anæsthetizing room must be kept closed so that the patient, when she is wheeled into it, shall not be able to see the theatre, since it is important to avoid any mental distress. The sight of the necessary preparations, of the presence of visitors, perhaps of an operation just being concluded, or of blood, may be very alarming to some patients.

4. On her arrival in the anæsthetic room, if the anæsthetist prefers the hair of the patient to be covered, this should be done by means of a sterile towel folded round the back of the head and pinned on to the forehead, in such a way that all the hair is inside the towel.

5. Before the administration of the anæsthetic is begun, the neck of the nightgown and jacket worn by the patient should be untied and loosened. A nurse should remain by the side of the patient until she is under the influence of the anæsthetic.

6. At the termination of the operation the patient should be very gently lifted on to the ambulance, and covered with blankets. A towel should be placed under her chin and a porringer by the side of her head, in case she vomits.

7. On the way back to the ward the nurse should hold the chin of the patient forwards, and watch carefully that she continues to breathe properly.

8. If the patient stops breathing and gets blue in the face it is generally an indication that the chin is not being held properly and that the tongue has fallen back. In such a case if further manipulation of the chin does not improve matters, the nurse, unless a doctor is near, should take hold of the tongue of the patient with a pair of forceps and pull it forward between the teeth.

9. On her return to the ward the patient should be very gently lifted by the canvas stretcher on to her bed which has been specially prepared meanwhile, and covered with blankets. To remove the canvas stretcher after the patient is in bed, she should be gently rolled from one side to the other.

10. A pillow should then be placed under the knees of the patient, and a pad is applied to her vulva, so that any loss from her vagina can be easily detected.

11. Hot-water bottles, with their stoppers thoroughly protected, are placed outside the blanket along the lower extremities of the patient. Some surgeons prefer that the hot bottles should be removed when the patient is returned to her bed and until she has recovered from the anæsthetic, unless directions are otherwise given.

12. The bed-clothes are then placed over the patient, her head is turned to one side, a towel is placed under her chin and a porringer on the locker by her side, to be immediately available if she vomits.

13. The pulse should then be counted and a note made as to its rate and character.

CAUTION.

Never leave the patient from the moment she is placed on the ambulance till she is anæsthetized, and handed over to the theatre nursing staff, and from the moment she leaves the theatre till she is settled in bed and handed over

to another member of the ward nursing staff. The nurse must never leave the patient till she is well out of the anæsthetic, since she may be very restless and throw herself out of bed, or she may vomit and become asphyxiated, or inhale some of the ejected material and thus get pneumonia.

If hot-water bottles are left in the bed, even outside the blankets, a restless patient may easily disturb them and burn herself. A certain amount of intelligence is required when using hot-water bottles. Thus if the pulse is good, and the patient is perspiring, or if the day is very hot, their use is superfluous, if not injurious.

If the operation is an abdominal one and there is retching or vomiting, the nurse must support the abdomen with a hand on each side of the incision to prevent undue straining of the sutures and this will also lessen the pain. When the vomiting has ceased, the nurse should cleanse the mouth with small wool dabs wrung out of a solution of glycothymoline and held in forceps.

The nurse should pay no attention to what the patient may have said under the influence of the anæsthetic, and should never repeat it either to the patient or anyone else.

CHAPTER XXIV.

ASEPTIC TECHNIQUE FOR OPERATIONS IN A PRIVATE HOUSE.

THE facility and safety with which operations can be carried out in private houses depends upon the means and surroundings of the patient. In some cases, when efficient nursing assistance can be obtained, and the various articles of furniture necessary for an operation can be hired, and a complete sterilized outfit can be purchased, an operation can be conducted with comfort to the surgeon, and, as far as the aseptic technique is concerned, with safety to the patient. On the other hand, an operation may have to be performed amidst surroundings which are very primitive, and the nurse will have to do the best she can. When an operation is to be performed in a private house the following subjects must be considered by the nurse :—

1. Preparation of the room.
2. Preparation of the instruments, etc.
3. Preparation of the nurses and their duties at the operation.
4. Preparation of the dressings.

Preparation of the Room.

Room.—A room should be chosen which has a good light, is well ventilated, and is not near the water-closet. The day preceding the operation the walls and all the woodwork in the room should be thoroughly dusted ; particular care being taken with the tops of the door and windows. The carpet, curtains, and upholstery on the bed should be removed, together with the pictures and all the

furniture which will not be required. The woodwork and furniture should be dusted with damp dusters, and the walls also, should they happen to be painted. The floor should then be thoroughly scrubbed. The furniture and woodwork should again be dusted with a damp duster on the morning of the operation.

If, however, the operation is one of emergency, and there is not sufficient time to allow for all these preparations to be made, then dust should not be disturbed by dusting. The furniture which will not be used should be removed as gently as possible, and a drugget or sheet wrung out in lysol (1 in 160) should be tacked down over the carpet, beneath the operating table.

Furniture.—The following articles must be procured and arranged in convenient situations (see Figs. 35 and 36):—

Operating table.	Instrument table.
Table for dressings, etc.	Swab table.
Washstand.	Sterilizer.
2 Basins for hand lotion.	Anæsthetist's table and stool.

1. As a rule the surgeon will bring his own operating table. If not, a table must be procured about four feet long, two feet broad, and twenty-eight inches high for the patient to lie on during the operation. An ordinary kitchen table will be found to meet these requirements.

2. Six small square tables, one for two basins in which the swabs or dabs can be rinsed, if dry sterilized swabs are not used, one for the instruments, two for the lotion for the hands, one for the anæsthetist's apparatus, and one for the dressings. Tea tables, work tables, washstands, or dressing tables will do, and if these are not available, very good substitutes can be made with ironing boards, or leaves from an extension table resting on chairs. Chairs will do for the hand lotion. These tables should be thoroughly dusted with a damp cloth, and then covered with clean sheets or towels.

3. Two chairs with wooden or cane seats, one for the anæsthetist and one for the operator if he needs it.

4. A washstand to hold two basins for washing the hands

and a basin in which to finish the preparation of the hands, containing biniodide of mercury (1 in 1000).

5. A nail-brush sterilized by boiling or immersion in a solution of biniodide of mercury (1 in 1000).

6. A cake of soap.

7. Two clean blankets, one sheet, and one piece of mackintosh sheeting for the operating table.

8. Several clean towels, not new. All the towels should be sterilized. If the surgeon does not bring sterilized towels with him, they must be boiled, and the nurse must ask how many he will require.

9. Two dishes, one for the instruments, measuring, if possible, twelve inches square, and a smaller dish, six inches square, for the ligatures and sutures. Meat dishes will do very well. Many surgeons like their instruments to be arranged on sterilized towels, in which case these dishes will not be required.

10. Six basins, two for preparing the hands, two for the lotion for the hands, and two for the swabs.

These dishes and basins should be thoroughly cleaned and scalded before use, and then turned upside down and covered with towels until they are required, in order that dust may be excluded. They can be efficiently sterilized before use by burning in them a little methylated spirit.

11. A sterilizer. It will be necessary to have a sterilizer of some description, even if the surgeon brings his instruments already sterilized, because an instrument may be dropped during the operation and have to be re-sterilized. In the absence of a proper instrument-sterilizer, the nurse should procure a fish-kettle or sauce-pan large enough to take the instruments.

12. One gallon of cold water, which has been boiled.

13. One gallon of boiling water. The mouths of the jugs containing the water should have gauze tied over them.

14. A foot-bath or pail, properly cleansed, for receiving any soiled water, etc.

15. A piece of oilcloth or linoleum to place under the table in vaginal or vulval operations, so that the floor of

the operating room and the ceiling of the room below can be protected. If such cannot be procured, newspapers should be used.

