

CHAPTER XV

Disturbances of Function

STERILITY AND SEXUAL DISTURBANCES

The disturbances belonging in this chapter will be taken up in the following order:

Sterility.
Contraception.
Sterilization.
Dyspareunia.
Sexual Frigidity.
Sexual Hyperesthesia.

STERILITY

The question of sterility is one of increasing importance, socially as well as medically. The estimates by different authorities of involuntary sterile marriages vary from one in ten to one in six. In recent years the heretofore underestimated male responsibility has been emphasized. This percentage ranges from 30 per cent in some series to 48 per cent in others. Only a small number of cases show a single lesion which can be held entirely responsible for the sterility. Usually there is a combination of lesions in the wife or husband or both, any one of which would probably not render the couple sterile; but their combined influence is enough to bring about that result. However, an occasional case presents two or more lesions, any one of which could cause sterility. The problem of therapy in such a case hinges on the question as to which lesion carries the chief responsibility for the sterile union. Endocrine disturbance and deficiencies in diet have been shown to be definite factors in certain cases. Absence of lytic power in the semen and abnormalities of the sperm have been found to be more important than heretofore realized.

It is the purpose here to give a comprehensive and systematic method of investigating and treating the sterile couple. On account of limited space only essential items can be considered, and the statements concerning these must be concise and limited to points of diagnostic or therapeutic importance.

Causes

In order to assist in determining the exact cause of the sterility in the various cases, it is well to consider what is necessary that a normal pregnancy may take place. It is necessary ordinarily (a) that healthy spermatozoa be deposited in the vagina, (b) that the spermatozoa remain healthy and pene-

trate into the uterine cavity and into the fallopian tubes, (c) that a healthy ovum be formed in the ovary, (d) that it find its way into the fallopian tube, where it can be fertilized by a spermatozoon, (e) that the fertilized ovum pass into the uterus, and (f) that it find there an endometrium suitable for its implantation and development.

Some of these conditions are not always absolutely necessary. At least five cases of conception, with labor at term, have taken place in patients where both fallopian tubes and presumably both the ovaries were removed. Of course, some ovarian tissue was left. When a tube is removed by the ordinary technique, the tube end at the uterus may reopen and permit the ovum to pass. Fritsch ligated both fallopian tubes in the middle with silk and still pregnancy followed three years later. Ashton reported the occurrence of pregnancy in the cervix following the removal of the body of the uterus for fibromyomata, showing that even the body of the uterus was not absolutely essential to pregnancy. Again, pregnancy has occurred in cases where penetration of the male organ into the vagina was impossible, showing that the spermatozoa may pass from the external genitals up to the uterus. But these are all very exceptional cases. Ordinarily each of the conditions mentioned is a bar to pregnancy.

Assuming that the husband furnishes healthy spermatozoa, the sterility may be due to the following causes:

1. *Some Conditions Interfering With Coitus.*—These conditions are considered under “dyspareunia.”

2. *Laceration of Pelvic Floor.*—When there has been a marked laceration, the vagina may be so relaxed and patulous that the semen is not retained in contact with the cervix long enough for the spermatozoa to pass up into the uterine cavity.

3. *Vaginitis or Profuse Discharge in the Vagina* may interfere chemically with the vitality of the spermatozoa or mechanically with their progress to, or entrance into, the cervix uteri. In either case the chance of pregnancy is diminished.

4. *Some Obstruction in the Cervical Canal.*—a. Stenosis of the external os may be found in the form of the congenital “pinhole” os, or it may be due to scar tissue resulting from former injuries.

b. Stenosis at the internal os may be due to scar tissue, but it is more frequently due to a sharp anteflexion of the cervix. It is often combined with a long pointed cervix and the “pinhole” os already mentioned. This combination is a frequent cause of sterility in women who have never been pregnant, and it is usually accompanied with dysmenorrhea.

It is a question, however, how much of the benefit from dilatation is due to overcoming the stenosis and how much to the reflex stimulation of the pituitary, as mentioned under Treatment.

c. Discharge. There may be in the cervical canal an excessive secretion which interferes with the upward journey of the spermatozoa. It has also been shown lately that acidity of the normally alkaline uterine mucus quickly destroys the spermatozoa and thus may be the cause of sterility.

5. *Some Displacement of the Uterus.*—a. Retrodisplacement. Retrodisplacement of the uterus may throw the cervix so far forward that the spermatozoa do not readily enter it.

b. Anteflexion. Sharp anteflexion of the cervix may also throw the cervical opening too far forward.

c. Decided Prolapse. Prolapse of the uterus may interfere mechanically with coitus or with the passage of the spermatozoa to the interior of the uterus.

6. *Some Abnormal Condition Within the Uterine Cavity* which interferes with the passage of the spermatozoa to the tubes or with the endometrium as a place for the implantation and nourishment of the fertilized ovum.

- a. Hyperplasia of Endometrium.
- b. Infected Endometritis.
- c. Tuberculosis of the Endometrium.
- d. Malignant disease (Carcinoma or Sarcoma).
- e. Fibromyoma.

7. *Some Affection of the Fallopian Tubes* which interferes with the entrance of the spermatozoa into the tube or with the entrance of the ovum into the tube or with the passage of the fertilized ovum from the tube into the uterus.

a. *Inflammation.* Inflammation of the tube is the most frequent cause of sterility from tubal disturbance. This may be very slight—not enough to produce symptoms or physical signs, but just enough to cause occlusion of one or both ends of the tube. It may vary all the way from this mild form to severe inflammation and disorganization of the tube, with extensive exudate and adhesions and abscess formation. Salpingitis, coming on after the first childbirth or miscarriage, because of inflammation during the puerperium or because of gonorrhoeal infection brought by the husband who was untrue to his wife during her confinement, is a prolific source of the so-called “one child sterility.”

Von Mikulicz-Radecki found that appendicitis with involvement of the tube and ovary was responsible in 14 per cent of the sterility cases in his care, and he ranks this factor third among the causes of sterility.

b. *Tuberculosis of tubes and adjacent structures.*

c. *Tumor.* A tumor of the tube or in the vicinity may interfere seriously with the lumen and function of the tube.

d. *Malformation of the tubes.* This may consist in atresia of one or both ends of the tubes, or in blind passages and diverticula into which the ovum may wander and lodge. Or there may be abnormal openings in the wall of the tube through which the ovum may pass out into the peritoneal cavity and be lost.

8. *Some Affection of the Ovaries* that interferes with their function to such an extent that healthy ova are not formed or are not discharged in such a way that they pass into the fallopian tubes.

a. *Inflammation.*—Inflammation of the ovary may be present in some of its various forms—infected oophoritis, simple oophoritis, cystic ovary, cirrhotic ovary, or an ovary with exudate and adhesions.

b. *Tuberculosis of ovaries and vicinity.*

c. *Tumors of the ovary.*

d. *Displacement of the ovary* may be so marked that the ova, instead of passing into a fallopian tube, where they would be fertilized, pass into the peritoneal cavity and perish.

9. *Certain Operations*—for example, removal of the uterus or of the fallopian tubes or of both ovaries, or radiation treatment sufficient to stop menstruation.

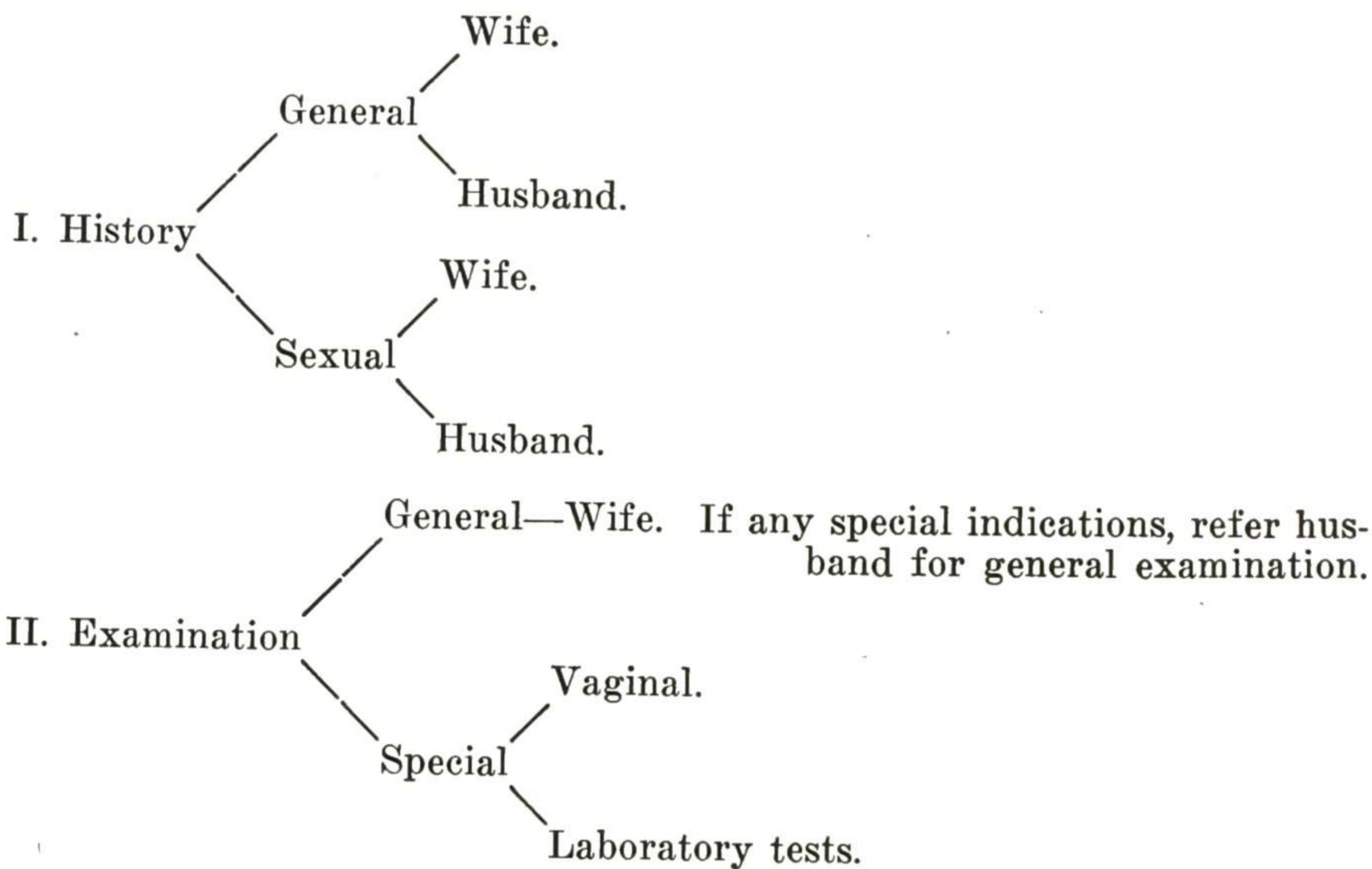
10. *Douches*, which may interfere chemically or mechanically with the process of impregnation.

11. *General Conditions.*—The general health may be so poor that all the organs of the body are in too poor a condition to functionate properly, the genital organs among them. This is seen in some cases of marked anemia and emaciation and general depression. On the other hand, it is present at times in patients who are inclined to stoutness. The effect of obesity in diminishing menstruation has been mentioned, and it sometimes has much the same effect on the capacity for impregnation. It has happened that sterility came on when a patient accumulated fat and disappeared promptly on reduction to her usual weight. That an insufficient diet may have an influence toward sterility has been shown experimentally by Reynolds and Macomber.

12. *Endocrine Disturbances* have a marked influence on the function of the ovaries and the uterus, and hence must be considered in all cases of persistent sterility.

Plan of Investigation

Outline of steps to be followed in the investigation of a sterile couple:



III. Huehner or postcoital test, with examination of sperm.

IV. Examination of condom specimen, with complete examination of sperm.

V. Gas test for tubal patency.

VI. Lipiodol test.

VII. Complete endocrinologic examination of husband and wife, with any special tests that are needed.

VIII. Test of treatment.

The steps of this plan are followed ordinarily in the order given. After Steps I and II, if no causative lesion is found, the patient is usually started on a course of treatment to increase ovarian activity and to overcome any minor local disturbance present, such as discharge or overacidity. The additional examination methods are employed subsequently, step by step, if and when the necessity for each appears.

HISTORY.—The general history should follow the form outlined in Chapter II and should include the following points of special interest:

FAMILY HISTORY.—History of fertility, age at onset of menses and of climacteric in the grandmother, mother, and sisters. Definite endocrine disturbances in the family, familial diseases.

PAST HISTORY.—Childhood diseases, especially mumps with any subsequent complications; tuberculosis; venereal diseases. Severe infections or illnesses; heart, kidney, lung, or gastrointestinal trouble. Operations, with a statement as to what was done and whether or not x-ray or radium was used. Occupation, including hours of work and type of work. Habits, especially use of alcohol, tobacco, and drugs. Social activities, including recreation, exercise, hours of sleep. Any gain or loss of weight should be noted.

MENSTRUAL HISTORY.—Age at onset, skipped periods, delayed periods, scant or profuse periods, date and character of last two periods, vaginal discharge, mental reaction with menses.

MARITAL HISTORY.—Age at marriage and ages at which children were born. Complications with pregnancy or delivery and postpartum course. Miscarriages or abortions with sequelae. Were the children breast fed and, if so, how long? When did the menses return? General health of husband, including height and weight; occupation, with hours of work, exercise, habits.

PRESENT ILLNESS.—How long has involuntary sterility existed, and is it primary or secondary? Is contraception practiced? Why? What form? How long has it been used? Has the patient any idea as to the cause of sterility?

The sexual history is seldom mentioned by the patient; but, by tactful questioning, she usually welcomes the opportunity of discussing the subject concerning which she had heretofore been reticent.

COITUS.—Method, frequency, pain, vaginismus; does penetration occur? Reaction: satisfaction, disgust, submission. Does semen remain in vagina or is it lost? Masturbation or other habits? Is a douche taken before or after coitus?

ENDOCRINE DISTURBANCES.—Many disturbances in the sexual life of a patient have an endocrine basis. There is much overlapping of symptoms due to the close relationship of all the endocrine glands, and it is not always possible to classify all the symptoms under one organ. A general outline of symptoms, classified under the various incretory glands, is here given.

Ovarian: Regularity of menses, amenorrhea, dysmenorrhea, metrorrhagia, scant or excessive flow, response to coitus, mental outlook, periods of wellbeing or sex desire, no desire, excessive desire or nymphomania, climacteric symptoms.

Thyroid: Exophthalmos, tremor, tumor of neck, palpitation, loss of weight, excitability, slightly elevated or depressed temperature, myxedema, periods of depression, obstipation, sleepiness, gain in weight, lassitude, lack of perspiration, scalp dry, prematurely gray, thinning of outer end of eyebrows, brittle hair which falls out easily, nails brittle and striated, loss of sex desire, cold hands and feet. As the function of the thyroid affects the ovarian function, symptoms listed under ovary are usually present.

Pituitary Gland: Gain of weight, increase or decrease of sexual desire, change in menses, bitemporal headache, sleepiness, hypertrichosis, polyuria, visual disturbances.

Adrenal Gland: Asthenia, loss of weight, diarrhea, pigmentation of skin, hypertrichosis, virilism, precocity.

General Examination.—In the general examination give special attention to the following points:

GENERAL.—Habitus or type—masculine, feminine, neuter, infantile. Distribution of hair and fat. Development of secondary sex characteristics, bony skeleton, voice, and gait.

ENDOCRINE.—Points to be noted are classified under the different glands.

Ovary: Development of sex characteristics, size of uterus, size of clitoris.

Thyroid: Size and shape of gland, consistency of gland, blood pressure, pulse, lid lag, palpebral fissure, bruit over gland, size and condition of heart, tremor of fingers, condition of skin, edema of myxedema, mental alertness, general muscle tone.

Pituitary: Fat distribution and weight; distribution of hair; size of jaw, hands, feet, and long bones; spacing of teeth; x-ray of sella turcica; carbohydrate test; Fröhlich's syndrome; amount of urine, glycosuria.

Adrenal: Virilism, hair distribution, pigmentation, blood pressure, blood sugar, sugar in urine.

Pelvic Examination.—The special points to be noted in the vaginal examination are: size of opening, size of clitoris, adhesions about clitoris, pain on examination. Distribution of hair (escutcheon), reaction of vaginal and cervical secretion, discharge (type). Position, size, and condition of cervix; size of os. Notice whether the cervical plug is present. Note the usual seven points about the uterus, especially position and size. Usual examination of adnexal areas.

Laboratory Tests.—There may be certain disturbances requiring one or more of the following laboratory procedures:

Complete Blood Test: R.B.C., W.B.C., differential count, Wassermann test.

Hormone Tests (urine and blood).

Basal Metabolism: If thyroid disturbance is suspected.

X-Ray: Long bones, jaw, and sella turcica where pituitary disturbance is suspected. Gastrointestinal x-ray, gallbladder function test, or x-ray of teeth when focal infection is suspected.

Sugar Tolerance Test: In pituitary cases.

Huehner or Postcoital Test.—Direct patient to lie on her back for one-half hour after coitus; then come to office immediately. Semen is then collected with a dry pipette from the following three areas for examination: posterior fornix, around cervical plug, and with the plug removed some of the fluid in the cervical canal is aspirated. The fresh specimens are then examined microscopically. If there are numerous very active sperms from all three locations which maintain their motility for two or three hours and show no morphologic abnormalities in the stained specimen, the husband may be considered fertile. If normal sperms are found only in the specimen from the posterior fornix, the action of the sperm on the cervical plug must be tested (see below). If the sperms are dead in the posterior fornix specimen, the reaction of the vaginal secretion must be determined and the viability of the sperm tested. If the sperms are few in number, slow moving, or show some morphologic abnormality (Fig. 1080), then the condom test should be employed.

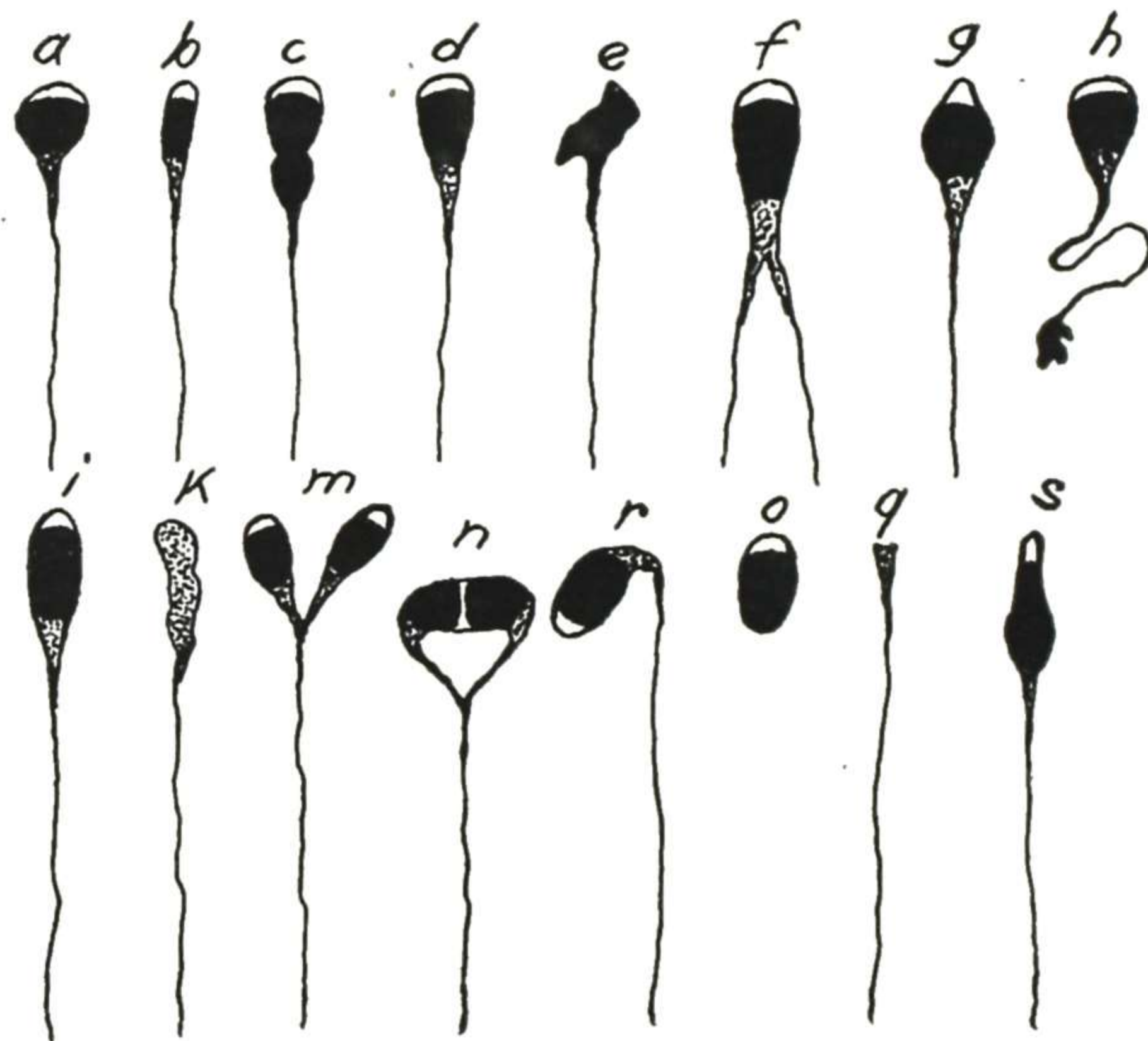


Fig. 1080.—Forms of spermatozoa. Tails shown relatively shortened. *i*, represents an average normal sperm, the head measuring 3 by 5 microns and the tail measuring 55 microns in length; *s*, shows a side view; *a*, *b*, *c*, *d*, *g*, variations in size of the sperm; *e* and *k*, degenerated forms; *f*, double tail; *m* and *n*, double head; *h*, a shortened tail; *o* and *q*, head broken from the tail. (Mason—*Am. J. Obst. and Gynec.*)

Examination of Condom Specimen.—To secure material for this examination have the husband wear a condom during intercourse; or, if he refuses to do this, have the wife aspirate the semen immediately after it is deposited. A bulb syringe with a piece of rubber tubing about four inches long attached to its end is handy for this purpose. The specimen is collected and the tubing is then folded back along the barrel of the syringe and held there by a rubber band. No special precautions are necessary to keep the specimen warm unless the weather is exceptionally cold, in which case it can be carried under the dress next to the body. Sperms live from twenty-four to sixty hours at ordinary temperatures; and, if dead on arrival, the trouble is probably the sperm.

Points to be noted are as follows:

1. *Gross.*—Amount usually 4-6 c.c.; consistency is that of thin starch.
2. *Microscopic.*—The fresh specimen is examined first. The motility of the sperm should be active and “purposeful.” With 450 magnification sperm should travel about one-half the diameter of the field in four minutes. A rough idea of the normal number per

field can be obtained only by observing numerous normal specimens. Any marked abnormalities are noted. Longevity of the sperm varies a good deal. Mason found that abnormal forms live longer than normal ones. These abnormal forms were present in couples where there were frequent abortions.

If the sperms are sluggish, change direction frequently, swim in wide arcs or live less than three hours in a hanging drop, they are probably deficient and a stained preparation should be made.

For the stained smear Moench's technique is very satisfactory. A mixture of $\frac{2}{3}$ Ziehl-Neelsen's carbolfuchsin and $\frac{1}{3}$ concentrated alcoholic eosin (bluish) solution is filtered, and to the finished mixture is added $\frac{1}{3}$ of 95 per cent alcohol. For the counterstain add 2 parts of distilled water to Loeffler's methylene blue. This stains the head of the sperm blue and the tail pink. An even smear is made on a clean slide, dried in the air, and fixed by heat. This is then treated with 1 per cent chlorazene to remove the mucus. The slide is then washed with water and 95 per cent alcohol. It is then stained for four and a half minutes, washed with water, and counterstained for four or five seconds.

3. *Lytic Power of Semen.*—If the motility and morphology of the sperm are normal, but few or none are found in the specimen removed from the cervical canal above the mucous plug, or if the mucous plug seems to be unusually large or tenacious, the lytic power of the semen on the mucous plug should be tested. The following method advocated by Kurzok and Miller is simple and accurate. Instruct the patient to take no douche for two days prior to her visit to the office. Have her bring a condom specimen which is not older than six hours. After cleansing the vagina and cervix around the external os, the cervical plug is removed with a sterile uterine dressing forceps and dropped into a test tube containing 2 c.c. of distilled water plus 0.5 c.c. of semen. This is incubated for twenty-four hours at 37.5° C. If the semen has normal lytic power, within half an hour the mucus loses its glossy, gelatinous appearance and becomes dull, hazy, and frayed; and in from twelve to twenty-four hours it should be entirely gone. Sometimes a slight film remains, but this disappears on shaking the tube.

Gas Test for Tubal Patency.—This test is completely discussed in Chapter II, including indications, contraindications, and technique.

Lipiodol or Neo-iopax Test.—When the gas test shows the tubes blocked, the exact location of the block can be determined by the neo-iopax test. This test is fully discussed in Chapter II.

Endocrinologic Investigation.—In obscure cases in which no definite trouble can be found and also in patients showing evident endocrine disturbance, special tests, such as basal metabolism and others mentioned under Endocrine Examination, should be carried out.

In this connection, the examination of vaginal smears will show whether the vaginal contents are normal or of the hormone-deficiency type. Also, such examination is helpful in determining whether the endocrine treatment being given is really effective. Vaginal smears plus rectal temperatures, as suggested by Rubenstein, assist in determining the time of ovulation.

Endometrial biopsy in the proper time-relation will show whether or not the patient is ovulating.

Test of Treatment.—In certain cases it is impossible to discover the exact etiology of the sterility. In these cases conservative treatment as outlined below should be tried.

Treatment

The treatment may be divided into the general treatment, which all sterility patients are to be given, and the special treatment for special indications.

General Treatment.—The diet given should be balanced and contain a high content of *vitamin E*, which aids fertility. Vitamin E is found in butter, wheat germ oil, meat, whole wheat, rolled oats, milk, spinach, and lettuce. Foods cooked in lard should not be used as the lard tends to oxidize the vitamin E, nullifying its effect. Cod liver oil has the same effect, consequently should not

be used during treatment. Concentrated vitamin E can be given in one of the forms prepared by the reliable drug firms. If the patient is overweight, a reducing diet should be given; and if underweight, a building-up diet is prescribed.

Endocrine Treatment.—The vitamin and nutritional requirements having been taken care of and there being no obvious local lesion, endocrine treatment is to be considered.

Hypothyroidism ranks high as a cause of sterility, particularly in private practice. Winkelstein in a study of a group of normal and hypothyroid sterility cases, concluded that thyroid is of great value in sterility if the patient is a definite hypothyroid but that in sterility cases with normal thyroid function thyroid medication is of no value. However, it is sometimes difficult to be certain whether or not a patient has mild hypothyroidism, and it is a good plan to give all sterility patients a test of thyroid therapy unless the basal metabolism is definitely elevated.

Disturbances in the pituitary-ovarian endocrine cycle may lead to cessation of ovulation, intermittently or over a long period. The incidence of **anovulatory sterility** varies in different reported series. Rock and his co-workers report 9 per cent in an unselected group of sterility cases, while Mazer and associates report 30 per cent in a group of sterility cases selected because there was no accountable cause for the sterility.

In the treatment of anovulatory sterility, indicated when the endometrial biopsy shows no evidence of corpus luteum formation, an attempt is made to imitate the normal menstrual cycle by giving ovarian and pituitary hormones in the following time-relation.

An *estrogenic hormone* is given by mouth throughout the first twenty-six days and then it is stopped. *Pituitary preparations* or *pregnant mare's serum* are given from the fifth to the fourteenth day. The new combination of the pituitary synergist and the urinary hormone, if used, should be given during this same time in the cycle. During the last twelve to fourteen days of the cycle five milligrams of progesterone are given daily as intramuscular injections. It is well to supplement this program with *thyroid medication*, as previously mentioned. If the basal metabolic rate is a little low, or even within normal limits, small doses of thyroid, $\frac{1}{4}$ to 1 gr. daily, should be tried.

When the endometrium shows that ovulation has occurred but that the progestational changes are not complete, the pituitary hormones need not be given but the ovarian hormones are given in the same sequence as outlined above.

Though the question as to whether pregnant mare's serum causes ovulation in non-ovulatory sterility is still unsettled; the fact that many patients, who have had a sterility resistant to other forms of therapy including endocrine therapy, become pregnant cannot be denied. We have had to date four very obstinate cases of long-standing sterility in our own practice. After other sterility factors had been ruled out and the usual endocrine therapy had been tried without result, they conceived after several series of gonadogen injections. Hall reported that 55.8 per cent of 43 sterility cases, in whom other causes had been ruled out, became pregnant after the use of pregnant mare's serum.

Recently a combination of pituitary hormone and the urinary gonadotropic hormone, called synapoidin (Parke, Davis and Company), has been used to promote ovulation. It is still too early to judge its effectiveness.

Other Measures.—If the patient is fat or sedentary, exercise each day is prescribed. If the patient is using up most of her energy working, a rest of an hour each day is advised, with a vacation if possible. A vacation is of decided benefit in cases where social responsibilities, with late hours, etc., are undermining the patient's general health. Sunlight and ultraviolet light help to improve the general health.

Alcohol and tobacco should be limited or prohibited, as experimental work has shown them to be definitely detrimental to fertility. This limitation ap-

plies to the husband as well as to the wife. Dr. Lyle Phillip of Honolulu, in a personal communication, reports an interesting case of sterility due to excessive cigarette smoking by the husband. The Huehner test showed normal-appearing spermatozoa and in normal number, but there was no motility. The test tube specimen gave similar findings. On discontinuing smoking, the spermatozoa became normal and the wife conceived. The test was carried out several times, and each time that the husband smoked heavily the spermatozoa became immotile, and after a few weeks of abstinence they would regain normal motility.

In obstinate cases of sterility patients may be advised to occupy separate beds, with periods of coitus only every two to four weeks. The period of rest increases the chance of conception. Edgar Allen and associates have removed the ovum from the tube on the twelfth day after menstruation, which means that from the twelfth to the fourteenth day is probably when ovulation takes place. The most likely time for conception is from about the tenth to the eighteenth day after the period.

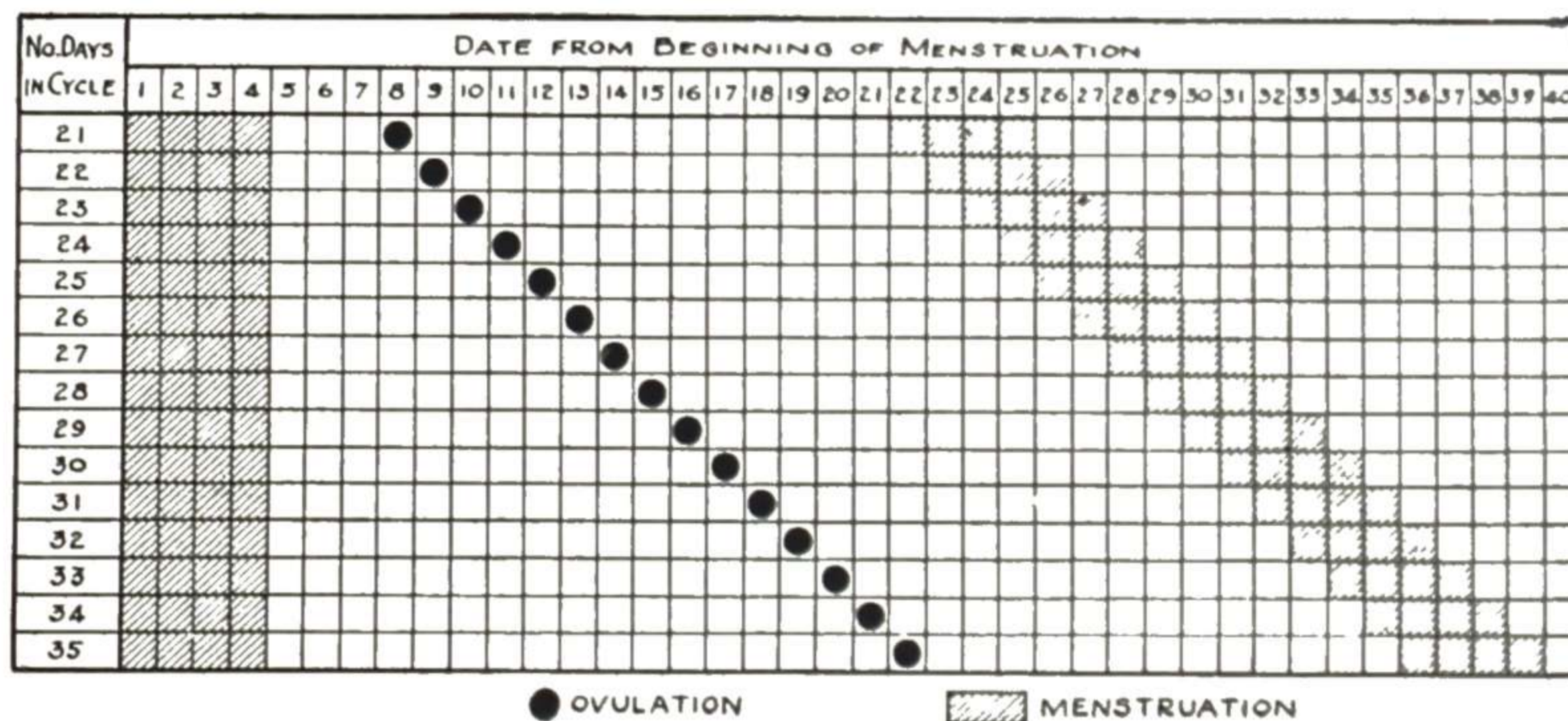


Fig. 1081.—Ovulation date for various cycles. (Miller—Surg., Gynec. & Obst.)

A. G. Miller made a five-year study of the fertile period in practice, and worked out that period for menstrual cycles of different lengths. Figs. 1081, 1082, and 1083 are from his article. The first shows how the day of ovulation varies with the different cycles, the second indicates the fertile period for each cycle, and the third demonstrates how attention to this item overcame sterility in a patient married eight years without a pregnancy. These tables are useful also in determining the period of least fertility in the different cycles—the so-called “safe periods,” mentioned later. Intercourse should not be limited to the fertile periods, however, as records show that pregnancy may result from isolated coitus at any time.

The knee-chest position after coitus may be tried. This throws the mouth of the uterus into the seminal pool.

The effect of an alkaline douche on the Huehner test and sterility was shown to be very beneficial by Singleton and Hunter. An alkaline douche before retiring is especially helpful where the vaginal reaction is strongly acid or where the sperm cannot resist even weak acid secretion. If the reaction is strongly alkaline, a 0.5 per cent lactic acid douche helps to establish the normal reaction of the vagina.

In cases in which the husband has active sperms but none are found in the cervical canal—that is, something about the cervical secretion renders the spermatozoa inactive—coitus during menstruation may be tried. The menstrual blood, according to Hoehne, is an especially favorable medium for persistence of the activity of spermatozoa; and Dickinson found that of recorded pregnancies from isolated coitus a considerable proportion resulted from coitus during menstruation. Rubenstein reported six cases of pregnancy following isolated coitus during menstruation.

Diathermy, by improving pelvic circulation, tends to improve ovarian function and thereby increases the chance for conception.

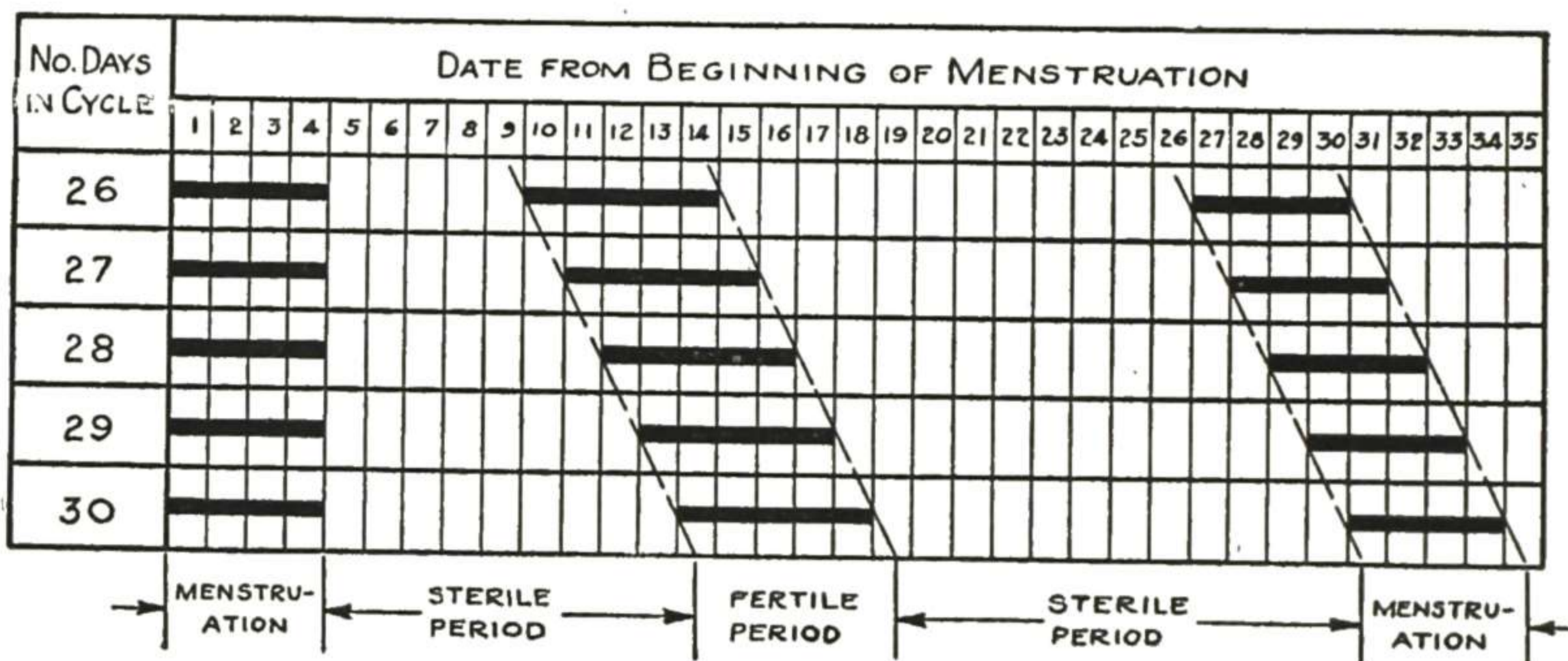


Fig. 1082.—Fertile period for various cycles. (Miller—Surg., Gynec. & Obst.)