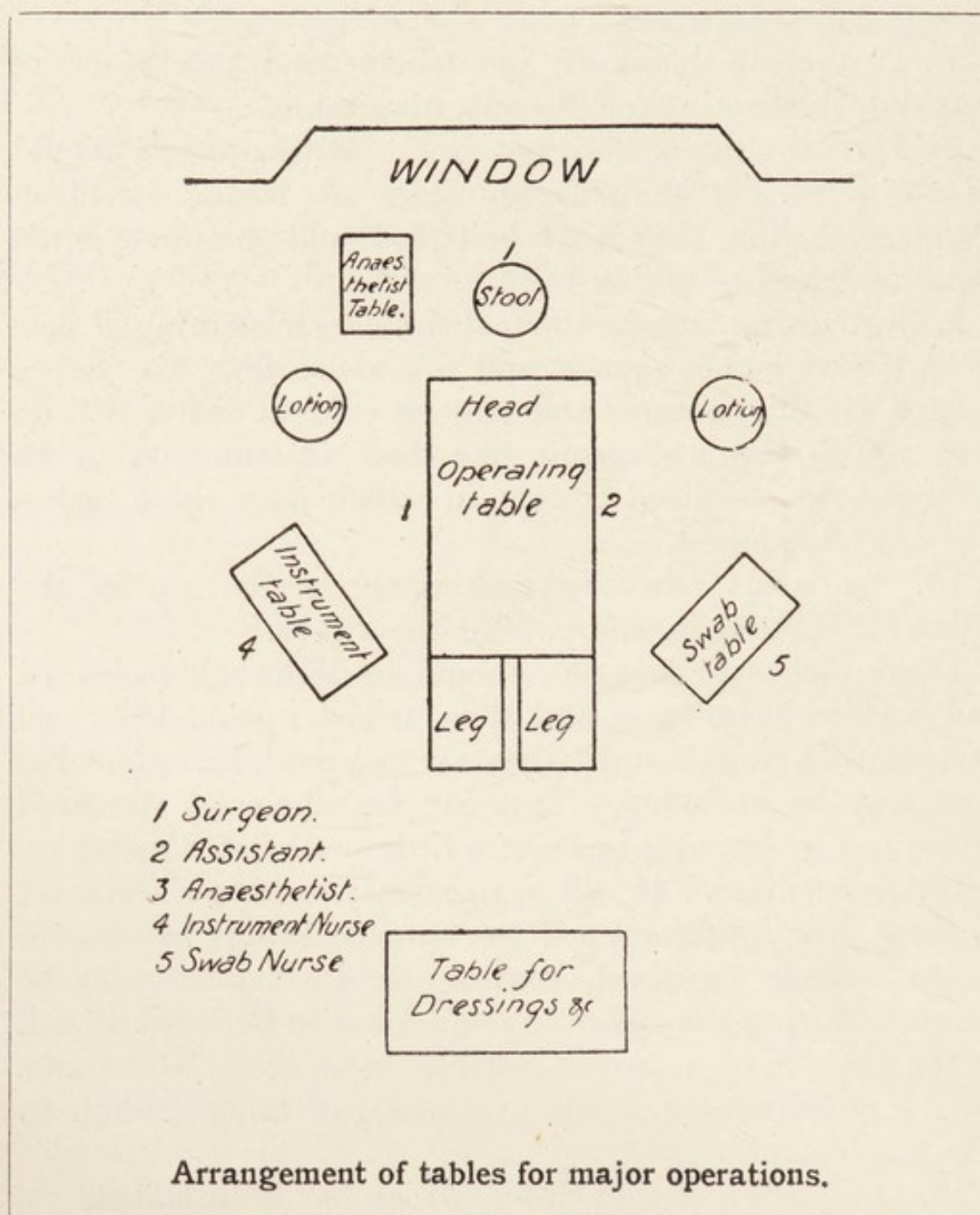


FIG. 35.

16. The bedstead should be thoroughly cleaned, the mattress aired, and the bed made up with clean sheets, a piece of mackintosh sheeting over the lower sheet, and a clean draw-sheet over this.

17. Two hot-water bottles carefully covered with flannel so that they shall not burn the patient should be provided in case they are wanted. Especial care should be taken

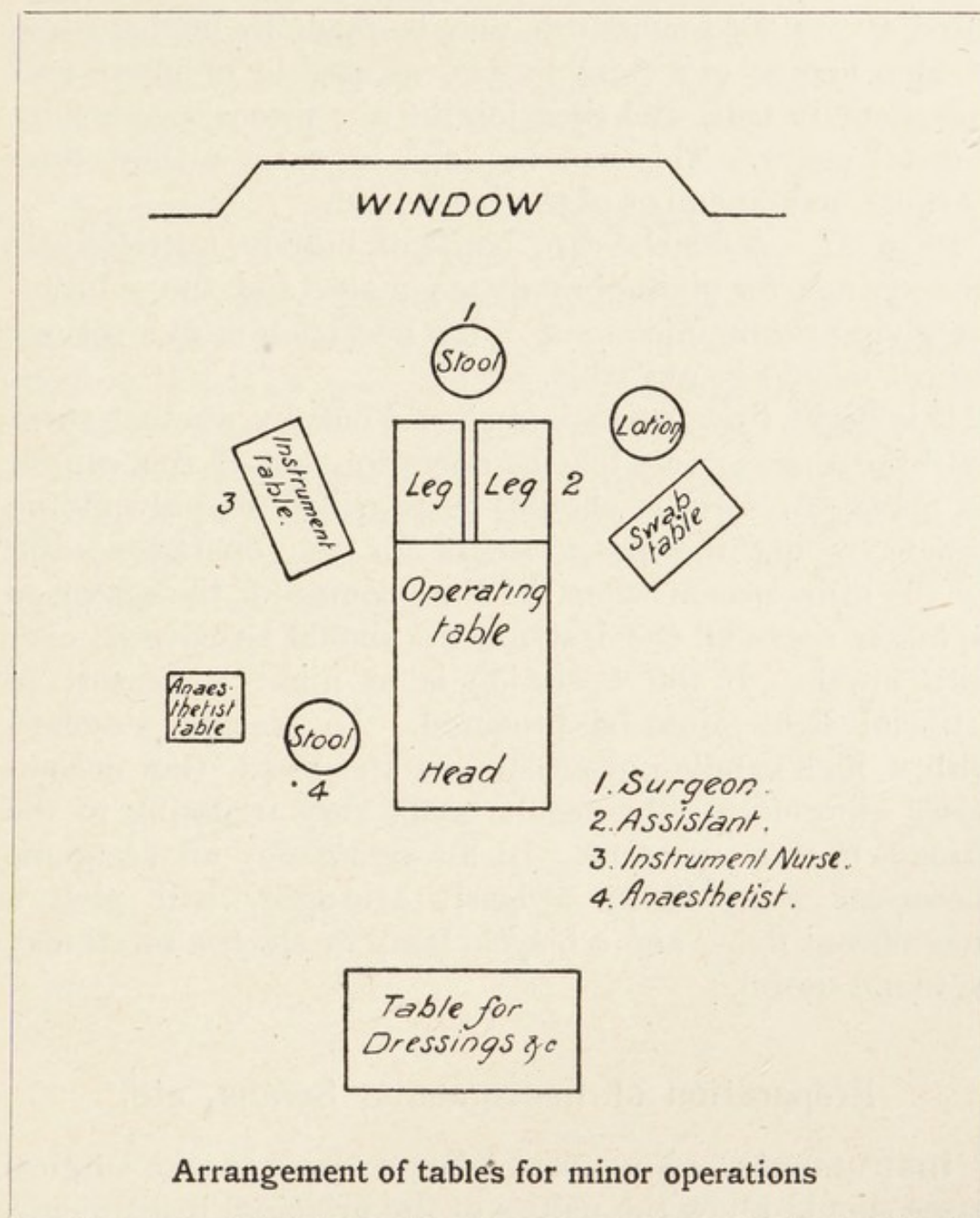


FIG. 36.

that the metal stopper is not in any way exposed. Unless properly looked after, hot-water bottles are a source of the greatest danger to the patient, who, when unconscious after the operation, is unable to feel them burning, with a

result that very serious ulcers are caused, which may take two months or longer to heal.

18. After an abdominal section or vaginal hysterectomy a cradle will be wanted. If a proper cradle cannot be procured a very good substitute may be made by buying some wooden hoops, of a suitable size, as used by children, cutting them in half, and then joining the pieces together by a metal screw. This can be done in quite a short time by some male member of the household.

19 to 22. A douche-can, bottle of brandy, nutrient enema-syringe for giving brandy enemata, and the solution for giving saline injections, if the operation is of a serious nature, should be available.

It is better that the patient should occupy another room until the time arrives for the operation, but if this cannot be managed, screens should be provided to prevent the patient seeing the preparations for the operation, and for the same reason when the time comes for the screen to be taken away all the instruments should be covered over with towels. If the operation is at night some sort of artificial light must be procured. An electric standard with a high candle-power lamp is the best. Gas decomposes chloroform, the result being very irritating to the throats of those present. In an emergency an acetylene motor-car searchlight, properly arranged, will give a magnificent light, and a bicycle lamp or electric torch may be found useful.

Preparation of Instruments, Swabs, etc.

Instruments.—Any nurse who professes to take surgical cases should know the names of the principal instruments, because she may be asked to attend to the instruments during the operation. In private the surgeon will bring his own instruments. The particular instruments used in gynæcological operations will be found figured on pages 186 to 201. The method of sterilizing instruments will be found described on page 161.

Sutures, Ligatures.—Sutures are of two varieties, mattress and continuous. A mattress suture is not tied in the needle, its length should be about twelve inches and it should be threaded with one end longer than the other. A continuous suture should be tied in the needle, with one knot close to an end of the suture and its length should be about eighteen inches. The average length of a ligature is eighteen inches (Fig. 21).

A nurse who intends to take up surgical work in private should master the rules set out for a theatre sister on page 168, especially those which will be appropriate to operations in a private house. The method of sterilizing sutures and ligatures will be found on page 162.