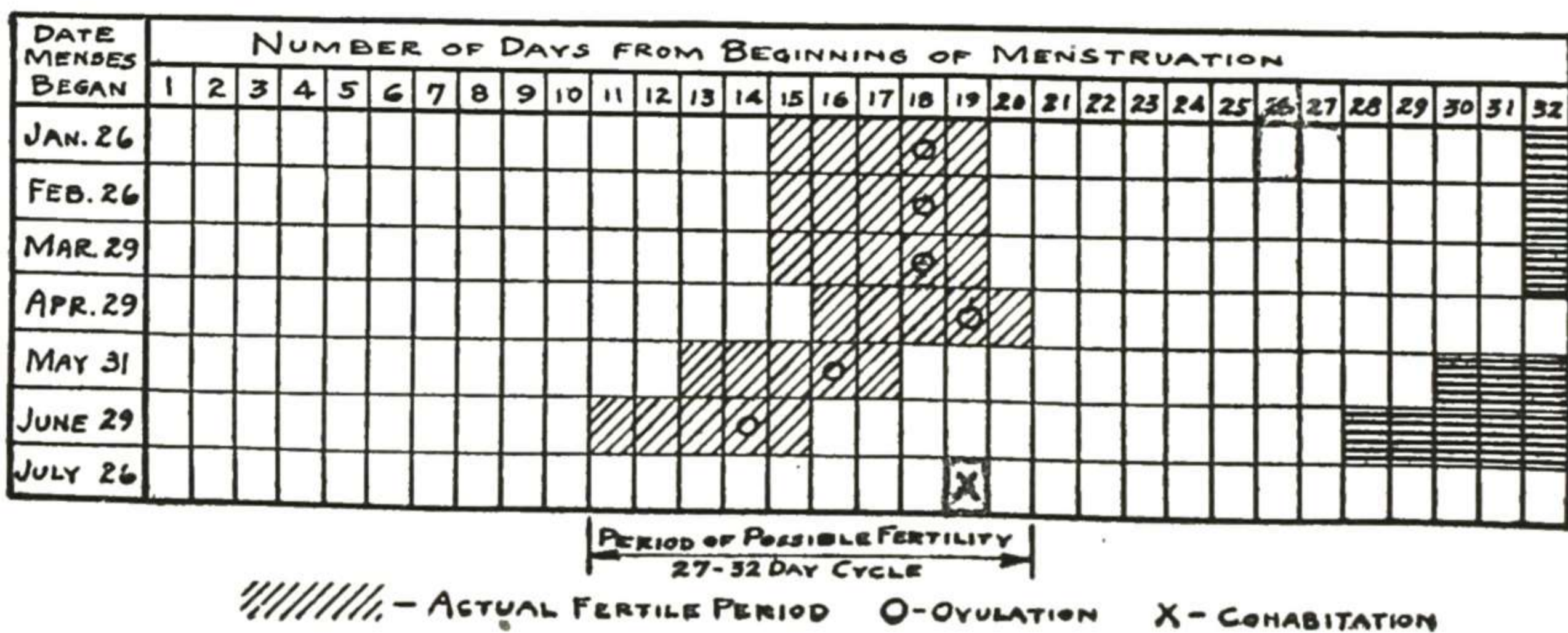


Fig. 1083.—Data in the case of a patient who came for sterility treatment, having been married eight years and no pregnancy. Pregnancy was secured promptly by strict attention to her fertile period. (Miller—Surg., Gynec. & Obst.)

X-ray and radium are indicated in selected cases where the periods are irregular. Kaplan in a series of 128 patients with amenorrhea and sterility treated by x-ray radiation of the ovary and in some cases to the pituitary area also, had 44 patients become pregnant. Thirty-six of these patients went to term, giving birth to 47 living children, one stillbirth and one abnormal fetus. Nine of these women had more than one child and there was one set of twins. Of the 44 pregnant patients amenorrhea had existed one month to fourteen years and sterility from one to eighteen years. The oldest child at the time of the report was 10½ years and there were no reports of any harmful effects on any of the surviving children.

Special Treatment of Lesions.—The special treatment required depends on the particular lesions found.

VAGINISMUS.—In some cases this is due to fear or to some inhibition carried over from childhood experience or teachings. In these cases a frank explanation of the natural instinct for coitus will do much to remove mental obstacles. Any stenosis or other congenital abnormality, such as double vagina or septate vagina, should be corrected. If intercourse is painful with a good-sized opening, free use of a lubricating jelly should be advised; and, if still painful, the cause of the pain must be determined and corrected. If the condition is due to a small opening or a rigid hymen, this should be stretched gradually; and, if this is unsuccessful, a plastic operation may be done to enlarge the opening.

VAGINITIS.—The treatment of this condition consists of a course of antiseptic and soothing applications and regular douches, such, for example, as a 5 per cent mercurochrome application once a week in conjunction with daily douches of 0.5 per cent lactic acid. This plan of treatment usually clears up the discharge and establishes the normal vaginal flora.

CERVICITIS.—Linear cautery treatment combined with the dry treatment will usually clear up the cervicitis. Diathermy is helpful in obstinate cases. If after a trial of conservative treatment the condition persists, conization of the cervix is advisable.

STENOSIS OF THE INTERNAL OS.—If this condition is mild, office dilatations usually suffice. If, however, the condition persists in spite of these treatments, thorough dilatation and insertion of a stem pessary are indicated. If the trouble returns in a short time, the Dudley operation will usually give permanent relief from the obstructive feature.

The beneficial effect of cervix dilatation in sterility cases may be due as much to reflex stimulation of pituitary function as to overcoming stenosis. Birnberg found a positive prolan response in the urine in 23 out of 30 sterile women in thirty hours following gradual dilatation of the cervix. All had had negative response before the dilatation. Those showing prolan response, later conceived. Birnberg feels that the beneficial action of the dilatation is due to stimulation of the pituitary gland by way of the sympathetic nerve pathway.

ENDOMETRIAL CONDITIONS.—Hyperplasia of the endometrium with excess menstrual flow may be present. Occasionally, chronic cervicitis is accompanied with a chronic metritis. In either case, curettage is beneficial in that it removes the diseased endometrium, giving a chance for a better one to develop under bettered conditions. Curettage is a stimulant to the uterine circulation and nutrition, and for that reason is indicated in sterility cases which resist other measures. Also, if simple dilatation of the cervix causes reflex stimulation of the pituitary function, curettage would probably have a more pronounced effect in that direction.

DISPLACEMENTS OF THE UTERUS.—Anteflexion of the uterus requires the treatment outlined under Stenosis of the Internal Os. Retrodisplacement, though not as important as formerly supposed, if marked, may cause sterility. Pessary treatment should be tried, combined with the knee-chest posture. If this proves unsuccessful and a study of conditions shows operation necessary, care should be taken to select the type of operation best suited to the individual case.

Prolapse during the childbearing period can be effectively corrected either by vaginal or by abdominal operation in such a way that it does not interfere seriously with delivery. Any anomaly of the uterus should be corrected.

CLOSED TUBES.—If the gas test shows the tubes closed, the sites of closure should be determined by lipiodol visualization and the conditions carefully studied before resorting to any operative procedure. In the best hands salpingostomy is successful in only 10 per cent of the cases, and in the successful cases there is a high percentage of abortions and ectopic pregnancies.

OVARIAN LESIONS.—Large cysts should be removed. When the outer portion of the ovary is thickened by an old inflammatory process which prevents ovulation, peeling off of the superficial layer so that the follicles can rupture may render the patient fertile. The authors had a striking case of this kind.

In some cases of long-standing endocrine disorder, the resulting cystic condition of the ovaries becomes so marked that operative treatment is required to overcome the structural interference with ovulation. Leventhal reported the details of such a case, and gave instructive illustrations concerning the diagnosis.

Artificial Insemination

In a case where the healthy spermatozoa fail to reach the uterine cavity in spite of the various treatment measures, artificial insemination may be employed. Careful precautions must be taken to avoid contamination of the semen that might lead to infection inside the uterus. Also, care must be exercised to avoid interfering with the vitality of the implanted spermatozoa.

In cases where the husband has no sperm and treatment is of no avail, the question of artificial insemination with selected semen arises. In some cases the partners of the sterile union are anxious to have the child at least partly theirs rather than adopting one of doubtful parentage. The donor is selected by the physician after a most careful history and physical tests, including of course blood tests. It is well to use two donors, so that no one can possibly know who is the father of the child. The actual procedure must be done at the supposed time of ovulation and under rigid aseptic technique.

Seymour has an interesting article on the use of this method, and in the same journal there is an excellent editorial on the legal aspects of the procedure and the legal status of the child (J. A. M. A. 112: 1832, 1939). Seymour and Koerner in 1936 discussed the medicolegal features and presented a legal form which they have signed by husband and wife, after which the finger-prints of each are affixed to the document. In 1941 the same authors presented the results of a questionnaire to 30,000 physicians in the United States. There were 10,604 reported cases of sterility treated by artificial insemination, with more than 9,000 women attaining motherhood through the method. After special consideration of various items, they give a summary about as follows:

Of nearly ten thousand pregnancies that were obtained through artificial insemination, two-thirds were effected through utilization of the husband's semen alone.

The proportion of boys to girls resulting was roughly 8 to 5 when the husband's semen was used and 7 to 5 when a donor's was used.

Ninety-seven per cent of pregnancies initiated by artificial insemination resulted in live babies.

The incidence of miscarriages and abortions was only one-fifth that occurring normally in the population taken as a whole in areas where artificial insemination is not practiced.

The incidence of extrauterine pregnancies was only one-sixth that occurring normally.

The occurrence of stillbirths was practically negligible.

"Flare-ups" from uterosalpingography were few and were mostly of a transitory nature.

All living children were born normal in every respect.

Successful pregnancies were reported with inseminations varying in number from one to seventy-two. Forty-five per cent of all pregnancies occurred in cases in which twelve inseminations were employed. In three hundred and sixty-five cases more than twenty inseminations each were required to secure a pregnancy.

One thousand, three hundred and fifty-seven had repeated pregnancies by artificial insemination.

One thousand, one hundred and fifteen failures were reported in the survey. The principal causes of failure can be removed if inadequate preliminary study of the case, lack of cooperation of the patient, unreliable messengers, the use of imperfect seminal specimens and the lack of perseverance on the part of the physician in his attempts at insemination are eradicated.

CONTRACEPTION

In cases needing contraceptive advice, the question arises as to what method to advise. In the extensive experience of the large clinics of the country the contraceptive diaphragm and the contraceptive jelly have given the best results, from both the standpoint of safety and of satisfactory response.

The size of diaphragm to be used is determined by trying the various sizes of measuring rings. The largest one that fits snugly when the posterior rim is in the posterior fornix is the one to use. The patient should be instructed in the use of the diaphragm, and it is best to have her insert it and remove it, so that there is no doubt as to her knowledge of its use, because to be successful the method must be correctly used.

In cases of retrodisplacement, an inserter is sometimes needed to enable the patient to get the inner end of the diaphragm across and behind the cervix. In cases of cystocele, the matrisalus type of diaphragm must be used.

The patient is instructed to use the contraceptive jelly around the rim of the diaphragm, and also to place some on the cervical surface of the diaphragm.

A condom used by the husband in combination with a contraceptive jelly used by the wife is also very successful but not quite as convenient as the diaphragm method.

Catholic patients who do not wish the diaphragm or condom methods may be instructed in the use of the "safe period," but it should be explained that this method is only relatively safe. Ogino and Knaus have shown that eight days after the onset of the period and eight days before the onset of the next period are relatively safe in women with regular twenty-eight day cycles.

The "safe period" varies with the type of the menstrual cycle. The details of these variations in relation to sterility and contraception are helpfully discussed by A. G. Miller in the article previously referred to and from which Figs. 1081 to 1083 were taken.

STERILIZATION

In certain cases there are serious medical conditions contraindicating pregnancy. In these, sterilization may be indicated. The first question to be decided in these cases is which of the partners should be sterilized. The operation in the male (ligation of the vas deferens) can be done under local anesthesia with little risk to the patient. The effective methods in the woman require either an abdominal operation or extensive vaginal work with entrance to the abdominal cavity and either of these procedures carries considerable risk, to say nothing of the discomfort and disability they cause. These questions and the problems of future events should all be discussed with the patient and her husband and the method selected which applies best in the particular case.

The use of diathermy to cause stricture of the uterine end of the fallopian tubes is as yet too new to judge as to its reliability.

DYSPAREUNIA

The two principal disturbances of sexual intercourse are dyspareunia (difficulty in coitus) and sexual impotence (absence of sexual orgasm in coitus).

Difficulty in coitus (dyspareunia) varies from a slight discomfort, hardly noticeable, to pain so severe as to make coitus unbearable.

Causes

The more common causes of dyspareunia are as follows:

1. **Some Obstructions to Normal Coitus**—*A. Imperforate Hymen.*—In such a case there would be present the history of amenorrhea and also the disturbances that come from retained menstrual blood. You may think there would be a history of no coitus, and such is usually the case, but in some cases coitus has taken place through some adjacent opening—for example, through a dilated urethra.

B. Organic Stenosis of Vaginal Orifice.—The opening is large enough to permit the regular escape of menstrual blood, but it is not large enough to permit coitus. The obstructing tissue is so firm that it does not rupture as ordinarily on attempted coitus. This obstruction may be due to a very strong, firm hymen, or to some distinct malformation, such as a vaginal septum from double vagina. Usually with double vagina, each vagina is large enough for coitus or the septum is placed so far to one side that it does not interfere. But it may be so placed as to interfere decidedly with coitus and to require division. Again, an organic stenosis here may be due to scar tissue from severe burn or other injury, or from laceration in labor, with extensive scar tissue formation, or from vaginitis in childbirth.

C. Spasmodic Stenosis at Vaginal Orifice.—In some cases there is marked hyperesthesia about the vaginal orifice, and every attempt at coitus causes unbearable pain or causes spasmodic contraction of adjacent muscles to such an extent that coitus is impossible. This marked hyperesthesia may be due to inflammation, such as vulvitis or vaginitis, or it may be due to sensitive abrasions about the vaginal entrance. In other cases it is due to that peculiar condition known as "vaginismus," a reflex contraction of the levator ani and adjacent muscles without apparent cause. In exceptional cases this is so severe and persistent as to prevent coitus altogether.

D. Severe Pain on Attempted Intercourse.—There is no stenosis or spasm, but just pain, so severe that coitus is impossible. This may be due to inflammation about the external genitals or inflammation within the pelvis.

2. **Simple Inflamed Abrasions about the Vulva** are not an infrequent cause of much suffering immediately after marriage. The small abrasions that naturally accompany rupture of the hymen at the first intercourse may become inflamed after a day or two, making subsequent coitus painful. This sometimes causes much alarm to the patient and her husband, who fear some serious trouble. The treatment is abstinence from coitus for a few days, with the frequent use of some mild antiseptic wash, followed by drying with absorbent cotton and the use of a soothing ointment, such as white vaseline. It is well

to keep the parts covered with a pad of absorbent cotton, to keep the clothing from contact with the painful areas and also to protect the abrasions from infection.

3. **Venereal Sores** (chaneroid, syphilitic).—These ulcers also may be found soon after marriage or at any other time. Care should always be taken not to give a positive prognosis in a case of abrasion or sore which has not yet had time to develop its characteristics.

4. **Gonorrhoeal Inflammation** is an altogether too common cause of painful coitus in the first few weeks following marriage. The pain may be due to the vulvar inflammation, or to the urethritis or to the vaginitis, or to painful abrasions or to the inflammation of the vulvovaginal gland of one or both sides.

5. **Other Forms of Inflammation** of vulva or vagina, or vulvovaginal glands.

6. **Inflammation of Uterus** (acute or subacute).

7. **Inflammatory Lesions around the Uterus**, in which pain is caused by the impact of the male organ or by the sexual congestion. When the ovary is prolapsed into the cul-de-sac and bound there by adhesions, sexual intercourse may cause much pain. The senior author recalls one patient in whom it was finally necessary to open the abdomen, break up the adhesions, and fasten up the prolapsed ovary in order to relieve the suffering in coitus. In the more serious pelvic inflammatory conditions, dyspareunia is frequently a prominent symptom.

8. **Retrodisplacement of the Uterus**, with inflammation. It is surprising how much displacement of the uterus, with forward projection of the cervix and apparent blocking of the vagina, can take place without occasioning any particular disturbance in coitus. But if inflammation appears, then dyspareunia is often marked—much more so than from the same amount of inflammation without displacement.

9. **Bladder or Rectal Diseases** occasionally cause painful coitus, particularly inflammatory diseases.

Treatment

The treatment of dyspareunia is indicated by the **particular condition present**, as determined by a careful examination.

1. If there is some **malformation** about the vaginal orifice (imperforate hymen, thick hymen, septum in vagina, organic stenosis of vagina), the obstruction must be removed by the necessary operative measures.

2. If coitus is interfered with by **tender areas** about the vaginal entrance, or by ulcers or by hyperesthesia, the following measures may be employed:

- a. Abstinence from sexual intercourse for from one to three weeks.
- b. Hot vaginal douches once or twice daily—medicated or unmedicated, depending upon the presence of discharge.
- c. Laxatives as needed. Chronic constipation increases the congestion and irritability of the structures.
- d. Some sedative ointment—for example, chloretone ointment (10 per cent), applied two or three times daily.
- e. Bromides, if there is much nervous irritability or apparent hyperesthesia of reflex centers.

f. When intercourse is again attempted, the patient should coat all the sensitive surfaces with a sedative ointment. The chloretone ointment above mentioned may be used or simply plain vaseline.

3. If the vaginal opening is too small or there is the spasmodic condition known as **vaginismus**, stretching of the opening is to be employed in addition to the other measures just detailed. In some cases the tendency to spasm may be overcome by gradual stretching with a speculum every few days. Also have the patient continue the stretching at home with graduated rectal dilators.

In cases of organic narrowing or a serious grade of vaginismus that does not yield to minor measures, it is advisable to operate under anesthesia. The operation consists in incising the perineum and pelvic floor so as to enlarge the opening, and then undermining the flaps and suturing them over so as to cover the divided surfaces.

The treatment of the **other organic lesions** mentioned is taken up in detail in the appropriate chapters.

SEXUAL FRIGIDITY

The absence of strong sexual feeling in the woman during coitus does not assume the serious aspect it does in the man, with whom erection is necessary to insemination leading to pregnancy. The strong sexual feeling, with its consequent orgasm, in the woman is not at all necessary to impregnation, though it increases the probability of impregnation. From the history of cases of sexual disturbance it is evident that many otherwise normal women have little or no sexual feeling until some months or years after marriage—sometimes not until after one or more children are born. The response to sexual excitement apparently grows with the proper exercise of the sexual functions. This fact is important and may be used to prevent discord and disruption in families where either the husband or the wife is becoming dissatisfied and despondent because it is felt that there is not the proper sexual response.

Again, there are cases in which the wife is not in physical condition to respond. She has some chronic trouble which so saps her strength that she has not the vitality for this function. This loss of strength may be due either to some general condition or to some local condition, or to both. It is hardly necessary to name the various conditions. They comprise the whole list of debilitating conditions, both general and local.

Some patients, because of parental ignorance, have been given an erroneous conception of the part which sexual intercourse plays in married life. These patients need instructions in sexual matters and the physician's advice should be supplemented by a good book on the subject. There are many helpful books on this subject, one of the best being *Married Love* by Marie Stopes. This book deals with the mental and spiritual reactions of the union as well as the physical side and technique.

The **treatment** of sexual impotence is directed toward removing any local disease, and toward building up the general health to the highest point—by a long course of tonics (including iron, strychnia, etc.); by change of environment, and by rest from care and worry and overwork and too frequent sexual intercourse. The rest indicated is very important, for the things mentioned

tend to keep the patient dragged down below par and in no condition to respond buoyantly and vigorously to any of the mental or physical requirements of daily life.

Endocrine disturbances are frequently the cause of diminished sexual response. Hypothyroidism is probably the most common in these depressed patients. Hypopituitarism and hypoovarianism are also causal factors in some cases. Thyroid or pituitary or estrogenic hormone, alone or combined, should be given in adequate dosage according to the indications in the particular case. Androgen therapy also has been found decidedly helpful. Its libido-stimulating effects are emphasized in a 1943 article by Salmon and Geist, and a large series of patients so treated is reported by Greenblatt, Mortara and Torpin (*Am. J. Obst. & Gynec.* 44: 658, 1942).

SEXUAL HYPERESTHESIA

The increase of libido to a serious extent is rare, but occasionally there is a patient presenting this difficult problem. The first step in treatment is to remove causes of special congestion and irritation inside the pelvis (tumor, inflammation) or outside (vulvitis, pruritus, etc.). If that is not sufficient, then employ anti-estrogenic measures, along with ordinary sedatives as necessary. Greenblatt, et al., in the above reference, found that pure progesterone in large dosage tended to depress libido, and hence was useful in these cases.

PREMARITAL EXAMINATION

The premarital examinations required by law are primarily to exclude syphilis and gonorrhea. The exact requirements vary somewhat in different states. Detailed information and the forms to be filled out may be obtained from the state health departments.

In addition to the designated legal requirements, the patient wishes to know of course if there is anything that would interfere with marital life. In such conference, one practical point is to avoid disturbing the patient's happy mood by attaching undue importance to certain findings, such as uterine retrodisplacement without symptoms, small fibroid, cystic ovary or other local variation from the usual that may not cause trouble. "O K for marriage" is often sufficient to say to the patient on this point, though it is well to mention such special condition to the mother, along with the assurance that it is causing no trouble and probably best not to disturb the girl with the information unless trouble should develop. If the hymen opening is so small as likely to cause difficulty in coitus, it is advisable to enlarge the opening by stretching, with or without incision as necessary—local application of strong cocaine solution being used for stretching with graduated dilators, and novocaine injection for incisions.

The premarital conference is receiving much attention as a means of aiding the young couple toward a successful married life and toward the avoidance of those marital tragedies which often grow out of small misunderstandings and lack of knowledge. In addition to the helpful and reassuring information obtained at this conference, it encourages coming to the physician later for intelligent advice on minor disturbances (physical or relational) while they are still minor and before resentments grow and lead to permanent damage.

CHAPTER XVI

Disturbances of Function

MISCELLANEOUS DISTURBANCES

In this chapter we consider disturbance associated with the cessation of ovarian function (climacteric and menopause), allergic manifestations in the genital tract and breast disturbances closely connected with gynecologic work.

CLIMACTERIC DISTURBANCES

The term "climacteric" is used to designate the period of normal cessation of ovarian function, and "climacteric disturbances" are the general nervous and endocrine symptoms frequently occurring during that time. The term "menopause" is used to designate the definite cessation of menstruation which occurs normally at a certain stage of diminishing ovarian function.

There is increasing necessity for exactness in the terms employed in medical study and exposition. As our fund of knowledge increases and lines of investigation multiply, concepts grouped under one term require separation and clear definition one from the other. This is necessary in order to avoid ambiguity and confusion in the discussion of the separate parts of what was formerly referred to under one term or under various terms used synonymously. Many examples of this are found along the highway of medical advance, and this subject is one of them.

The age-period under discussion presents two phenomena, each important and each requiring study and decisions as to advice and treatment. One is cessation of the menstrual flow, a physical event easily identified. The other is more indefinite in time and content and runs through the long period of gradual cessation of ovarian endocrine influence, starting long before the menses cease and continuing long afterward. The terms "menopause," "climacteric," and "change of life" have been used interchangeably to refer to these two phenomena, meaning sometimes one and sometimes the other.

It has long been recognized by workers in this field that there should be a definite unambiguous term for each of these two concepts. Maranon, in his excellent work, states the problem clearly and furnishes a practical solution. He proposes that the long period of gradual cessation of ovarian function be designated as the "climacteric," and that the term "menopause" be used to designate the cessation of the menstrual flow. We agree thoroughly with this proposition. Intelligent technical discussion requires the adoption of exact terms, and the ones selected are practical and satisfactory. Hence they are adopted in this connection. If at times we drop into the old ambiguous use of the terms, it only demonstrates the force of habit.

It is interesting to note that developments in the cancer field bring additional necessity for exact limitation of the meaning of these terms. Investigations concerning cancer of the corpus uteri indicate that delayed menopause (late cessation of the flow) has a signification in regard to the development of endometrial carcinoma. The necessity in such investigations and discussions for a term to express exactly the cessation of the flow and nothing more, is apparent, and the term "menopause" is well suited for that purpose.

Before taking up the nervous and endocrine disturbances of the climacteric it is well to say a word concerning certain general aspects of this period

of natural ovarian involution or, more specifically, concerning the patient's general attitude toward it. This stage in the evolution of the individual is a step upward into new horizons. The duties of childbearing and the care of young children have been carried out, and the fruits of faithful work and developmental experiences are ready for utilization in further progress.

The gradual shift of emphasis is a natural and helpful one. The reproductive structures, having fulfilled their appointed special functions, are now yielding the stage to the factors operative in the next step in the evolution of the human spirit. Every important change requires adjustments to new experiences, and these may be somewhat troublesome for a time until the nervous system has completed its adjustment. Understanding the beneficial character of this natural process, and that therapeutic measures are available to care for any disturbances that may occur, it is apparent that the gloomy forebodings of many women constitute borrowed trouble and unnecessary worry.

Even the hot flushes of the adjustment period are not always of troublesome extent. In his helpful articles on the management of this period, Novak calls attention to the exaggerated idea as to the frequency of marked disturbances. Questioning 100 patients who had passed through this period and who represented such varied social types that they could be considered a fairly cross-sectional group, he found that in 72 of the 100 there were no symptoms sufficiently troublesome to require medical help, in 20 there had been treatment by oral administration and in 8 the patient had been given hypodermic treatment with ovarian hormones for varying periods.

In only a small minority of individuals are these symptoms troublesome enough to require medication, and for those cases satisfactory medication is available. As far as menace to health and happiness is concerned, the endocrine disturbances of the climacteric do not compare with those of puberty and early womanhood, as can be readily appreciated by recalling the serious amenorrheas and menorrhagias of that period and the difficulties of their effective treatment.

Another point is that many of the disturbances which patients attribute to the climacteric are not due to this natural change but to organic or functional disorders having no connection with it. The general health must be looked after then, as at other times, if comfort and efficiency are to be maintained. This applies to all the organs, including the nervous system, which must always bear a major share of adjustment to changed conditions.

Recognition of the progressive and beneficial character of this "change of scene" in the drama of life, with the resulting cordial cooperation and studious curiosity and happy anticipation in the great adventure, constitutes the mainspring of a happy and successful "growing old." A vision of this basic fact, so often obscured by exaggerating the importance of minor things, would go far toward relieving the restless anxiety which afflicts so many at this important turn in the road. They focus attention on the fading scene as though that were their last view of life, forgetting that our evolutionary road leads on to still greater things.

While endocrine and other forms of medication may relieve minor disturbances of the climacteric, the relief of the troublesome "anxiety neurosis," which so many women bring on themselves, requires personal orientation to the basic facts of our progressive life. Then our natural curiosity becomes operative and we seek to learn something of the next developmental period through the facts and implications of the present one. This leads one to the outposts of knowledge, to the work of the pioneers and advance guards in the worldwide attack on the unknown in earth and sky and in the realm of the spirit. The vision widens and our daily ups and downs assume their proper place as developmental exercises in the spirit's school of experience, and the disturbing anxieties "fold their tents like Arabs and as silently steal away."

Endocrine Changes

The chief characteristic of the climacteric is the gradual cessation of ovulation and ovarian function. The ovary as it reaches the end of its functioning period becomes refractory to the action of the pituitary secretion, even though the pituitary continues to furnish the gonadotropic hormone. The excess of this latter hormone, chiefly pituitary A, is excreted in the urine, causing an increase of the urinary pituitary-like hormones over the former output. On the other hand, estrogens usually disappear from the urine. In some women in whom the ovaries have been removed, estrogen has been found in the urine. The explanation for this is not clear, but it is believed that some other endocrine gland, probably the adrenal cortex, plays a part in the production of estrogen after the climacteric.

The change in this pituitary-ovarian relationship is responsible for the symptoms occurring with the climacteric. There is undoubtedly a connection between the endocrine system and the higher nerve centers in the region of the pituitary, though this relationship is not well understood. Because of the interdependence of the various endocrine glands upon the proper functioning of each, it is easy to see that readjustment is necessary all along the line. The thyroid is the one most frequently disturbed in the climacteric, and the change may cause hypo- or hyperthyroidism. Hence it is important to check the basal metabolism rate before starting ovarian therapy.

Vasomotor Disturbance

The most constant climacteric symptoms are those due to the disturbance of the vasomotor system, such as hot flushes (involving the head, neck and upper part of the body or the entire body) and the sweats which frequently follow the flushes. These can be appreciated and described by the patient, and their frequency and extent serve as an index to the need and the success of therapy. It is little wonder that a patient who has been kept awake a good part of a night by repeated flushes, should be irritable, have a headache and even be a little neurotic.

Treatment.—In the first place, before any hormonal treatment is started, the physician should take time to explain to the patient that her condition is a normal one and that the symptoms can be relieved while she is making the required physical and mental adjustments to the shifting conditions. With some patients, a book on the subject would be helpful, and an excellent one to recommend is that by Novak, giving helpful information for the intelligent woman on the physiology and disorders of the reproductive system (*The Woman Asks the Doctor*).

The comfortable adjustment to the changing conditions, which many make spontaneously, may be disturbed by two factors: namely, (a) some general or local disorder which lowers the adjusting capacity of the nervous system or (b) too rapid diminution in the natural manufacture of the ovarian hormones. Both of these factors must be looked after in treatment, for they react on each other, and troublesome symptoms are usually due to a combination of the two.

GENERAL HEALTH.—The general health is of first concern. In many of these cases the vasomotor symptoms would not have become troublesome if the adjusting capacity of the individual had been maintained, by attention to the general health and avoidance of exhausting or irritating household conditions. Also, full response to endocrine treatment cannot be expected as long as the various organs are depressed by anemia, vitamin deficiency, undernourishment, loss of sleep or persistent worry from any cause.

ENDOCRINE TREATMENT.—As previously mentioned, the thyroid is one of the endocrine glands most frequently affected in the climacteric, hence the basal metabolism rate is to be determined at the start of treatment. Depressed thyroid function is the usual type of disturbance. The hypothyroidism may be marked, with a low basal rate, or else moderate with a basal rate within normal limits. "Subclinical" hypothyroidism, that is, depressed function that does not yet show in the basal rate, is so frequently associated with climacteric symptoms that we give thyroid in all these patients who do not show elevated basal rate. Thyroid is started with a small dose and increased according to indications, as explained in detail under menstrual disturbances.

Ovarian Hormones.—The purpose of the hormone treatment is to augment the diminishing hormone supply up to the patient's capacity for comfortable adjustment. After attention to the general health and any thyroid disturbance as mentioned, we come to the details of substitutional treatment with ovarian hormone or hormones.

If the vasomotor disturbances are very troublesome, it is well to start the patient on intramuscular injections until the symptoms are brought under control, and then to use a combination of oral preparations and intramuscular injections as needed. Other forms of administration which can be used are vaginal suppositories, inunctions, and subcutaneous implantation of specially-prepared hormone pellets.

Concerning dosage, the smallest dose giving relief for twelve to twenty-four hours should be used, and this rarely exceeds 10,000 U. The dose vaginally should be about equal to the intramuscular dose, while orally the dose needs to be about five times as strong. The dose can gradually be decreased as the symptoms improve.

The estrogen which has the most prolonged effect is estradiol dipropionate. In a clinical comparison with estrone, Dorr and Greene conclude that estradiol is of unusual clinical value in that injections may be given at very infrequent intervals. The use of subcutaneous theelin pellets is reported by Bennett, Biskind and Mark.

Werner, in a recent survey of estrogenic dosage, concludes that estrone (theelin) is more potent in the human than alpha-estradiol benzoate (progynon-B), stating:

"The assay of estradiol and its compounds on the rat greatly magnifies their activity, because of the extreme sensitivity of the rat to these substances. This same degree of sensitivity to estradiol and its compounds is not present in the human being, nor even in the mouse. . . .

"Published research indicates that extremely large dosages of alpha-estradiol benzoate (progynon-B) are necessary to duplicate the effects of comparatively small dosages of theelin (estrone) in the human being."

Stilbestrol is a synthetic estrogenic substance which has the advantage of low cost. It has been tried out in several clinics with varying results. Huberman and Colmer noted improvement in 90 per cent of 77 climacteric women under stilbestrol. The incidence of toxic effects varied from 10 per cent to 80 per cent in different reports. These consisted of nausea, vomiting, and vertigo.

They may be eliminated for most patients by employing doses of 0.5 mg. (or even starting with 0.1 mg. in hypersensitive individuals), by giving the dose at bedtime, and by interrupting the administration at regular intervals (see cyclical therapy, page 256).

Schneider recommends the prophylactic use of the estrogens after removal of the ovaries and after radiation to stop the menses, and he feels that the patient has a much easier time adjusting herself to the climacteric.

During the course of treatment with these estrogenic substances, bleeding due to withdrawal may occur. This is especially true when the dose used has been excessive. Most workers in the field regard this with a nonchalance which is refreshing if not reassuring. In the first place, bleeding at this age when fundal cancer is most common is disconcerting. One cannot be certain without curettage that an early carcinoma is not the cause of the bleeding, along with the estrin withdrawal. In the second place, stimulating the growth of the endometrium, which is supposed to be atrophic at this age, is not an altogether safe procedure, according to the knowledge gained from animal experimentation and clinical work.

Because of our feeling in this matter we have for years used the corpus luteum hormone in menopausal women except in patients where the uterus had been removed, and our results have been comparable to those obtained by estrogen. The only drawback to this form of treatment at present is its cost. Other forms of treatment which have been suggested are testosterone propionate and x-ray of the pituitary gland.

The vaginal smear method of the following treatment, recommended by Papanicolaou and Shorr, enables objective confirmation of the subjective indications of the effectiveness of the treatment. It is particularly helpful in the handling of cases in which the patient's reports are variable and of uncertain dependability. In their instructive article on the subject they give a helpful tabular description of the progressive changes in the vaginal climacteric smear under treatment (Fig. 1084) and also photomicrographs of the smears in various stages of treatment (Figs. 1086 to 1097). In the following quotation, they point out the difficulties of classification, the modifications occasioned by the variations in the original climacteric smear, and the types of original smears. It may clarify the titles to point out that the term "menopause" in the quotations refers to the menopause period or climacteric—hence the patient may still be menstruating at times and thus may have a "premenstrual type" of smear. It is only after ovarian involution has progressed to complete cessation of menstruation that the atrophic smear is found at all times.

The variations in the urinary excretion of the pituitary-like hormones in climacteric patients under treatment are graphically shown in Fig. 1085, from the article on the menopause period by Frank, Goldberger and Salmon.

A classification of the progressive stages in the transition of the menopausal smear to the follicular type would greatly assist in the uniform evaluation of the effects of treatment. A detailed description of the morphologic changes would be too extensive for the scope of this paper and too cumbersome for practical use. Furthermore the variability in the initial smear picture and the overlapping in some of the alterations under treatment would render a rigid schema inaccurate and misleading. A simple system can, however, be suggested into which the most fundamental changes in the significant elements of the smear may be fitted.

This has been done in the Table (Fig. 1084). The alterations in the constituents of the smear have been arranged, as far as possible, in the order in which they usually appear, and in relation to each other. It should be remembered that there is much overlapping, and considerable variability in the tempo of the various changes. Leucocytes and deep cells, for example, may disappear unusually early, or persist in small numbers at relatively advanced stages. The descriptive terms—early, moderate, advanced, and complete—are considered preferable to the designation of stages by numbers.

One of the chief obstacles to a rigid classification appears to be the variability in the original menopausal smears. As has been pointed out, this arises from the differences in the degree of atrophy of the genital organs and the cyclical changes which persist after menopause. Although the character of the original smear bears no relation to the intensity of symptoms in patients with the menopausal syndrome, it will modify, to some extent, the changes taking place under treatment. For this reason it may be of value to describe the several types which have appeared with sufficient frequency and uniformity as to be readily recognized.

a. *The Menopausal Atrophic Type*.—This is most frequently seen in the surgical menopause. It is apparently dependent on absent or minimal ovarian activity, and is associated with an advanced atrophy of the genital tract. It is characterized by an abundance of well-preserved leucocytes and deep cells, and varying numbers of erythrocytes. Mucus is moderate in amount and bacteria profuse.

b. *The Intermediate Type*.—This is marked by a prevalence of superficial cells in relation to the deep cells, which are also present in fairly large numbers. The superficial cells are irregularly formed, folded, and densely grouped. They have relatively large nuclei. The leucocytes are usually numerous, but poorly preserved. Erythrocytes may be present or absent. Mucus is moderate and bacteria are abundant.

c. *The Mucous Type*.—This is featured by an excess of mucus, usually associated with some bleeding and typical fibrination. Deep cells may prevail or be less numerous than the superficial cells. Leucocytes are abundant, but diluted by the profuse mucus, as are the bacteria which are also present in large numbers.

d. *The Premenstrual Type*.—This has a strong resemblance to the normal premenstrual smear. The cells are irregularly folded, appear in dense clumps and have relatively large nuclei. The leucocytes are usually numerous but poorly preserved. Erythrocytes may be present or absent. Mucus is, as a rule, moderate in amount, but may be scant or relatively abundant. The bacterial flora is rich. Deep cells are usually absent, and, when present, are rare.

e. *The Bacillus Vaginalis Type*.—This is characterized by a rich growth of a bacillus closely resembling the Döderlein bacillus. Superficial cells with relatively large nuclei prevail. Deep cells may be present in moderate numbers or absent. One of the chief features of this smear type is the fragmentation of the cells and the liberation of large numbers of nuclei. Leucocytes are present in fair numbers, but mostly degenerated and fragmented. Erythrocytes may or may not be present. Mucus is usually moderate.

f. *The Pseudo-Leucopenic Type*.—This is marked by a pronounced leucopenia. Leucocytes may be found, but are usually degenerated or fragmented. Most of the cells are of the superficial type, irregular, and heavily grouped. The nuclei, as a rule, are relatively large, though small nuclei may prevail in some cases.

Vaginal smear and endometrial biopsy studies have led to epochal gains in the accuracy and extent of our knowledge of the normal and abnormal functioning of the reproductive system. These methods are indispensable in the most effective experimental work, where accurate objective evidence is imperative, and the understanding of their forms and implications is fundamental to an understanding of the physiology of these organs.

Smear Elements	Menopausal Smear Before Treatment		Effect of Treatment on Smear			
	Typical Atrophic	Variations	Early	Moderate	Advanced	Complete
Mucus	Moderate or scant. Rarely abundant.	Same.	Abundant.	Moderate or scant.	Moderate or scant.	Moderate or scant
Leucocytes	Numerous.	Numerous or moderate. Rarely leucopenia.	Diminishing.	Progressive diminution.	Relative leucopenia.	Leucopenia.
Erythrocytes	Usually present in moderate numbers. Rarely numerous. Often fibrination.	Less frequent; in small or moderate numbers.	Unchanged or increased in number. Fibrination.	Diminished or absent.	Absent	Absent.
Clearness of smear	Hazy or "dirty." Rich in bacteria.	Same.	Usually unchanged.	Progressive clearing	Clearer.	Clear
Deep cells	Numerous.	Less numerous. May be rare or absent.	Unchanged or decreased in number.	Diminished or absent.	Absent or very rare.	Absent.
Superficial cells	In varying numbers. Irregular or folded. Poorly outlined; most with large nuclei.	Numerous; prevailing. Same type. Cells with small nuclei less frequent; rarely prevailing.	Usually unchanged. Cells less numerous in general.	Sharper outlines. Elongate or navicular forms often numerous.	Sharper outlines. Flatter. Cells with small nuclei increase in number.	Sharp outlines. Larger. Flatter. Cells with small pyknotic nuclei prevailing.
Grouping of cells	Moderate.	More pronounced. Often dense smudgy clumps.	Very little or no change.	Progressive spreading. Sometimes dense groups persist.	More spreading; more isolated cells.	Smaller, looser groups; many isolated cells.
Typical cornified cells	Absent.	Absent.	Absent.	Usually absent. May begin to appear.	In varying numbers	Many

Fig. 1084.—Classification of smear types and transitional stages of the menopausal period during treatment with ovarian follicular hormone. (Papanicolaou and Shorr—*Am. J. Obst. & Gynec.* As reproduced by Squibb.)

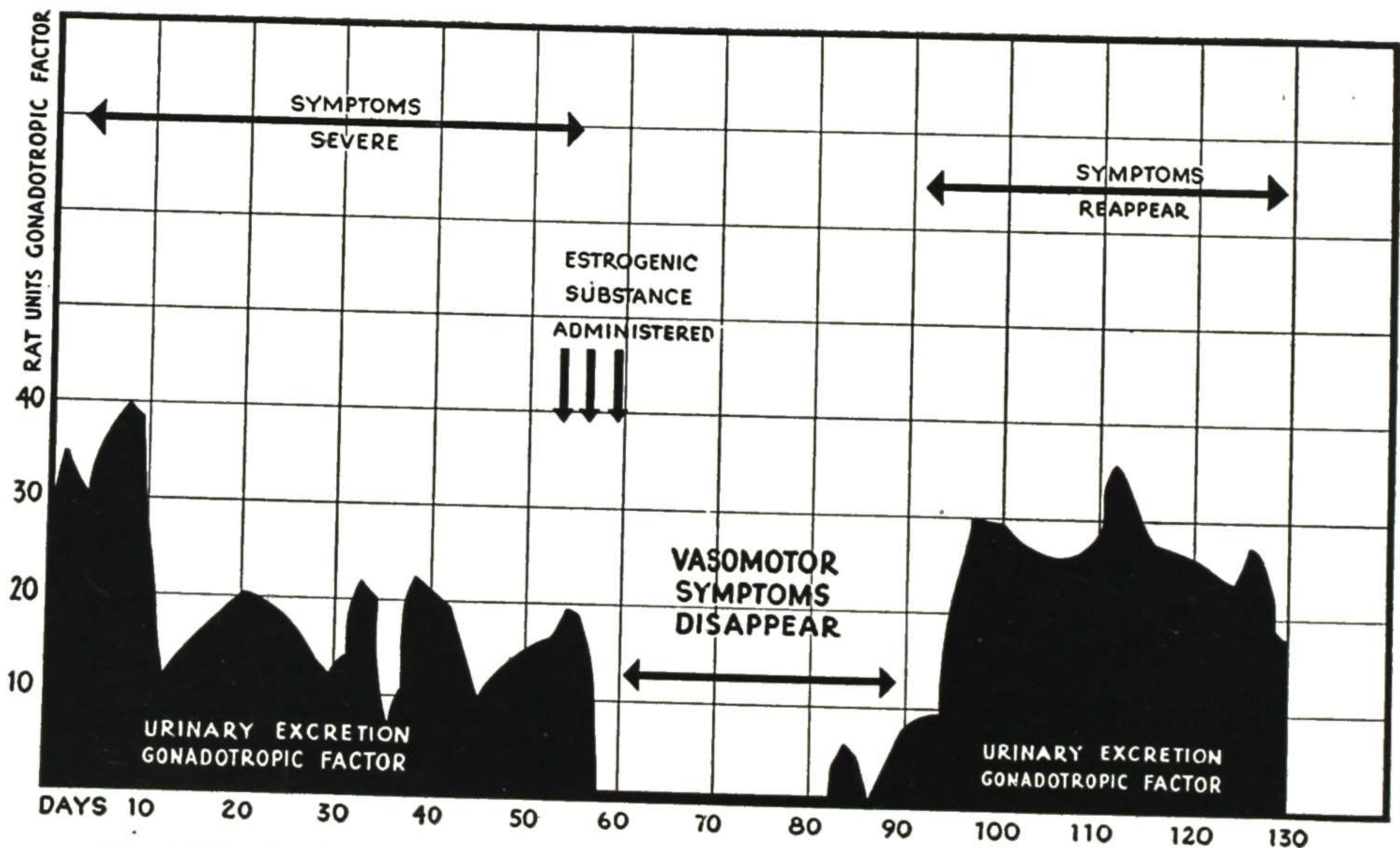


Fig. 1085.—Variations in amount of the gonadotropic factor in the urine during treatment in the menopause period (climacteric). (Frank, Goldberger and Salmon—*New York State J. Med.* As reproduced by Squibb.)

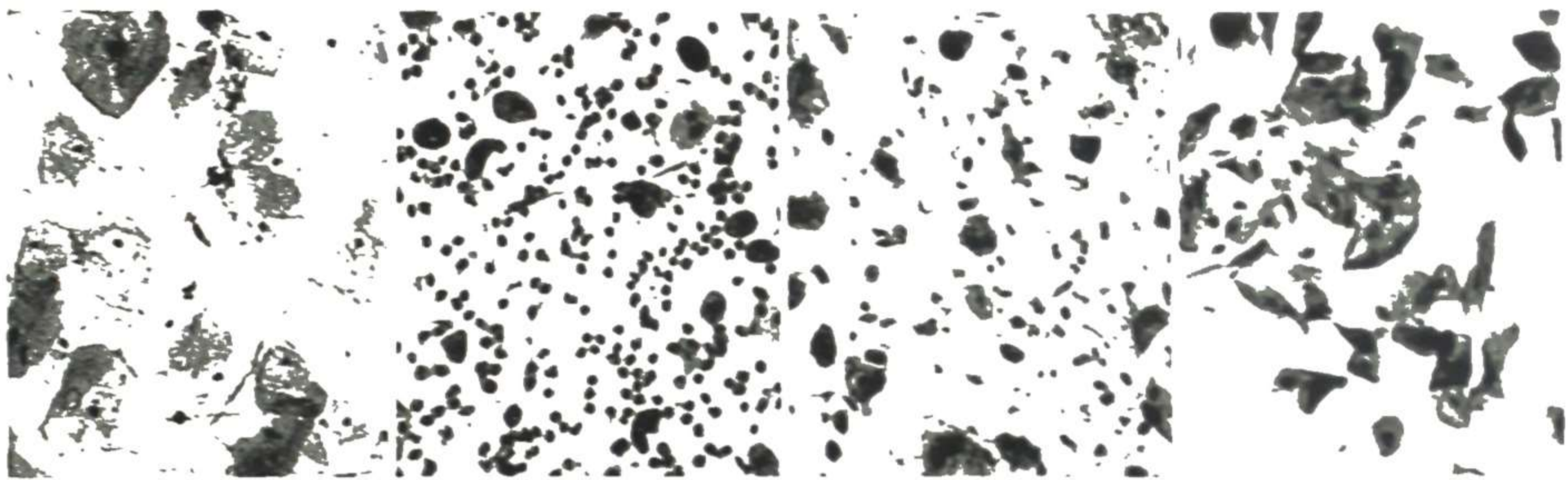


Fig. 1086.

Fig. 1087.

Fig. 1088.

Fig. 1089.

Fig. 1086.—Follicular phase of a normal woman at the eleventh day of the menstrual cycle. Note absence of leucocytes and prevalence of large flat cells with pyknotic nuclei.

Fig. 1087.—Age thirty-eight; surgical menopause before treatment. Note abundance of leucocytes and prevalence of round or oval deep cells with large nuclei. Some erythrocytes are present. Such slides have a "dirty" appearance and are notably free from the large strands characteristic of mucus.

Fig. 1088.—Ten hours after second injection of oestrin at total 8,000 I.U. Note absence of mucus secretion as an early effect of treatment. Leucocytes are absent.

Fig. 1089.—Twenty-four hours later, third injection of 4,000 I.U. was given. The smear taken Feb. 22. Leucocytes and erythrocytes have disappeared. As the treatment progresses very numerous large flat cells with pyknotic nuclei take the place of the smaller and less numerous cells with large nuclei previously prevailing.

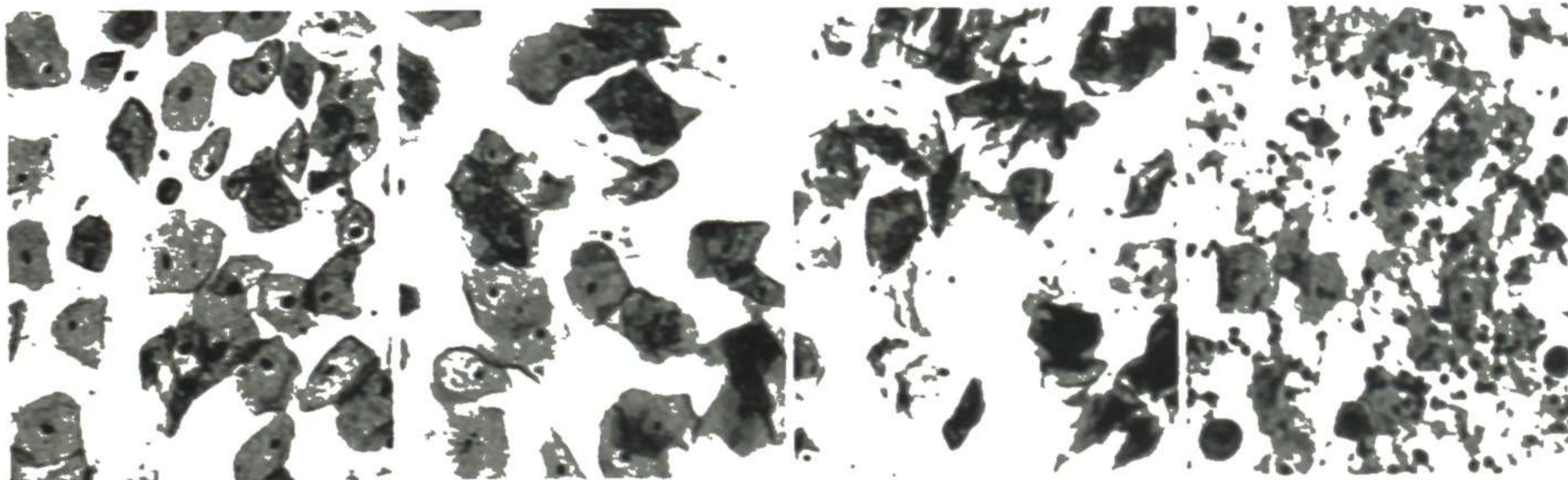


Fig. 1090.

Fig. 1091.

Fig. 1092.

Fig. 1093.

Fig. 1090.—Smear taken Feb. 27 (total dosage now 34,000 I.U.). Early follicular phase. Note absence of leucocytes and mucus as well as "clean" appearance of slide. Large flat cells with pyknotic nuclei are more numerous and more developed. At this stage there is marked symptomatic improvement in the severity and number of flashes.

Fig. 1091.—March 4 (total dose, 58,000 I.U.), smear shows typical follicular phase, not unlike Fig. 1086. This is the optimum stage in the management of the patient.

Fig. 1092.—March 16, regressive grouped type of smear induced by insufficient oral treatment.

Fig. 1093.—March 16 to April 1, treatment discontinued. Smear taken March 31 shows further regression. Leucocytes and deep cells have reappeared. Symptoms gradually returned.

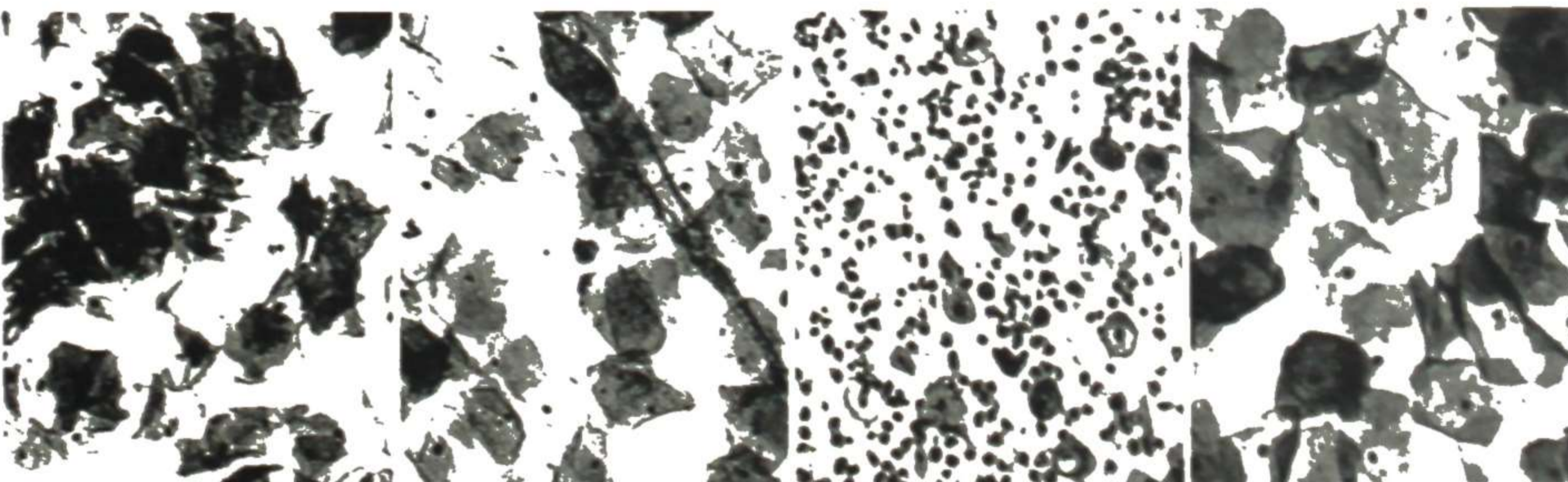


Fig. 1094.

Fig. 1095.

Fig. 1096.

Fig. 1097.

Fig. 1094.—Grouped type without leucocytes, after resumption of treatment.

Fig. 1095.—May 1, after 64,000 I.U. in thirty days, smear returns to typical follicular type and the patient's distressing symptoms again disappeared.

Fig. 1096.—Almost complete regression to original menopausal type of smear after discontinuation of treatment.

Fig. 1097.—Follicular phase following resumption of treatment.

Figs. 1086 to 1097.—Showing changes in the vaginal smear of a typical climacteric patient during administration of estrogenic substance. (Papanicolaou and Shorr—*Am. J. Obst. & Gynec.* As reproduced by Squibb.)

In the handling of climacteric patients, however, the subjective symptoms may be taken as a fairly reliable indicator of the effectiveness of the medication being employed. In exceptional cases, examination of vaginal smears may be needed as a check-test, as in a case where there seems to be marked exaggeration of symptoms or where symptoms persist in spite of medication that is ordinarily sufficient, but in general the symptoms may be taken as a guide in instituting and varying treatment.

On this point, Werner concludes as follows, in his article surveying estrogenic dosage: "The most easily obtainable and dependable criterion of sufficient estrogenic dosage in the climacteric and related conditions is relief of subjective symptoms as expressed by the patient." He quotes the following from Broun:

"It is quite evident from the present study that changes in the vaginal secretion are a much less delicate index of the effectiveness of estrogenic material than is examination of the uterine mucosa secured by curettage. In the smallest dosages employed the changes in the uterine mucosa were definite and striking. It is also quite obvious that symptomatic relief can be secured in dosages that are too small to produce definite changes in the vaginal secretion, since the group of subjects receiving the smallest dosage apparently secured as much relief of symptoms as those who received larger doses."

Werner also quotes Edgar Allen: "We have found the relief of symptoms a more accurate guide to proper dosage than the changes in the vaginal smear."

Other Disturbances

Associated With the Climacteric

Atrophic Vaginitis.—This is often troublesome and refractory to treatment in the latter part of the climacteric and in the postclimacteric (senile) periods. The administration of estrogen in the form of vaginal suppositories helps greatly in clearing up these cases.

It was hoped that that other troublesome atrophic disturbance, leucoplakic vulvitis, might be similarly benefited by estrogenic medication, but so far results have been disappointing.

Pruritus Vulvae.—Pruritus vulvae, vaginal burning, and other paresthesias of the climacteric and senile periods are sometimes definitely benefited by estrogenic medication. In these cases it is well to employ the vaginal suppository method of administration, to be supplemented, if necessary, by oral or hypodermic methods.

There are other disturbances which in some cases seem to be influenced by the more remote effects of endocrine medication.

Emotional Disturbances.—Troublesome emotional and mental states are sometimes much benefited by endocrines of the ovarian-pituitary cycle. This subject is being investigated in its various ramifications, but enough information has already been accumulated to show that endocrine investigation and treatment can help many of these patients not relieved by other measures.

Arthritis.—Certain cases of arthritis in the climacteric are benefited by ovarian endocrine medication. This so-called climacteric arthritis seems to locate principally in the knee. In one of our patients the effect was so marked as to be surprising.

The patient was referred by the orthopedist for trial of endocrine treatment before deciding on operation, which was being considered because of the marked swelling, disability, and x-ray evidence of internal disturbance in the knee joint. The patient had had a rather sudden menopause caused by x-ray. Within two months after starting the course of corpus luteum therapy, there was definite improvement in the knee. This continued, and later the patient was able to dispense with her cane, could walk upstairs, and eventually returned to work. Part of the swelling remained in the knee, but the tenderness and disability were gone. In this case the element needed to restore endocrine balance seemed to be the corpus luteum hormone. After considerable improvement had been secured by a course of this hormone by oral administration, an estrin preparation was substituted for the corpus luteum, to see if improvement could be hastened thereby. The estrin had the opposite effect. The joint became worse, pain and disability returned, and the patient requested that she be allowed to go back to the former medication. Return to the corpus luteum medication started improvement again, and it continued.

Reports in literature indicate that in a variety of joint conditions in the climacteric, medication with endocrines of the ovarian-pituitary cycle may be beneficially employed as part of the treatment. This, however, should not be taken as an occasion or excuse for haphazard endocrine medication, nor for neglect of the thorough general investigation for which every attack of arthritis or rheumatism calls in order that any hidden focus of inflammation may be ferreted out before it results in serious cardiac complications.

In obscure cases of arthritis in this critical involutional period which do not yield to the regular treatment, it would be well to add a trial of this type of endocrine medication to the systematic handling of the condition.

Allbright, Smith and Richardson feel that the late climacteric state is a common etiologic factor in osteoporosis. This type usually involves the spine and pelvis. The long bones are seldom involved and the skull almost never. In the early stages of the disease, urinary calculi are common, due to increased calcium excretion. In the later stages the disease is likely to be discovered by x-ray examination made because of sudden backache from an apparently inconsequential trauma, such as a minor jolt received when the auto goes over a small bump. They hold that the beneficial effect of estrogen treatment is due to its ability to aid in calcium retention.

Hypertension.—In regard to hypertension in patients in the climacteric, about the same may be said as for arthritis. It may be added, however, that in a large proportion of these cases this type of endocrine imbalance seems to be a factor of some importance, and hence it is well to add ovarian endocrines as part of the treatment to take care of this factor.

Miscellaneous.—There are various other conditions such as involutional melancholia in which a disturbed endocrine balance of the climacteric may be a factor requiring treatment, and recognition of this fact may aid materially in restoring the patient's health.

MENOPAUSE DISTURBANCES

The menopause bears the same relationship to the fifth decade of life that the menarche does to the second decade, that is, it is the outward sign of important physiological changes in the ovaries and the uterus. At puberty, these internal changes are developmental toward establishment of function, and

when ovarian function has developed to a certain extent, menstruation appears (menarche). At the climacteric, the changes are regressive toward cessation of function, and when it has regressed to a certain extent menstruation disappears (menopause).

The menopause then is the climacteric cessation of menstruation. It is not the gradual approach to it represented by occasional amenorrhea of climacteric origin, but the complete and permanent disappearance of the menstrual flow.

Problems of the Menopause.—The problems of the menopause were considered by the authors in an article in the *American Journal of Surgery* ("Amenorrhoea, Menorrhagia, Metrorrhagia, and Delayed Menopause") and that work-up of the subject has been drawn upon freely for this presentation.

The problems connected with the climacteric cessation of menstruation may be indicated by the following questions. Are the conditions and phenomena normal or pathological? If pathological, in what way and why, and what should be done about it? The first question brings up the inquiry as to what constitutes a normal menopause.

At what age does menstruation normally cease? What is the earliest age at which it may cease and still be considered normal? What is the latest age of normal cessation? These queries open a field not yet sufficiently investigated. We know that the age at which the normal menopause takes place varies greatly in different individuals, but we do not know the exact limits of this normal variation. However, for the present consideration of abnormalities, the current approximate estimates of what is normal may be used.

In regard to the age at which the menopause occurs, this permanent cessation of menstruation may take place any time within the limits of the fifth decade (age forty to fifty years). However, suspicion of abnormality should be aroused by menopause occurring before the age of forty-two years or delayed to the age of forty-eight years, and the greater the variation below or above these limits the greater the probability of some pathological process.

The definite disturbances of the menopause are two, premature menopause and delayed menopause. In this connection it may be well to refer also to certain premenopausal disturbances, namely, amenorrhea, hypomenorrhea, menorrhagia and metrorrhagia. These various menopausal and premenopausal disorders will be taken up under three headings, premature menopause, premenopausal disturbances and delayed menopause.

Premature Menopause.—Premature permanent cessation of menstruation may be due to some local lesion or some general condition or some endocrine disorder. As in the case of serious amenorrhea of an earlier age, the local lesions causing premature menopause are those affecting the integrity of the endometrium or of the ovarian functioning tissue.

In the former class come hysterectomy and hyperinvolution of the uterus. In the latter class come double oophorectomy and tumors or other disease causing destruction of the ovaries. An incurable blood dyscrasia or some disease of the respiratory, gastrointestinal, urinary or cardiovascular systems may so weaken the patient as to cause permanent cessation of menstruation, and the same may be said of certain incurable disorders of the endocrine glands.

In conditions which do not necessarily preclude further menstruation, an attempt at restoration may be made along the lines of treatment already advised for severe amenorrhea.

Premenopausal Disturbances.—In premenopausal menorrhagia and metrorrhagia, the same treatment is to be employed for the different types of cases as advised for similar disturbances at an earlier age. A larger proportion of the bleeding cases of this late age-period have carcinoma of the endometrium and hence diagnostic and therapeutic curettage becomes urgent earlier in the disturbance.

In premenopausal amenorrhea and hypomenorrhea, the same etiological factors are to be looked for as in similar disturbances at an earlier age, and similar treatment is to be employed for the various types of cases.

Delayed Menopause.—Delayed menopause and late menopause are terms used synonymously to designate that condition in which the permanent cessation of menstruation is delayed beyond the normal time. In the clinical consideration of this group we include all cases of late uterine bleeding, whether or not presenting the rhythmic character of menstruation. In giving the history, patients usually regard any recurring bleeding as menstrual flow and an appearance of blood after cessation as a return of menstruation.

Accepting this composite group for investigation, pelvic examination will show the cases in which the late bleeding is due to a demonstrable local lesion, such as carcinoma of the cervix or corpus, uterine myoma, ovarian tumor, or a tumor or inflammation of some adjacent structure. Further investigation will identify the cases presenting some extrapelvic disease which may be the cause of the bleeding, such as blood dyscrasia or cardiovascular-renal hypertension or thyroid disorder.

There remains a small group of cases presenting no evident genital lesion nor extragenital disease to account for the bleeding, and in which the bleeding simulates more or less the menstrual rhythm. This is a most interesting group, presenting unsolved problems in pelvic physiology and pathology. The patients are past the usual age for normal ovarian functioning and yet they present evidence of endometrial activity dependent on ovarian activity.

Are these cases simply examples of unusual disparity between the age in years and the age in physical changes, and consequently due to run a normal course to a later menopause? Are they, on the other hand, cases representing an irregularity of functional decline which may impose a pathological influence on the cell activity of the involuting endometrium? We have given considerable thought to this interesting problem and its practical bearings, and some features were presented in a previous article. The ramifications of the subject are extensive and space consuming, but the practical conclusions from our study may be stated as follows:

1. Delayed menopause, especially when delayed to the age of fifty years, means some pathological condition, either in structural change or in cell activity. The influence of persisting irregular ovarian activity on the cells of the involuting endometrium tend to erratic cell activity thereby favoring cancer development. In our series of 89 cases of cancer of the corpus uteri, there were 30 in which there was a definite interval between the menopause and the clinical appearance of the endometrial carcinoma. In these 30 cases the menopause occurred at the age of fifty years or later in 22 or 70 per cent, and at age of forty-eight years in 3 other cases.

2. Endometrial hyperplasia in the endometrium of involutory age seems to represent a step in the pathological progress from normal endometrium to carcinoma. Hyperplasia is a very frequent finding at curettage for bleeding in this age-period when carci-

noma is most common. In our series of cases of endometrial carcinoma a few of the patients had been curetted, in their home town or elsewhere, one or two years previously. In 3 such cases the slides of the previous curettings were available for study and each of them showed definite hyperplasia at that time. Here, in this one series of cases, there were 3 instances in which curetting showed benign hyperplasia and another curetting one to two years later showed endometrial carcinoma. There was also an interesting specimen of a double uterus in which one horn showed endometrial hyperplasia and the other horn endometrial carcinoma.

3. Delayed menopause, especially when delayed to the age of fifty years, is an indication of aberrant endometrial activity and a warning of a tendency to endometrial malignancy. Consequently, appropriate treatment should be employed to stop the aberrant endometrial activity.

4. Appropriate treatment consists usually of curettage (to stop the bleeding temporarily and to furnish tissue for microscopic study), conization of the cervix if needed for chronic cervicitis, and radium treatment to stop the erratic endometrial and ovarian activity. If there is no malignancy in the curettings or in the cervical tissue, the treatment outlined is usually sufficient to prevent further trouble. If the microscopic investigation of the curettings shows that endometrial carcinoma has already developed, then radical measures for that must be employed.

ALLERGIC DISTURBANCES

The fact that allergic patients may have pelvic symptoms directly referable to the allergic constitution, has been shown by Duke, Rowe, D. R. Smith, and others. According to Rowe, allergy may be a factor in painful periods with or without vomiting, in excessive or scanty periods, in prolonged periods, in leucorrhoea, and in eczema of the vulva. In a series of patients with allergic dysmenorrhoea, Smith was able to give relief by proper dietary investigation and advice. As remarked in the chapter on Menstrual Disturbances, it is rather strange that this connection between allergy and dysmenorrhoea (painful uterine contractions) was not appreciated long ago, since the test material of antigens is the uterus of an experimental animal.

Relief in scanty, excessive, and prolonged menstruation has been reported by Rowe, who recommends his elimination diets in testing suspected allergic cases. The mechanism by which the control of the flow results in such cases is not clear, but it is supposed to be due to improved ovulation.

In allergic persons, this factor may enter into the cause of leucorrhoea. Mucous discharge from the gastrointestinal tract and from the bronchial and nasal membranes has long been recognized as due in certain cases to allergy. In women and girls with excessive vaginal discharge, in whom there is no infection and in whom the vaginal smear shows a predominance of epithelial cells, the question of allergy should be investigated.

Eczema of the vulva is a condition recognized as sometimes due to allergy, and any case persisting despite ordinary treatment merits attention in that direction.

There have been cases reported of menstrual asthma in which the patient was found to be sensitive to some allergen present in her own blood at the menstrual time. A sample of blood taken at the menstrual time was preserved—injected in the interval period, and it caused an asthmatic attack. The patient was cured by gradual desensitization to her own menstrual allergen.

In the chapter on treatment (Chapter III) attention was called to the necessity of allergic investigation and treatment in connection with some gynecologic disorders, and to some of the fundamentals of the subject and a table was given showing the proportionate prevalence of allergic reaction to the more common contact substances. The facts there cited and the additional items mentioned here show that allergic investigation should be considered in any erratic disturbance of uncertain origin, particularly in sudden edemas without obvious cause.

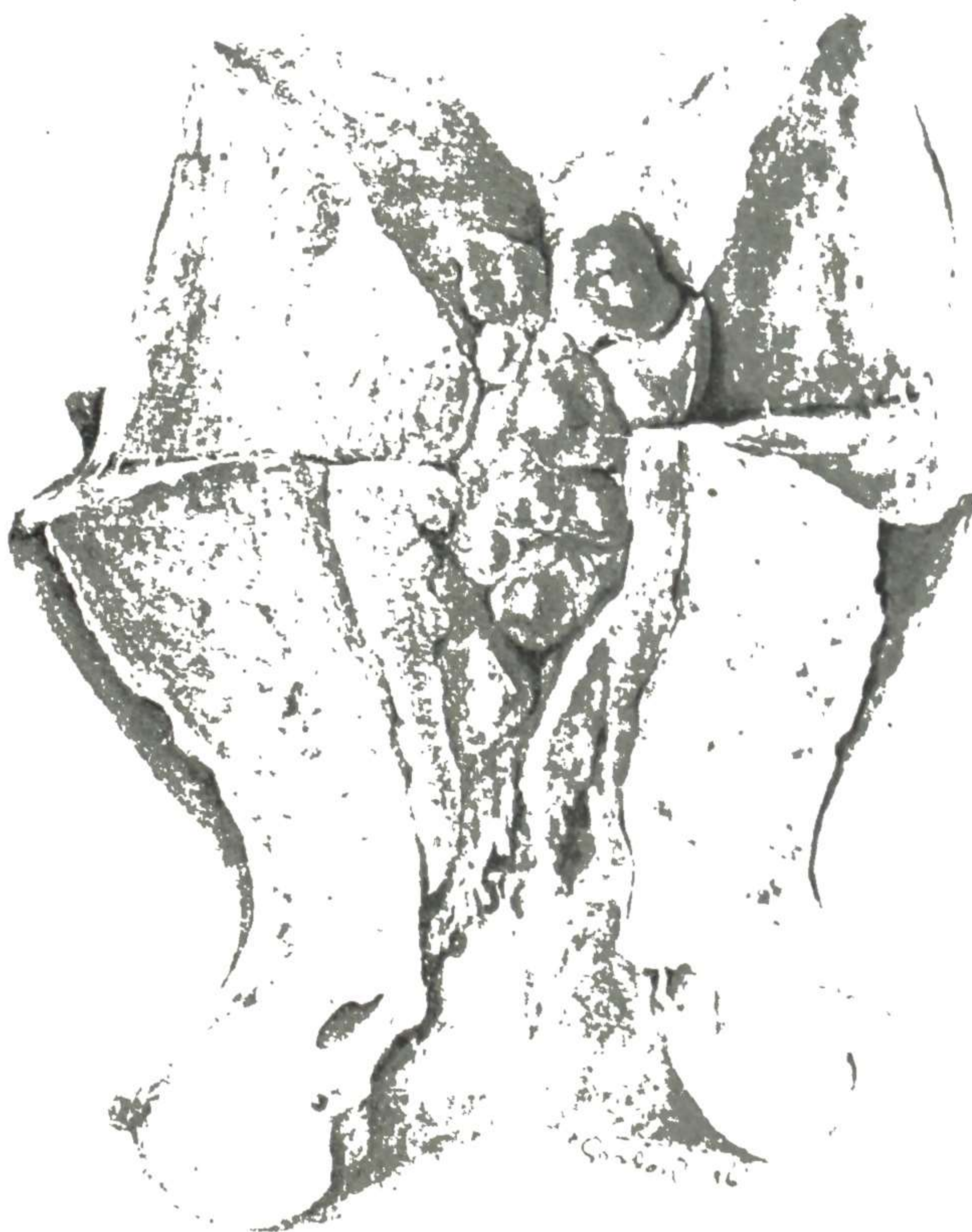


Fig. 1098.—A uterus removed from a markedly allergic patient and showing great swelling and edema of the mucosa and muscularis with nothing to account for the condition except allergy. The details of this and other cases, given in the articles, furnish food for thought from the pathologic, diagnostic, and therapeutic standpoints. (Goodall and Power—*Am. J. Obst. & Gynec.*)

Goodall and Power in a thought-provoking article on this subject, present Fig. 1098 as an example of allergic edema of the uterine mucosa and muscularis.

“Fulminating pelvic edema” is the term applied to an intense and widespread edema of the pelvic interior, that comes on suddenly without apparent adequate cause. It is accompanied by serious symptoms and usually extreme prostration. In fact, the sudden onset, the severity of the symptoms and the marked collapse suggest ruptured tubal pregnancy, and this mistaken diagnosis has been made in some of the cases. It is a rare condition and presents a puzzling problem in etiology and in diagnosis. Most of the cases have been

associated with chronic inflammatory lesions in the pelvis, but why the sudden edema and serious symptoms should develop without apparent cause has not been satisfactorily explained.

Possibly allergy is a factor in this intense edema localizing in the pelvis. The cause of the localization in the pelvis may be sensitization of the tissues to the products of old inflammation or of some other local condition. The salient features of the symptomatology and pathology of this bizarre disorder can best be presented by detailing a personal experience with it. Several other cases were found reported in literature.

Fulminating Pelvic Edema.—The senior author was called in consultation to see a patient with pelvic disturbance. It was Sunday; the patient had attended church in the morning feeling fairly well, but while there became very sick and could scarcely get home. She had a chill, followed by severe headache and general aching, but no localizing symptoms. There was no apparent local trouble in any part of the body to account for the fever, which rose to 105.5°. By evening there was evidence that the pelvis was the seat of the disturbance and it was then the author was asked to see the patient, about 10 P.M.

Examination.—The temperature had been reduced to 104°. The pulse was rapid, but of fair volume. The pelvis was filled with a tender mass which surrounded the uterus and fixed it firmly. There seemed to be acute pelvic inflammation with extensive exudate, but there was no apparent cause, either recent or remote. The patient had always been rather nervous and this nervousness had been somewhat worse of late, but there had been no symptoms indicating pelvic disease of any kind. The next day the temperature was 104.2°, pulse 120, respiration 28, and there was much peritoneal irritation. Operation was indicated to check the rapidly progressing inflammation if possible, and accordingly the patient was taken to the hospital.