Swabs, Dabs.—A method of making swabs for abdominal operations and dabs for minor operations and their sizes will be found on page 164. Swabs must be sterilized by steam pressure or by boiling, and dabs may be sterilized by chemical disinfectants.

CHAPTER XXV.

PREPARATION OF THE NURSE—PLACING THE PATIENT IN POSITION—ASSISTANCE DURING AND DUTIES AFTER THE OPERATION IN PRIVATE OPERATIONS.

THE preparation of the nurse and the assistance she will and may be required to give during the operation will be found fully described under the rules set out on pages 166 to 179 for the theatre and ward sister and theatre nurse.

If possible, and especially if the operation is of a serious nature, two nurses should be available at the time of and for a week following the operation. In this case one nurse should act as theatre sister and the other as ward sister and theatre nurse combined.

In the rules referred to, it will be seen that the nurses have to wear sterilized overalls, and, if requested by the surgeon, veils also. Nowadays the surgeon generally sends or brings a tin containing the sterilized clothing for the nurses and doctors, and coverings and towels for the patient. Such tins can generally be obtained, in most towns of any importance, containing the necessary articles of clothing for the surgeon, nurses, and the coverings, swabs, dabs, and dressings for the patient already sterilized.

These articles are packed in separate tins according to whether they are required for a major or minor operation. If such a tin is not available the nurse, as already stated, must sterilize a number of towels by boiling them, and in place of an overall she must pin a large towel round her chin, so arranging it that it covers the front of the body.

Sterilized Articles Necessary for a Major Operation.

A body cover.	10 Small swabs.
6 Towels.	2 Yards of cyanide gauze.
3 Gowns.	Half-pound of absorbent wool.
3 Masks.	A many-tailed binder.
2 Large swabs.	A packet of safety pins.

Sterilized Articles Necessary for a Minor Gynæcological Operation or a Vaginal Hysterectomy.

A pair of leggings.	Dozen dabs.
A perineal cover.	2 Vaginal tampons.
4 Towels.	2 Yards of gauze.
3 Gowns.	Pound of absorbent wool.
3 Masks.	A T-bandage.

Figs. 18 and 19 show a sterilized tin containing these articles, as put up for the author by Messrs. Bell & Croyden. Different surgeons will vary the contents of these tins, so that if the nurse is directed to procure such a tin, she must ask the surgeon what articles he requires. The towels are used for covering the instrument and swab tables, and any part of the surroundings of the patient thought necessary, and not protected by the body or perineal covers.

The method of preparing the hands and the india-rubber gloves will be found described on pages 162 and 166.

India-rubber gloves should be worn at all operations, and by all concerned except the anæsthetist. By their use the risk of infecting the patient is very much diminished since they can be boiled, whereas the hands cannot. In addition, they protect the hands of the nurse from contamination with any pus that may be present, and so lessen the chance of her conveying infection to some other patient.

Placing the Patient in Position.

The method of placing the patient in the Trendelenburg and lithotomy positions is described on pages 175, 176, and is illustrated in Figs. 24 and 25. As in a private house, for an operation necessitating the lithotomy position, it is

unlikely that a tray will be available, the nurse can improvise a lithotomy pad by placing a mackintosh, covered with a sterilized towel, under the buttocks of the patient. The mackintosh and towel should be rolled several times at the end upon which the patient will rest, and be so arranged that it will form a ridge and prevent fluids escaping under the back of the patient. The sides should then be folded in, to form a gutter, and the free ends should be inserted into a pail.

When a patient is fixed in the lithotomy position with a Clover's crutch, her body will be very unstable. It is therefore most important that the nurse should hold the patient in position by means of the crutch. If the nurse has to leave the patient she must get the anæsthetist or someone else to hold the patient meanwhile. The author has knowledge of a case in which the patient fell off the table in such circumstances with very serious results.

Preparation of the Dressings.

A list of the dressings which may be required for the different gynæcological operations will be found on page 165. The particular dressings required will vary with the individual surgeon, so that if he does not provide them, the nurse must ascertain his wishes.

Duties after the Operation.

Tidying the Room after Operation.—After the operation and before the patient recovers consciousness, the soiled linen, operating table, and instruments should be removed and the room re-arranged, two tables being left, one for the dressings and one for the use of the nurse. An armchair and a camp-bed or sofa, if there is only one nurse and it is necessary for her to remain in the room during the night, should also be supplied.

A lamp, candle, or electric light properly shaded so that the nurse can read, and write her report, without disturbing the patient will be required. The blinds must be drawn and the room kept as quiet as possible, so that the patient may sleep when she comes out of the anæsthetic.

The room must be well ventilated and kept at a temperature of 65° F. To accomplish this there should, if necessary, be a fire in the room and the window should be a little open. Great care must be taken that the patient is not in a draught, and this may be obviated, if necessary, by a judicious arrangement of screens.

The best way to admit air through the window is to place a piece of wood six inches high and the breadth of the window under the bottom sash, by which means the air will pass into the room up to the ceiling between the two halves of the window.

Relatives or friends must not be admitted unless the doctor gives permission, and following the operation the nurse must for some hours never leave the patient alone, so that if she wants help she must summon it by bell.

Cleaning the Instruments.—This duty may have to be left for some little time, as the nurse will probably have to attend to the patient at first; meanwhile, if the surgeon wishes his instruments cleaned, the best plan is to put them all into a basin and cover them with cold water.

When there is time to clean the instruments they should be well washed with cold water, soap, and soda to remove the blood-stains, after which, if necessary, they should be polished with some plate powder, and then again washed with hot water and scrubbed, all the joints being carefully examined to see that no *débris* is adhering to them; they should then be boiled for fifteen minutes. Lysol forms a very good medium to wash the instruments in; it is of a soapy nature, antiseptic, and helps to polish them. A stream of water and a fine wire should be passed through the curette to remove any blood, and the instrument is then boiled, after which a little ether or absolute alcohol run through it will prevent any rust forming.

Cleaning the Gloves.—The gloves are scrubbed with soap and water, inside and out, then rinsed in clean water, boiled for ten minutes, and then dried with a towel and powdered with boric acid.

CHAPTER XXVI.

AFTER TREATMENT.

THE nurse must ascertain from the surgeon exactly how he wishes his patient treated after the operation, as individual surgeons have their own particular methods. The methods suggested in this chapter are the outcome of an experience of many thousands of cases and may be followed unless the nurse has directions to the contrary.

A record should be kept for every patient, under which is entered the pulse-rate, respiration-rate, temperature, the times the bowels have acted, the amount of sleep, the quantity of nourishment taken, and, if necessary, the quantity of urine passed.

Pulse.—The pulse-rate should be taken every four hours and charted. The pulse is by far the most important means we have of estimating how the patient is progressing after an operation, and all nurses would be wise to practise taking it on every suitable opportunity.

The pulse is quickest for the first twelve hours after the operation, but during this time should not exceed 120. After this, as a rule, if everything is progressing satisfactorily, it falls below 100. If the pulse does not fall, but continues to rise, this is, as a rule, a bad sign. In shock and hæmorrhage its rate may be increased to 140 or more, becoming at times uncountable, whilst in hæmorrhage the pulse is very soft and weak. Distension, if marked, will increase the frequency. In peritonitis the pulse rapidly increases in frequency to above 120, and is hard and wiry, it gradually becomes running in character, and at the end cannot be counted.

Temperature.—The temperature should be taken under the patient's tongue every four hours and charted. The temperature must never be taken just after the patient has had a hot drink, as this may raise it a degree. As a rule, in about eight hours after the operation the temperature rises to nearly 100° F. During the next twelve hours it keeps at this level, and then gradually falls to normal.

A subnormal temperature points to shock or bleeding.

A rapidly rising temperature, especially on the second day, is of very serious import, pointing, as it does, to peritonitis as a cause, although in many cases with this complication the temperature remains subnormal if the disease is so rapidly fatal as to cause death in the first two or three days.

A persistent high temperature without any apparent cause is often found on examination to be due to a stitch abscess, or hæmatoma of the wound, whilst in cases when the patient is very neurotic the temperature may rise for a few hours. In many instances a raised temperature will become normal after the bowels have been opened.

Respiration.—The nurse must notice the respiration rate and chart it. If rapid soon after an abdominal section it may be due to shock or hæmorrhage, and later an increase in its rate may be associated with bronchitis, pneumonia, and peritonitis.

Tongue.—For the first twenty-four hours after an abdominal section the tongue is generally dry and rather brown. After this it should be moist and rather white. In peritonitis and intestinal obstruction it becomes dry, brown, or red, glazed or ulcerated.

Bladder.—*Perineorrhaphy.*—Some surgeons prefer their patients to micturate naturally after the operation, kneeling up to do so, whilst others prefer the catheter to be used regularly until the bowels have acted.

Other Minor Operations.—There is no need for the catheter to be used.