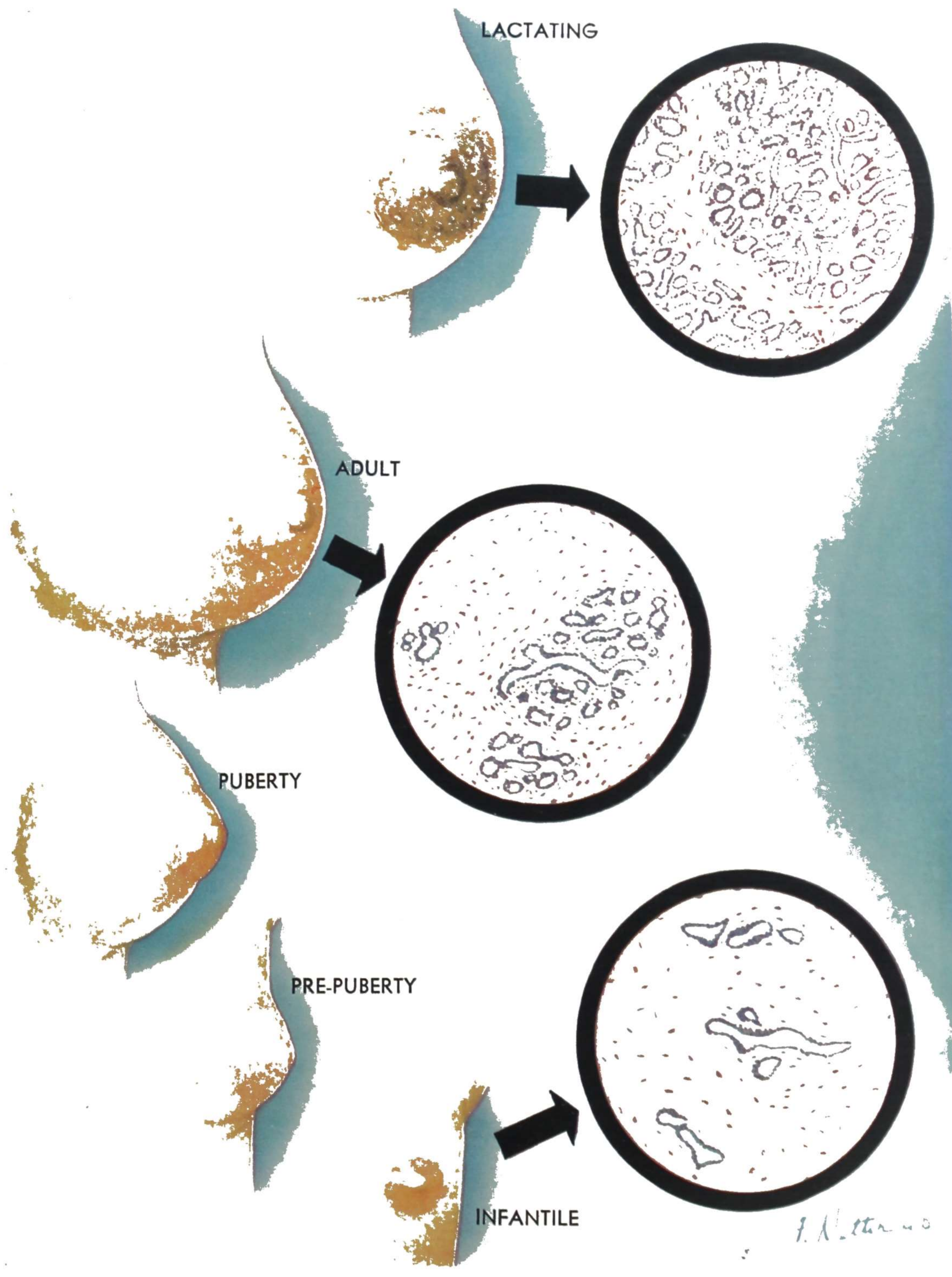
Operation.—When the abdomen was opened the pelvis was found filled with small encysted collections of fluid involving the tubes, ovaries, broad ligament, and uterus. The cysts or pseudocysts were of various sizes, were filled with clear serum and seemed to extend deeply into the substance of the organs involved. From the appearance, hydatid disease was suspected. All the cysts that it was feasible to remove were removed, and the pelvis drained through the abdominal incision.

The temperature dropped within a few hours to 98°, and it did not again go high. During the first part of the period of convalescence it ranged from 99° to 100.2°, and later dropped to normal, where it remained. The wound and drainage tract healed rapidly and the patient had a smooth convalescence. Laboratory examination of the tissues removed showed no bacteria of any kind, no evidence of hydatid disease, and no specific pathologic process that would adequately account for the alarming symptoms and the marked tissue change.

BREAST CONSIDERATIONS

The functioning of the breasts runs parallel with that of the ovaries and the uterus, as indicated in Fig. 1099. The connection of the breasts with the nourishment of the newborn brings them to that extent into intimate relation with obstetric practice. The radical treatment of cancer of the breasts brings them within the province of general surgery in its application of extensive dissection to the chest wall and adjacent lymphatic areas. Along with the treatment of breast cancer goes of course the diagnosis of that disease, and also the recognition and diagnostic observation and treatment of the various other conditions that may simulate cancer or require surgical care.

There are, however, certain points of contact with gynecologic practice, including breasts painful at menstrual time, hypertrophy of the breasts, and discharge from the nipples.



J. Netter M.D.

Fig. 1099.—The Breast at Different Ages. (Netter—Ciba Pharmaceutical Products, Inc.)

Painful Breasts; Hypertrophied Breasts; Abnormal Discharge

Taylor made an extensive study of chronic mastitis in relation to ovarian and pituitary hormones and to gynecologic lesions. The paper was based on the clinical and laboratory study of 261 patients with nonmalignant breast disturbance handled in the Memorial Hospital in the preceding two and a half years. It was divided into two parts—(a) a general and histological study and (b) a clinical study of the patients. His conclusions and comments were as follows:

The general conclusion of this study is that a certain minimum activity of the ovary is necessary for the development of chronic mastitis but that no specific hyperfunction or hypofunction of the ovary is at present demonstrable. This result is contrary to hopes entertained at the beginning of the work and contrary to what might have been expected from the known proliferative effects of the ovarian hormone on the breast tissue.

Certain exceptions and reservations must be made. In one small group of cases in which swelling of the breast, sometimes with secretion, develops in the presence of a persistent follicle or corpus luteum cyst, a hormone cause is probable, but the clinical aspects of this condition are different from that of the common type of chronic mastitis with painful outer quadrant induration. It is not unlikely that other unrecognized reactions of the breast to certain hormone states may exist.

Even for the common type of mastitis, however, it must be conceded that the present method of study has not exhausted the possibilities of a hormone cause. Present technical methods for the clinical determinations of estrin and prolan are far from perfect and no satisfactory test exists for the quantitative study of the corpus luteum hormone in body fluids. A very slight disturbance of gland function might cause hyperplasia in the breast when active over a considerable number of years and yet not be obvious when studied by relatively crude laboratory methods over a month's time. Irregularities in the peaks of production or excretion of estrin may furthermore have a significance quite aside from the total quantities chiefly discussed in this paper.

Finally, it is possible that the abnormal estrin effects on the breasts may be the result of local conditions such as an increased responsiveness to normal quantities of hormone, possibly as the result of local hyperemia, or a tissue concentration of the gland substances, bearing no relation either to the actual activity of the ovary or to the amount of hormone in the blood stream.

With these reservations, the following summary is offered of the present knowledge of the conditions under which chronic mastitis is found to develop.

A. THE PAINFUL NODULAR BREAST

1. *An active ovary producing estrin must be present.*—(a) The painful breast is limited to women before the menopause and after puberty. (b) The pain and nodularity improve with x-ray and surgical castration, such improvement paralleling the fall in estrin excretion in the urine.

2. *There is no indication of an extensive ovarian activity.*—(a) The histological structure of the painful breast does not show the uniform epithelial proliferation of a hormone-produced hyperplasia. (b) The 7 cases studied did not contain any excess of estrin in the urine or blood and in several cases the estrin excretion was quite low. (c) The endometrium in cases of the painful breast does not show the hyperplasia to be expected with hyperactivity of the ovarian follicle. (d) Administration of considerable quantities of ovarian hormone to patients with the painful breast does not increase the severity of the symptoms.

3. *There is no indication of an underfunction of the ovary.*—(a) The average excretion of estrin in 7 cases which were studied was within normal limits and in several of these cases rather high values were found. (b) The scant menstruation noted in 16.9 per cent of the women with the painful breast was the chief evidence for the underfunction theory,

but the estimation of the estrin excretion in such cases gave normal values. (c) Consistent results have not been obtained in this clinic by the treatment of the painful breast with estrin or the ovary-stimulating hormone of the anterior pituitary.

4. *A "dysfunction" of the ovary remains a possibility which cannot be entirely excluded.*—(a) Delayed or irregular menstruation, which must be accepted as a sign of a disturbed ovarian function, was present in 13.7 per cent of the cases. (b) Irregularities in the curves of estrin excretion or of blood concentration may eventually be shown to have some significance, but knowledge for their interpretation is at present lacking. (c) The multicystic ovaries observed in so many cases also may be taken as evidence of a disturbed ovarian function but they may be looked upon as well as the result of vascular congestion in the pelvis.

5. *A corpus luteum disorder cannot be excluded since tests do not exist for studying the blood and urinary levels of this hormone.*—(a) The frequency of normal menstrual rhythm, the histological evidence of a regular endometrial cycle, and the rarity of evident disease of the corpus luteum in patients operated upon are evidence against this factor.

6. *There is no indication of a hyperactivity of the anterior pituitary.*—(a) Prolan appears in the urine only in cases of pronounced underfunction of the ovary, which is never found with the painful breast. (b) An increase in prolactin in the urine comparable with that taking place in the menopause has been excluded by the present series of studies. (c) The appearance of prolactin in the urine after x-ray of the ovaries occurs at the time of improvement of breast symptoms.

7. *The painful breast has from the clinical viewpoint a large nervous element.*—(a) The pain and tenderness are more marked than are to be expected in an endocrine-produced glandular hypertrophy. (b) The pain radiates to the arm, neck, axilla and lateral body wall and may be associated with hyperesthesia of the skin of the whole thorax. (c) The pain and swelling in certain cases are produced or become worse during periods of nervous tension and may even develop abruptly within a few minutes after a nervous shock at any time in the monthly cycle. (d) Various associated nervous complaints are described by the patient including insomnia, anxiety, palpitation, blurring of the vision, mucous colitis, and headaches. (e) One case report exists in the literature of the disappearance of the premenstrual breast symptoms in one breast after the destruction of the thoracic sympathetic of that side.

8. *A local state of vascular congestion is a prominent feature of the painful breast.*—(a) The gross appearance of the painful breast before menstruation with its hyperemia of the areola, venous dilatation, and increased weight alone suggests hyperemia. (b) The histological signs of this vascularity may be demonstrated in the "edema" of the lobule. (c) The relief afforded by the onset of menstruation is usually too rapid to be explained as the result of epithelial regression. (d) The sudden appearance of pain and swelling in the middle of the cycle in certain cases cannot be ascribed to epithelial proliferation. (e) Simple support of the breast often causes considerable amelioration of symptoms. (f) In one case described with pain and hypertrophy, petechial hemorrhages occurred regularly before menstruation in the skin about the areola.

9. *The coincident gynecological lesions and menstrual disturbances have a possible significance as evidence of an associated vascular congestion and tissue edema in the pelvis.*—(a) The common pelvic lesions are classifiable as adnexal inflammation, parametritis, retroversion, and cervical infection. (b) The onset of pelvic symptoms and breast pain after marriage, abortion, or pelvic infections is significant of parametrial congestion or inflammation. (c) The scant menstruation may be regarded as the effect of the secondary fibrosis in the pelvis described by many writers as the end-result of chronic pelvic congestion. (d) The edematous, cystic, and fibrotic ovaries may have a similar cause.

One may offer the following provisional conclusions on the cause and nature of the painful, diffusely nodular type of mastitis as follows:

1. The ovarian hormone is certainly a necessary factor, but it has not been possible by present laboratory methods to demonstrate any specific abnormality of ovarian or anterior pituitary function. It is, however, possible that refinements in technical methods may eventually reveal a definite endocrine disturbance.

2. The conception of the disease as primarily a vascular disturbance with changes occurring in the interstitial tissues of the breast based on abnormal nervous stimuli explains many of the clinical aspects of the disease. Such a view can only be accepted with caution, however, because it requires the assumption of a physiologic mechanism yet largely undemonstrated.

B. BREAST HYPERTROPHY OCCURS IN AT LEAST TWO FORMS

1. In one group in which there is a simple painless enlargement of the breasts of relatively uniform consistence an endocrine factor is clearly prominent. This includes the hypertrophy developing in childhood and in old women in the presence of the specific

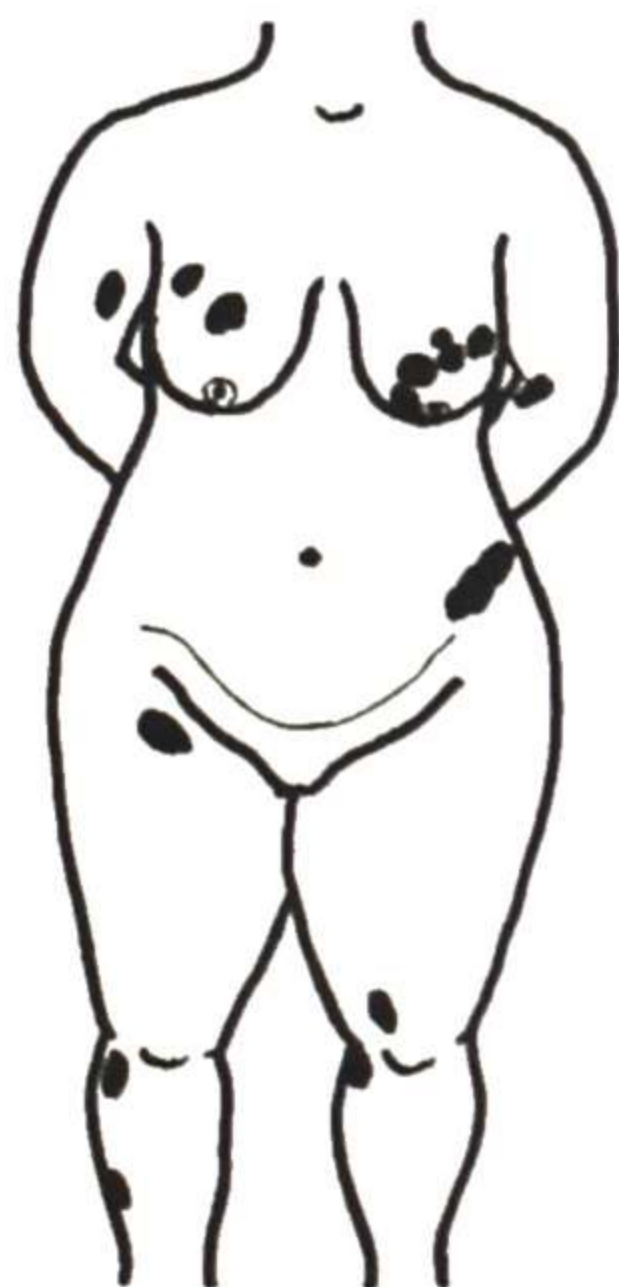


Fig. 1100.

Fig. 1100.—Relapsing febrile nodular non-suppurative panniculitis, showing the distribution of the lesions and the degree of involvement of the breasts.

Fig. 1101.—Appearance of patient on admission, showing multiple areas of nodular non-suppurative panniculitis of the breasts. (Binkley—*J. A. M. A.*)

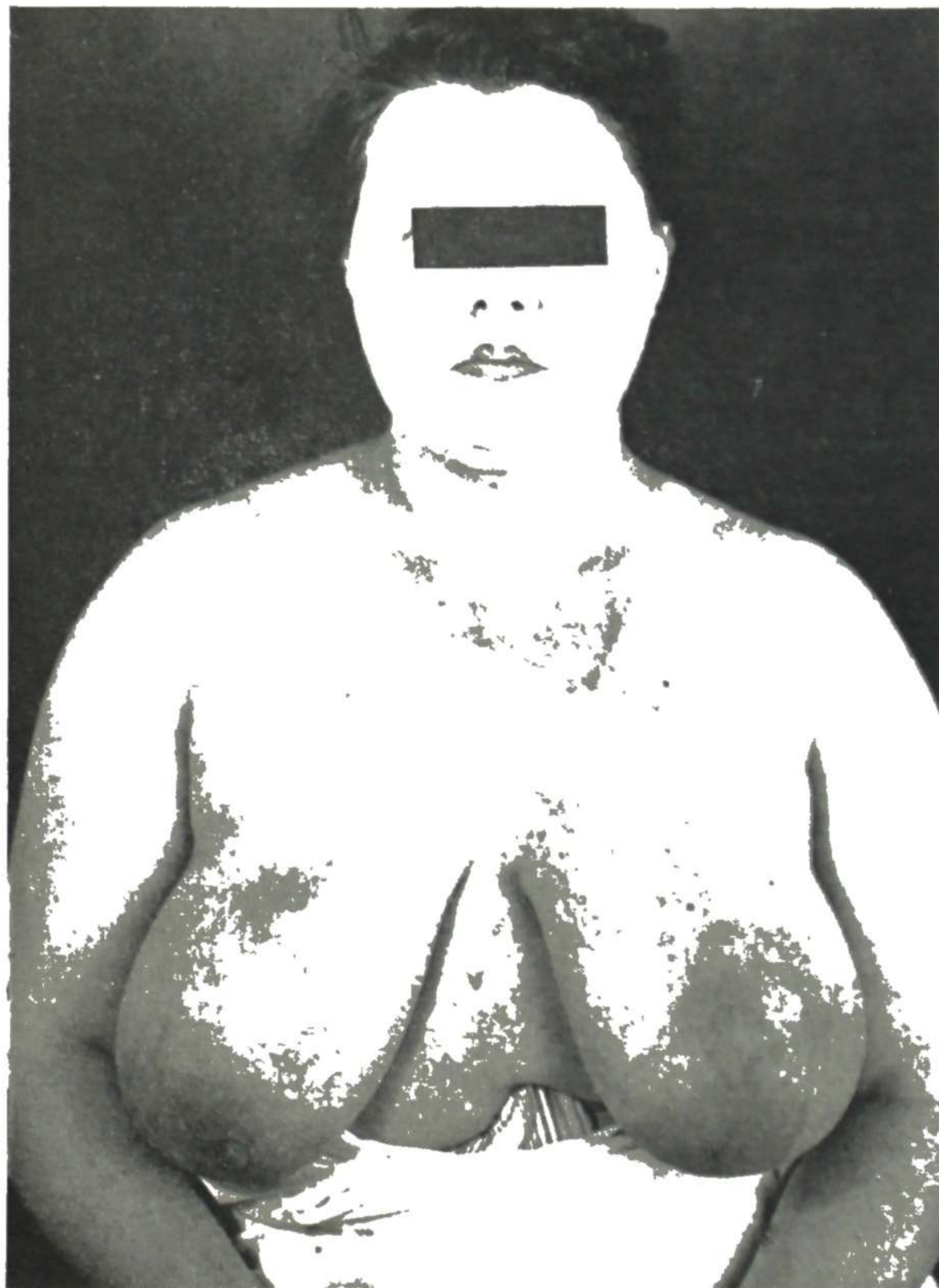


Fig. 1101.

ovarian neoplasms, such as the granulosa cell tumors and teratomas. Breast swelling has also been observed in the presence of persistent corpus luteum and follicle cysts and ascribed to a polyhormonal amenorrhea. Breast hypertrophy after hysterectomy may, in some cases, have a similar basis.

2. The painful hypertrophies of this study were not of this type and resembled closely the tender nodular breasts, both in regard to their physical characteristics and the conditions under which they occurred. Hormone studies of a series of these cases gave normal blood estrin values, rates of monthly excretion of estrin a little higher than in the cases of the painful breast, but still probably within normal limits, and no increase in prolan excretion. X-ray of the ovaries led to a disappearance of the pain and to a reduction in the size of the breasts but the use of ovarian hormone by mouth or hypodermic was ineffectual. The coincident pelvic lesions and the incidents associated with the onset of the

breast enlargement were in general the same as those found for the painful breast.

The conclusions in regard to the causes of this type of hypertrophy must be similar to those for the painful, nodular breast.

C. ABNORMAL SECRETION FROM THE NIPPLE

The local physical characteristics as well as the conditions under which abnormal nipple secretion occurs seem to distinguish it somewhat from the two preceding groups: the average age of these patients was higher; the proportion of women with preceding pregnancies was much greater; menstrual disturbances were more frequent, particularly in the form of delayed menstruation; the average daily excretion of estrin was lower; the secretion did not disappear at once after x-ray of the ovaries.

In many cases, however, the characteristics of the painful breast were present, notably the cyclical pain and swelling, the diffuse nodularity and certain coincident pelvic lesions.

It is concluded that the cases with abnormal secretion are a heterogeneous group, the following representing a possible classification of these.

1. Cases with a non-specific discharge, serous, sanguineous or purulent, from local disease of the larger ducts.
2. Cases reported in the literature with a definite nervous factor either in the form of direct stimulation of the nipple, or a central nervous system disease, such as tabes dorsalis or syringomyelia.
3. Cases reported in the literature with definite evidence of endocrine disease, such as the instances of amenorrhea with follicle or corpus luteum cysts. To this group may belong the cases of temporary secretion in the early menopause, theoretically ascribable to the sudden decrease in ovarian activity or the increased function of the anterior pituitary.
4. In a large group of cases one is forced to maintain the alternative theories noted for the other two types of breast disease, namely an as yet undetermined variety of endocrine disturbance or a little known form of neurovascular disorder.

While nonmalignant tenderness of the breasts is usually due to endocrine disturbance affecting the secreting apparatus, it may occasionally be caused by *nonsuppurative panniculitis*, pictured in Figs. 1100 and 1101. A case of this disease was reported in detail and the literature reviewed by Binkley, from whose article came these illustrations.



CHAPTER XVII

THE LOWER INTESTINAL TRACT IN RELATION
TO GYNECOLOGY

BY H. S. BROOKES, JR., M.D.

The close anatomic and symptomatic relation between the lower intestinal tract and the female generative organs necessitates the consideration of this portion of the intestinal tract, particularly the anorectal region, in the diagnosis and treatment of gynecologic affections.

The accurate interpretation of lower pelvic discomfort requires information as to the condition of the immediately adjacent bladder and rectum as well as of the genital tract. The location of the bladder and urethra causes them to be palpated in the regular vaginoabdominal examination, and thus any existing tenderness or induration is found and leads to special urinary-tract investigation. As the rectum lies far back in the pelvis, it is missed in the vaginoabdominal palpation—and the rectal condition causing or aggravating the patient's distress is likewise missed. The result is a mistaken or partial diagnosis and inadequate treatment.

The objectives of this chapter are: to call attention to the importance of rectal palpation in women coming with pelvic symptoms, to indicate the cases requiring further rectal investigation, to give an idea of the further methods that may be employed, and to assist in the care of minor rectal conditions which the physician may wish to handle.

History

Rectal symptoms as described by the patient are very helpful in some cases, while in others they are vague and uncertain. For example, the majority of patients diagnose every rectal condition as "piles," and it is up to the physician to determine whether the "slight attack of piles" represents a simple varicosity or an anal dermatitis or an advancing rectal cancer.

Examination

Rectal Palpation.—When a patient comes with pelvic symptoms, the examination to determine the cause or causes of those symptoms should include rectal palpation of the posterior part of the pelvis as well as vaginoabdominal palpation of the middle and anterior portions. Simple rectal palpation, before removal of the glove after the vaginoabdominal and speculum examinations, will give factual knowledge of the important hemorrhoidal area (where chronic irritation may cause much distress or give rise to a new growth) and of higher rectal and perirectal conditions.

To those not familiar with the maneuver, it is surprising how much help rectal palpation gives in outlining a mass in the cul-de-sac and in determining the facts in regard to fluctuation, nodulation, uterine or adnexal attachment, parametrial involvement and rela-

tion to the pelvic wall. Rectoabdominal palpation may aid materially in clearing important items which remain uncertain in spite of careful vaginoabdominal palpation.

Rectal palpation of the posterior wall of the pelvic cavity enables identification of those cases in which the pelvic distress is due to arthritis or neuritis in the coccygeal area (coccygodynia) or to neuritis involving the sciatic nerve or sacral plexus (Fig. 244). Backache interpretation requires internal palpation of the posterior part of the pelvic cavity and of the posterior pelvic wall, as well as localizing palpation externally of the lumbar and sacral areas (Figs. 171 and 284). For combined internal and external palpation of the coccyx and sacrococcygeal joint (Fig. 283) the patient is changed from the dorsal to the semiprone position (Sims' position), on the right or left side as preferred. With the combined use of the finger inside and the thumb outside, the coccyx and lower sacrum can be outlined and points of tenderness accurately located. Thus it can be determined whether the discomfort is due to arthritis, with the tenderness limited to the sacrococcygeal joint and much pain on movement of the joint, or to neuritis, with tenderness extending over the whole region, or to inflammation, with tenderness limited to the infiltrated area, or to deformity (from injury or disease) so marked as to interfere with rectal function or cause painful pressure on some nerve.

There are certain things which diminish the pain or discomfort of rectal palpation. The gloved finger should be well lubricated and the introduction should be made gradually, the patient at the same time being told to "bear down" slightly so as to relax the sphincter muscle. The strong contraction or "spasm" of the muscle blocks the opening, but with steady even pressure and the patient "bearing down" the muscle gradually relaxes. Of course, any painful condition aggravates this sphincter spasm, and in such cases a local anesthetic application may be needed, such as the 20 per cent cocaine solution mentioned under Instrumental Examination.

Instrumental Examination.—The necessity of instrumental examination of the rectum will be determined by the findings on rectal palpation and by the patient's history of her trouble. If there are rectal symptoms which the digital palpation of the rectum does not account for, then investigation with instruments is advisable. Following are listed those ordinarily used, with methods of use.

The **anoscope**, such as Kelly's (Fig. 1102), is used for examination of the anal canal by direct light, or by light reflected from a head mirror. It is a short speculum, one and a half to two inches long; and after being lubricated, it is inserted to its full length, and the obturator removed. As the tube is slowly withdrawn, the canal is inspected carefully, observing the appearance of the mucosa, and looking for hemorrhoids, internal openings of fistulae, and fissures.

The **proctoscope** (Fig. 1102) is a longer instrument than the anoscope, and is used for examining the upper rectum. It is about six inches long; and can also be illuminated either with reflected light by the use of a head mirror, or by direct light by using a proctoscope with a special electric light attachment. Another special attachment is a glass cap fitted so that air can be forced in with a hand bulb and the rectum thus inflated (Fig. 1102). With the patient in the semiprone position, the lubricated instrument is inserted gently, the obturator removed, and the condition of the mucosa and the valves of Houston is noted. A local anesthetic is seldom necessary for a proctoscopic examination, but may be needed in cases of stricture or other painful condition. Examination can usually be made after a pledget of cotton saturated with 20 per cent cocaine solution has been inserted and allowed to remain for several minutes. If the rectum contains feces, a small enema of boric acid solution will usually clear it.

The **sigmoidoscope** (Fig. 1102) is an instrument ten or twelve inches long which can be illuminated with reflected light or electric light attachment. The Tuttle and Yeomans types of sigmoidoscopes are very satisfactory, the former having a small electric light at the distal end and the latter having the light near the proximal end. The proximal end can be closed with a glass cap to which a hand bulb can be attached for forcing air into the rectum. The electric current comes either from dry cells or by attachment to the reg-

ular electric light system with a reducer. Sigmoidoscopic examination can usually be done without a local anesthetic; but in slightly painful conditions of the canal, application of 20 per cent cocaine solution to the surface will relieve the pain and permit examination. In certain cases with very painful conditions, and in apprehensive or neurotic patients, a general anesthetic will permit a satisfactory examination, which otherwise could not be made. Besides the dangers common to a general anesthetic, an added danger is the greater possibility of injury to the intestine when the patient is unable to complain and thus limit the extent of the pressure or distention.

In the preparation of the patient, if the rectum contains feces, lavage with boric acid solution will usually empty the rectum and sigmoid. When the large intestine is atonic, more elaborate preparations are necessary. In these cases, the day before the examination, the patient should take three drams of magnesium sulphate; and three hours before coming to the office a large saline enema should be taken, followed two hours later by an injection of one-half pint of clear water containing one dram of glycerin.

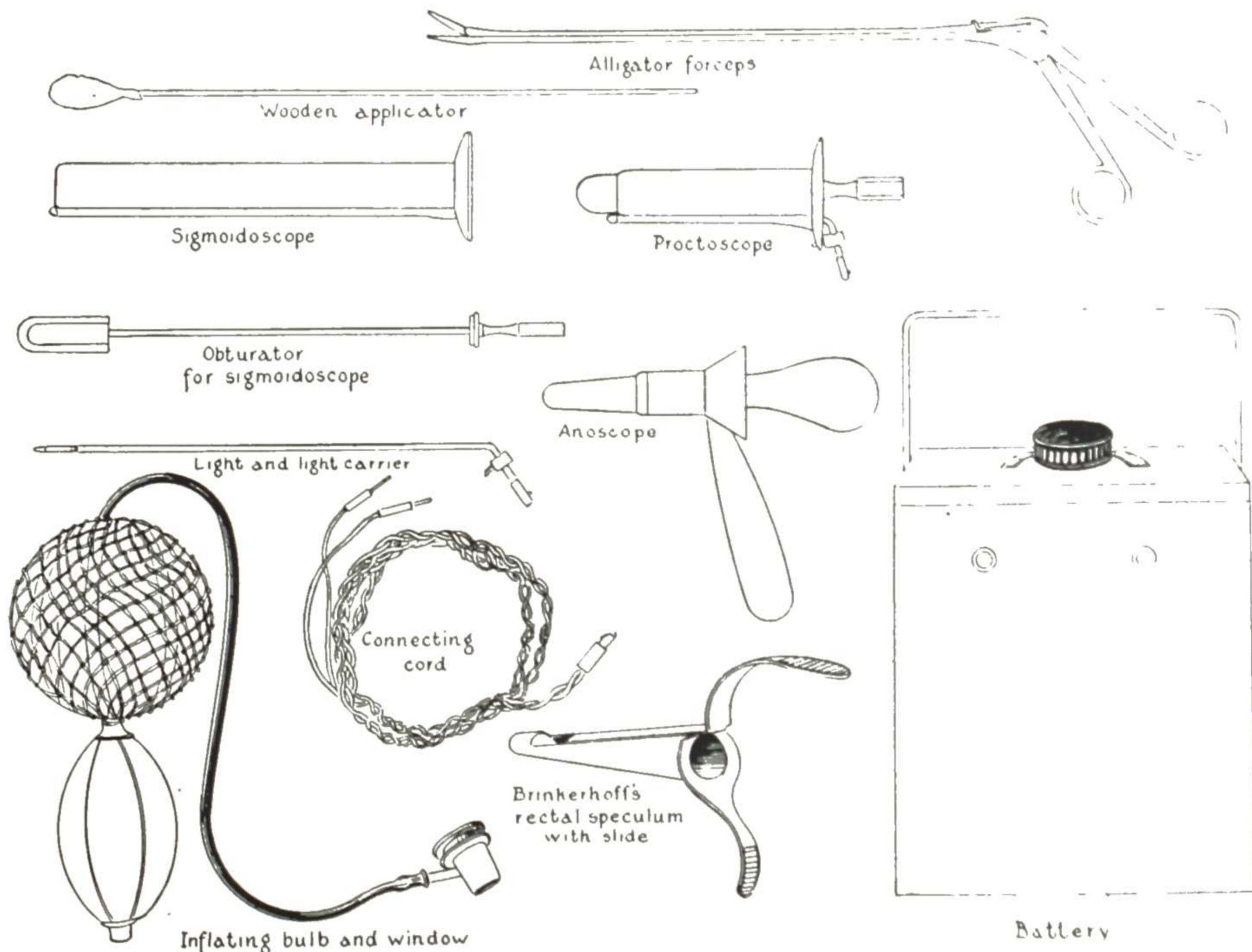


Fig. 1102.—Articles for instrumental examination of the rectum, and also for treatment.

In arranging the patient for the sigmoidoscopic examination, she is placed in the knee-chest position, unless she is particularly hypersensitive or it is difficult on account of physical disability. The index finger is inserted first to lubricate and dilate the anal canal. The lubricated sigmoidoscope is passed while the patient strains as instructed. After the anal canal has been passed, the handle is gradually lowered and pushed forward until the end of the instrument has reached the middle portion. The obturator is removed, and one can see the margins of the three or four valves of Houston. As the tube is passed on, these valves and the rectum are inspected by direct vision, the instrument being gradually raised and pushed onward to the sacral promontory where resistance may be met in the form of a well-developed fold of mucous membrane. This can be effaced with the end of the instrument, which is passed on into the sigmoid flexure. Areas of congestion and ulceration should be looked for. These may be evidence of simple inflammation or irritation, or signs of more serious trouble, such as tuberculosis or carcinoma.

X-Ray Examination.—The ordinary diagnostic methods should be used before the patient is referred for x-ray examination. Digital and instrumental examinations will differentiate the large majority of lesions of the rectum and lower half of the sigmoid far more accurately than the x-ray can. This does not detract from the valuable assistance rendered by the x-ray in certain conditions. It is usually advisable to ask for a complete gastrointestinal series whenever the symptoms are not accounted for by the ordinary examination. After giving bismuth or barium preparations, the roentgenologist, at stated intervals, makes fluoroscopic examinations, or stereoscopic or simple photographs. These examinations will outline the form and position of the colon, detect displacements and points of chronic intestinal obstruction; differentiate mechanical from physiologic delay, locate strictures and diverticula, as well as be of great value in the diagnosis of appendicitis. X-ray examination following a barium enema will show the length and mobility of the pelvic colon, obstructions by adhesions or strictures or new growths, and the efficiency of the functioning of the distal colon and rectum. After injecting fistulae with lipiodol or bismuth paste, x-ray films will outline the tortuous tracts.

DISEASES OF THE ANORECTAL REGION

The following diseases will be considered in the order mentioned:

Pruritus ani.	Hemorrhoids.
Fissure in ano.	Stricture.
Fistula.	Proctitis.
Anorectal abscess.	Foreign bodies.
	New growths.

Pruritus Ani

Pruritus ani, of all rectal conditions, is probably the most annoying to the patient and the most stubborn in responding to treatment. Because it is rather common and appears so simple, those who are afflicted with it cannot understand why it is not easily cured.

It is a condition of the skin about the anus characterized by annoying or severe itching, and tending to become chronic and to recurrence. At the beginning there may be no gross changes in the appearance other than congestion. In an effort to relieve the itching the patient scratches, thus producing a chronic inflammation; and the abrasions and fissures become portals of entry for the bacteria, so that an infective process is superimposed. In chronic cases the skin appears thickened, pale from loss of pigment, and moist and abraded, due largely to the scratching. In old cases the skin becomes parchmentlike, smooth and leathery, as a result of the subcutaneous fibrosis. The terminal nerve endings may be compressed by this new fibrous tissue and so aggravate the itching. The changes occur especially in the midline, anterior and posterior to the anus, and frequently involve the vulva; when a large area is involved, it resembles eczema.

Etiology.—Different writers attribute this disease to various causes; some believe that it is a primary disease in itself, and others say it is a symptom of some underlying condition.

Murray says it is an infection caused by the *Streptococcus fecalis*; but others think the pruritus occurs first, and the infection is secondary, caused by the scratching. Diet, physical exercise, and certain constitutional diseases such as diabetes, allergy, and endocrine imbalance, seem to have some relation to it. Hill divides the cases of pruritus into two classes. In his first group there is a coexisting rectal disease which keeps the perianal skin moist with discharges; the skin becomes soggy and soft, and pruritus results. In the second class are the cases in which no evident cause can be found; they are apparently

due to infection by the streptococcus or other intestinal flora. Intestinal worms may cause itching in the anal canal or at its orifice. Pediculi or fungus organisms may be responsible. The presence of any condition which would prevent proper cleansing of these parts may be a factor. Local congestion is usually noticed in pruritus, and hemorrhoidal veins may be an etiologic factor. Foci of infection in the teeth, tonsils and other organs should be looked for. Diseased organs, far removed from the site of itching, may be the etiological factor. Also there may be more than one source of the trouble.

Symptoms.—The chief symptom is a severe, tantalizing, local itching, which may be intermittent or continuous. It may be confined to a small area or spread over the entire perianal region. It is usually worse at night, causing loss of rest and sleep, and more noticeable in warm weather. The nervous strain and physical suffering may make the patient unfit for ordinary duties.

Diagnosis.—The diagnosis can usually be made easily, based on the history and the examination. The early cases may have only slight skin lesions; but in more advanced cases the skin may be dried, reddened, wrinkled, and thickened, or blanched, moist, and macerated.

Examination of the parts is made for worms or pediculi, ulcer, fissure, or suppurating sinus. Prolapsing or ulcerated hemorrhoids should be looked for, and a rectosigmoidal examination should be made for the source of any pathologic discharge. A thorough general examination is advisable in order to discover diseases in the various organs and tracts, foci of infection, and general constitutional diseases. Joslin states that the pruritus in diabetes is more likely to be general; but, if local, it usually affects the vulva.

Treatment.—The treatment depends upon the etiology, as to whether the condition is due to a local infection or to a coexisting rectal or constitutional disease. The patient should be treated for any general constitutional disease and for any local rectal conditions, such as external hemorrhoids with their ragged tags of redundant skin which prevent proper cleansing of the parts, or for conditions causing the formation of irritating mucus, such as prolapsing internal hemorrhoids or mucous membrane. Treatment should be given to superficial ulcers and abrasions of the anal canal and to polypi, fissures, and fistulae. It is sometimes surprising to note the quick relief obtained in pruritus by the cure of a coexisting small lesion of the anal canal.

In the **general treatment** attention should be paid to the diet, limiting tea and coffee, prohibiting alcoholic beverages, reducing sweets, allowing small amounts of meats, and encouraging the drinking of water freely, especially alkaline waters. Cotton or linen underwear should be worn and also an anal pad of absorbent cotton, which should be changed frequently. A powder may be dusted on the cotton to help keep the parts dry, such as:

	Gm. or c.c.
℞ Phenol	0.60
Amyli pulv.	15.
Pulv. zinc oxid. q. s. ad.	30.

The patient should be cautioned against scratching; and, if necessary, she should wear white cotton gloves at night to prevent scratching while asleep. Sedatives may be used for insomnia; but it is best not to use opium derivatives, because of the habit-forming danger in such a chronic condition. Sodium bromide, veronal, allonal, and similar sedatives may help in producing a restful sleep. After each bowel movement the parts should be cleansed with cotton wet in warm water, followed by witch hazel, and blotted, not rubbed dry with cotton.

In the local treatment applications are to be varied with the condition of the skin. Very often dry applications are more effective than ointments; but if the skin is inflamed, painful, and itching, soothing applications should be made. The following combination is helpful and should be applied as required to control itching:

	Gm. or c.c.
℞ Phenol liq. -----	4.0
Calamin praep. -----	8.0
Zinc oxid. -----	16.0
Glycerin -----	16.0
Liq. cal. hydrox. -----	30.0
Aq. ros. -----	240.0

Applications of 0.5 per cent yellow oxide of mercury give considerable relief in some cases. For a dry application the following powder is helpful:

	Gm. or c.c.
℞ Boric acid -----	8.0
Zinc stearate -----	8.0
Talcum -----	30.0

In older cases in which the skin is tough and leathery, Adler applies a saturated solution of silver nitrate, using first a 10 per cent solution of cocaine if there are any abrasions present. The silver application is repeated every four or five days until the dead epithelium has been removed. At each visit after the application the exfoliating layers of epithelium are removed, the anal region is cleaned with cotton, and any excoriated areas are cleansed with tincture benzoin comp. This is continued until the skin regains its original color and elasticity.

X-rays have been used extensively, but with relatively poor results. A small number of patients have apparently been cured. Temporary relief has been obtained in many cases. Some use fractional and others, intensive doses.