Abdominal Section and Vaginal Hysterectomy.—The catheter is passed eight hours after the operation, and then,

unless there is retention, it is not used, except in the case of vaginal hysterectomy when clamp-forceps have been left on, and then the catheter, which must be used with the greatest care for fear of disturbing the forceps, is passed every eight hours until they are removed.

The catheter should be used only when absolutely necessary, and then at regular intervals. Frequent passage of the catheter not only increases the risk of infecting the bladder, but also makes the urethra sore, and subsequent micturition painful. Moreover, patients quite easily get the catheter habit and as a consequence, at times, appear unable to pass their urine naturally many days after catheterization has become quite unnecessary.

It is very important to measure the amount of urine passed and note any peculiarities in it, such as blood. The amount first passed after the operation should be 4 to 5 ounces; a less amount than this implies shock, hæmorrhage, suppression of urine, or injury to ureter, and in the latter case, or in injury of the bladder, it may be mixed with blood. If, after an abdominal section, the patient is passing her urine naturally, and the amount is less than might be expected, the catheter should be passed at the end of micturition to make sure that there is no residual urine due to partial retention.

In cases of sub-total hysterectomy some surgeons prefer the catheter to be used for the first twenty-four hours to prevent the distended bladder causing traction on the stump.

Bowels.—*Perineorrhaphy.*—An enema is given thirty hours after the operation and an aperient eighty hours, after which the bowels are kept acting regularly by some aperient that agrees with the patient.

Other Minor Operations.—On the second night following the operation the patient is given an aperient, and an enema the next morning if necessary, and then the bowels are kept acting as required.

Abdominal Section and Vaginal Hysterectomy.—At 4 a.m. on the morning of the fourth day following the operation the patient is given an ounce of castor oil,

after which a soap and water enema is given at 7.30 a.m. An aperient is then administered once daily if necessary.

Rectal Tube.—After vaginal hysterectomy and abdominal section it may be necessary to pass the rectal tube. The indication for so doing is when the intestines become distended with flatus and the pain resulting therefrom is severe. Such distension, as a rule, does not occur before twenty-four hours after the operation, any flatulence prior to this being relegated to the stomach, and for which a rectal tube is of no use. When a patient is disturbed by intestinal flatus, the passage of a rectal tube once or twice will probably suffice. In some cases it is necessary to pass it every four hours for a day or two.

The rectal tube has to be passed very carefully, the end being first smeared with vaseline, as it so easily becomes kinked on itself when pushed into the bowel, and should this happen it must, of course, be taken out and passed again. The tube must be pushed as far as possible, using ordinary care; it will go farther in some patients than others, but an average distance is about twenty-one inches, the total length of the tube being thirty-one inches. There are various patterns of rectal tube; the best is one with the hole at the end, and not, like a catheter, at the side.

As a rule, very little discomfort is caused by passing the tube, whilst the relief to the patient is often very marked. Occasionally, however, if the patient has hæmorrhoids, great distress is caused by the passage of the tube, and in these cases it is best to introduce a little gall and opium ointment some time before passing it.

Having introduced the tube as far as possible, it is kept in position as long as any flatus is escaping. If no flatus passes the tube is left in situ for about five minutes, its free end being kept under Condy or mercury solution in a porringer.

Dressing.—*Perineorrhaphy.*—The successful termination of this operation depends probably more upon the nurse than anyone else, the reason for this being the great difficulty that is experienced in keeping the wound aseptic.

Practically all the failures of this operation can be traced to the wound becoming septic and partly breaking down. In the majority of cases when this happens a good result is still obtained, the wound healing by granulation, but the convalescence is prolonged and the discomfort to the patient much increased. In a few cases the wound sloughs, and the patient finds that after going through all the worry, pain, and expense, the operation has been a failure, and will have to be repeated.

The reason the wound is so difficult to keep aseptic is apparent when its situation is remembered, since it can be so easily contaminated with fæcal matter, urine, leucorrhœa, or the menstrual flow.

The wound, then, must be redressed whenever it is soiled, and in those cases, when the urine is drawn off by catheter till the bowels are opened, the wound is dressed twice daily.

The stitches are removed when necessary on the twelfth day. As catgut sutures are now generally used, they do not require removal.

Removal of Cysts and Tumours from the Vulva.—The dressing is practically the same as for perineorrhaphy.

Trachelhorraphy.—*Removal of Vaginal Cysts or Tumours.*—*Amputation of Cervix.*—After these operations a piece of gauze is left in the vagina till the next morning. The stitches are taken out on the twelfth day, unless catgut sutures have been used.

Curettage.—Many surgeons do not employ dressings after a curetting other than those of a pad and T-bandage. If tampons are inserted into the vagina, or the uterus has been packed with gauze, these are removed according to the directions given, generally on the following morning. If the nurse is directed to remove the gauze she must do so very gently, in order that she may not break it off short and leave a piece in the uterus.

Vaginal Hysterectomy.—After vaginal hysterectomy the gauze which has been inserted into the vagina is left there

for thirty-six hours. After its removal it will be necessary to cleanse carefully the lower part of the vagina every four hours with a swab of absorbent wool soaked in perchloride of mercury (1 in 4000) and held in a pair of forceps.

Supposing clamp forceps have been left on, the nurse must be very careful that the patient does not interfere with them, especially when recovering from the anæsthetic, and she must also be very careful when catheterizing or otherwise attending to the patient for fear of detaching them.

Abdominal Hysterectomy.—As a rule dressing, if used, need not be renewed until the seventh day, when the stitches or clips are taken out. A fresh supply of dry dressing must then be ready, and also some long strips of adherent plaster, about two inches broad and twelve inches long, in case the surgeon wishes to strap the wound after the stitches or clips have been removed.

If a rubber tube has been left in the abdomen it will be necessary to change the dressings when they get soiled by the blood or discharge. The tube is, as a rule, removed on the day after the operation if it was used for oozing of blood, but if it has been inserted because of the presence of pus in the operation-site, or the fear that the latter may become septic, then the time for its removal will vary according to the nature of the case. As a general rule it will not be disturbed for five days, after which it will be removed altogether, shortened, or reduced in size.

Douching.—The douches generally used are tincture of iodine one drachm to a pint of hot water, perchloride of mercury, 1 in 4000, or lysol one drachm to a quart.

Perineorrhaphy — Operations of the Vulva, Vagina, Cervix, and Curetting.—The custom of douching the vagina and vulva after these operations is becoming less usual. Many surgeons now deem it better to keep the wound dry and clean by swabbing and the application of iodine. Others still favour douching, in which case the nurse must ascertain how often the patient is to be douched

and what disinfectant is to be used. As a rule twice a day is considered sufficient.

Vaginal Hysterectomy.—After vaginal hysterectomy, about the tenth day, the discharge commences to be very offensive. This is due to some sloughing of the injured parts and separation of the ligatures. It is then customary to order a vaginal douche twice daily. If this is ordered it must be given with very little pressure, the douche-can being held but very little higher than the patient.

Abdominal Section.—After abdominal section douches as a rule are not given. In some cases after a total abdominal hysterectomy an offensive discharge will appear during the second week, due to separation of the ligatures. If so, the surgeon will probably order a vaginal douche.

Food.—*Perineorrhaphy.*—Eight hours after this operation the patient should be given 4 ounces of tea and milk or hot milk and water. The subsequent feeding depends on which day the surgeon orders the aperient, the first, the fourth, or the seventh, because, before this, ordinary liquid diet is prescribed. After the bowels have been well open the patient is given bread and butter, custard and sole, and quickly returns to ordinary diet.

Other Minor Operations.—Eight hours after the operation the patient is given 4 ounces of tea and milk or hot milk and water. The patient then returns to a normal diet.

Major Operations.—See next chapter.

CHAPTER XXVII.

ABDOMINAL OPERATIONS.

Time-Table for Nursing and Feeding a Patient after
an Abdominal Operation as used by the Author.

Hour.	Directions.	Nourishment.
FIRST DAY.		
5 a.m.	Simple enema Oii. If the last part of the enema does not return clear another must be given.	Chicken-tea. Cup of tea, bread and butter, rusk or biscuit.
8.40 a.m.	Hypodermic injection of morphia gr. $\frac{1}{4}$, atropine gr. $\frac{1}{120}$, or scopolamine, gr. $\frac{1}{100}$, atropine gr. $\frac{1}{120}$, heroin gr. $\frac{1}{2}$.	
8.45 a.m.	Catheter.	If the operation is at 2 p.m. tea and bread and butter will be given at 6 a.m. and beef-tea at 10 a.m. The catheter will be passed at 1.45 p.m. and the hypodermic injection at 1.40 p.m.
9 a.m.	Operation. When the patient is returned to bed she must be covered with a warm blanket, and hot bottles should be removed from the bed, unless otherwise directed. A pillow should be placed under the patient's knees, a cradle over her abdomen, and her head is to be kept low. If retching or sickness supervenes the patient is to be turned slightly on her left side and her abdomen is to be supported by the nurse laying the flat of her hands on each side of the stitches.	