Ultraviolet rays are theoretically a good form of treatment, because of the claim for germicidal action of the rays; but, practically, the results have been disappointing so far.

Ionic medication is advocated by Rolfe, of Boston. It is a form of electrical treatment by which the ions of certain salts having marked antiseptic properties, such as those of zinc, iodine, or mercury, are driven into the deeper layers of the skin by a direct current of electricity of low voltage. The treatment is based on the fact that the disease is an infection of the perianal skin caused by one of the streptococcus groups. Such treatment requires special apparatus and experience. It has proved successful in some cases, and has given considerable relief in others.

Vaccine treatment is applicable only to those cases of pruritus ani due to infection, usually by the *Streptococcus fecalis*, according to Murray. An autogenous vaccine is made from the surface of the cleansed pruritic skin, and frequent injections are given, beginning with small doses and working rapidly up to massive doses. Murray apparently had more success with this method than other workers have had.

Subcutaneous injections of alcohol locally have been used for their destructive effect on the network of fine terminal sensory filaments. With the patient in the lithotomy position under a light general anesthesia, 95 per cent grain alcohol is injected with a short fine needle. The needle is plunged vertically through the skin, and from 2 to 4 drops of the alcohol are injected in the subcutaneous tissue at each puncture. Punctures are made about $\frac{1}{4}$ of an inch apart. There is very little after-soreness, and the itching stops immediately. There is numbness of the perianal skin, but there is no disturbance in the act of defecation. A few patients are apparently cured, and some are relieved for several years; but in many, the itching returns in from six to twelve months. These patients can be reinjected, thus gaining relief for another period.

Yeomans advocates the use of benacol, a nontoxic, highly anesthetic, moderately antiseptic preparation. About 2 c.c. of benacol are slowly injected subcutaneously at the periphery of the pruritic area, the solution being distributed in a fan-shaped area to the anal margin. This injection takes in a single quadrant of the perianal tissues, beginning in the quadrant in which the itching is most intense. Treatments are repeated at intervals of two or three days until the whole area is injected. This course of injections may be repeated at intervals of five days until the itching ceases.

In those cases of chronic dermatitis in which the vessels are obstructed and the nerve endings ensnared, after all exciting causes have been investigated and treated without relief, operation is resorted to in order to free the entangled nerves and constricted vessels from subcutaneous adhesions.

Fissure in Ano

A fissure is a break in the mucous membrane near the anal margin, within the grasp of the sphincter. It occurs most commonly in the midline, anteriorly or posteriorly, and is usually superficial; but, occasionally, it is deep enough to expose the muscle fibers. The fissure has an elliptical appearance; but, on full exposure, may appear as a round ulcer. It is almost always single, and when multiple, it may be of specific origin (syphilitic, gonorrhoeal, or tuberculous).

Etiology.—Constipation is considered the principal cause, the mucous membrane being torn by the forced passage of hard fecal masses. The passage or introduction of foreign bodies may traumatize the mucosa. Ball and Gant think that typical fissures are produced also by the tearing of the crypts of Morgagni; this is brought about by the deposit of small fecal masses in these pockets, followed by pressure on them at bowel movement. This causes a tearing of the valves at the edge of the crypts, the laceration gradually extending with each passage. Other predisposing factors are any conditions which weaken the tissues and render them liable to abrasion, such as polypi, pruritus, trauma, or any type of inflammation about the anus.

Symptoms.—In superficial fissures there is usually a sharp shooting pain during defecation, lasting only a short time afterward. With deeper fissures there is the same sharp pain with defecation, followed by a dull, dragging pain or ache, lasting several hours, or in some cases being constant. Because of the close association of the nerves supplying the anal canal and the genito-urinary organs, there may be reflex or referred symptoms to one or more of these organs which might lead to confusion in the diagnosis.

Diagnosis.—The symptoms are so typical that a correct diagnosis can usually be made from the history alone. On separating the buttocks and asking the patient to strain, the fissure can usually be seen in the midline, anteriorly or posteriorly. Or one may see a prominent skin tag, which frequently has a fissure situated at its base (often referred to as a sentinel pile). Digital examination to detect complicating conditions is likely to be difficult, because of the local pain and muscular spasm. However, local anesthesia is usually sufficient to relieve the pain and spasm, and permit the examination.

Treatment.—Prophylactic treatment consists in making it a habit to have a daily bowel movement, keeping the parts clean, and taking proper care of other rectal conditions. Palliative treatment should be used in simple cases where the ulcer is superficial; and it may be tried also in the more severe cases, where the patient frequently has the morbid fear of any operative procedure.

Relief is occasionally secured by palliative treatment in the more severe cases; and, if not, the patient has had the opportunity to see the futility of delay and becomes more cooperative. Rest is important; and the bowels should be regulated by diet and, if necessary, some form of mineral oil should be given by mouth once or twice a day. Careful injection of from 2 to 4 ounces of warm cottonseed oil at night through a soft rubber catheter will soften and help lubricate the movement. Constipated bowel movement is injurious and painful, and liquid movements are very irritating.

If the pain is very severe, an ointment of cocaine or morphine, 5 to 10 grains to the ounce, may be applied. Applications of 15 per cent ichthyol in glycerin every four or five days are often helpful. The pain is relieved first by applying a 20 per cent solution of cocaine directly to the fissure, stretching the sphincters moderately with the fingers, and then applying the ichthyol on a small pledget of cotton and allowing it to remain for several hours.

Touching the fissure with silver nitrate is a common method of treatment, with rapid healing in some cases. Digital dilatation under general anesthesia will usually give temporary relief, and, at times, permanent cure. Frequently, there is a severe pain after this treatment, which can usually be relieved by inserting a suppository, such as belladonna and opium.

Injections of quinine and urea hydrochloride are used with good results. A freshly prepared 5 per cent aqueous solution of quinine and urea hydrochloride is injected one-eighth inch below the edge of the fissure. Two minims are deposited beneath the skin; the needle is then advanced, and a total of 15 minims is gradually injected. The solution is irritating, and may cause the patient severe pain for a few minutes after the injection.

Operative treatment consists of incision or excision of the fissure. While operative treatment will usually completely disable the patient for a few days, it will shorten the time of partial disability and suffering, and be more certain of preventing recurrence.

Fistula

A fistula is a chronic suppurating canal having one or more external openings about the anus, or an internal opening into the rectum, or both. A complete fistula has both an internal and an external opening. An incomplete fistula has only one opening, either external or internal. If the opening of an incomplete fistula is outside the anorectal line, it is called a blind external fistula; or if within the rectum, it is called a blind internal fistula. Usually there is only one internal opening, but there may be several external openings.

Etiology.—Most fistulae develop from abscesses; and, in the rare cases with no previous abscess history, they are due to organisms gaining entrance through the abrasions of the mucous membrane, such as an anal fissure. The failure of a complete fistula to heal is due to the constant passage of fecal material and gases through the tract. In a blind internal fistula there is also passage of fecal material into the sinus, healing being prevented by the imperfect drainage. The nonhealing of blind external fistulae is due to the constant motility of that area from respiratory movements, action of the bowels, and movement of the sphincter muscles. Tuberculosis and syphilis are also causes of fistulae.

Symptoms.—Ordinarily, there is so little pain that a patient may not know she has a fistula, or there may be a dull ache or feeling of discomfort. When the external opening closes, as it often does, especially in a blind external fistula, there may be considerable pain until the abscess again opens and the

pressure is relieved. With complete fistulae there is likely to be more pain when the internal opening is large, thus allowing the passage of fecal material which keeps up the irritation and produces the extensive burrowing. When the internal opening is small, there is little irritation unless the stools are liquid.

Diagnosis.—There is usually the history of an abscess that has opened spontaneously or has been incised. The external orifice may be a slit in the skin, or an ulceration of varying size, or may be a small projection or a cicatricial depression. A probe can often be passed through the fistula from the external to the internal opening; but if it does not pass readily, the internal opening can often be located by inserting the finger into the rectum. The internal opening may be located also by injecting through the external opening a solution made up of two parts of methylene blue and one part of hydrogen peroxide. The gas liberated by contact with the discharges carries the methylene blue to all ramifications of the tract, and with a speculum one can watch the point from which the solution escapes internally. X-ray pictures following the introduction of bismuth paste or lipiodol, give one an idea of the number and direction of the sinuses.

Tuberculosis is to be suspected when the fistula has a large, irregular-shaped opening with bluish-tinted undermined edges. Microscopic examination of an excised specimen from this area will complete the differentiation.

Treatment.—Operation is the only treatment that really offers reasonable hope of cure in fistula. However, because of the slight discomfort caused by most fistulae, and the patient's fear of an operation and of incontinence, many will insist on other than operative treatment. The external opening should be kept free for proper drainage, by dilatation, if necessary, by hot packs and sitz baths, and by keeping the feces well formed. Injections of bismuth paste have been used with indifferent success. Beck's bismuth paste is composed of one part of bismuth subnitrate and two parts of vaseline; this was formerly commonly used in the treatment of fistula in ano. Gant says: "This treatment is tedious, usually fails, and when force is used bismuth sometimes ruptures the main tract, or gets caught in branch sinuses where it later causes irritation." He uses bismuth only in those cases which, for one reason or another, are inoperable.

In operative treatment the fistula may be incised or excised, or treated with an elastic ligature which gradually cuts through.

Anorectal Abscess

The perirectal tissues are frequently infected due to traumatism caused by hard stools or instrumentation. It is surprising that infection of the perirectal tissues does not occur more frequently. This may be explained by the fact that pus-forming organisms are not usually present in the stool, and that there is an extensive protective blood supply. Damage to the mucosa permits entrance of the organisms to the deeper tissues, with possible abscess development. If the abscess forms above the levator ani muscle, it will be a superior pelvirectal or a retrorectal abscess. If the abscess forms below the levator ani muscle, it will be an ischioirectal or a postanal abscess.

Pain, tenderness, swelling, and fluctuation will indicate the location of the abscess. The two important points of treatment in pararectal abscess are the locating and division of the internal opening, and institution of adequate drainage.

Hemorrhoids

Hemorrhoids, or piles as they are frequently called, are considered the most common disease of the rectum. They are varicose swellings involving the veins and capillaries of the mucosa and submucosa of the anal canal, and are characterized by a tendency to bleed.

Etiology.—There are many predisposing factors, such as age, sex, occupation, habits, diet, cathartics, enemas, and complicating affections of the bladder, uterus, liver, heart, and kidneys.

Hemorrhoids are rare in infancy, being most frequently found at middle age. They are said to occur twice as often in males as in females. This may possibly be accounted for by the fact that being accustomed to the regular menstrual flow, women do not attach as much importance to rectal hemorrhage as do the men. A sedentary life, when muscles become atrophied and relaxed with impairment of general health, has much influence in causing piles. On the other hand, those engaged in heavy work, involving great straining and lifting, are also subject to piles. Improper diet, by causing constipation with its resultant straining, drastic cathartics, and affections of the various organs, are factors in the production of hemorrhoids. Anything causing pressure and thus interfering with the return circulation, such as distended colon, large fibroids, or pregnancy, is very likely to produce hemorrhoids. Piles which develop during the last months of pregnancy will generally disappear a short time after the pressure is removed. The most satisfactory explanation of the basic cause is anatomic, i.e., the erect posture and the absence of valves in the portal system.

Classification.—Hemorrhoids are divided into three main groups: external, internal, and mixed or combined externo-internal. External hemorrhoids are further divided into venous and cutaneous types, the venous types being either thrombotic or varicose and the cutaneous types being redundant or hypertrophic tags.

EXTERNAL HEMORRHOIDS

External Thrombotic Hemorrhoids are swellings, varying in shape and size from that of a pea to that of a small English walnut, occurring at the anal margin. They are usually single.

Thrombotic piles usually appear suddenly, due to the rupture of a vein during coughing or straining, or from direct injury to the anal region. Heavy lifting, violent exercise, straining at stool, or injury caused by digital or instrumental examination, may be responsible for the development of a thrombus.

At first there is a pricking or uneasy feeling at the anus; but later, as the bleeding from the ruptured vessel continues, the swelling becomes larger, the skin tension is increased, and the patient complains of the pain and swelling. The pain is often so severe as to prevent sleep in any position, but it usually subsides in two or three days.

The **diagnosis** is easily made from the history of sudden onset, hypersensitiveness, acute pain, and the finding at the anal margin of a firm oval mass of bluish color.

The **treatment** may be palliative or operative. Palliative care consists of rest in bed, softening of the bowel movements, and applications of hot or cold packs or of a soothing lotion or ointment, such as the following:

	Gm. or c.c.		Gm. or c.c.
℞ Liq. plumbi subacetatis--	16.0	℞ Ung. stramonii -----	6.0
Tinc. opii -----	10.0	Ung. belladonnae -----	10.0
Aq. dest. q. s. ad. -----	120.0	Ung. acidi tannici -----	15.0

The above palliative treatment is applicable only in the small thrombi, operation being preferred in the large tumors or because of the slow response to palliative measures of the small thrombi.

In operative treatment the clot is enucleated under local anesthesia, and the wound is packed with a strip of gauze for twenty-four hours. Some prefer to remove the mass in toto, by an elliptical incision of the skin about the base of the tumor, and then close the wound with catgut sutures.

External Varicose Hemorrhoids.—This type is not very common, and appears as tortuous or pouchlike dilated veins near the anal margin. They, alone, cause little discomfort other than a sensation of fullness and uneasiness about the anus during defecation.

The **treatment** is usually palliative. They may be reduced in size by rest, cold packs, and some astringent application. The bowel movement should be soft, and the conditions responsible for the persistent straining must be corrected. It is seldom necessary to operate for this condition alone, as it causes very little trouble; but if one is operating for another anorectal disease, these enlarged veins may be removed with the Paquelin cautery or by dissection or ligation.

External Cutaneous Hemorrhoids.—These are not vascular piles, but may be an enlargement or thickening of one or more of the normal folds of skin about the anus, or may consist of a skin tab with a broad base or a pedunculated projection. They may be secondary to cancer, fissure, stricture, or other diseases accompanied by a discharge which keeps the perianal skin irritated. This type seldom causes much trouble, except the greater care necessary to keep the parts clean. Pruritus may develop from insufficient cleansing.

Treatment.—Cleanliness of the parts, regulation of the bowels, and, if the condition is acute, rest in bed and cold applications, will give relief. Also applications of the calamine and phenol lotion, previously mentioned, or of a 1 per cent cocaine solution, if needed.

Operative treatment cuts short the inflammatory period and prevents the possibility of recurrent attacks. Under local anesthesia this type of hemorrhoid can be easily removed with a pair of curved scissors, permitting the wound to heal by granulation.

INTERNAL HEMORRHOIDS

Internal hemorrhoids are vascular swellings situated in the lower rectum, just above the anorectal line. Typically, they consist of a conglomerate mass of dilated venules with chronic inflammatory changes in the connective tissue stroma, and a covering of rectal mucosa which is more or less diseased.

Etiology.—Some patients give a history of an inherited structural weakness. Hemorrhoids in later life are part of a degenerative change affecting all the tissues of the body. The sphincters are thin and atonic, and proper muscular support is lacking. The upright posture and lack of valves in the portal vein into which the hemorrhoids drain are anatomic factors. Increased abdominal pressure and straining at stool caused by constipation are predisposing causes.

Symptoms.—Bleeding and protrusion are characteristic symptoms. Bright red blood is passed in smaller or larger quantities at bowel movement. Protrusion is usually a late symptom. Pain is not a characteristic symptom, although smarting or throbbing may occur at defecation. Prolapsed internal hemorrhoids may become inflamed, thrombosed, and strangulated, and are then very painful and tender.

Diagnosis.—With careful examination one should be able to differentiate internal hemorrhoids without difficulty. The area is inspected, the patient, in the Sims position, being instructed to bear down while the buttocks are separated by the examiner. The mucosa protrudes, exposing the piles and possibly other associated conditions, such as fissures. Digital examination is of little help in the diagnosis of hemorrhoids unless there is thrombosis; but hemorrhoids are often secondary to conditions in the bowel above, and digital examination will aid in the discovery and diagnosis of such complications. Instrumental examination by the use of the endoscope or proctoscope is of great help, for the longer instrument permits examination of the upper rectum and sigmoid, and on its withdrawal the hemorrhoids prolapse into the lumen.

Treatment.—Palliative treatment is sometimes successful in early cases, and may be tried in cases in which the hemorrhoids never protrude. It may be used also where there is contraindication to operation. Rectal injection of one ounce of olive oil before retiring will relieve constipation and lubricate the fecal mass so that it is passed without injury to the hemorrhoidal tumors. Ointments may prevent inflammation and relieve pain. They should be applied immediately after bowel movement so as to come in direct contact with the tumors, and help in the reduction of the mass. Zinc oxide ointment is useful when applied on toilet paper over the index finger, or by inserting the perforated tip of a collapsible tube and compressing the tube, or the ointment of stramonium, belladonna, and tannic acid may be used in collapsible tube.

If there is much pain, astringent and analgesic ointments are used as follows:

	Gm. or c.c.		Gm. or c.c.
℞ Cocaine hydrochloride----	0.5	℞ Morphine hydrochloride--	0.6
Menthol -----	0.6	Ext. belladonnae -----	15.0
Adips. benzoinati -----	30.0	Adips. benzoinati -----	30.0

Many types of suppositories containing various drugs, such as cocaine, morphine, belladonna, ichthyol, aristol, or adrenalin chloride, have been used, and are further beneficial because their introduction tends at the same time to reduce any piles that have prolapsed.

Injection methods have been greatly exploited and are very helpful in certain cases, but their indiscriminate use in all kinds of cases has caused them to be condemned. More recently the injection method has again become popular as a legitimate form of treatment, when properly used in selected cases. The object of the injection is to set up inflammation in the pile tumor by the injection of an irritant. The resultant inflammatory infiltration produces a gradual obliteration of its vessels without causing a slough. At the present time a 5 or 10 per cent solution of carbolic acid in almond oil, or a 5 per cent aqueous solution of quinine and urea hydrochloride are the solutions most commonly used. They give very good results in many cases. It is best to treat only one or two hemorrhoids at a time, although several may be present. If prolapsed, they should be reduced before treatment is begun. Strangulated hemorrhoids should not be injected until the acute symptoms have subsided. The hemorrhoids are brought into view with a small, conical, fenestrated speculum; a fine-pointed needle is inserted into the center of the hemorrhoid, and ten minims of a 5 or 10 per cent solution are injected. The hemorrhoid becomes swollen and indurated, this induration lasting from ten to fourteen days. During this time the blood vessels of the tumor are obliterated and fibrous tissue develops, causing the vessels to shrink and practically disappear. If the hemorrhoidal tumor is still marked after two weeks, it should be reinjected.

Operative treatment is indicated when other measures fail. Many operations have been devised and suggested for the treatment of internal hemorrhoids, but the ligature and clamp and cautery methods are the ones that receive general recognition.

Stricture

A stricture of the rectum is a narrowing of the lumen. There are two varieties, the annular and the tubular, and either may be congenital or acquired.

Etiology.—The congenital stricture of the rectum is rare, and if present, it is usually associated with abnormalities in other parts of the body. Acquired strictures may be due to chronic inflammatory processes or trauma. Ulcerations heal by granulation, leaving a certain amount of scar tissue. Operative procedures, such as the removal of hemorrhoids, may be followed by stricture if too much of the mucous membrane is sacrificed or if too much of the submucous tissue is removed.

Strictures at the anal orifice may be caused by too free removal of the external skin which in healing becomes so contracted that it will not allow dilatation of the external sphincter. Also, the motility of the muscle is diminished by the scar tissue infiltration. Strictures at the level of the internal sphincter may be due to too free removal of the mucous membrane or to an infective ulceration of this area, following a hemorrhoid operation. Strictures in the rectum proper are usually due to ulceration in the bowel or to infiltration around it. There is also a type of spasmodic stricture caused by worms, irritating discharges, foreign bodies, fracture of the coccyx, and diseased structures adjacent to the anal canal. Syphilis was thought to be the most common cause of stricture, but few of the lesions show local evidence of syphilis, and the serology is negative in a large number of the cases. A disease which has been recognized more frequently in recent years, lymphogranuloma inguinale or lymphopathia venereum, is one of the many factors in the development of inflam-

matory strictures. The staphylococcus, colon bacillus, and streptococcus are frequent causes of inflammatory strictures. New growths within the rectum or tumors pressing from the outside may cause a mechanical narrowing or complete obstruction of the lumen.

Strictures above the internal sphincter are found about five times as frequently in women as in men, occurring in the large majority of women during the childbearing period. The frequency in women may be attributed to perirectal extension of genital inflammation, or to injury in difficult labor from the use of forceps, or from long pressure of the head on the rectum.

Symptoms.—A history of progressive constipation and frequent incomplete evacuations of the bowels, resulting in a great deal of straining and tenesmus, should arouse suspicion of stricture. Other symptoms are passing of ribbon stools, abdominal distention, and griping abdominal pains. Ulceration usually occurs, due to the loading and distention of the colon with fecal matter, resulting in the passage of blood and pus. The general health is impaired, the appetite becomes poor, and there are indigestion and loss of weight.

Diagnosis.—A very large percentage of strictures can be reached for diagnosis by digital examination. One should determine the size, shape, length, and also the extent of infiltration and ulceration about the stricture. The malignant stricture gives the impression of a tumor, feeling much like the cervix uteri through the rectal wall, except that it is nodular and often associated with invagination of the mass. The benign stricture is usually easily differentiated. If it is at the anal orifice, the skin is tightly drawn down and will rarely admit the index finger. If it is at the level of the internal sphincter, there is an annular bandlike stricture; but a stricture above this level gives the impression of passing one's finger into the mouth of a funnel. A positive Frei test is indicative of lymphopathia venereum.

Treatment.—In regard to prophylaxis, proper surgical technic and suitable postoperative care will prevent in most cases the formation of stricture following hemorrhoid and other rectal operations. Treatment depends upon the location of the stricture.

At the anal orifice dilatation causes considerable pain, so that a simple operation is preferred. This consists of a division of the fibers of the external sphincter under local anesthesia, followed later by digital dilatation. Annular strictures near the level of the internal sphincter, if seen early following hemorrhoid operation, can be cared for by dilatation. When seen later, operation is necessary. Strictures at the level of the internal sphincter, or above, are difficult to handle in regard to a cure. Considerable relief can be obtained by gradual dilatation up to three-fourths of an inch, and this may be repeated, as necessary, to maintain a fair-sized opening. Some have obtained results with the use of carbon monoxide snow or diathermy, the former causing a softening of the stricture from edema, the latter by increasing the blood supply in the scar tissue.

In lymphopathia venereum sulfanilamide has been beneficial in many cases. Good results are sometimes obtained from intracutaneous injections of Frei antigen.

Besides the surgical measures, diet and regulation of the bowels are necessary. The patient should have a nutritious, but not too bulky, diet, avoiding spinach and other rough vegetables and, especially, rice. Constipation should be corrected by regular habits and mineral oil, one-half ounce three or four times a day.

Proctitis

Catarrhal inflammation of the rectum may have a common origin with similar conditions of the mucous membranes of other portions of the body; and,

because of the similarity of structures and continuity of the mucosa, the colon, sigmoid, and rectum are frequently involved in the same inflammatory process.

Etiology.—In some people susceptible to certain reflex disturbances, chilling of the body is sufficient to produce an attack of acute inflammation. In others, it is produced by irritating cathartics, or by certain foods or drinks, or by parasites. Foreign bodies or impacted feces can produce slight wounds or abrasions which permit infection of the mucous membrane by the bacteria ordinarily present (colon bacillus, streptococcus, staphylococcus). Other bacteria sometimes found are the dysentery ameba, typhoid and tubercle bacilli, gonococcus, and pneumococcus. The rectal mucosa is very susceptible to irritation by radium, and large doses used in the vicinity, for example, for carcinoma of the cervix uteri, may produce early or late ulceration, with very distressing symptoms.

Symptoms.—Acute proctitis is characterized by sensations of heat, weight, and fullness in the rectum, with aching, throbbing pain, often radiating to the sacrum, down the limbs, and to adjacent organs, such as the bladder. Often there is also a constant desire to empty the rectum, with severe tenesmus. In catarrhal inflammation there is first a hyperemia and outpouring of mucus, leucocytes, and red cells. Later, proliferation and desquamation of the epithelium may take place.

Diagnosis.—In acute conditions the parts are tender, and digital examination is very painful; the parts feel hot, dry, and swollen; and there are congested areas, which bleed very easily when the secretions are wiped away.

Treatment.—In the milder cases diet and rest are often sufficient. A liquid diet, principally of barley water and strained oatmeal gruel with broth (beef, lamb or chicken), is advisable. At the beginning of treatment a large dose of castor oil will rid the bowel of any irritating substance. In more severe cases local treatment should be started to relieve the tenesmus and pain, and to prevent the acute conditions from becoming chronic. Rectal irrigations, by means of a return flow tube, of normal saline or bicarbonate of soda or boric acid solution should be given, with the patient in the knee-chest position. Use one or two quarts of the solution and allow it to run in slowly. After this has been passed, the patient can be examined. The secretions are wiped away, and the involved areas are painted with silver nitrate solution (10 grains to the ounce) or 10 per cent argyrol, or 15 per cent balsam of Peru in castor oil. The irrigations should be given daily, and the local applications used at intervals of three or four days. Daily retained enemas of one or two ounces of olive oil are also soothing.

Foreign Bodies

Foreign bodies may lodge in the rectum after being swallowed, or may be inserted directly through the anus. Occasionally they may migrate from adjacent organs, or may form within the intestinal tract, such as gallstones or fecoliths. Foreign bodies may penetrate and lodge in the rectum as the result of an accident, but by far the greater majority are inserted deliberately, either out of curiosity, by perverts, or to relieve certain local conditions. The history

is difficult to obtain because of the reluctance of the patient to admit such acts on her part, or the patient is unaware of having swallowed anything which might produce such trouble.

Some foreign bodies are expelled spontaneously, some are easily removed, but others may require considerable ingenuity and skill to remove without serious damage to the rectal wall. The ingestion of large quantities of soft bulky foods or agar agar, followed by a laxative, may assist in expelling small objects.

Nonmalignant Growths

The most common forms of anorectal benign tumors are polyps and condylomas. **Polyyps** may be single or multiple. The term refers to a pedunculated growth, but does not designate the type of cell. Polyyps are usually benign in origin, but may undergo malignant change. The most common type of polyp is the adenoma, which usually originates from an inflammatory hyperplasia of the glandular elements of the mucosa. Such growths occur more commonly in children.

The most common symptom is bleeding at stool. There may also be constipation, straining at stool, a feeling of incomplete evacuation, and occasionally, the tumor may protrude through the anus. These growths can usually be felt by the examining finger, and proctoscopic examination will show the exact location, size, and number of the tumors.

Treatment consists of crushing the pedicle at its base and snipping the tumor off with scissors, without anesthesia, or the pedicle may be ligated and the tumor permitted to slough off. When there is an elongated base, a wide excision can be made, followed by electric coagulation of the site of removal. In multiple polyposis, treatment consists in the removal of any irritating process, and accessible tumors are snared through the proctoscope.

Condylomas.—These growths are also known as venereal or anal warts, papillomas, and verucca, but are not venereal in origin. They are caused by irritating discharges, and produce a tumorlike growth which surrounds the anus and has a cauliflower appearance. They are soft and bleed easily. Treatment consists in removing the cause of the discharge and cutting away small growths under local anesthesia, or removal of large growths under general anesthesia with the cautery.

Cancer

Cancer of the rectum and sigmoid occurs about as frequently as cancer of the uterus, and next to the stomach, they are the most common locations for all intestinal growths. Carcinoma occurs more frequently after middle life.

Etiology.—Cancer of the rectum bears the same relation to that organ as cancer bears to other parts of the body. There are found here the many predisposing factors and precancerous conditions that are found elsewhere; and many theories have been advanced to explain the etiology, but the specific cause is still unknown.

Symptoms.—External growths manifest themselves early to the patient, but in internal cancers the early symptoms are vague, with no tumor or local change visible to the patient. The earliest symptoms are some slight changes

from the regular action of the bowels, associated with tenesmus and uncomfortable sensations. The symptoms gradually increase, the bowel movement becomes "unsatisfactory," and the patient has a more or less constant desire to have a movement. The passing of blood and pus are usually late symptoms, as are also marked loss of weight and cachexia, as the growth in this part of the alimentary canal does not interfere in the assimilation of nourishment. Pain is an important symptom in epithelioma of the anus, but it is seldom pronounced in rectal carcinoma, unless the growth is very low or involves the sacral or pelvic nerves.

Diagnosis.—As the symptoms are not characteristic of carcinoma alone, the patient should have a thorough examination. Failure to make a diagnosis may be due to omitting the rectal examination or to an incomplete examination, the investigation stopping when some coexisting condition is found; or to failure to do a proctoscopy in cases where the tumor is beyond the reach of the examining finger. In late cases rectal cancer can usually be felt with the index finger, possibly as a protuberant mass superficially ulcerated, or as a craterlike excavated growth with an indurated base, or as an annular constriction with nodular or ulcerated surface, occurring especially at the rectosigmoidal junction. In doubtful cases proctoscopy should always be done as a supplement to digital examination, as it will reveal tumors beyond the reach of the finger. X-ray examination is unnecessary for tumors of the rectum and lower sigmoid, but is of great help in detecting lesions higher up.

Treatment.—The treatment of cancer of the rectum requires radical measures, which need not be detailed here.

CHAPTER XVIII

INVASION OF THE PERITONEAL CAVITY

For the Treatment of Gynecologic Diseases

In the treatment of certain gynecologic affections it is necessary to invade the peritoneal cavity. This invasion of the great peritoneal sac in the center of the body necessarily carries with it much risk to the patient. In the preantiseptic days the mortality was great—so great that the operation was but rarely resorted to. By modern antiseptic and aseptic methods, however, the mortality has been reduced to a very small percentage. Though the mortality of the operation is small, we must not forget that there is a mortality due directly to the operation. The danger varies much in different cases, depending on the particular form of disease present and on the condition of the patient at the time of operation—but there is some danger in every case. Attention must be called to this because some physicians seem prone to overlook, or at least fail to give proper weight to the fact that occasionally a patient, with everything apparently favorable, will die, and no one can promise any patient absolutely that she will survive. One may say, in a favorable case, that the risk is very slight and that in all probability the patient will go through the operation and convalescence without trouble. But though the risk is slight, it is nevertheless a risk, which the patient must assume when she finally decides to have the advised operation.

In advising operation, the surgeon advises what he feels is best and safest for the patient after careful consideration of the various factors. He must consider not only the risk of operation but also the risk of waiting, which in certain cases means additional complications and increased danger. If this point is made clear to the patient, it aids her in a difficult decision.

The peritoneal cavity may be entered in two ways—by abdominal section (incision through the abdominal wall) or by vaginal section (incision through the vaginal wall).

ABDOMINAL SECTION

Abdominal section is incision into the peritoneal cavity through the abdominal wall. This is known as “celiotomy,” “laparotomy,” and “suprapubic section.” All these terms refer simply to the incision through the abdominal wall into the peritoneal cavity and not to the subsequent operative manipulations carried out within the cavity.

The incision may be located at any part of the wall—in the median line or laterally. The direction of the incision may be longitudinal or transverse or oblique, or a combination of these directions.

There is usually some additional operative procedure carried out after the peritoneal cavity is opened, and this additional procedure frequently gives the name to the whole operation—for example, ovariectomy (abdominal section

with removal of an ovary or an ovarian tumor), myomectomy (abdominal section with removal of a myoma of the uterus), abdominal hysterectomy (abdominal section with removal of the uterus).

Indications and Contraindications

Abdominal operation is employed to take care of serious and disabling conditions which cannot be handled by less dangerous methods of treatment.

The more common contraindications to operation are marked nephritis (especially interstitial nephritis), diabetes, inoperable cancer, and advanced pulmonary tuberculosis.

Any chronic disease, general or local, causing marked weakness and lessening the patient's resistance, may contraindicate operation in a particular case. Also, acute diseases that might be aggravated by the operation, any condition that would contraindicate general anesthesia (if such is to be used), or dermatitis at the site of operation.

All these contraindications are, of course, only relative. There may arise circumstances demanding the operation at once in spite of contraindications—that is, circumstances in which the danger of delay would be greater than the danger of immediate operation. But when the case is not one of extreme urgency, the operation should be postponed until the complicating condition can be corrected and the patient placed in better condition.

Pregnancy increases the danger of abdominal section very decidedly, but it is not often a contraindication for the reason that the disease requiring operation (for example, a large tumor or an abscess) precludes the full development of the fetus or makes the dangers from advancing pregnancy greater than those from immediate operation.

Dangers

The immediate dangers of an abdominal section are three:

1. Failure of the vital forces to stand the shock of the operation. This shock is due principally to (a) the loss of blood, (b) the handling of intraperitoneal structures, and (c) the anesthesia.

2. Failure of the vital organs (heart, lungs, kidneys, and gastrointestinal tract) to perform the extra work thrown on them in the first few days following the operation.

3. The development of infection, causing general peritonitis or localized suppuration.

PREPARATIONS

For Abdominal Section

In order to reduce to a minimum the dangers of the operation, careful preparation is required.

The various items of preparation may be conveniently grouped under three headings, which will be considered in the following order:

- A. Preparation of the patient.
- B. Preparation of instruments and dressings.
- C. Preparation of operator and assistants.

A. Preparation of the Patient

The patient, having been subjected to a careful general examination, including urine analysis, to exclude contraindications, is sent to the hospital one or two days before operation, that the proper preparation may be carried out. Of course there are cases of rapidly spreading pelvic inflammation, or of intraabdominal hemorrhage or injury, in which the abdomen must be opened at the earliest possible moment. In such a case there is no time for preliminary preparation—careful immediate sterilization is carried out and the abdomen is then opened. But when the case is not an emergency one, the preliminary preparation should be made. It gives the patient a decidedly better chance of complete and uninterrupted recovery.

Medication.—Sleep is important, and it is well to have a regular order for sodium bromide or other sedative, to be given as needed to quiet the nervous system and avoid wakefulness.

A preanesthetic sedative eliminates the anxiety of the trip to the operating room and starting the anesthesia, and also reduces the amount of anesthetic required. For this purpose, morphine sulphate, $\frac{1}{4}$ gr., and atropine sulphate, $\frac{1}{150}$ gr., given about forty-five minutes before operation, are used by many. For some years the authors have been using hyoscine-morphia analgesia as a preanesthetic sedative, and with much satisfaction. Morphia sulphate, $\frac{1}{4}$ gr., and hyoscine hydrobromide, about $\frac{1}{130}$ gr. (one ampule—B & W), are given hypodermically one hour and forty-five minutes before the operation. The hyoscine (but *not* the morphia) is repeated forty-five minutes later, i.e., one hour before operation. The patient is then kept quiet with the room darkened until taken to the operating room.

The hyoscine-morphia analgesia eliminates the preoperation anxiety, which is so troublesome to some patients and more or less troublesome to all. As a rule, the patient knows nothing about the trip to the operating room and the induction of anesthesia and is surprised when she learns that the operation is over. Also, the patients take the anesthetic more quietly and require less for operations of the same length. Again, there is less post-operative vomiting and distress. The dose of the drugs should of course be adjusted to the size and condition of the patient, being somewhat less than the above for small or weak individuals.

When spinal anesthesia is to be employed the following preanesthetic sedation is preferred: ten grains of sodium barbital are given by mouth one and one-half hours before the operation.

Hypodermic injection of pantopon, one-third of a grain, with scopolamine, one one hundred and fiftieth of a grain, is given one hour before the operation. The patient's ears are stopped up with cotton, the eyes covered and the room kept quiet.

Light diet is to be given up to and including noon of the day before operation, then liquids only, but with water in abundance. After midnight, just preceding operation, nothing is to be given by mouth but water, and the water may be continued to within an hour of the operation.

An enema is to be given the night before, and again the next morning. The idea is to have the intestinal tract in as nearly normal condition as possible, with just a good clearing out of the lower bowel just before the operation. Experience has shown that this simple method of preparation brings the patient to the operating table in better condition and causes less disturbance after the operation than the prolonged dieting and purging formerly employed.

In cases of marked habitual constipation and cases in which the bowels are not to be moved for some time after operation, such as in repair of complete laceration into the rectum, it is well to clear out the intestines some days before, but avoid prolonging increased peristalsis to the operation. When there are complications that may necessitate resection of the intestine or opening of the stomach, then, of course, the usual preoperative measures for approximate sterilization of the upper intestinal tract would be indicated.

Preliminary Sterilization of the Field.—In the preparation of the operative field, as in the intestinal preparation, the trend of practice has been toward simplicity. It has been found that some of the measures formerly employed served to irritate the skin and increased rather than diminished the chance of inflammation. This was true particularly of the strong antiseptics applied for long periods preceding operation. Instead of the extensive soap poultice and the prolonged antiseptic pack, the following method, with minor modifications, is now employed generally:

The afternoon before operation the abdomen is lathered and shaved. It is then scrubbed with green soap and, after soap is removed, with sterile water, and then the surface is washed with alcohol. The cleansed surface is covered with a sterile towel or sterile cotton, held in place with a binder.

In most of the gynecological cases vaginal preparation also is needed, because part of the operation is vaginal or the vagina is to be opened into or conditions may be found requiring it to be opened. On this account, preoperative vaginal preparation along with the abdominal is made routinely, unless otherwise ordered in some exceptional case.

In the *preliminary vaginal preparation*, the pubic region, vulva, and perineum are shaved, and a douche is given. Then 8 c.c. of 1 per cent solution of neutral acriflavine in glycerin ("A-G" solution) is injected into the vagina, and a sterile perineal pad applied. Next morning, after the enema has been expelled, another vaginal injection of the acriflavine solution is made and the pad applied.

Catheterization.—A convenient time and place for the catheterization is during the preparation in the operating room immediately preceding operation—during the vaginal preparation if made; otherwise just before the abdominal preparation. Catheterization at that time has the added advantages of emptying the bladder immediately before operation (instead of an hour before, after which a troublesome amount of urine may collect in some cases) and of avoiding disturbance of the patient while hyoscine sleep is being induced.