Hour.	DIRECTIONS.	NOURISHMENT.
2 p.m.	Pulse, respiration, temperature. If shock is present a rectal injection of saline solution with glucose, $\bar{3}i$, should be given every two hours, to which brandy may be added if necessary. If the patient is unconscious a pint of saline can be given. When conscious 6 to 10 ounces will probably be all she can retain. If the patient complains much of pain when she has recovered from the anæsthetic a rectal injection of aspirin gr. 20, in saline $\bar{3}vi$, may be given.	
6 p.m.	Pulse, respiration, temperature. Pass a catheter if the patient has not passed her urine naturally and measure urine. Patient may have one or two pillows.	Hot or cold water $\bar{3}i$, as preferred, to be given frequently to the patient when awake.
FIRST NIGHT.		
8 p.m.	If the aspirin fails to relieve the pain, a hypodermic injection of morphia, gr. $\frac{1}{8}$, to be repeated if necessary, may be given. It is best if possible to postpone the administration of morphia till late in the evening, so as to ensure, if possible, the patient having a good night. Morphia should not be given after the first night, unless absolutely necessary, as it causes flatulence and is apt to mask important symptoms.	
10 p.m.	Pulse, respiration, temperature.	After the patient has quite recovered consciousness, she may be allowed to drink $\bar{3}v$ to $\bar{3}vi$ of water at a time. Such comparatively

Hour.	DIRECTIONS.	NOURISHMENT.
2 a.m.	Pulse, respiration, temperature.	large quantities are not so apt to cause sickness as small ones.
6 a.m.	Pulse, respiration, temperature.	
7 a.m. to 9 a.m.	SECOND DAY. The patient's hair to be brushed and plaited. Her hands, face, shoulders, and lower part of her back to be washed. The back and shoulders to be rubbed with eau-de-Cologne and boric powder. Mouth to be cleansed. Draw-sheet and top-sheet to be changed. The amount of nourishment taken, sleep obtained, and urine passed to be entered in the report book. If the patient passes only a small quantity of urine the catheter must be passed to ascertain if there is any residual urine, and if so the catheter must be used till practically all the urine is naturally evacuated. The patient should be placed in Fowler's position unless there is any contra-indication.	Cup of tea and milk with a biscuit or bread and butter.
10 a.m.	Pulse, respiration, temperature.	During the day a glass of milk and soda or barley water or plain water may be given from time to time, as desired, or chicken-tea or beef-tea.
2 p.m.	Pulse, respiration, temperature.	
4 p.m.	During the second day flatulence may become troublesome and painful. It is at first felt in the	Cup of tea and milk with bread and butter.

Hour.	Directions.	Nourishment.
	stomach when small drinks of hot water with a few drops of essence of peppermint may relieve it. Later, as the intestine becomes distended, the flatulence is best relieved by passing the rectal tube to allow of the escape of flatus, and if this does not afford relief, a turpentine enema or rectal wash-out should be given before the rectal tube is withdrawn. These measures may be repeated if necessary every four hours.	
6 p.m.	Pulse, respiration, temperature.	
7 p.m.	The patient's hair to be brushed and plaited. Her hands, face, shoulders, and lower part of her back to be washed. The back and shoulders to be rubbed with eau de-Cologne and boric powder. Mouth to be cleansed. Draw-sheet and top sheet to be changed. The amount of nourishment taken, sleep obtained, and urine passed, to be entered in report book. SECOND NIGHT.	
10 p.m.	Pulse, respiration, temperature. Mouth to be cleansed.	
11 p.m.		Drinks of milk and soda or milk and barley water during the night if wished for.
2 a.m.	Pulse, respiration, temperature, if patient is awake.	
	THIRD DAY.	
6 a.m.	Pulse, respiration, temperature.	

Hour.	DIRECTIONS.	NOURISHMENT.
7 a.m. to 9 a.m.	The patient's hair to be brushed and plaited. Her hands, face, shoulders, and lower part of her back to be washed. The back and shoulders to be rubbed with eau-de-Cologne and boric powder. Mouth to be cleansed. Draw-sheet and top-sheet to be changed. The amount of nourishment taken, sleep obtained, and urine passed to be entered in report book.	Cup of tea and milk. Bread and butter. Boiled egg, if patient would like it.
10 a.m.	Pulse, respiration, temperature.	Milk, beef-tea, or chicken broth.
1 p.m.		Fish, calf's foot jelly or custard.
2 p.m.	Pulse, respiration, temperature. Mouth to be cleansed, wash hands and face.	
4 p.m.		Cup of tea and milk, bread and butter, jam or cake.
6 p.m.	Pulse, respiration, temperature.	
7 p.m.	The patient's hair to be brushed and plaited. Her hands, face, shoulders and lower part of her back to be washed. The back and shoulders to be rubbed with eau-de-Cologne and boric powder. Mouth to be cleansed. Change draw-sheet and top-sheet. The amount of nourishment taken, sleep obtained, and urine passed to be entered in the report book.	Milk or soup.
THIRD NIGHT.		
10 p.m.	If the patient is progressing normally omit four-hourly temperature, respiration, and pulse, and take these only twice daily, morning and evening.	

Hour.	Directions.	Nourishment.
4 a.m.	Castor oil.	Drinks of milk, water or barley water during the night if wished for.
FOURTH DAY.		
6 a.m.	Simple enema Oj to be given.	
7 a.m. to 9 a.m.	The patient's hair to be brushed and plaited. Her face, hands, shoulders, and lower part of back to be washed. The back and shoulders to be rubbed with eau-de-Cologne and boric powder. Draw-sheet and top-sheet to be changed. The amount of nourishment taken, sleep obtained, and urine passed to be entered in report book.	Cup of tea and milk. Bread and butter. Boiled egg.
10 a.m.	Pulse, respiration, temperature.	Milk, beef-tea, or chicken broth.
1 p.m.		Fish, custard pudding, piece of bread.
4 p.m.		Cup of tea and milk, bread and butter, jam, cake.
6 p.m.	Pulse, respiration, temperature.	
7 p.m.	The patient's hair to be brushed and plaited. Her face, hands, shoulders and lower part of back to be washed. Her back and shoulders to be rubbed with eau-de-Cologne and boric powder. Draw-sheet, top-sheet, and bottom-sheet to be changed. The amount of nourishment taken, sleep obtained, and urine passed, and the number of times the bowels have acted to be entered in report book.	Rabbit, chicken or mince, custard pudding, bread or biscuit.

Hour.	Directions.	Nourishment.
	FOURTH NIGHT.	
		Drinks of milk, water, or barley water during night if necessary.
	FIFTH DAY.	
7 a.m. to 9 a.m.	The patient's hair to be brushed and plaited. Her face, hands, shoulders, and lower part of her back to be washed. Her back and shoulders to be rubbed with eau-de-Cologne and boric powder. Mouth to be cleansed. Draw-sheet, top-sheet, and bottom-sheet to be changed. The amount of nourishment taken, sleep obtained, and urine passed, and the number of times the bowels have acted to be entered in report book.	
8 a.m.		Cup of tea and milk, bread and butter, boiled egg.
10 a.m.	"Michels" clips to be removed and the abdominal wound to be then painted with the iodine solution, if this was used in the first instance. If dressings have been used, these to be renewed. Pulse, respiration, temperature.	
1 p.m.		Lunch.
2 p.m.	Mouth to be cleansed. Wash hands and face.	
4 p.m.		Tea.
6 p.m.	Pulse, respiration, temperature.	
7 p.m.	The patient's hair to be brushed and plaited. Her face, hands, shoulders, and lower part of her	Dinner.

Hour.	Directions.	Nourishment.
	body to be washed. Her back and shoulders to be rubbed with eau-de-Cologne and boric powder. The patient may be lifted into another bed or sofa whilst her mattress is being turned. Draw-sheet and top-sheet to be changed. Mouth to be cleansed. The amount of nourishment taken, sleep obtained, and urine passed, and the number of times the bowels have acted to be entered in the report book. FIFTH NIGHT.	
7 a.m. to 9 a.m.	The patient's hair to be brushed and plaited. Her face, hands, shoulders, and lower part of her body to be washed. Her back and shoulders to be rubbed with eau-de Cologne and boric powder. Draw-sheet and top-sheet to be changed. Knee pillow to be removed. The amount of nourishment taken, sleep obtained, and urine passed, and the number of times the bowels have acted to be entered in report book. SIXTH DAY. The pulse, respiration, and temperature are to be taken twice daily, and the patient is attended to as before. SEVENTH DAY.	Diet as before, and mutton may be substituted for chicken.
		For this and the following days the ordinary diet may be renewed.

Hour.	Directions.	Nourishment.
	TENTH DAY. If silk-worm gut retaining through and through sutures have been used, they should be removed on this day. FIFTEENTH DAY. Patient is lifted on to a couch. SEVENTEENTH DAY. Patient may walk about. TWENTY-FIRST DAY. Patient goes home.	

This table is meant to serve as a guide only in normal cases, and the nurse should always ascertain from the surgeon how he wishes his patients to be treated after the operation.

If sickness is troublesome, nourishment will have to be given more cautiously or even withheld for a time.

Belts.—Some surgeons prefer their patients to wear belts when they get up, for some time after abdominal operations. Other surgeons never advise their use. It is doubtful whether their use lessens the chance of a ventral hernia supervening. As many ventral hernia occur in patients who wear belts as in those who do not. Certain patients, however, appear to find the want of some support and feel more comfortable with it. In such cases a properly fitting pair of corsets is probably better than a belt.

Getting Up.—After abdominal operations or vaginal hysterectomy, free of complications, the patient may get up on the seventeenth day and leave on the twenty-first. Some

surgeons allow their patients to get up earlier than this. If the patient has been ill before the operation and has suffered from much loss of blood, it may be wiser to keep her in bed a month.

After colpo-perineorrhaphy the patient may get up on the eighteenth day.

After other minor operations the patient may get up on the tenth day and leave on the fourteenth. Here again some surgeons allow their patients up much earlier.

CHAPTER XXVIII.

NURSING OF COMPLICATIONS.

THE nurse will have to be on the look-out for any complication occurring after an operation, so that she may report it to the doctor as soon as possible.

The most common complications met with after an abdominal section are : thirst, pain, sleeplessness, vomiting, and distension. Among the rarer complications are shock, hæmorrhage, peritonitis, intestinal obstruction, cystitis, venous thrombosis, pulmonary embolism, and those relating to the abdominal wound.

Thirst.—This is a very distressing symptom, and the following methods may be tried to relieve it. The mouth may be swabbed out with hot water or glycerine and borax. The patient may be allowed to wash her mouth out with hot water or a weak solution of Condyl's fluid ; saline injections into the rectum, 6 ounces every four hours, will relieve the thirst to a great degree. Hot or cold tea, with or without milk, will often relieve thirst, as also will vinegar and water, $\mathfrak{z}$ i to $\mathfrak{z}$ vi, which encourages the flow of saliva.

Sucking ice is not a very good remedy ; in most cases the relief is only momentary ; it generally increases the thirst, and predisposes to flatulence.

Pain.—Patients complain of pain in their back and abdomen on the night of the operation. This is due principally to the arching of the back resulting from the Trendelenburg position, and can be to some extent obviated by placing a pillow under the small of the back when the patient is in position. The pain can also be greatly relieved

by putting a pillow under the legs, which allows the back to lie flat on the bed, and not arched, as is otherwise the case; much relief is also generally afforded to pain in the back by placing a small air-cushion or pad under it. The patient should be encouraged to put up with the pain as long as possible. The surgeon will probably leave directions that if the pain becomes unbearable in the early hours after the operation, 20 grains of aspirin in 6 ounces of saline are to be given per rectum. Later, and during the night, an injection of morphia may be necessary. It is a better plan to give two small doses, say $\frac{1}{6}$ grain at intervals, than one larger one, as the second dose may not be required. If morphia is known to disagree, an injection of heroin, $\frac{1}{2}$ grain, can be given in its stead. After the first night morphia is contra-indicated, since it favours distension, and masks peritonitis and obstruction.

In some cases when the patient is very neurotic, throwing herself about and complaining of the greatest agony, although an examination shows the temperature and pulse to be normal, sickness absent, and no distension, an injection of $\frac{1}{3}$ to $\frac{1}{2}$ grain of morphia is of the greatest value, and will quiet her at once.

Sleeplessness.—It will depend upon the effect of the morphia injection what amount of sleep the patient gets the first night. Some patients sleep several hours at a stretch, others for short periods at a time only, although they may not be in much pain. After the scopolamine, atropine, and heroin injection, patients will often sleep well on into the afternoon following their operation. For sleeplessness after the first night, trional or aspirin is often a satisfactory remedy. The following mixture, given per rectum, is in most cases very efficacious and may be repeated in four hours if necessary :—

Potassium bromide grains 30 ; aspirin, grains 20 ; brandy $\frac{3}{5}$ ss., saline solution, $\frac{3}{5}$ vi.

Vomiting.—This may be due to the anæsthetic, to gastritis, to neurosis, to peritonitis, or to obstruction of the bowels.

Anæsthetic Vomiting.—This comes on early, and lasts, as a rule, about twenty-four hours. It is very often more of a trying to be sick than actual vomiting, and in many cases appears to be made worse by the smell and taste of the anæsthetic. The patient retches a good deal, and when she does bring up anything it is only a small quantity, a drachm or so at a time, and light green in colour. There is no tenderness of the abdomen, no fever, or increase in the pulse-rate. It is often associated with flatulent distension. It may be treated by making the drinks colder or hotter, by peptonizing the milk, or by giving a draught containing—

R ^y	Bicarbonate of soda	.	.	.	.	1 drachm
	Essence of peppermint	.	.	.	.	5 minims
	Warm water	.	.	.	.	10 ounces

which generally makes the patient very sick, and so really washes the stomach out. Other good remedies are a minim of tincture of iodine in a drachm of water every half hour or so, pine-apple juice, very strong coffee, or an ice bag to the epigastrium. Inhalation from a handkerchief wrung out of pure vinegar is, in many cases, very comforting.

If these remedies fail the condition can always be cured by putting the patient on rectal feeding for a few hours.

A good method of treatment is to wash the stomach out. If the surgeon elects to do this the nurse must prepare 2 or 3 quarts of boric or saline solution at a temperature of 105° F., as the solution will be used until it returns quite clean.

Irritative Vomiting.—This is due to gastritis set up by the anæsthetic. Although the stomach rejects anything that is put into it, if it is left alone vomiting is not so likely to occur. Irritative vomiting is often associated with gastric flatulence. It is best treated by withholding all food by the mouth for some hours and giving saline injections in its stead. A soap and water enema will at times stop this variety of vomiting at once. As a rule irritative vomiting does not last more than twenty-four hours. The

pulse and temperature are normal and there is no abdominal tenderness.

Neurotic Vomiting.—The patient is continually retching, whether there is anything in her stomach or no; she appears to be trying to be sick. An examination of the pulse, temperature, and abdomen fails to disclose any abnormal condition. Neurotic vomiting, which may last for some days, is often accompanied by complaints of great agony and by excitement and lack of sleep. The various remedies already mentioned may be tried and in very excitable patients an injection of $\frac{1}{2}$ grain of morphia will often prove to be the most successful remedy.

Peritonitic Vomiting.—This comes on during the second or third day, the ejected fluid is dark green or brown in colour, and sometimes offensive, while the amount may be very considerable, the patient vomiting as much as half a pint at a time. With it there is no feeling of sickness or effort to eject the vomited fluid as in the irritative vomiting; the fluid simply wells up and runs out of the mouth. The other signs and symptoms which accompany peritonitis are also, as a rule, so evident that no mistake can be made of the significance of this variety of vomiting.

Obstructive Vomiting.—This is due to some portion of the gut having become accidentally included in a ligature during the operation or to adhesions forming after the operation, or to the gut becoming adherent to the stump in a hysterectomy.

This variety of vomiting, which comes on gradually at first and only at intervals, continues to increase in frequency, till at last it is practically continuous. Although fæcal vomiting is said to be diagnostic of it, it often does not become fæcal in character till the end is at hand, and on many occasions it does not become fæcal at all.

It is always accompanied by distension, which gradually becomes more and more marked, commencing, as a rule, over the left abdomen, as it is here, in the region of the sigmoid flexure, that the obstruction generally takes place.

The treatment of these last two varieties of vomiting will be that of the cause.

Abdominal Distension.—Propping the patient in Fowler's position often relieves distension.

Gastric Distension.—This is due to the irritation of the anæsthetic, and may be treated by the administration of essence of peppermint $\mathfrak{m}$ 5, in water $\mathfrak{z}$ ii; ol. cajuput $\mathfrak{m}$ iii on a lump of sugar, or by adjusting a hot-water bottle to the epigastrium.

Intestinal Distension.—This is not an uncommon condition, especially when the operation has been at all prolonged and there has been much handling of the intestines. The distension, which is due to loss of tone in the bowel walls, is uniform and soft; there is no tenderness or rigidity of the abdominal walls, and unless it becomes very marked there is no alteration in the pulse or temperature. If this variety of distension gets very bad and is not relieved the patient may die. It may be treated by frequent application of the rectal tube, by a turpentine, ox gall, or rue enema, by a rectal wash-out, or by a rectal injection of an ounce of essence of peppermint in a pint of water.