Preparation in Operating Room.—The final sterilization of the abdominal field is ordinarily carried out as the patient is being anesthetized, though exceptionally it may be advisable to complete this preparation before the anesthesia is begun in order to save time under the anesthetic. As previously explained, vaginal preparation also is advisable in most abdominal cases, and this is usually completed just preceding the abdominal preparation. If the patient is in good hyoscine-morphine sleep, no additional anesthesia is needed for the vaginal preparation, which may be immediately proceeded with.

The patient's hips are drawn to the edge of the table and the feet are supported out of the way by stirrups. The external genitals and vicinity all round are cleansed thoroughly with green soap and warm water, using gauze or cotton balls, rinsed with sterile water, and then with bichloride or cyanide solution.

Catheterization is now carried out with strict asepsis, the labia being held away and the meatus specially cleansed. The sterile catheter should be lubricated and care should be taken to avoid contaminating the bladder portion with soap or irritating antiseptics.

The vagina is then cleansed with green soap and warm water, rinsed with sterile water, and then with bichloride or cyanide solution, using small pieces of gauze or cotton and opening the vagina with a speculum. If the opening is too small for the speculum, a finger may be used beside the sponge forceps. The details of vaginal preparation are explained later under Vaginal Section.

If the operation is to be complete abdominal hysterectomy, some iodine solution is applied to the vaginal vault, and removed with alcohol. If the hysterectomy is for a condition accompanied with infective uterine discharge, the cervix is grasped with a tenaculum forceps and the uterine cavity is packed with a quarter-inch gauze drain moistened with iodine solution.

When the vaginal preparation is finished, the patient is drawn back to the proper place on the table, the leg supports are removed, and the abdominal field is prepared. In arranging the patient on the table for the abdominal preparation and operation, watch that the knees are just at the joint of the table top, so that they will bend with the joint when the feet are lowered slightly in the later Trendelenburg position. When the patient is in position and the arms and hands are arranged safely (Fig. 1103), the abdominal surface is painted with the iodine solution over the large area shown in Fig. 1104.

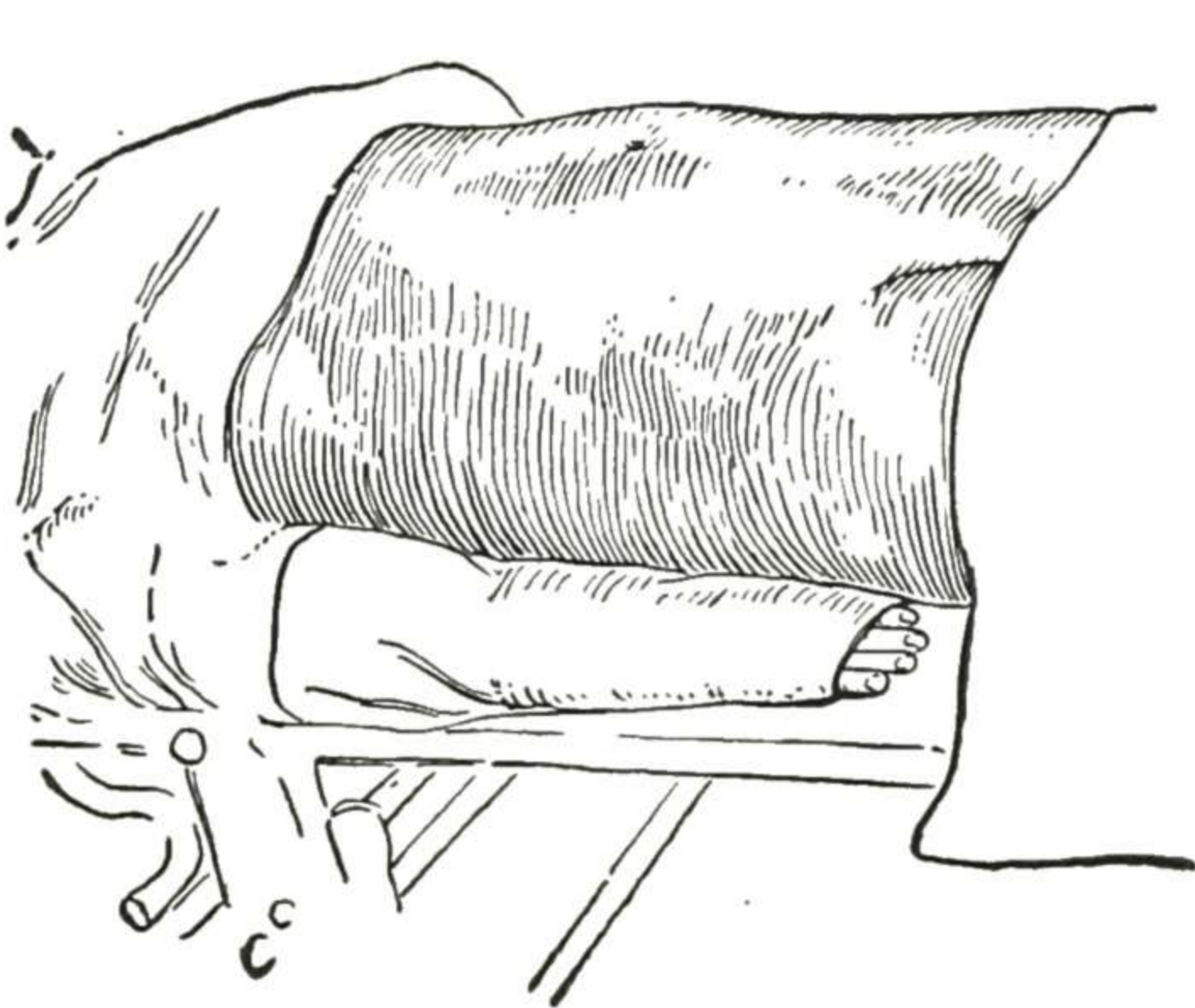


Fig. 1103.

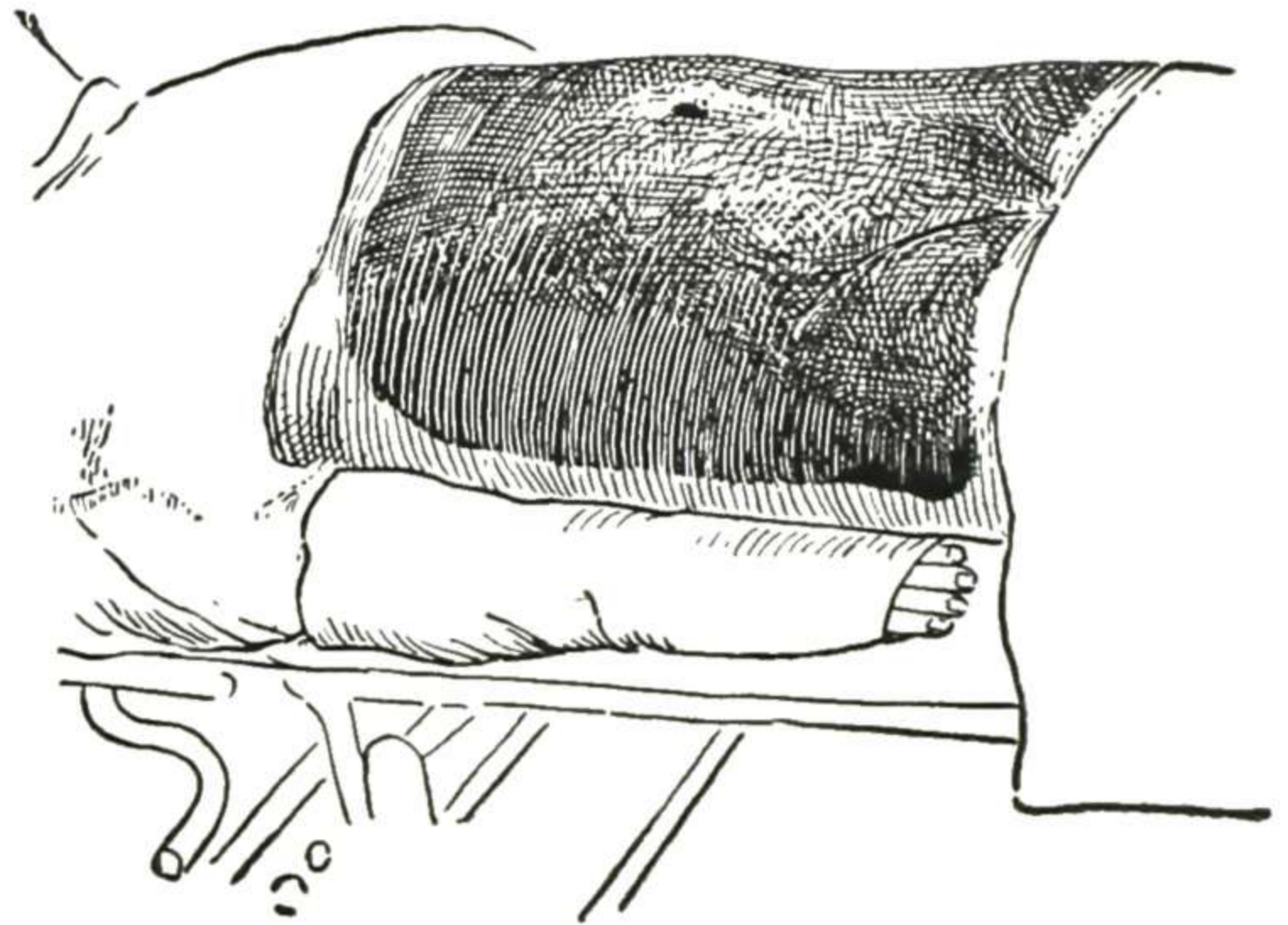


Fig. 1104.

Fig. 1103.—Another safe position of the arms during anesthesia, and the preferable one for abdominal operation. This effective arm protection is secured by the use of the special arm restraint. When ready to restrain the arms, the upper flap is raised out of the way and the lower flap is brought up over the arm and tucked under the patient, taking care to smooth it out so that it goes well above the elbow and also down to the middle of the fingers. Then the upper flap is brought down over the arm and tucked securely under the patient. The hand should lie flat on the table, as indicated by the fingers in the illustration.

If there should be some loosening during anesthesia, the upper flap is again pushed well under the patient when relaxation is attained.

This illustration shows also a step in the operating room preparation of the operative field. The vaginal preparation (which is advisable in most cases of abdominal operation for pelvic disease) has already been made, the patient has been pulled up on the table to the position for abdominal operation, the leg supports used in the vaginal preparation have been removed, and the abdominal surface is exposed preparatory to painting it with tincture of iodine (7½ per cent).

Fig. 1104.—Preparation of operative field. The abdominal surface painted with tincture of iodine, which will be immediately removed with alcohol. (Crossen—*Gynecology for Nurses*.)

Particular care should be taken to sterilize the depth of the umbilical depression, to rub in the solution along the line of incision, and to extend the sterilization down over the pubes well beyond the lower end of the incision (Fig. 1104). Iodine is a skin irritant and must be removed with alcohol. Consequently, particular care should be exercised in applying it, that none be allowed to run down where it will escape removal; e.g., to the patient's back or in the genital creases between the thighs. Also, in the removal with alcohol, be sure that no iodine is left around the edges or elsewhere. Some patients have an idiosyncrasy to iodine and any left on the skin causes dermatitis, particularly under the adhesive strips. In this preparation, it is well to use forceps for holding the gauze pieces, as this eliminates contact with gloves and gown sleeves.

In applying the iodine to the abdominal surface and in removing it, special care must be exercised to avoid contaminating the median sterilized area from the unsterilized sides. Keep in mind that the incision is to extend down to the pubic area, and consequently there must be no movement of the gauze swab across this site from the lateral edges of the field.

To avoid such contamination it is necessary to follow a definite plan of procedure with two points in view; namely, (a) no movement of the swab from an unsterilized to a

sterilized area and (b) no movement of the swab from the pubic area (with its numerous hair follicles and greater bacterial content) up over the abdominal surface. At first thought it may seem that this could be easily accomplished by simply making all movements outward from the incisional area. But this is time-consuming, and unless the swab is discarded at the end of each stroke material is carried from the far lateral areas to the center. The following plan is effective, easily followed and may be carried out rapidly (a point of importance in saving time under anesthesia).

The first step is thorough application to the depth of the umbilicus, with discarding of that swab. Then by circular motion, enlarging from the umbilicus, the central area is sterilized down to near the pubic area, as shown in Fig. 1105, one or two swabs being used as needed. In the second step, with downward and outward strokes application is made to the pubic area and adjacent thigh surfaces (Fig. 1106), changing swabs as necessary to avoid recontamination of sterilized surfaces. Then, in the third step, with a fresh swab or two application is made to the outward portions of the abdominal field (Fig. 1107), giving the complete coverage indicated in Fig. 1104. The same plan is followed in the rapid removal of the iodine with alcohol swabs. A final firm wipe is made from the umbilicus down the median line and over the pubes.

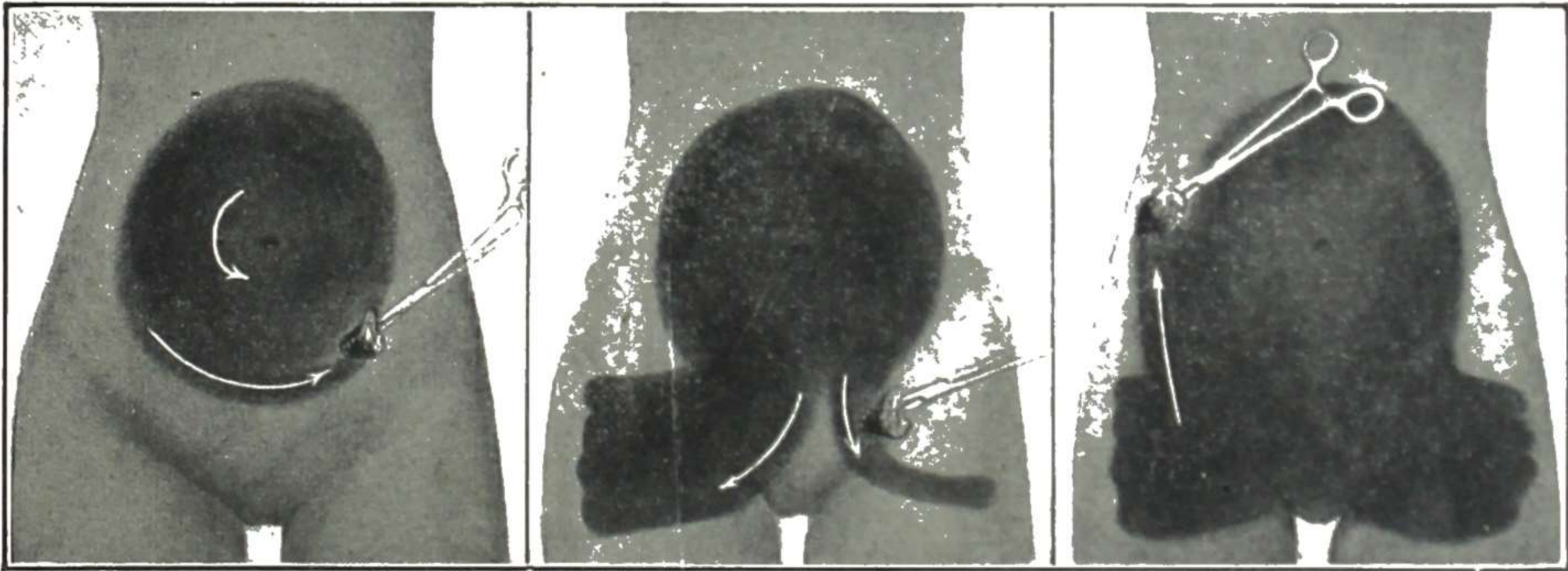


Fig. 1105.

Fig. 1106.

Fig. 1107.

Figs. 1105 to 1107.—Sterilization of operative field. These illustrations are employed to emphasize the necessity of care and systematic procedure in this important feature of preparation for operation. As explained in the text, in order to avoid recontamination of partially prepared surfaces, the sterilization proceeds by three distinct steps.

Fig. 1105.—Completing the first step. Fig. 1106. The second step. Fig. 1107. Starting the third step, which when finished gives the complete coverage shown in Fig. 1104. (Crossen and Crossen—*Operative Gynecology*.)

When the sterilization of the operative field has been completed, the area is draped with the sterile coverings, the patient's hips are elevated to the Trendelenburg position, and the small platforms for the operator and assistants to stand on are slipped into place (Fig. 1108).

When preparing to place the Mayo table over the patient, the leg-rest is dropped slightly and then the table is slipped into place. This lowering of the feet in the Trendelenburg position should be very slight, only enough to level them out of the way of the Mayo table. Any considerable dropping of the feet and legs increases the tension of the abdominal wall, and is to be avoided.

The sponge bag is clamped to the laparotomy sheet at a convenient place as indicated in Fig. 1108, in order to facilitate pulling the strip-sponge out of the containing bag and placing the soiled portions in the receiving compartment. The sponge-end of the bag should be at the *pubic end* of the incision so that the sponge passes to and from the pelvic cavity *always over the pubic area*, which is free of forceps.

In the operating room after anesthesia, all preparations should be carried out *rapidly*. Every minute's prolongation of the preparation takes time which may be urgently needed at the critical stage of the intra-abdominal work. This is a very important point, and it should be repeatedly impressed on assistant physicians and nurses. Every preparation should be carried out as rapidly as accuracy will permit. The saving of seconds and minutes under anesthesia is much facilitated by good teamwork among those engaged in the preparation of patients. The repeated emphasis of this point by the chief assistant physician and by the nurse supervisors will create an *esprit de corps* that makes for rapid accurate work—to the benefit of every patient handled and to the added satisfaction of all concerned.



Fig. 1108.—Preparation of operative field. The patient has been elevated into the Trendelenburg position and the continuous-strip sponge bag has been clamped in place. The small platforms for the operator and assistants to stand on have been pushed into position.

The gauze-strip sponge bag is in position. Notice that the sponge-end of the bag is at the *pubic end* of the operative field, so that the sponge will be carried into and out of the pelvis over the pubic area which is free of forceps. (Crossen—*Gynecology for Nurses*.)

B. Preparation of Dressings and Instruments

The dressings, pads, towels, sheets, gowns, instrument trays, and basins are all put through the steam sterilizer, and kept wrapped ready for use. Attention may be called to certain special points in the preparation and arrangement of the sponges and instruments.

Sponges.—In regard to the form of sponges to be used, the authors strongly recommend the **continuous gauze-strip sponges** for abdominal work. The numerous detached sponges ordinarily used are dangerous and have led to many serious results. A sponge left in the peritoneal cavity following an operation constitutes one of the most deplorable accidents of abdominal surgery. This is not a new subject. Much has been written upon it and many cases have been reported, and many suggestions have been made as to preventive measures. But all such measures hitherto proposed have broken down under the various circumstances and vicissitudes of surgical work, as evidenced by the facts cited in an extensive monograph by the senior author. In this connection attention must be called to the following facts:

a. Sponges are lost in the peritoneal cavity much more frequently than is generally supposed. And it must be kept in mind that the reported cases represent only a small proportion of the recognized cases, for, naturally, the accident is not given publicity except where there is some special reason for doing so. In any large body of surgeons, a little experience meeting, in which testimonies are freely given, will bring to light a number of unreported cases of this accident.

Furthermore, many cases are not even recognized. The patient dies with evidence of peritonitis; there is no suspicion of any foreign body having been left in the abdomen, no postmortem examination is made, and the death is supposed to be due to ordinary peritonitis. The possibilities in this direction are indicated by the fact that in a reported series, in thirty-nine of the cases the accident was recognized only on postmortem examination, when the sponge was found, but would have remained unknown had there been no autopsy.

b. It is a most serious accident. In the large series of cases collected, more than one-fourth of the patients died, and of those who recovered many went through weeks and months of suffering.

c. To persons outside the profession the accident seems absolutely inexcusable. They can understand how other complications may arise, such as hemorrhage or sepsis or kidney failure, in spite of every precaution, but they can imagine no reasonable excuse for allowing a sponge to be lost in the patient's interior. To those not familiar with surgical work it seems past belief that the surgeon would carry into the peritoneal cavity anything the removal of which was not provided for with absolute certainty.

The growing cognizance of the public in regard to the occurrence of this accident and the feeling in regard to the responsibility for it are reflected in the increasing number of lawsuits connected therewith.

d. There has hitherto been no sure preventive method which was applicable in all the circumstances of abdominal surgery. The list of preventive measures recorded shows that much thought has been given to devising means for preventing this accident. Rules interminable have been proposed, and expensive and cumbersome racks and stands devised for the purpose. Not one of these devices, however, has proved absolutely safe, for the reason that in their use the certain removal of all sponges carried into the abdomen depends on the studied attention of the operator or on a system of attentive cooperation among assistants and nurses. While such attentive cooperation is entirely feasible under ideal conditions and with ideal persons, the fact remains that it is not secured and is not likely to be secured under the variable circumstances of abdominal work. The many emergencies which arise in the course of abdominal operations, the changing of assistants and nurses, the hurried operations at night in the hospital with insufficient help, the operations in private homes where the patient cannot be taken to the hospital at all—all these conditions play havoc with safety arrangements depending upon a nicely balanced system of rules and cooperation or on the use of cumbersome racks or stands.

There is not space here to take up in detail the various ways in which mistakes have occurred; suffice it to say that a review of the cases where dependence was placed on counting shows an appalling list in which a sponge was left, because one was hastily torn in two and one-half forgotten, or an extra one was primarily included in the bundle and missed in the counting, or an extra one was secured for an emergency during the operation, or some loose piece of gauze, not intended for intraperitoneal use, slipped in while near the wound, or a mistake was made in the final count of the sponges removed. It is astonishing what slight inattention may lead to a sponge being left, and the consequent death of the patient.

The method of attaching a tape to each sponge and then fastening a forceps to the tape and at the same time to the abdominal sheet is the method probably in most general use. It has a record of many accidents—the tape pulled off the sponge, or there was a failure to attach the forceps, or the forceps failed to hold well. In one case recorded the sponge, tape and forceps were all lost in the cavity.

The difficulty of guarding absolutely against leaving a sponge in the abdomen is such that entire security against this fatal accident is counted one of the unsolved problems of abdominal work. Practically all writers on the subject state that there is no guaranty against its occurrence, even in routine hospital work and with all the rules of cooperation and the special apparatus designed to prevent it. Neugebauer, in a most exhaustive consideration of the subject, comes to the conclusion that the accident is, to a certain extent, unavoidable. Schachner, in an excellent paper, states, "So long as surgery continues an art, just so long will foreign bodies continue to be unintentionally left in the abdominal cavity." Findley states, "In former years the abdominal surgeon was seriously disturbed by well-grounded fears of secondary hemorrhage and sepsis, but surgery has mastered these problems to a large degree and they are little feared and seldom experienced. Now it is the thoughts of the sponge that disturb the night's repose when the report comes that something has gone wrong with our patient. The operator never can rid himself of the feeling of uncertainty as to the possibility of leaving a sponge." This expresses very well the feeling of those who have given attention to this subject, and particularly of those who have personally experienced the accident and have thus been brought face to face with a concrete exemplification of the inadequacy of the usual methods.

The continued occurrence of this fatal accident and the failure of the preventive methods in general use constitute sufficient reason for emphasizing a method which the authors have used with much satisfaction for many years. This method gives entire security and at the same time is simple and inexpensive, and is effective in all conditions of abdominal work—in the emergency operation in the country with unfamiliar assistants, as well as in the routine hospital work. The failure of the safety methods in general use is due to their dependence upon sustained attention concerning the sponges, which attention on the part of the surgeon cannot be given to the sponges, for it is required elsewhere. A method, to be effective under all circumstances, must be practically automatic, insuring the removal of all gauze without particular attention on the part of any one at the time of the operation.

THE METHOD

The underlying principle of this method is the elimination of all detached pads and sponges. In place of them long strips of gauze are used, each strip being packed into a bag in such a way that it may be drawn out a little at a time as needed.

The senior author was led to a study of the subject and the adoption of this method by an unfortunate experience. Following the usual technique he operated for years without accident, and then one day he left a gauze pad in the abdomen. The case was one of diffuse

pelvic suppuration, requiring extensive drainage, and, fortunately, the pad was discovered and extracted through the drainage opening about two weeks later. The patient recovered without serious result from the accident—but the lesson was not lost. He determined to find some method that would really prevent such an accident—a method which would be entirely under the control of the operator and first assistant (a greater division of responsibility increases the danger), and one which would occasion no delay in the closing steps of the operation.

In pursuance of this idea the method described in the illustrations was devised. The object of the method is to make the removal of all sponges automatic, and therefore independent of sponge counting and other uncertain procedures. The essential feature of this method is the substitution of a long gauze strip for the ordinary detached sponges, the greater part of the strip being always outside the abdominal cavity. The strip is ten yards

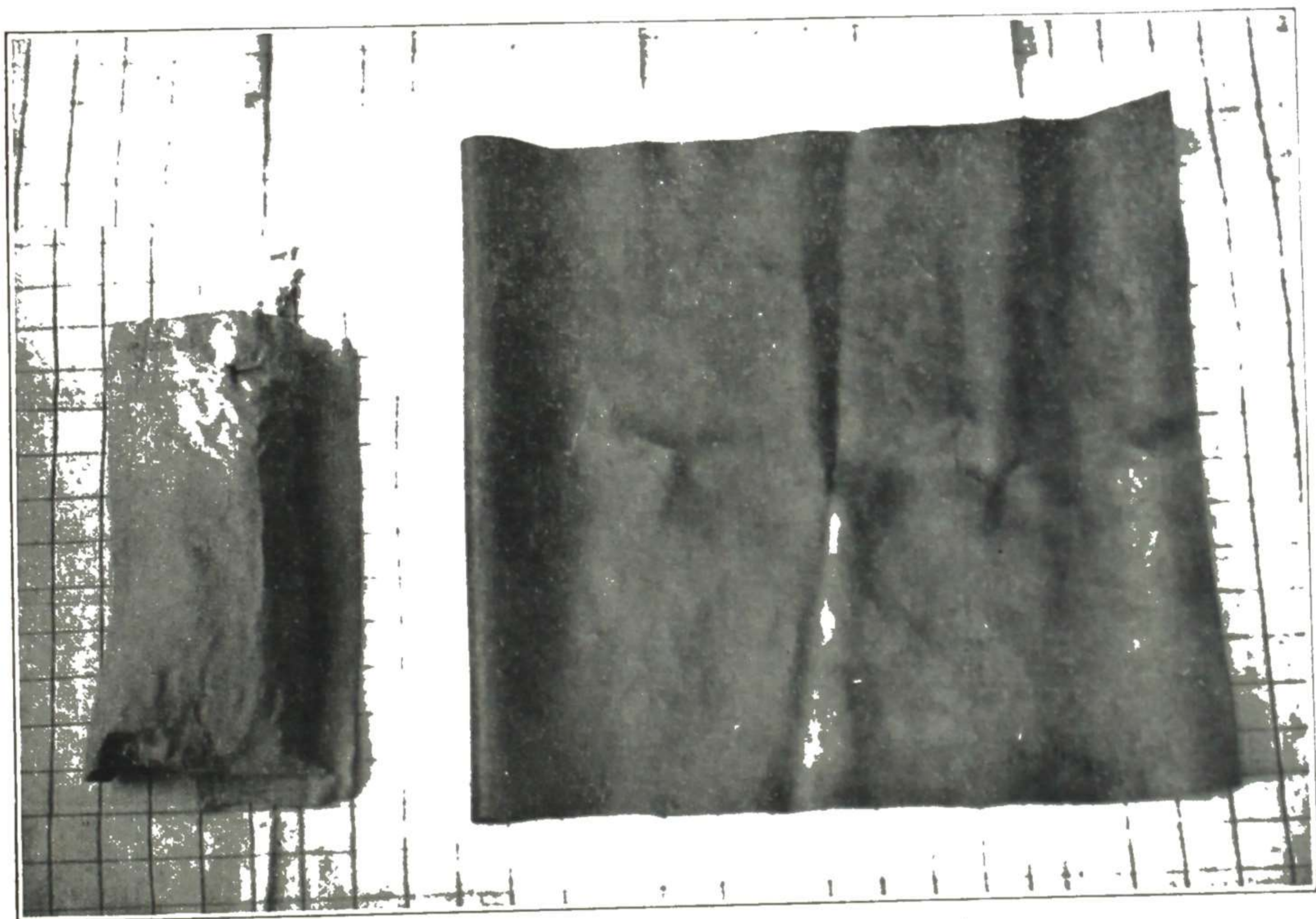


Fig. 1109.—Articles for abdominal sponging and packing.

A, The filled bag, folded and ready to be wrapped for sterilization and storage. B, The heavy rubber sheeting for packing back the intestines. This is very heavy pure gum rubber dam No. 20 gauge, measuring 18 by 36 inches. The lighter weight rubber dam was found not satisfactory for this work. (Crossen and Crossen—*Operative Gynecology*.)

long. Two strips are made by dividing the yard-width of gauze in the center and folding each half longitudinally to six thicknesses. Each strip is therefore ten yards long, about three inches wide, and has six thicknesses of gauze. For protection and convenience in handling, the strip is packed into a small muslin bag, five inches wide and ten inches deep. The end of the strip is stitched near the top of the bag, and the strip is then packed into the bag in such a way that it may be pulled out a little at a time, as needed. The filled bags are sterilized and are then ready for use (Fig. 1109, A). At operation, the bottom of the bag is clamped or pinned to the abdominal sheet, and the gauze strip is pulled out a little at a time as needed for sponging. For packing back the intestines, sheet rubber is used. Experimentation with different sizes and weights resulted in the adoption for routine use of a piece 18 by 36 inches of very heavy pure gum rubber sheeting, No. 20 gauge (Fig. 1109, B). This may be folded as desired.

The arrangements for abdominal packing and sponging thus become very simple (Fig. 1109). The intestines are packed away from the field with the rubber sheeting and the sponging is done with the continuous-strip sponge.

This method eliminates all chance of leaving a piece of gauze in the abdomen, for a large part of the strip is always outside the cavity, and the end is fastened securely outside. An important point is that the sure removal of all gauze is practically **automatic**. It does not depend on the accuracy of a hurried counting of sponges at the close of the operation or catching each spongetape with a forceps as it is put into the cavity, or on a studied "watching what sponges go in and what sponges come out of the cavity." Those methods that depend for safety on the observance of complicated rules or on the strict following of a regular routine, or on the constant attention of the operator, have all broken down, as reported cases clearly show. A method, to be safe and suitable for general use, must be practically automatic in the removal of all gauze carried into the cavity, must be comparatively inexpensive in materials and preparations, must be fairly simple and convenient in use, and must be applicable in every environment, including emergency work in the country. These requirements are met by the method here described.

The dangers from hemorrhage and sepsis in clean cases have been largely done away with through improvements in technique, and now this other serious menace in abdominal work should be eliminated. The patient has a right to demand, and is demanding as the many lawsuits show, that **real protection** be afforded against leaving a sponge in the abdomen. It seems only justice to those who intrust themselves to our care that we should provide absolute security against this fatal accident, so far as such security is practically attainable.

This method also simplifies the preparations for abdominal section—all the many pads and sponges of various sizes being replaced by two strips of gauze. The gauze is simply folded and then tacked by a few stitches at each end to prevent unfolding. Nurses as a rule welcome the method, stating that it is much less troublesome than the sewing of the numerous small pads and sponges. The bags may be used again and again after sterilization.

LONG INSTRUMENTS

In about one-fourth of the recorded cases of a foreign body left in the abdomen, the article left was a forceps or piece of an instrument or other small object used about the wound. This calls attention forcibly to the fact that small instruments should not be allowed about an open abdominal wound. Neugebauer long ago called attention to this danger of small instruments, and urged the use of long instruments exclusively in abdominal work.

Many surgeons have adopted this safety measure, but there are many others who seem to give no thought to the matter, and continue to use numerous small instruments in this dangerous locality. It may not be possible at present to prevent entirely the accident of leaving some article of the surgical armamentarium in the abdomen, but it is possible to reduce the danger to a minimum by the use of long instruments exclusively, and it seems to me that all those who are engaged in abdominal surgery should be led by common prudence to adopt this simple expedient. The details, as carried out in the authors' work, are as follows: Every instrument used about the wound is long—so long that a portion of it is practically always outside the abdominal cavity. Again, if by accident such an instrument should slip entirely into the cavity, its length is such that it would almost certainly be felt when the hand is carried into the cavity for the final palpation before closing. All the artery forceps, dissecting forceps, tenaculum forceps, pedicle needles, scissors, and other instruments for internal work are from six and one-half to eight inches long, the shortest being the large dissecting scissors (six and one-half inches). The shortest instrument used anywhere about the wound is the scalpel (six inches), which is laid aside as soon as the

peritoneal cavity is open. The needles and Murphy buttons are not brought near the wound, except when held with a forceps or with a suture attached. No Michel clamps (for holding rubber tissue or gauze along the wound margin) or other small unattached objects are allowed near the wound as long as the peritoneal cavity is open.

It is not necessary to take space for instrument lists for various operations or the details of their sterilization and arrangement. The operating-room nurses have their complete lists and directions covering these items, which belong to nursing and may be found in detail in the books on the subject, for example, the authors' *Gynecology for Nurses*.

Suture Materials.—Many different types and sizes of catgut are used by different operators in pelvic abdominal work. To simplify matters the authors have adopted three kinds for routine use. For ligating and suturing specially heavy pedicles, No. 1, forty-day catgut is used. This long-lasting catgut answers the purpose where a strong, lasting approximation is necessary, as in fastening the broad ligament pedicles to the vaginal vault in complete hysterectomy. For ordinary pedicle ligation and approximation, we prefer catgut that is more quickly absorbed, such as the twenty-day catgut. The terms "forty-day" and "twenty-day" refer to the lasting period in connective tissue, but the lasting period is very much less on peritoneal surfaces and especially on mucous surfaces.

The plain catgut is used, in slender intestinal needles, for suturing in conservative work on the ovaries and tubes and for suture-ligation of the meso-appendix and other small delicate pedicles. It is used for tying the stump of the appendix, preceding the silk or linen inverting suture, and also for the closing skin suture.

The twenty-day catgut is used for all the layers of the abdominal wall except the skin, and for inside ligating generally.

ARRANGEMENT OF SUTURES AND LIGATURES

The progress of an operation is much facilitated if all the sutures likely to be used are threaded and ready before the incision is made. In preparing for the ordinary abdominal operation for pelvic disease, it is well to have needles threaded as follows:

Four Mayo needles, each threaded with half a strand of No. 1, twenty-day chromic catgut. It is well to tie the end of each suture in the needle by a half knot. Chromic catgut is stiff and should be softened by being soaked for a minute in water or by being drawn once or twice through wet gauze.

These sutures are for pedicles and inside work generally. If the operation involves a hysterectomy or the removal of a tumor, two additional Mayo needles should be threaded, making six in all. The tube of forty-day catgut is for any special work for which the operator may need such a long-lasting catgut.

One slender curved intestinal needle threaded with a twelve-inch suture of fine silk (*D*), or linen if preferred, with end tied in the needle by a half knot. This is for the inverting suture about the appendix stump, and for suturing any intestinal injury.

Two large full-curved cutting needles, each threaded with half a strand of No. 1, twenty-day catgut, with end tied in needle. These are for closing the abdominal incision, and are used in suturing the peritoneum, muscles, and aponeurosis.

Six large full-curved needles, each threaded with a heavy strand of silkworm-gut. These are not tied in the needle, but are fastened by twisting. Pull about one-fourth of the suture through the needle and then twist with three full turns—no more and no less.

This usually fastens the suture so it will stay in the needle while being passed and yet it will come out easily when pulled on. These silkworm-gut sutures are used as stay-sutures, and the heavy strands should be selected. They are placed just before the suturing of the aponeurotic layer of the wall.

One long straight trocar-point needle, threaded with half a strand of No. 00 plain catgut with end tied into needle with a half knot. This is for suturing the skin.

It is advisable to arrange the threaded needles so that they will not get lost or tangled. When the sutures must be prepared hurriedly by the nurse or assistant physician, it is well to place the strong suture-ligatures (twenty-day catgut in Mayo needles) directly in the needle holders for immediate use. The appendix sutures (plain catgut and fine silk, each in slender curved needle) may be clamped in a curved forceps until needed, and the sutures for the abdominal wall are stuck in a towel in the order in which they will be needed.

C. Preparation of Operator and Assistants

Everything that is to come in contact with the operative field must be sterilized. The hands and forearms of the operator and assistants must be disinfected as far as possible, and should then be covered, so that there is no chance of direct contact of the operative field with the skin of the hands or arms, for the skin cannot be absolutely sterilized. Again, the operator and assistants must be so covered as to effectually protect the field of operation from contamination by particles from the hair or beard, or by particles carried in the breath.

The accomplishment of this thorough protection of the operative wound has been the object of many decades of study and experimentation. The present effective technique for the preparation of the operator, as well as all the other antiseptic and aseptic preparations, was attained gradually, by improvements added year by year, but it is all the direct outgrowth of the epoch-making work of Pasteur and of Lister. The following are the steps in the preparation of the operator and assistants:

1. The sleeves are rolled well up above the elbows and the finger nails are trimmed short and cleaned thoroughly.
2. The hands and forearms are then scrubbed carefully and vigorously, for ten to fifteen minutes, with warm water and some liquid preparation of green soap—using a stiff brush and giving particular attention to the irregularities about the nails and knuckles and to the spaces between the fingers at their junction with the hand. Where the brush causes undue irritation of the skin, gauze is preferable for scrubbing the arms, but a brush should be used on the hands.
3. Then the soap is washed off with sterile water, and the hands and forearms are scrubbed in 80 per cent alcohol with gauze.
4. Then they are scrubbed in bichloride solution (1:2,000), with gauze.
5. The long-sleeved sterile gown is then put on, and the cap and face mask are applied. As the rubber gloves are put on, the gauntlet of the glove is brought up over the lower end of the sterile sleeve to hold it in place. The arm is thus securely covered and there is no chance for any skin surface to come in contact with the wound. The assistants go through the same process.

The process of hand-disinfection just given is known as the "alcohol-bichloride" method. It is called also, from its originator, the Fürbringer method.