Paretic intestinal distension is also, in many cases, very successfully treated by injections of pituitrin 1 c.c. or by eserine grain $\frac{1}{100}$ with strychnine grain $\frac{1}{60}$, every four hours.

Turpentine enema :—

A good receipt for a turpentine enema is that used at the Middlesex Hospital.

Turpentine	$\frac{1}{2}$ ounce
Castor oil	1 ounce
Soap and water	$\frac{1}{2}$ pint.
Water and gruel	$\frac{1}{2}$ pint

It is made as follows, the enema being injected as warm as possible: Either by mixing the turpentine in a porringer with a piece of soft soap as large as a hen's egg, then stirring in the oil, and adding the remaining ingredients last, or by beating up the turpentine with the white of an egg, and then stirring in the ingredients.

Rue enema :—

Oil of rue	20 minims
Mucilage of acacia	2 drachms
Soap and water to	6 ounces

In either case if the enema is not returned the rectal tube is passed to draw it off.

Ox gall solution enema :—

Six ounces of ox gall solution heated by placing the bottle containing it in hot water, and then injecting the ox gall into the rectum, often affords great relief.

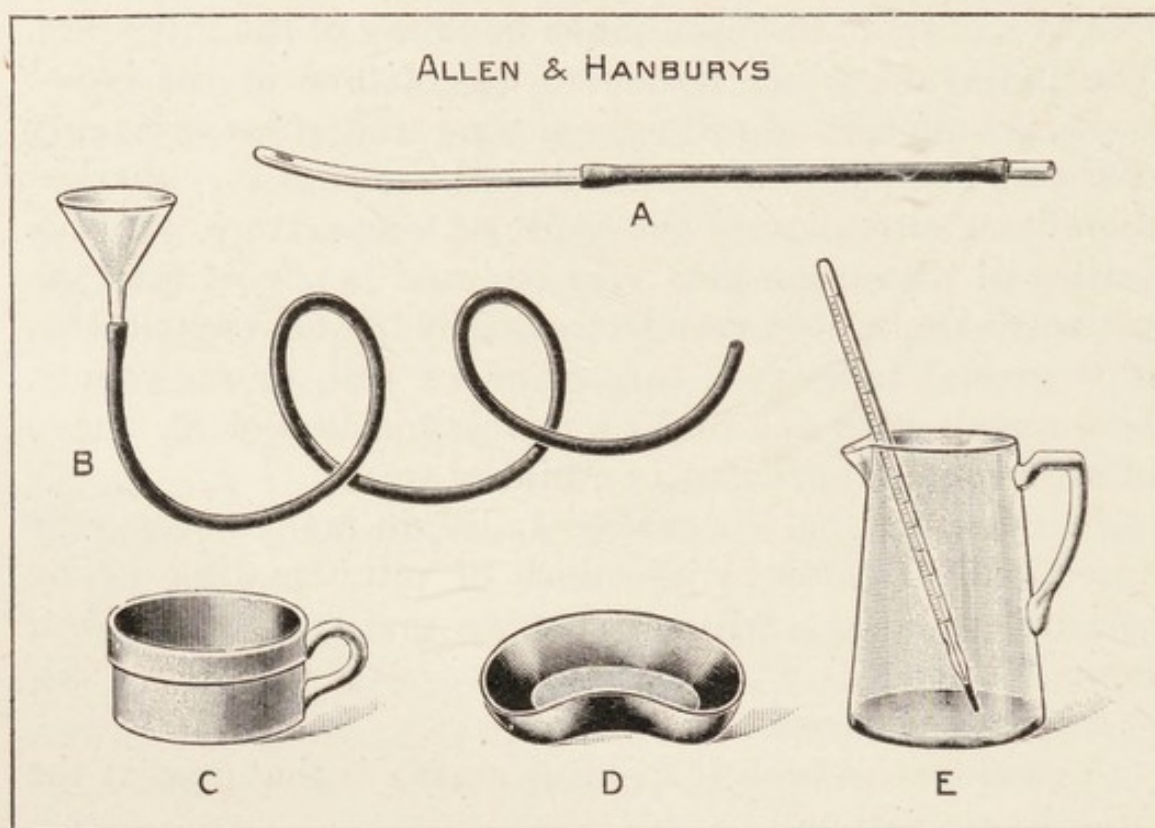


FIG. 37.

Rectal Wash-out.—To give this a catheter with a glass funnel and tubing fitted to its end by a glass joint are required. It is important before inserting the tube to drive the air out of it. Some of the fluid therefore should be run through the tube which should then be pinched just below the glass funnel, before the latter is quite empty. Two pints of soap and hot water containing 1 ounce of turpentine are then made up, and 6 ounces of this solution are poured into the funnel, which is held as high as

possible. The fluid is then allowed to remain in the rectum for a few minutes, after which the funnel is lowered into a basin of water, and the solution allowed to run out with a consequent aspiration of flatus from the intestine. It is important that a siphonage action should be established, by not emptying the funnel before it is lowered to withdraw the bowel contents. This is repeated till the two pints are used up. As a rule, this method of treating the distension is very successful (Fig. 37).

Peritonitic Distension.—There is great abdominal pain, the walls are very rigid, and the patient soon becomes collapsed. As a rule treatment is of no avail, but rectal “wash-outs” and enemas afford the best means of relief. Patients suffering from this form of distension will often pass flatus with the tube, but not naturally, till the end.

Obstructive Distension.—This distension cannot be relieved until the obstruction is relieved.

Shock—Hæmorrhage.—These two complications will be dealt with together because to the untrained eye there is a certain resemblance between them, and even the trained observer may occasionally be in great doubt as to which of the two the patient is really suffering from. A great responsibility devolves upon the nurse, however, with respect to these two conditions, since she will have the first opportunity of diagnosing them, and her failure to send for the surgeon when the patient is bleeding may result in the patient's death, whereas by an early intimation many a life has been saved.

It will be better to take the signs separately and compare them.

Shock.

Signs date from the operation.
Signs tend to get better.
Face may be blanched.

Pulse fast, 140, may at times be slow.
Patient is quiet.
Respirations are quick and shallow.

Hæmorrhage.

Signs develop after the operation.
Signs tend to get worse.
Face and lips are markedly blanched.
Pulse fast, 140 and feeble.
Fast pulse nearly always.
Patient is very restless.
Respirations are sighing and gasping.

Shock (cont.).

Does not as a rule feel faint.
 Brandy enemata improve shock.

Abdominal pain absent.
 Temperature may be subnormal.

Duration and severity of the operation of special significance.

Hæmorrhage (cont.).

Always feels faint.
 Brandy enemata increase hæmorrhage.

Severe abdominal pain.
 Temperature as a rule subnormal.

Duration and severity of the operation of no special significance.

TREATMENT.—In cases of shock, hot-water bottles, an enema containing 1 ounce of brandy and 10 ounces of hot saline, and a hypodermic injection of strychnine 5 minims, will be of great service, and may be repeated if necessary. If the patient does not improve with these measures a saline infusion of two or three pints should be at once administered. In cases of hæmorrhage the only treatment which is of any avail is for the bleeding point to be exposed and tied.

Whilst the surgeon is doing this, the nurse, if she has not done so before, will have to get ready the saline solution for infusion or injection. *If the nurse suspects hæmorrhage she should never stimulate the patient.*

The shock may be due to irritation of the sympathetic nerves during the operation or to loss of blood, and it is more especially in these latter cases that the difficulty of deciding between shock and hæmorrhage is so great.

General Peritonitis.—This, the most frequent cause of death after abdominal section or vaginal hysterectomy is due to septic infection of the peritoneum. It may be due to some flaw in the aseptic technique, and on its occurrence the strictest inquiry must be made into the various details connected with the operation in order that the source of the infection may, if possible, be discovered, and so danger, in this respect, to other patients undergoing operation prevented.

Every case of peritonitis, however, is not due to faulty technique. It may be that the abdominal tumour is already infected before an operation for its removal takes place, or during the operation some pus, which has been

locked up in an abscess, may be disturbed and soil the peritoneum.

The appearance of general peritonitis is gradual, and as a rule the symptoms and signs do not become marked until the third day. It will be noticed that the pulse-rate does not fall in the usual way but continues to rise so that it reaches 120 or over. The temperature in most cases rises rapidly. The respirations increase and the tongue becomes dry. Vomiting now supervenes, the vomited matter, which is green or dark brown in colour, being ejected without any effort or feeling of nausea. The amount vomited at a time may be considerable and the stomach cannot tolerate any solid or liquid. With the vomiting there is associated marked abdominal distension, the walls of the abdomen are extremely rigid and there is great tenderness all over it. The patient complains of agonizing pain, and lies with her legs flexed to relieve the tension of the abdominal muscles. There is, as a rule, constipation, the breathing is thoracic, and hiccough is often troublesome all through. In very rapid and fatal cases the temperature may fall to below normal, and there is no pain or tenderness to speak of.

There are many channels by which sepsis infects a patient, but it has been proved over and over again that the greater care that is taken in making everything aseptic, so much the less chance will there be of peritonitis supervening; in fact, peritonitis, from being one of the commonest complications seen after abdominal section, has nowadays become one of the rarest.

Intestinal Obstruction.—Intestinal obstruction after an abdominal section may be due to adhesion of the intestine to the pedicle remaining after the removal of a diseased ovary or tube, or to the stump of a hysterectomy. A piece of intestine may be included in a ligature. These are some of the causes.

With intestinal obstruction there is colic and intermittent pain of great severity, more particularly aroused by abdominal palpation, or eating and drinking. The

pain most often starts in the left iliac region, as this is the commonest site of the obstruction. The abdomen is rigid, there is marked distension, and palpation often excites intestinal movements. Although in the early stages flatus may be passed by the rectal tube, this soon ceases. The patient will vomit quite apart from the fact whether she is taking anything into her stomach or not, and she may retain food for several hours before returning it. Towards the end the vomiting is continuous. The vomit becomes brown and in some cases is fæcal. The pulse-rate is markedly quickened, as a rule there is no fever and the temperature may even be subnormal.

Cystitis.—About the end of the second week after vaginal hysterectomy or abdominal section the patient may complain of pain on micturition. The urine in such cases may be found to be acid and to contain a little pus. Salol, or urotropin in doses of 10 grains, with acid sodium phosphate 30 grains and water to an ounce three times a day, will, as a rule, soon cure this form of cystitis. The urine may, however, be alkaline and ammoniacal, in which case the cystitis will have to be treated by washing out the bladder (see page 143).

Femoral Thrombosis.—About the thirteenth day the leg becomes swollen and very painful. The swelling may be limited to the lower part of the leg or the whole leg may be swollen. This swelling pits on pressure, and a hard, tender lump can be felt in the vein.

There is, as a rule, tenderness over the femoral vein, and because of the pain the patient is unable to move the leg. The temperature will be somewhat raised. The leg remains in this condition as a rule for a few days, and then gradually gets better, although in some cases the leg remains permanently swollen.

The condition may occur after any operation, and, as a rule, the left leg is affected.

The surgeon will direct that the leg be painted with warmed glycerine and belladonna, over which a warm fomentation will be placed, and a bandage loosely applied.

The leg should be rested on a pillow, a cradle put over it, sand-bags should be placed each side, while the nurse will be directed to see that the patient does not move her leg, and that it be kept perfectly quiet. The great danger of femoral thrombosis is that the clot in the vein, on account of some movement, may get loose and escape into the circulation, causing pulmonary embolism.

Pulmonary Embolism.—This condition is due to the detachment of a clot of blood (thrombus) from some vein into the circulation, when it is called an embolus. The embolus is then carried to the heart and may block the blood-vessel through which the blood is sent to the lungs to be aerated. This complication is known as a pulmonary embolism. If the pulmonary artery is entirely blocked the patient dies practically suddenly. If partially blocked, death may be slower, or rarely the patient may recover. If death is not sudden the patient experiences the greatest difficulty in breathing. She will sit up in bed, gasp, struggle to get her breath, throw her arms about, and the colour of her face, at first blue, gradually becomes grey. The nurse should administer brandy and oxygen, if any is available, and a hypodermic injection of morphia to relieve the distress. If the patient stops breathing, artificial respiration should be performed.

Complications of Abdominal Wound.—The abdominal wound may be the seat of a hæmatoma or of an abscess. It may slough, it may be the seat of a sinus, and rarely it may burst.

Hæmatoma.—A hæmatoma will lead to a certain amount of tenderness, and the temperature will be irregular, without the patient being otherwise apparently upset. This condition is generally discovered when the bandage is removed at the end of the week.

Depending upon the size of the hæmatoma the surgeon may decide to leave it alone or may open the wound, scrape the blood-clot out, and apply an antiseptic dressing or re-suture it.

Abscess.—An abscess of the abdominal wound is generally due to an infected suture or ligature, or to infection

of a hæmatoma. It may declare itself in a few days, or not perhaps for months later. Pain and tenderness, a rise of temperature, redness and swelling at some spot along the site of the wound are its leading symptoms.

Sloughing.—Occasionally, especially if the operation has been a long one and the retraction of the abdominal wall has been prolonged, and virulent bacteria are present in the tissues removed, such as occurs in cancer of the uterus, the whole of the abdominal incision will slough. Such a complication is more likely if the resisting power of the

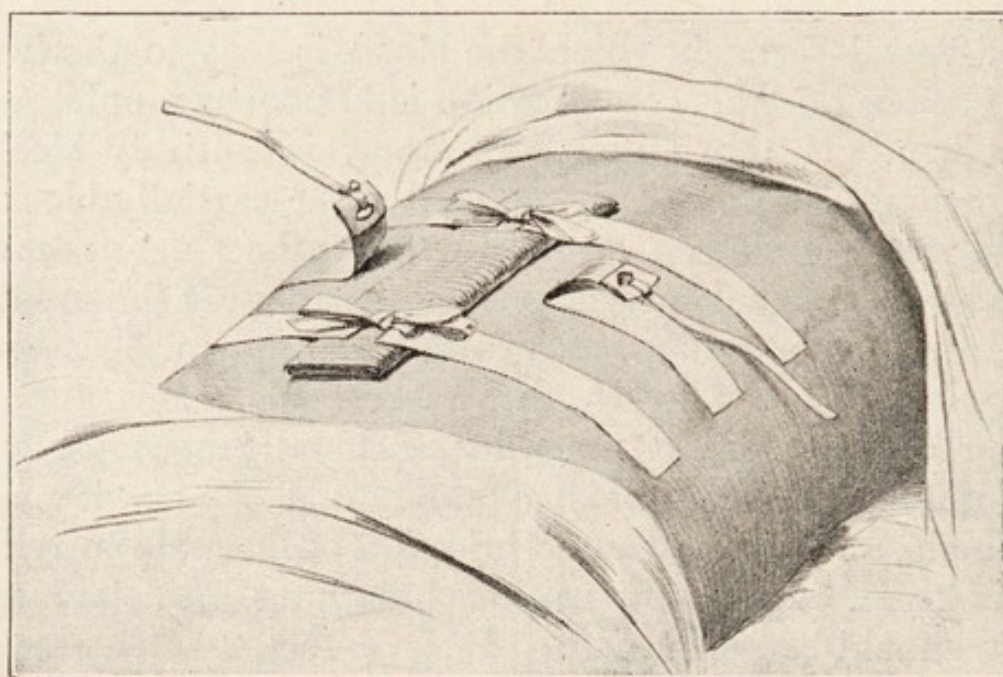


FIG. 38 —ARRANGEMENT OF PLASTER AND TAPES.

Note the free end of the tape turned inwards to prevent it sticking to the dressing and also to form a firmer attachment for the tape.

patient has been lowered by a severe illness. A high temperature and pain in the region of the wound will lead to its examination. Part of the muscle layer often sloughs and the discharge is extremely offensive. Such a condition will require hot fomentations, together with frequent irrigation with a disinfectant (of which peroxide of hydrogen, 10 volumes, will do very well), till the wound is clean, after which it must be dressed as the surgeon directs.

The dressing is best kept in place and the facility with which the wound can be dressed is greatly increased by

the use of tape and plaster. Pieces of strapping 5 inches long by 1 inch broad should be cut and a tape $\frac{1}{4}$ inch broad should be sewn to one end of each. The strapping is then applied to the abdominal wall so that the end the tape is attached to reaches not nearer than 2 inches from the edge of the wound. About six pieces of strapping thus prepared will be required, three on each side. After the wound has been dressed, its edges can be approximated and the dressing kept in place by tying each piece of tape to the corresponding piece on the opposite side.

Sinus.—A sinus of the abdominal wound may be due to an infected suture or ligature, to the track made by a drainage tube, or to the result of a fæcal fistula. The latter complication occurs towards the end of the second week, and is preceded, as a rule, by a marked rise of temperature. In most cases the fæcal fistula closes in a short time or the sinus may remain for months and rarely, without further treatment, it remains permanent.

Bursting.—This is an alarming complication and is generally due to violent fits of retching, vomiting, or coughing. Occasionally the only cause that can be detected is that of a too rapid absorption of the parietal sutures when catgut has been used.

Either part of the wound or the whole wound may burst. Partial bursting may occasion no symptoms at first, and it is not until the pulse-rate rises and abdominal pain is complained of, that the abdominal bandage is removed and a coil of intestine, perhaps partly strangulated, is detected. When the whole wound bursts the patient has a sudden and severe pain and is collapsed. It is peculiar how often bursting of the wound is overlooked in the first instance.

The surgeon will have to clean the intestine, replace it, and re-suture the wound. Fortunately the patients nearly always do well, the fatalities being due to the intestine escaping through the fascial edges of the wound only and then becoming strangulated before the accident is recognized.

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