The careful and prolonged scrubbing with soap is the most important feature in any method of hand-disinfection. This fact has long been recognized,

and many operators have discarded bichloride and other irritant antiseptics and depend entirely on the soap scrubbing followed by the scrubbing in alcohol. When carried out with care and judgment, this practice is safe and gives good results and avoids the irritation due to bichloride. In some persons, however, alcohol causes more irritation than bichloride.

There are *three methods of hand-disinfection* which are much used. The thorough scrubbing with green soap and warm water is common to all of them. The further steps differ as follows:

a. The "alcohol-bichloride" method. The various steps in this method have just been given in detail.

b. The "permanganate and oxalic acid" method. The hands and forearms are next immersed in a hot saturated solution of potassium permanganate and kept there until the skin takes on a dark brown color, then they are immersed in a hot saturated solution of oxalic acid until the skin again has its natural color. The oxalic acid is washed off in sterile water or sterile limewater.

c. The "chlorinated lime and sodium carbonate" method. After the preliminary scrubbing, a tablespoonful of chlorinated lime is taken in the palm of the hand and moistened with enough water to make a thick paste. Then a piece of sodium carbonate (washing soda) about the size of the thumb is crushed in the hand and rubbed thoroughly into the lime paste. This mixture, containing nascent chlorine, is rubbed vigorously into the skin of the hands and forearms for from three to five minutes. The parts are then washed in sterile water, and later in weak ammonia water to remove the chlorine odor.

As to the choice of method of hand-disinfection, that is largely a matter of personal preference. Any one of the above three methods, properly carried out, will give good practical hand-disinfection—i.e., from hands and arms so prepared, infection will rarely if ever take place. The important thing is not which method is chosen, but *how thoroughly* the chosen method is carried out.

Absolute disinfection of the hands and arms is impossible by any method, as the disinfection is necessarily confined to the superficial layers of the epidermis. Bacteria situated in the deeper layers of the epidermis may work to the surface during the course of the operation—hence the importance of thoroughly covering the prepared hands and arms with rubber gloves and sterile sleeves, leaving no skin surface exposed.

REGULAR STEPS

In Abdominal Section

In order to present some idea of the main features of this important therapeutic measure, the regular steps in this operation will be simply enumerated, and later some of the special points that require attention considered briefly.

The regular steps incident to every case of abdominal section are as follows:

1. Anesthesia.
2. Incision.
3. Exploration.
4. Correction of pathologic condition.
5. Toilet of peritoneum.
6. Closure of incision.
7. Dressing.

In abdominal section for pelvic disease the incision is made, almost invariably, in the median line. All parts of the pelvis may be reached from such an incision and, in practically every case, exploration of the whole pelvis should be made. Ordinarily the incision is begun near the umbilicus and continued downward from four to six inches. If there is no large solid tumor, the incision is made small at first, but large enough to admit the fingers or hand into the pelvis for exploration. As a rule, the primary incision is about five inches long. If the abdominal walls are very thin, it may be shorter; if they are very thick, it must be longer.

The lower the incision is placed, the more easily the deeper portions of the pelvic cavity may be reached. When a tumor is present, the bladder may be drawn up considerably; consequently in such a case the incision must not be extended low until the peritoneal cavity has been opened and the bladder located. If it is thought that the bladder may be drawn so high as to interfere with the ordinary incision, a steel bougie may be introduced into the bladder and the height of its cavity determined before the incision is made.

In cutting through the abdominal wall it is not necessary to strike the tendinous tissue between the recti muscles. If the incision is made a little to one side of the tendinous center and passes through the rectus muscle of that side, it makes little difference. Consequently, no time should be lost trying to make a careful dissection exactly in the median line.

The incision is continued through the skin and the subcutaneous fat and fascia, and the rectus muscle with its tendinous sheath, down to the loose subperitoneal fat. When the subperitoneal tissue is reached, all bleeding is stopped, and the subperitoneal fat and connective tissue are cut through between two dissecting forceps. The peritoneum is then picked up with the dissecting forceps and a short cut is made in it, and this opening in the peritoneal cavity is enlarged by scissors or knife.

Sterile towels now may be fastened on each side to the edges of the peritoneum to avoid any contact with exposed skin surface.

SPECIAL POINTS

In Abdominal Section

There are a number of special items that must receive careful consideration by every one doing abdominal section work. Among these may be mentioned the following:

1. Drainage.
2. Shock.
3. Injury to adjacent organs.
4. Foreign bodies in abdomen.

1. **Drainage.**—The rule in abdominal surgery is not to drain unless there is some special reason for it, and that special reason must be a very strong one. Experience has abundantly shown that in all but exceptional cases the best results are obtained by closing the peritoneal cavity completely and leaving Nature to carry on the reparative process alone, undisturbed by tubes or gauze or other form of drainage.

That small percentage of cases in which drainage is advisable includes the following classes:

a. Rapidly spreading inflammation of the peritoneum or acute general peritonitis. In such cases free drainage is indicated, and, as a rule, the freer the better.

b. Rupture of abscess in pelvis. This accident happens not infrequently during the enucleation of an inflammatory mass containing pus. In some cases the pus is not confined in any removable sac, but has burrowed in various directions among the adherent organs. In such a case as soon as the adhesions are separated, the pus flows out into the peritoneal cavity.

c. Persistent free oozing from surfaces left after the enucleation of an inflammatory mass. Here the effect desired is pressure rather than drainage, but, as the end of the gauze used for pressure must be brought out through the abdominal wound or through the vagina, it is usually referred to as a drain or pack.

2. **Shock.**—The principal factors in shock are (a) loss of blood, (b) exposure and handling of abdominal contents, and (c) long anesthesia. To avoid shock, therefore, particular attention must be given to the following points:

a. Careful hemostasis. All vessels that can be located are ligated or clamped before they are divided. In cutting through ligated tissues, forceps are in readiness to catch any vessel that may have escaped the ligature or upon which the ligature is not tight enough.

b. Protection of the abdominal contents, so far as possible, from handling and exposure. The Trendelenburg posture accomplishes this to a large extent. In this posture the intestines and omentum gravitate into the upper part of the abdominal cavity, away from the field of operation. Those parts that still tend to protrude into the pelvis are held out of the way by gauze or rubber dam, which, at the same time, serves to wall off the pelvis from the abdominal cavity. When the intestines are unavoidably permitted outside of the peritoneal cavity, they should be kept covered with large sterile towels soaked in warm saline solution.

c. Minimum duration of anesthesia. To cut down the duration of the operation and consequently of the anesthesia, the operator should work rapidly—as rapidly as is consistent with safety and accuracy—but accuracy must not be sacrificed to haste.

In this connection attention should be called to the fact that nurses and assistants may materially shorten the time under anesthesia by working rapidly in every step of the postanesthesia preparation. Here, again, accuracy must have first consideration, but that is no excuse for the slow, painfully slow, preparation so often seen. The most efficient nurse or assistant will execute the steps of the preparation **rapidly** as well as accurately and thus reduce the anesthesia time and the operative strain.

3. **Injury to Adjacent Organs.**—The ureter, the bladder, and the intestines are the organs particularly liable to injury in difficult cases. Ordinarily an injury of any of these organs occurring in the course of an operation must be repaired at once or at the close of the operation, and anyone doing pelvic surgery must be prepared to take care immediately of the injuries mentioned.

4. **Foreign Bodies Left in the Abdomen.**—The absolute certainty of the removal of all articles carried into the peritoneal cavity is a subject that deserves most careful consideration. It is surprising how easily and quickly the intestinal coils will enfold an object and carry it out of sight and touch. The prevention of this by the use of continuous gauze-strip sponges and long instruments has already been mentioned under the “preparation of instruments and dressings.”

VAGINAL SECTION

Vaginal section is incision through the vaginal wall into the peritoneal cavity. If the entrance is made behind the cervix, it is known as "posterior" vaginal section. If the opening is made in front of the cervix, it is known as "anterior" vaginal section.

In some cases of pelvic disease it is better to enter the peritoneal cavity from below; i.e., by vaginal section; while in other cases it is better to enter from above; i.e., by abdominal section.

Advantages

Of Vaginal Section

The advantages of vaginal section, in suitable cases, are as follows:

1. Less danger. There is less exposure and handling of the intestines and peritoneum. In vaginal section the manipulations are confined to the pelvic cavity, while in abdominal section the central portion of the great peritoneal sac is invaded; therefore in vaginal section there is less shock and less danger of general peritonitis. Again, if infection should develop after vaginal section, it is very likely to be "walled off" from the general peritoneal cavity and to cause simply local suppuration, whereas when infection appears after abdominal section it is very likely to take the form of an acute general peritonitis.

2. Evacuation of pus without contamination of peritoneal surfaces. This is one of the strongest points in favor of vaginal section in suitable cases. As a rule, when there is a large collection of pus that can be reached from below, it should be evacuated that way. This is particularly important if the pus be of recent origin. In such a case it is very important to prevent soiling of the peritoneal surfaces with this infectious fluid. This is accomplished by opening from below.

Again, in many cases of pelvic suppuration, the pelvic cavity, containing the abscess, is entirely shut off from the general peritoneal cavity by a wall or roof of inflammatory exudate, which binds together the upper pelvic structures. When operating from below we work beneath this roof, which protects the general peritoneal cavity from contamination.

3. Better drainage. In vaginal section the opening is made at the lowest part of the pelvic cavity—the best place for drainage.

4. Quicker convalescence. There is less disturbance of the intraabdominal structures. Also the wound is smaller, better protected and supported by surrounding parts, and is not so likely to be followed by hernia.

5. No visible scar. This is of some importance. A long scar marking the site of a former opening into one's interior is not particularly pleasant for the patient to contemplate. It is an ever present reminder of the disease that was present and of the operation. It is well to avoid making such a scar in cases where other methods are just as good.

6. Vaginal section combines easily with certain plastic operations, which are sometimes indicated at the same time.

Disadvantages

The disadvantages of vaginal section are:

1. Lack of room in the operative field. The manipulations are cramped and are carried out with less certainty of accomplishing the desired result.

2. Imperfect exploration of pelvis and lower abdomen. The pelvic structures are harder to reach and the lower abdominal structures (appendix, etc.) cannot be satisfactorily reached at all. And of the structures reached, the determination of their condition must usually be made almost altogether through the sense of touch, for the structures can be only imperfectly exposed to sight.

3. Remnants remain. Where the adhesions are extensive there is likely to be imperfect work unless the uterus is removed, and in many cases it is not advisable to remove the uterus.

4. There is not so good a chance to determine whether or not the conditions are favorable for conservative work on the ovaries or tubes, and the work itself, when indicated, cannot, as a rule, be so satisfactorily executed.

5. Appendix affections cannot be satisfactorily handled. The appendix is diseased and requires removal in a considerable proportion of patients with pelvic disease.

Selection of Cases

The operative cases in which the authors consider the **vaginal operation preferable** to the abdominal are:

1. Acute infection in the pelvis that has not yet spread to the general peritoneal cavity. This acute severe pelvic peritonitis is seen principally in cases of sepsis following labor or abortion. If general peritonitis is present, abdominal section is preferable.

2. A collection of pus low in the pelvis within easy reach of the fingers, particularly if there is a probability that the general peritoneal cavity is well walled off above.

3. For exploration of the pelvis in certain doubtful cases when it is evident that all the information required can be determined from below.

The operative cases in which the authors consider **abdominal section preferable** to vaginal section include:

1. Chronic inflammatory lesions, with or without a collection of pus.

2. Cases of adherent retrodisplacement of the uterus.

3. Cases in which conservative work on ovaries or tubes is probably required.

4. Ovarian and broad ligament and uterine tumors (except certain myomata that can be satisfactorily removed from below).

5. Extrauterine pregnancy (except where all that remains is a walled-off hemocele).

6. Cases complicated with, or probably complicated with, appendix trouble.

7. Obscure cases, requiring thorough examination of the pelvis and lower abdomen.

PREPARATIONS

For Vaginal Operation

The preparations for vaginal operation are practically the same as for abdominal operation, except that in the preparation of the operative field comprising the external genitals and vagina, some special measures are employed.

The day before operation, the external genitals and adjacent surfaces are shaved, and an antiseptic vaginal douche is given. Then about half an ounce of an acriflavine mixture (1 per cent neutral acriflavine in glycerin) is injected to the vaginal vault and left in place, a pad being applied. Early the next morning another acriflavine injection is made.

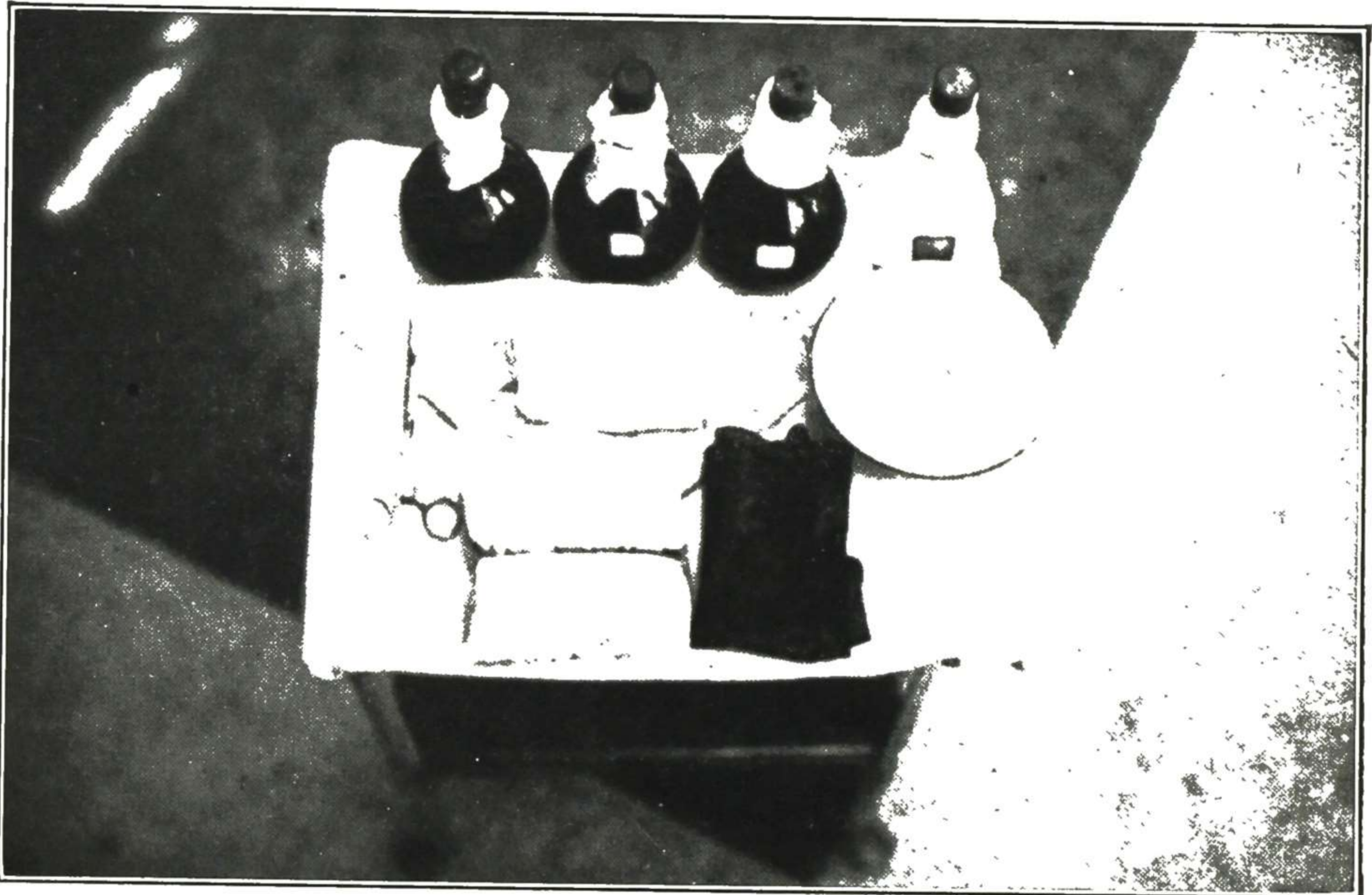


Fig. 1110.—Preparation of operative field. Preparation stand, with picric solution, iodine solution, alcohol, sterile bowl, gloves, forceps, and gauze pieces. On the lower shelf of the stand is placed a basin containing sterile catheter, towels, vaginal speculum, and vaginal forceps. This basin on the lower shelf is shown in Fig. 1111. (This series from Crossen and Crossen—*Operative Gynecology*.)

Bacteriologic studies, particularly in regard to anaerobic infections per vaginam as investigated by T. K. Brown, indicate that in preoperative preparation of the vagina it is advisable to make long-continued application of an antiseptic in a penetrating medium, in order to reach the bacteria deep in the vaginal folds and epithelium.

When the patient is on the operating table, the vagina and external genitals are scrubbed with soap solution, rinsed in sterile water, and then with bichloride or cyanide solution. In cutting operations, 3 per cent iodine solution is applied as desired by the operator. The articles for the antiseptic preparation and the arrangement and draping of the patient are shown in Figs. 1110 to 1113.



Fig. 1111.—Preparation of operative field. Patient in position for preparation of the operative field, and the preparation stand brought conveniently near.



Fig. 1112.—Preparation of operative field. Patient's feet elevated ready for draping with the sterile sheet. This elevation of the feet puts them out of the way of the operative work, and enables the assistants to stand so they can observe and assist satisfactorily.

Instruments and Dressings.—The preparation of instruments, sutures, gowns, dressings, etc., is the same as for like articles for an abdominal operation.

In vaginal work numerous small gauze pieces of the "ten" and "twenty" type are required, and cotton balls, also, should be at hand, for use especially in curettage. In hysterectomy and in vaginal section, one or two large flat gauze sponges, with a long tape attached, should be provided for introducing into the pelvis to hold the intestines out of the way.

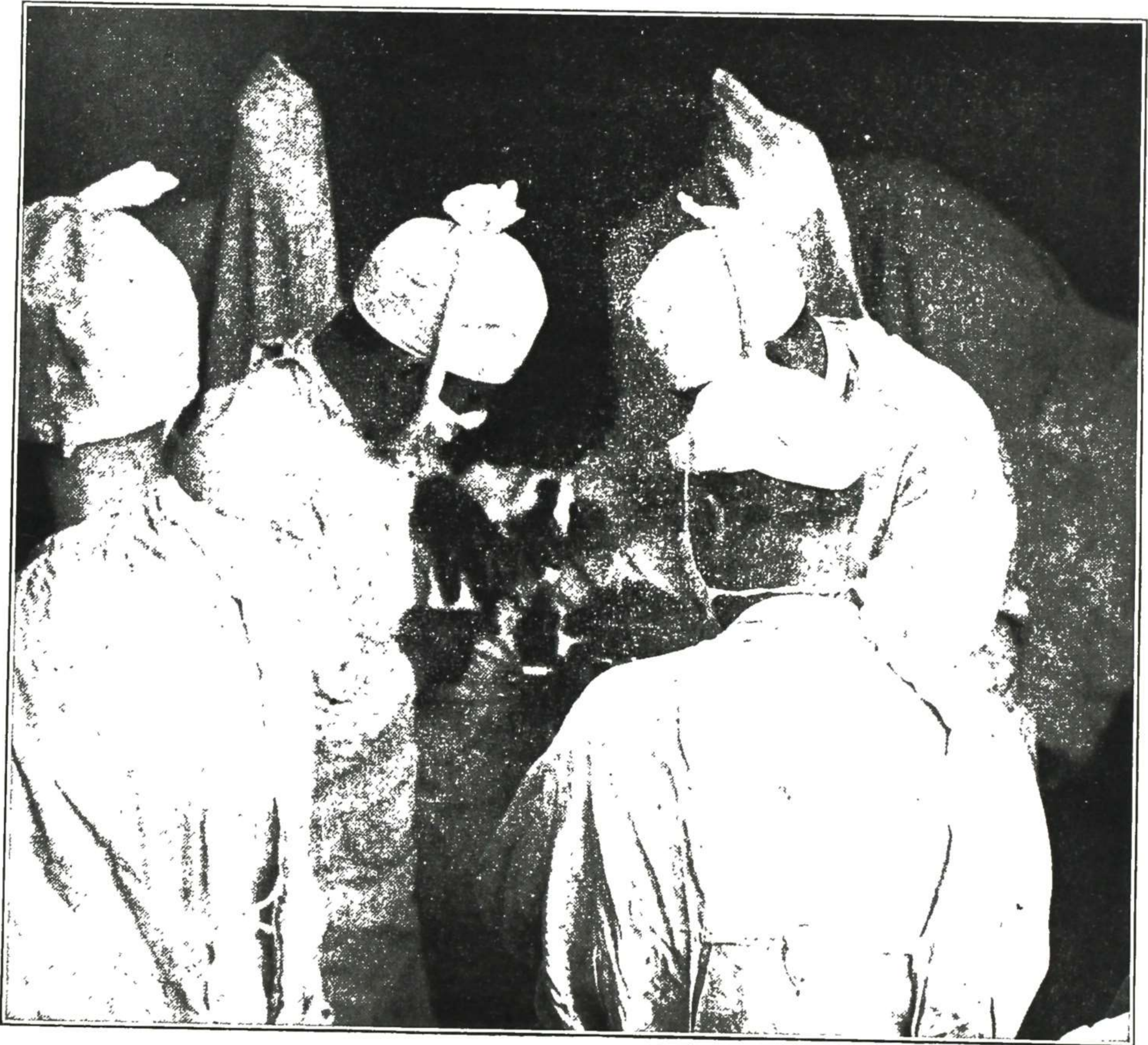


Fig. 1113.—The operator and assistants grouped about the field, beginning the operation. Notice that the patient's feet are out of the way so that the assistants can get at the operative field to observe and assist intelligently. The nurse (at operator's left) is standing beside her table ready to hand sutures as needed.

For vaginal operative work it is convenient to have three lists of instruments—List A, List B, and List C.

List A specifies the instruments needed for curettage and excision of specimen from cervix and radium application to cervix or within the uterus. List B specifies the additional instruments to be added to List A to provide for repair or excision of cervix, repair of pelvic floor, and plastic operations at vaginal outlet. List C specifies the additional instruments to add to Lists A and B to provide for anterior or posterior vaginal section or for vaginal hysterectomy.

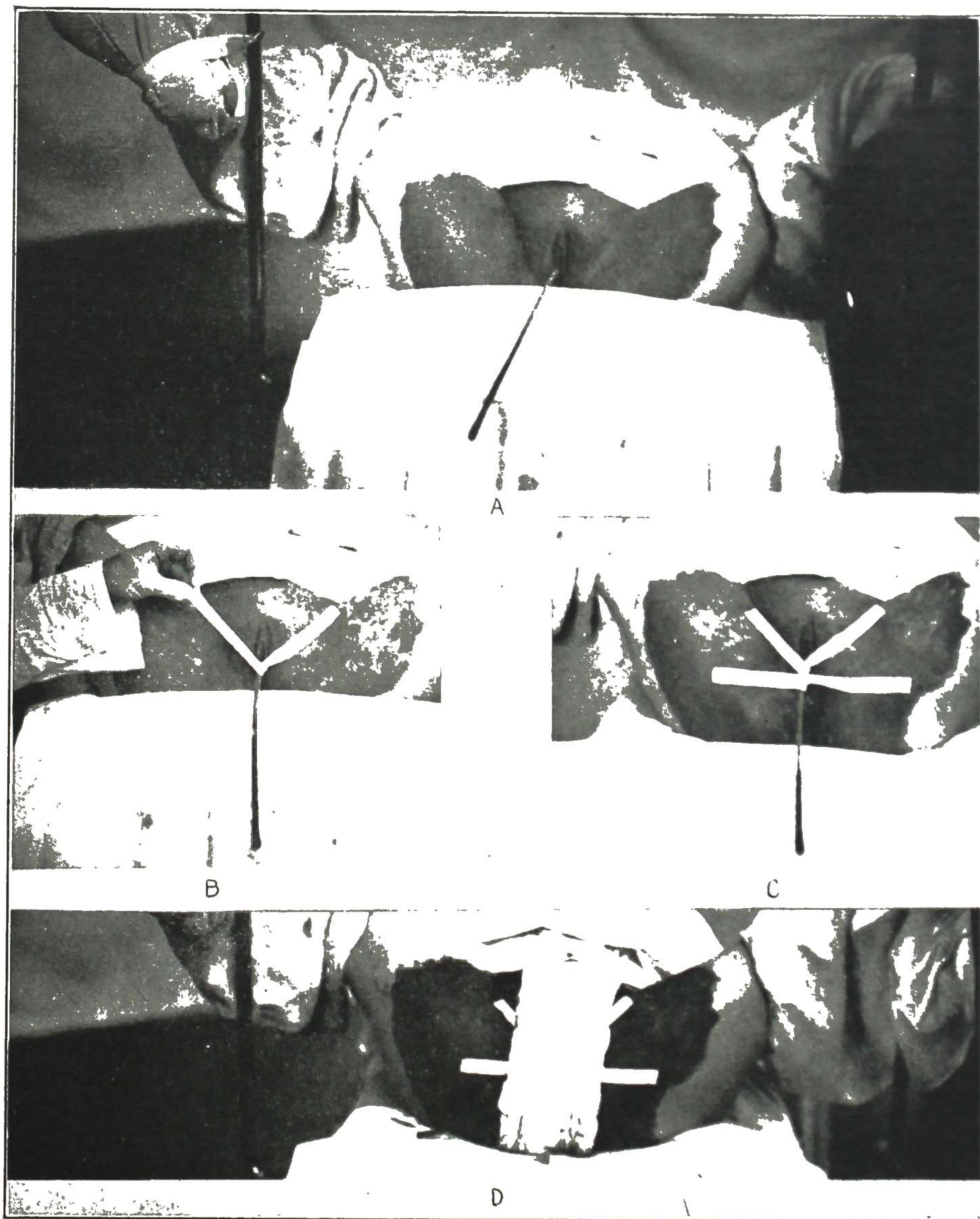


Fig. 1114.—Fastening a retention catheter by "four point" fixation. This is an effective method of maintaining the catheter securely in position. *A.* The catheter in place and ready to be fastened. *B.* The upper long narrow adhesive strip has been fastened to the skin on the left side and brought once around the catheter and is being fastened to the skin on the right side. *C.* The lower adhesive strip has been similarly fastened to the skin on one side, brought once around the catheter and fastened to the skin on the other side. *D.* The dressing and T-bandage applied, with the catheter extending out to one side. When the patient is put to bed, the catheter will be connected with tubing to convey the urine to a bottle tied to the side of the bed. Patient's skin is prepared with picric acid solution. We formerly used this for the skin preparation but have discontinued its use because of frequent idiosyncrasy to it.

In arranging the patient in position for the operative work, the **feet and legs should be raised** far enough to carry them out of the way of the assistant standing at each side, as well shown in Figs. 1112 and 1113. This arrangement puts the operative area in the best position for the operative work and, the patient's feet being out of the way, the assistant on each side can stand close to the field and see and assist to the best advantage. If the leg-supports do not elevate the feet sufficiently to give plenty of room for the assistants, a moderate outward twist of each support will assist materially.

Catheterization in the operating room immediately preceding operation is advisable as part of the routine preparation. It gives an entirely empty bladder, which tends to prevent injury in extensive pelvic operative work and also facilitates accurate examination in those cases requiring deep palpation under the anesthesia. Catheterization in the operating room has the advantages that it is carried out under better antiseptic precautions and with less trouble and loss of time than in the patient's room, and also prevents troublesome accumulation of urine between catheterization and operation. In the exceptional cases where catheterization is not advisable, a word in time to the preparation-assistant will eliminate it.

Another point of importance in vaginal work is to arrange the sterile coverings about the vaginal opening in such a way that the rectum will be kept covered. Unless such care is exercised in the various manipulations in the course of the operation, the rectum may become exposed sufficiently to permit contaminating contact of sutures or instruments or the operator's gloved fingers.

Another point is the free use of citrate solution during curettage, to prevent clotting. The top of the vagina should be filled with the solution before using the curette, so that the introduction of the curette carries citrate solution into the uterus. Also, it is well to keep adding citrate solution as the curetting progresses. Otherwise the curettings become lost in a mass of blood clot, which interferes with their separation and preparation for the laboratory work.

Again, in investigating the depth of the uterus preliminary to curetting, it is well to use a cotton-tipped forceps instead of the uterine sound, as the latter may easily go through a diseased uterine wall into the peritoneal cavity.

If a retained catheter is needed after operation, it should be fastened by **four-point fixation**, as shown in Fig. 1114. If not securely fastened in all directions, it is likely to be found pushed out after a time.

CHAPTER XIX

AFTER-TREATMENT IN OPERATIVE CASES

ABDOMINAL SECTION

The details of the care of a patient after abdominal section may be divided into (A) the regular after-treatment and (B) the care in special conditions.

(A) REGULAR AFTER-TREATMENT

First Thirty-six Hours.—During the operation the patient's bed should be warmed with hot-water bottles placed under the blankets. When the patient is placed in bed, the hot-water bottles are distributed about her, to maintain the heat and diminish shock. Care should be taken to avoid leakage from any bottle, and that a thick blanket is kept between the hot bottles and the patient. Much discomfort and even serious injury may be caused by leakage from a bottle, or a too thin protective covering between the bottle and the patient. In several instances legal complications have resulted, involving the nurse or the hospital, or the physician.

The patient's head should be low (no pillow under it) until she has recovered from the anesthetic. Keep the patient quiet and let her sleep as long as she will from the anesthesia. If the patient vomits, she should be turned well over on the side to cause the vomited material to run out of the throat, that there may be no chance of its getting into the larynx and choking her. Death may occur from this cause.

The **orders** for the day of operation and first postoperative day are usually about as follows:

Fifteen hundred c.c. of normal saline solution to be given subcutaneously immediately on return to bed. Foot of bed to be elevated for six hours, except in drainage cases.

Codeine, gr. i, hypodermically, every two hours when awake. If after two or three doses the patient is not asleep, give morphine, gr. $\frac{1}{6}$, hypodermically. When necessary to thus supplement the codeine with morphine, continue the codeine after that as before, i.e., every two hours when awake. The morphine is not to take the place of the codeine, but only to supplement it when necessary to give sleep. Sodium amytal, gr. vi, or nembutal, gr. iii, in 5 c.c. of water, given per rectum, is better than morphine for restlessness. If preferred, the medicine may be given by suppository.

Water may be given by mouth as soon as the patient desires it, either hot or cold, as best retained. The water should be given only in small amounts, but may be given frequently unless there is persistent vomiting.

Patient may ordinarily be propped up to void. If unable to void after the usual expedients (warm water to genitals, pressure on bladder, etc.), catheterize at eight-hour intervals or oftener if bladder fills.

When catheterization has been necessary and the patient is again beginning to void, she should be catheterized once daily for residual urine, until the residual urine is less than 10 c.c. After catheterization always irrigate with 4 per cent boric solution and then instill 10 c.c. of 1 per cent protargol solution.

When a retention catheter is in place, irrigate the bladder twice daily with 4 per cent boric solution, and instill 10 c.c. of 1 per cent protargol solution every other day.

It is not necessary ordinarily for the patient to be kept lying on her back. She should be turned frequently during the first several days, to avoid pulmonary congestion.

As a rule, we prefer to let the patient have water in small doses as soon as she wishes it. It diminishes the thirst and helps to supply the system with needed fluid. Occasional vomiting does no harm; rather it is beneficial in that it helps to clear out the ether-saturated mucus, the retention of which increases stomach irritation and disturbance.

If there is persistent vomiting, and especially if there is persistent epigastric pain, a nasal tube should be introduced and the stomach washed out with a quart of normal saline solution.

This stomach washing (lavage) has come to be recognized as a most important measure in postoperative treatment. It is the only effective treatment for the serious complication of acute dilatation of the stomach, and in any case of persistent stomach irritation it adds much to the patient's comfort by clearing out the irritating material.

In the cases of persistent vomiting and dilatation of the stomach it may be left in place and washing done every hour until the stomach begins to empty itself. Lavage should be resorted to promptly when indicated. Because of the minimum discomfort of the small tube, it is decidedly preferable to the regular size stomach tube.

If the patient cannot take water by mouth, the thirst may be diminished by saline solution under the skin. If the patient is in shock, start the subcutaneous saline at once, and also give glucose (10 per cent solution) intravenously or transfusion if needed.

Second Postoperative Day.—During the second postoperative day the orders previously given are continued unless there is some special reason for modifying them. The patient may take water more freely, and the liquid nourishment is now begun and gradually increased as the stomach will bear it. For this purpose any liquid except milk is permissible: broths, albumin water, fruit juices, tea, etc., as best retained by the patient.

If the patient has to be catheterized, it is well to give some reliable urinary antiseptic to diminish the danger of cystitis. If gas in the intestines is troublesome, a rectal tube may be introduced. Prostigmine aids the moving of gas by intestinal peristalsis, but it is contraindicated in intestinal obstruction.

If the operation was an emergency one, where there was no opportunity for preliminary preparation of the intestinal tract, it may be advisable to secure a bowel movement within the second twenty-four hours, in which case an enema of magnesium sulphate oz. i, glycerin oz. ii, and water oz. iv, may be given. This may also be used in those cases in which the rectal tube does not relieve the gas pains and distention.

If the patient has a retention catheter, it is usually removed on the second or third day; and then catheterization for residual urine is done once or twice daily, depending on the amount, until the residual urine is less than 10 c.c. Protargol solution is instilled after each catheterization. If there are 100 c.c. of residual urine, it is best to replace the retention catheter to avoid overdistention and consequent partial paralysis of the bladder muscle.

Third Postoperative Day.—At the beginning of the third postoperative day start the patient on the regimen indicated below, that a bowel movement may be secured some time during this twenty-four hours.

The **orders** for the third postoperative day, usually booked the afternoon of the second, include the following:

Magnesium sulphate and glycerin enema, morning of the third day. Continue the codeine as necessary to give rest.

In those cases in which there has been persistent vomiting or distention, continuous gastric drainage through a nasal tube connected to a suction apparatus and frequent enemas are used. Pitressin or prostigmine may be given if a mechanical obstruction can be ruled out. Five cubic centimeters of uritone are given intravenously as a urinary antiseptic.

The saline solution and the glucose should be stopped as soon as the patient is taking sufficient fluids by mouth, as indicated by the output of urine.

Fourth Postoperative Day.—Ordinarily by this time one or two good bowel movements have been secured, and the patient has become fairly comfortable. All medicines may now be given by mouth. The patient may be propped up as necessary to aid in urination if she is not already urinating. Some semisolid and solid articles of diet (custards, breakfast foods, toast, crackers, bread, etc.) may be allowed. As a rule, no sedative is now necessary, except an occasional dose of sodium bromide when the patient is particularly restless at night. It is well to start the patient on some good tonic, for these patients are usually anemic.

The **orders** given at this time may serve as standing orders, to be continued as long as the patient is in the hospital, except when modified for some special indications. They are about as follows:

Light diet, increasing to regular, as tolerated. Give an abundance of water and liquid nourishment. Articles from the regular diet may be added as desired.

Continue the iron preparation.

Continue the urinary antiseptic, if needed.

Mild laxative (mineral oil, phenolphthalein, or cascara) at night as needed. Give an enema when there is no bowel movement during the day.

Subsequent Orders.—The *care of the bladder* is an important item after pelvic operations. The urinary antiseptic should be continued until danger of urinary infection is past—ordinarily about a week after the bladder is emptied spontaneously. Curtis demonstrated that unsuspected residual urine is the most common cause of postoperation cystitis. When a patient has to be catheterized at all after operation, catheterization with the accompanying irrigation should be continued at least once daily, immediately after urination, until all residual urine disappears. By following this plan, Curtis was able to eliminate practically all postoperative bladder troubles. Uritone, 5 c.c. intravenously, is given until the patient can take medicine by mouth. Te Linde used 1 per cent mercurochrome to stimulate bladder tone.

The **diet** is gradually increased until the patient is taking regular diet with extras. She should continue to take liquid nourishment between meals. If during convalescence the patient does not take and digest sufficient food, the digestive powers may be increased by massage, passive movements and resisted movements, judiciously administered by a competent nurse. The careful carrying out of the regular nursing given bed patients (including the daily morning bath and evening alcohol rub) is also an important factor in

causing the patient to be comfortable and to rest well at night, and to digest her food promptly. If the patient is anemic, liver, spinach, and carrots are included in the diet, and iron, as ferrous sulphate, gr. v three times daily, may be given.

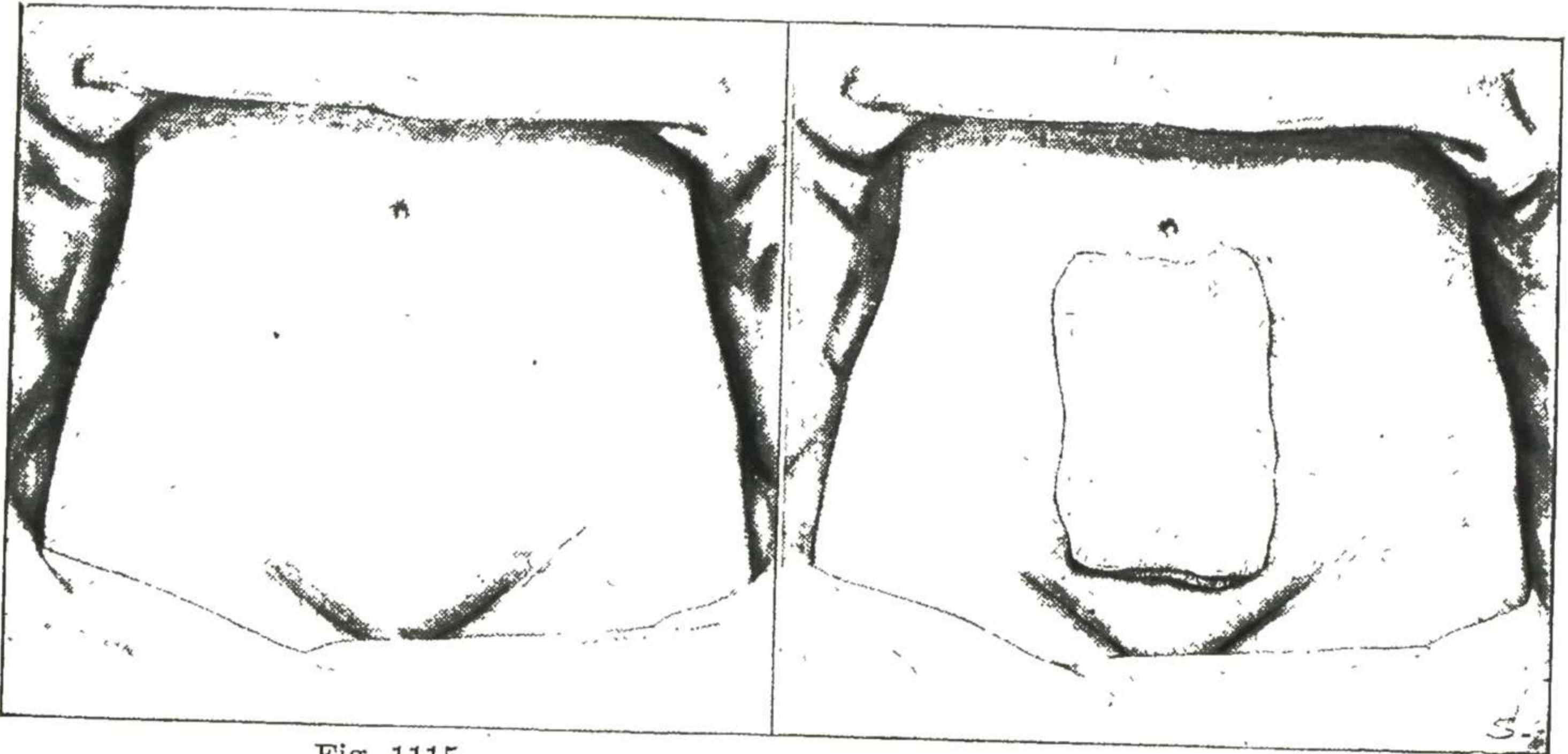


Fig. 1115.

Fig. 1116.

Fig. 1115.—The sutures removed and the area powdered freely with boric acid. A large amount of the boric acid powder should be used, as it absorbs moisture and prevents itching and irritation. (Figs. 1115-1125 are from Crossen and Crossen—*Operative Gynecology*.)

Fig. 1116.—The flat gauze applied, ready for the strapping.

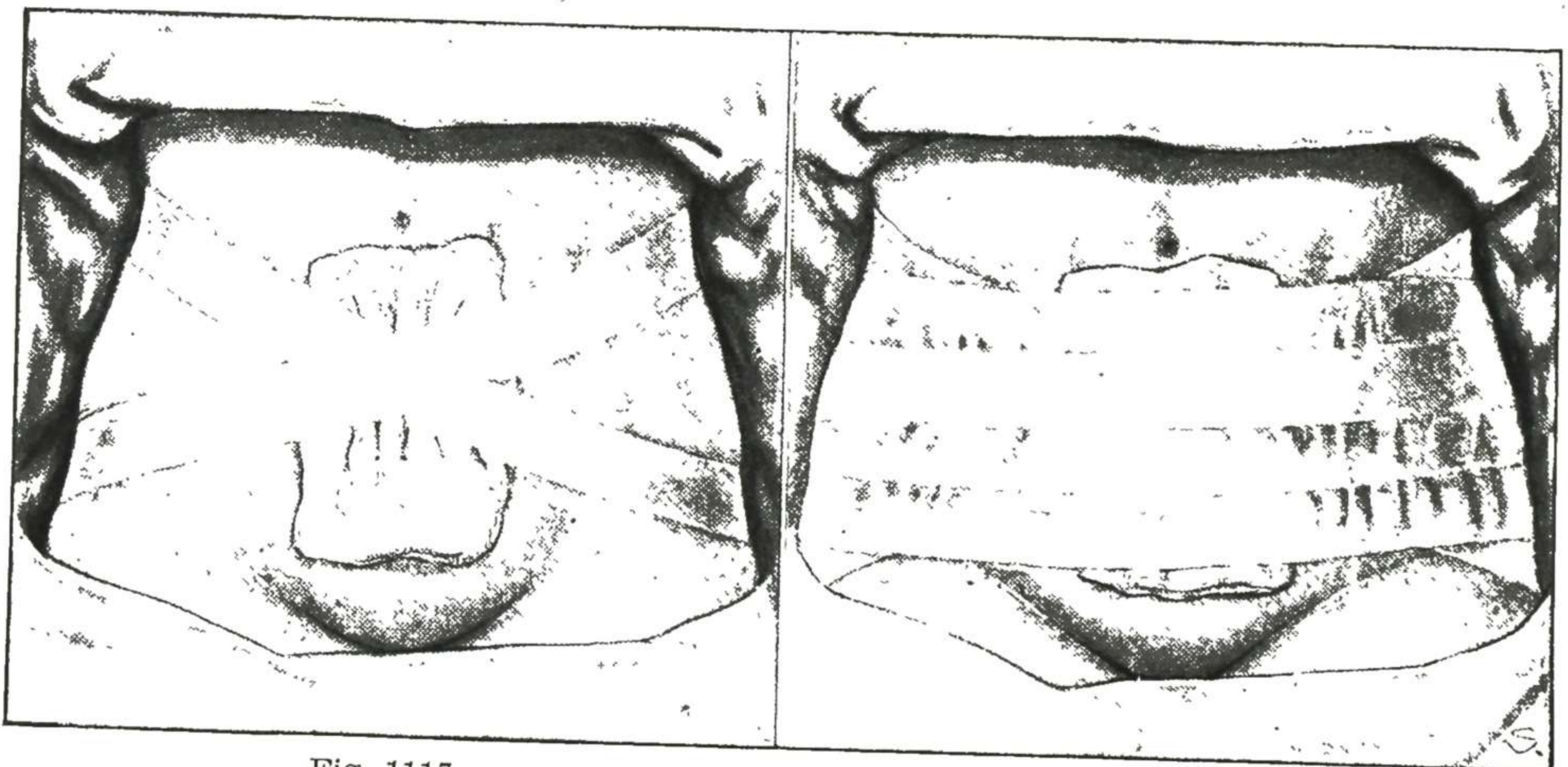


Fig. 1117.

Fig. 1118.

Fig. 1117.—The two diagonal strips of two-inch adhesive plaster applied. These should be long enough to take firm hold at the sides, so there is no chance of their loosening and coming off. They should be applied with moderate tension, as here indicated, to give good support.

Fig. 1118.—The transverse strips applied. These also should be long enough to take firm hold at the sides. Plenty of adhesive plaster should be used, so as to form a support which will permit the patient to be up and about without any possible danger of the newly healed wound being burst open by sneezing or coughing or other strain.

Removing the Sutures.—Unless there is some indication of irritation in the wound, the dressing is not to be disturbed for ten days. Then it is taken off and the sutures removed. The wound is now healed. The vicinity of the wound is dusted freely with boric acid powder, a smooth piece of gauze (several thicknesses) is laid over the scar, and the **abdomen is strapped** with strips of

two-inch adhesive plaster (Figs. 1115 to 1118) in such a way as to take the strain from the newly healed wound. From four to six strips are put on so as to give firm support. Then a piece of cotton is placed over all and the binder reapplied.



Fig. 1119.

Fig. 1120.

Figs. 1119 and 1120.—Subsequent dressings. In the later dressings, the adhesive strips are cut along the margin of the gauze, as indicated in Fig. 1119, and the gauze removed, exposing the scar as in Fig. 1120. After the required treatment, the fresh dressing is applied, and new adhesive strips are applied over the old ones. This obviates the frequent removal of the adhesive plaster from the skin, which is annoying to the patient and in some cases causes abrasions of the skin. New adhesive strips may be thus applied over the old ones three or four times if necessary, and, in the meantime, the adhesive first applied has become slightly loosened by the skin secretions, so that it comes off easier than if recently applied.



Fig. 1121.

Fig. 1122.

Fig. 1121.—The new dressing applied and the first new adhesive strip being put on over the old ones. With forceps or the fingers, the sides of the old plaster support are drawn tense, as here indicated, as the new adhesive strips are applied.

Fig. 1122.—The renewed adhesive support completed. Use as many strips as needed for secure support.

The adhesive strips are usually left undisturbed for about a week. If it is desired to look at the wound area, because of irritation along the suture tracts or for any other reason, the adhesive plaster is cut along the edges of the gauze (Fig. 1119) and the gauze removed so that the scar and vicinity are exposed (Fig. 1120). After the required treatment, gauze is again applied and then

new plaster put on, the ends of the new plaster adhering to the old plaster at each side (Figs. 1121, 1122). This permits inspection of the wound area as often as desired without the discomfort of repeated removal of plaster from the skin.

Ordinarily, however, the adhesive strips need not be disturbed until a week after the patient goes home. In the meantime a well-fitting corset or girdle, preferably the one she is accustomed to, is adjusted to the patient, to be worn after the adhesive is removed. The support is to be worn for about three months, but only when the patient is up and about. It may be taken off at night. Some authorities recommend that no abdominal support or binder be worn. But while most patients get along very well without it, the authors feel that it is a precaution which it is well to take. It is of decided benefit in some cases (where the abdominal wall is lax and protuberant), it adds to the patient's comfort in most cases, it is a safety guard in sudden strains, such as coughing, sneezing, or vomiting and it does no harm in any case if waist-constriction be avoided.

Sitting Up, Walking.—Unless there is some special reason for hurrying the patient to the sitting posture, she should be allowed to remain quiet and in the recumbent posture for the first few days. After the bowels have moved well, the patient should be encouraged to move about in the bed and to be propped up as much as she likes—more and more each day—so that by the end of the first week she is sitting up straight in bed. By the eighth or ninth day she may sit on the edge of the bed and be out of bed on the tenth day. The advantages of this early moving about in the bed and early getting up are better circulation (less "bed-weakness"), and consequently better repair of wounds, better digestion, and quicker restoration to normal condition.

The feeling of the patient is, as a rule, the best guide as to when to begin activity. In cases where the patient will be benefited by further rest, do not hesitate to keep her in bed two weeks, or even longer. In many instances the patient is greatly debilitated and literally "worn out" by chronic sepsis or by months of suffering and ill health, or by heroic work for her children in spite of failing strength. In all these cases, the enforced rest in bed may be an important aid in restoring the patient's health.

If the abdominal wall is found lax and atonic, as is so frequently the case, the "knee to chin exercises" described in Chapter III (Fig. 332) should be carried out regularly night and morning for several months after operation. They may be begun before the patient leaves the hospital or as soon thereafter as she finds she can carry them out without discomfort.

After the patient has returned to her home, the tonic medicines and regimen should be kept up for from three to six months, as necessary, to put the patient in good general health.

(B) SPECIAL CONDITIONS

1. **Drainage Cases.**—The drainage tube should be raised slightly and rotated once daily, in order to prevent injurious pressure on the rectum (which might cause perforating ulceration) and to prevent stopping-up of the drainage holes by omentum or bowel or exudate.

The tube is removed when the collection of fluid in the pelvis ceases—that is, in from two to five days. In suppurative cases the secretion, of course, keeps up indefinitely. In such a case, the tube is left in until all acute threatening symptoms have disappeared and until a good wall has formed about the tube tract, shutting it off from the general peritoneal cavity. It may, as a rule, be removed in from four to six days, and a small rubber tube inserted into the tract to keep the outer end open until it closes from the bottom. The treatment of such a tract is to keep it clean by cleansing (daily or less frequently, as needed) with hydrogen peroxide, keeping the outer end open as mentioned, and protecting it from secondary infection by an antiseptic dressing. It is well to keep some antiseptic drying powder (e.g., boric acid) dusted freely on the wound about the drainage tube.

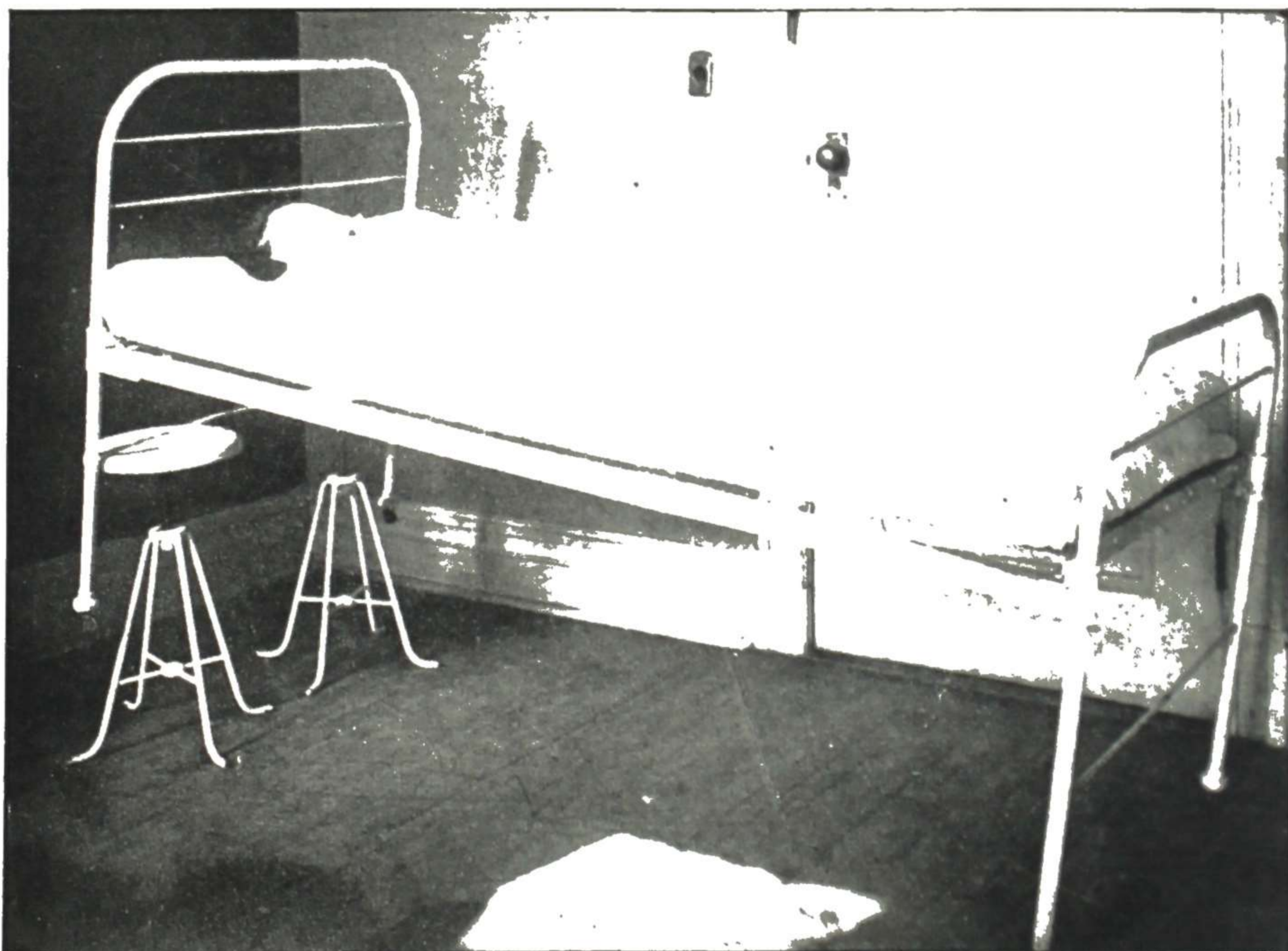


Fig. 1123.—Elevation of the upper part of the body, to aid drainage toward the pelvis. This simple elevation of the head of the bed is employed immediately after operation and also at other times when the patient is too weak to be placed in the "half-sitting" or Fowler posture. The head of the bed is to be raised from eighteen to twenty-four inches (46 to 61 cm.)

In cases with extensive intraperitoneal suppuration, it is well to put the patient at once into partial Fowler posture by elevating the foot of the bed, as shown in Fig. 1123, and into regular Fowler posture (Fig. 1124) when sufficiently recovered.

2. Uterine Replacement Cases.—The principal special point in the care of the patient after any operation for fastening the uterus and adnexa forward, is to see that the bladder is not allowed to fill sufficiently to force the uterus backward again in the first few days following operation. If the patient cannot urinate, she should be catheterized often enough to prevent injurious distention.



Fig. 1124.—The Fowler posture. Head-rest elevated thirty to forty degrees. Slipping down in the bed may be prevented by placing a box at the patient's feet or by elevation of the foot of the bed or by a sling extending from the patient's hips to the head of the bed.

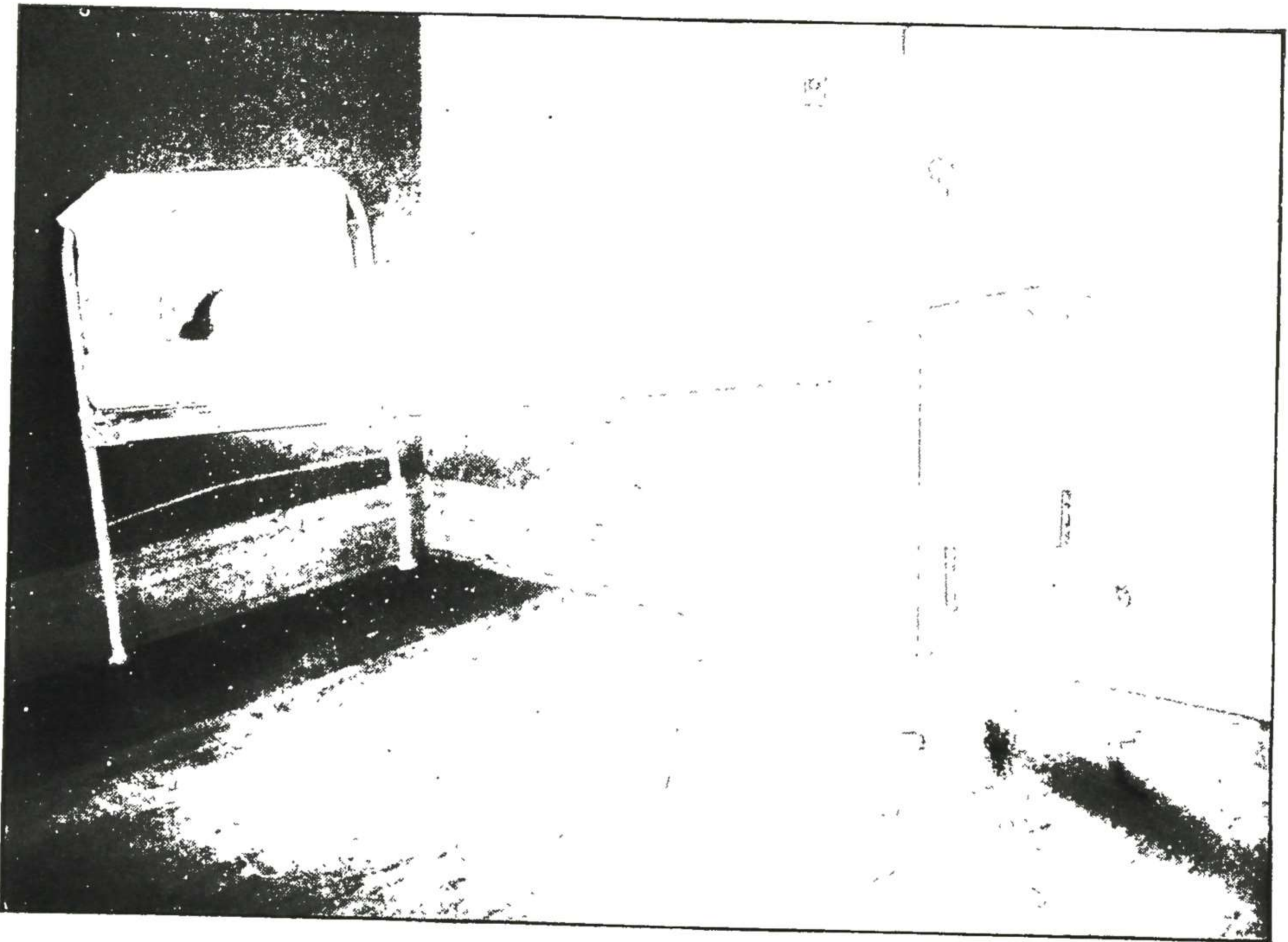


Fig. 1125.—Elevation of the lower part of the body, for the treatment of shock. The foot of the bed is to be raised from eighteen to twenty-four inches (46 to 61 cm.).

3. **Severe Shock.**—When the patient is in severe shock, the head should be lowered by the elevation of the foot of the bed about two feet as shown in Fig. 1125, except in those cases where there is danger of spreading pus from the pelvis to the upper part of the uncontaminated peritoneal cavity.

Give the patient quick stimulants, along with glucose intravenously and plasma or serum if available. If the shock is primarily due to hemorrhage, transfusion is indicated. The use of carbon dioxide is an additional measure of value where respiration is shallow.

4. **Internal Hemorrhage.**—A serious internal hemorrhage is indicated by rapid weakening of the pulse, an increase of pain in the abdomen, and sub-normal temperature. It is rare after the first twelve hours, and usually comes within the first six hours. If there is a drain through the abdominal incision or into the vagina, there will be a free flow of bloody serum, or, if it is a tube drain, of blood itself.

The treatment of a slight hemorrhage is (a) to elevate the pelvis by raising the foot of the bed, (b) to put an ice bag on the pelvis outside the dressing, (c) to keep the patient perfectly quiet on her back, and (d) to give a sedative (codeine) if necessary to secure rest. Discontinue the saline or glucose solution. Do not give any stimulants or employ any measure that will increase the blood pressure. The hope is that, as the blood pressure is low, the bleeding will cease for a few hours—long enough to permit effective clotting to take place in the oozing area. In twenty-four hours such clots become so firm that a renewal of the bleeding is not probable. Fibrogen, 4 to 8 c.c. in ice water by mouth, aids in lowering the clotting time. If the patient is unable to take liquids by mouth, this can be given intramuscularly.

When there is indication that a vessel is still bleeding, the abdomen should be promptly reopened (if the patient is seen in time) and the bleeding vessel caught.

5. **Persistent Vomiting.**—To make the nausea and vomiting as slight as possible, the patient's head should be low (no pillow) for several hours after anesthesia. For the first day the patient should be kept perfectly quiet, with the eyes closed most of the time, so as to nap as much as possible. The nausea is increased by talking or by even looking about. If a visitor is allowed, it should be for only a few minutes and there should be no talking. When water is first given, it is preferable usually to give hot water, in tablespoonful doses and frequently, though some patients retain cold water very well from the first.

The most effective measure for overcoming vomiting, persistent nausea, and stomach distress generally, is washing out of the stomach with normal saline solution, as previously described. After the bowels are well opened the vomiting usually ceases unless there is some serious complication, such as beginning peritonitis or intestinal obstruction, both of which are mentioned later.

6. **Acute Dilatation of the Stomach** is a serious complication that may develop any time after operation, but especially within the first sixty hours. The patient complains of persistent pain in the epigastric region, and this region becomes more or less distended. The pulse becomes rapid and weak without apparent cause. There is usually nausea and vomiting, but the most constant and characteristic signs are the persistent epigastric pain and the failing pulse.

The anatomic change is overdilatation of the stomach with gas, due to different causes in different cases. In the majority of cases it is probably due to some displacement of the stomach, with kinking and obstruction at the pylorus. As the gas cannot escape, its continued accumulation becomes a serious matter, and in several instances death has resulted from overdilatation of the stomach caused thereby.

The treatment for this condition is prompt introduction of the stomach tube, to permit the gas to escape, and irrigation of the stomach with normal saline solution to remove all decomposing material and prevent reaccumulation of the gas by instituting continuous drainage, using suction if needed. This complication should be watched for and recognized, and the nasal tube used before it reaches a serious stage. If the trouble recurs, several stomach washings may be required. It is well also to vary the patient's position, so as to overcome displacement of the stomach and dragging on its supports. In some cases the condition is promptly relieved by turning the patient on the abdomen.

7. **Kidney Insufficiency** is more easily prevented than treated after it once develops. The preventive measure is to make sure that the kidneys are doing their work well before operation. The treatment for kidney insufficiency after operation consists in elimination by means of free bowel movements, and sweat packs and such other measures as are used for the regular treatment of uremia.

8. **Dilatation and Intestinal Paralysis.**—When the laxative measures, given previously under the regular after-treatment, fail to cause bowel movement, the loss of function may be due simply to temporary paralysis of the bowel or to intestinal obstruction or to beginning peritonitis. Unless there are decided evidences of mechanical obstruction or of peritonitis, it is to be assumed that the trouble is temporary intestinal paralysis (adynamic ileus) and treatment for it is begun. This condition is one of the most serious of postoperative complications. It is due to the paralysis of a segment of the small intestine which, due to the lack of peristalsis, prevents the passage of the intestinal contents past this point. The results are the same as obstruction from kinking, adhesions, etc. There is the persistent vomiting, becoming fecal in the late stages, the dilatation not relieved by usual measures, and later the toxemia from absorption from the distended bowel. Peritonitis is easily ruled out early. Paralysis may be confused with obstruction from other causes and the differential diagnosis is difficult. X-ray examination may help.

The treatment consists in repeated washing of the stomach, and it is here that the duodenal tube left in place is of great value; repeated enemas such as magnesium sulphate oz. i, glycerin oz. ii, water oz. iv, s.s. enema with 1-2 dr. turpentine, saturated solution magnesium sulphate oz. vi (either alone or with olive oil oz. vi) aid in overcoming this condition.

The use of continuous duodenal drainage with the Wangensteen tube should be tried, and if relief is not obtained then the Miller-Abbott tube should be used. The details of the use of the Miller-Abbott tube are shown in the following account of the management of a case reported by Smith, Gehring and Wilson.

Upon the fourth day, Aug. 18th, the obstructive symptoms suddenly became more marked, resulting in fecal vomiting and increased distention and as a preoperative measure the Miller-Abbott tube was passed. This consists of a double chamber rubber tube about 11 feet long, one chamber for aspirating intestinal contents, and the other, an air chamber through which air can be forced to inflate a balloon at the end.

Abbott and Johnston have reported a number of cases of intestinal obstruction successfully relieved by the use of this tube, and in some instances rendering operation unnecessary. Its application reduces the distention of the gut proximal to the lesion, relieving the obstructive symptoms and rendering the patient a better surgical risk. As stressed by Miller and Johnston its prolonged use is contraindicated where a disturbance in blood supply of the involved loop with possible gangrene is suspected.

In our case the exact nature of the obstruction was not known, but it was felt that the intestine was not strangulated.



Fig. 1126.

Fig. 1126.—The Miller-Abbott tube on 8/20/39, having completely traversed and decompressed the small intestine, lies with its tip and the inflated balloon at the site of obstruction near the cecum. Barium is shown distributed in the colon. (Smith, Gehring and Wilson—*Jackson Memorial Hospital Bulletin*.)



Fig. 1127.

Fig. 1127.—Roentgenogram on fourth day of intubation. 8/22/39. All evidence of intestinal obstruction has disappeared. (Smith, Gehring and Wilson—*Jackson Memorial Hospital Bulletin*.)

The balloon was deflated and the tube passed through the nostril into the stomach. The suction was begun and the patient turned on to his right side. The tube was advanced inch by inch as in passing a duodenal tube, until the 75 mm. mark reached the nose. A roentgenogram revealed the tube coiled in the stomach. About six inches was withdrawn and $\frac{1}{150}$ gr. atropine was given hypodermically, hoping to relax the antrum. After advancement of the tube about a foot farther, x-ray examination revealed the tube following the characteristic duodenal curve. Thirty c.c. of air was injected into the balloon and the tube to the air chamber clamped. The tube was passed at the rate of 6 inches every half hour and the peristalsis allowed to draw the balloon through the intestine until the end of the tube had gradually worked its way to the point of obstruction in the right lower quadrant, completely emptying and deflating the gut on the way (Fig. 1126). The balloon was deflated and the tube left in place.

All symptoms had ceased on the fourth hospital day and a soft diet begun. It was felt that this food would be partly absorbed before reaching the point of obstruction which was apparently low in the ileum.

On the fifth hospital day the tube was clamped, but due to slight distention, suction was again started. Bowel movements began on the sixth day, feeding was resumed, and the tube was again clamped. A roentgenogram on the eighth day showed no evidence of obstruction, so the tube was withdrawn (Fig. 1127).

The patient was discharged on the following day and has had no recurrence of symptoms during the three months since elapsed.

This case demonstrates a typical mechanical obstruction in which the use of the Miller-Abbott tube was intended to convert an emergency operation into an elective surgical procedure, but which apparently effected satisfactory release of the obstruction, rendering operation unnecessary. The obstruction was probably due to kinking by adhesions and was perpetuated by the distention itself.

The use of the Miller-Abbott tube in this case illustrated well the help the roentgenologist can give to the surgeon in the management of a case of intestinal obstruction. By examining the upper gastrointestinal tract, a lesion of the stomach and duodenum was ruled out. During the same examination intestinal obstruction was diagnosed. In using the Miller-Abbott tube the possible dangers of barium in the intestinal tract proximal to the obstruction were obviated.

Active cooperation between the surgeon and roentgenologist is imperative if the fullest advantages of this method are to be realized. Both must share in the responsibility for successful intubation. Roentgenography makes passage of the tube a much less haphazard procedure. The progress of the tube must be closely followed with frequent roentgenograms. This makes possible the prompt detection of any delay and also the degree of decompression that is being effected. With the benefit of a complete visual record to supplement the clinical findings, the surgeon is equipped to proceed in the indicated direction with confidence.

By means of this effective "intestinal decompression," developed by the splendid work of Wangensteen and others, the intestine proximal to the obstruction is relieved of its irritating and toxic contents. Also, this part of the intestine can then be used for nourishing the patient until the obstruction is relieved. For the feeding, a preparation high in vitamins and proteins and carbohydrates is used.

Electrolytes and the serum protein-concentration can be maintained by the intravenous use of Hartman's solution and the amino acid preparation for intravenous use worked out by Elman. The danger of hypoproteinemia in surgical patients and the details of its effective treatment are considered at length in Chapter III. Much work has been done along this line also by Ravdin, Stengel and Prushankin, and in their article they review the literature.

A muscular stimulant to increase peristalsis, such as pitressin or prostigmine, may start the gas and other intestinal contents through the paralyzed loop. But if there is organic obstruction with constriction of a loop, increase of peristalsis may increase the tissue damage, swelling, and constriction and thus hasten thrombosis and devitalization of the loop. Consequently, extreme caution is necessary in the use of peristalsis stimulation in these borderline cases with uncertain local condition.

The chief indications are (a) to keep the intestine above the obstruction decompressed and quiet, so that the edema of the wall of the affected loop can subside and allow resumption of function, (b) to supply nourishment and fluids to the patient as above mentioned while nature is repairing the local damage, and (c) to empty the lower bowel gently with enemas, and thus encourage the passage through of material from above without unduly stimulating the bowel above. This active intestinal decompression plan of treatment eliminates the immediate toxic danger, lessens the increasing peristaltic dam-

age in the affected area, sustains the patient's strength while you are differentiating between functional and organic obstruction, and aids in that differentiation by eliminating the obscuring toxemia and distention and painful peristalsis.

9. Organic Intestinal Obstruction.—Definite organic obstruction by band or volvulus of course requires prompt operation when such diagnosis can be made. Unless operation is carried out promptly when local circulation is subjected to increasing organic constriction, thrombosis and devitalization of the affected loop will take place. The diagnosis is usually clear when obstruction with classical symptoms comes on suddenly some weeks or months after operation.

On the other hand, in the first few days postoperative, functional disturbance of one or more loops (from the necessary operative handling and separation of adhesions or from low-grade peritonitis) is much more frequent. Also, reopening of the abdomen is a much more serious matter in this early postoperative period. Consequently, all measures should be employed to rule out functional obstruction and make the diagnosis of organic obstruction definite before reopening. Additional help in such differentiation and in the management of this difficult problem will be found in the detailed case previously given, and also in the articles of Wangensteen, Miller, Abbott, Johnston.

Spinal anesthesia will sometimes relieve a functional obstruction. Consequently, in an uncertain case it is well to employ this, either as a diagnostic-therapeutic measure or as the type of anesthesia where operation appears necessary.

10. Peritonitis is indicated by the combination of symptoms consisting of fever (beginning or increasing after the second day), persistent vomiting (extending into the fourth and fifth days), serious increase in the pulse rate, steady pain in the abdomen (without the cramplike pains of intestinal obstruction), and an increasing tenderness and rigidity in the lower abdomen, which gradually spreads to the upper abdomen. The intestinal tract is usually sluggish (partial intestinal paralysis), but there is not the complete absence of bowel movement such as occurs in intestinal obstruction.

A rise of temperature within the first twenty-four hours after operation is not of serious significance. Not infrequently in extensive operations, involving large peritoneal or connective tissue surfaces, there is a sharp rise of temperature (up to 102° or 103° F.), coming on within twenty-four hours and subsiding the second or third day without further disturbance. In the absence of a more definite explanation, this "aseptic rise of temperature" is said to be due to the "absorption of blood ferment." But when there is a rising temperature after the second day, it is indicative of some unusual disturbance, and when the combination of symptoms above mentioned is present, the diagnosis of peritonitis is clear.

The treatment of peritonitis following operation is the same as for peritonitis without operation. Saline solution and glucose should be given freely, and also blood transfusion, with duodenal drainage and nourishment as needed.

11. Local Suppuration is indicated by fever, coming on after the sixth day, and a moderate increase in the pulse rate and localized pain. If the suppuration is deep in the pelvis, the patient complains of deep-seated pain and usually of backache or of pain extending down one thigh. If the inflammatory

focus is situated in the back part of the pelvis, bowel movement or the giving of an enema causes pain. Vaginal examination shows a boggy mass which is very tender. The treatment for such local inflammation deep in the pelvis is to secure good bowel movement, to make the patient comfortable, to increase tissue resistance and to await resolution or abscess formation. When fluctuation can be detected by vaginal examination, open and drain the abscess per vaginam. Exceptionally, it may be advisable to open into a solid mass (inflammatory focus without fluctuation) or to open into the cul-de-sac for general pelvic drainage.

When the suppuration is in the abdominal incision, there is increasing pain along the course of the incision. This calls for removal of the dressing and inspection of the wound. Inflammation at this point is indicated by the cardinal signs (pain, heat, redness, and swelling), localized at some part of the incision, or extending all along it. If the disturbance is slight, a hot moist antiseptic dressing, changed every twenty-four hours, may be sufficient. If there is a pronounced cellulitis at some point, that portion of the wound should be opened superficially and a gauze or tube drain put in and the hot moist dressing applied. If drainage of the infected area can be satisfactorily effected without removing the tension sutures, that is preferable. In some instances the inflammation is confined to the subcutaneous tissue and no disturbance of the deep buried sutures is necessary. The important point, however, is to secure free drainage of the infected area and prevent serious absorption. If the whole wound is infected, it must all be drained. In such a case, the whole wound (except the peritoneum) is likely to open. As soon as serious absorption has ceased, the sides of the wound are brought together by strapping with adhesive strips, the wound being exposed and cleansed every day or two (depending on the amount of discharge) with hydrogen peroxide. Later, if thought preferable, the granulating surfaces may be freshened by curetting and then brought together by sutures, with the idea of securing secondary union.

12. **Phlebitis** seldom occurs now, since patients are allowed out of bed earlier. When it does appear, it is usually in the third week, when the patient has passed the time for the ordinary operative complications and is congratulating herself that she will soon be entirely well.

She complains of pain in the groin and upper part of the thigh on one side, and the temperature gradually rises to 102° or 103° F. There may or may not be swelling of the foot and leg, but there is always tenderness on pressure over the femoral vessels just below Poupart's ligament. This tenderness may, in some cases, be traced a considerable distance down the thigh, and also up along the iliac vessels.

The treatment of phlebitis is immediate bandaging of the leg and thigh (from toes up), elevation of the leg in a comfortable position on pillows, and the maintenance of this position and of the dorsal posture for several days. In mild cases the measures mentioned usually relieve the spontaneous pain, but in severe cases sedatives may be necessary for a time to give rest.

It will be necessary to maintain this position most of the time for a week or more, depending on the severity of the trouble and the rapidity of the improvement. When the above-mentioned treatment is carried out promptly and persistently, serious trouble seldom results. If the patient is permitted to use

the leg, the suffering is increased and the disability prolonged, and there is danger of serious embolism by particles detached from the thrombosed area in the vein and carried to the brain or heart or lungs. On account of the danger of detaching emboli, no massage or rubbing of the involved area is permissible until some time after all acute symptoms have subsided.

Ochsner and DeBakey obtained excellent results in thrombophlebitis by procaine block of the lumbar sympathetic ganglia, as described in their article on the role of vasospasm in thrombophlebitis. They summarize their results as follows:

1. The concept that mechanical blockage of the venous and lymphatic systems is of primary significance in the production of the clinical manifestations in thrombophlebitis is, in our opinion, inadequate.

2. Based on recent clinical and experimental investigations, we believe that many of the symptoms and signs are due to vasospasm of the arterial and venous systems and that the vasoconstricting impulses originate in the thrombophlebitic segment.

3. As the result of vasospasm there result increased filtration pressure, relative anoxia of the capillary endothelium and diminution in the flow of lymph, all of which increase the amount of perivascular fluid.

4. By interrupting the vasoconstrictor impulses with procaine hydrochloride infiltration of the sympathetic ganglions, there is produced a reestablishment of the normal exchange of intravascular and perivascular fluids.

5. Fifteen patients with seventeen thrombophlebitic processes have been treated by procaine block of the sympathetics. These cases are characterized by the prompt and permanent relief of all clinical manifestations in contrast with the usual case of phlegmasia alba dolens, in which there is pyrexia for from four to six weeks and the likelihood of persistent undesirable sequelae such as edema, varicosities and ulceration.

6. There was prompt and permanent relief of pain in all instances.

7. In half the cases the temperature returned to normal within forty-eight hours and in the other half within one week.

8. In more than half the cases the edema completely subsided in eight days and in the remaining ones within twelve days.

9. Sixty per cent of the patients were discharged from the hospital as cured within eight days after the institution of therapy.

Getting patients out of bed early (at the end of a week or ten days) has almost eliminated this complication in the personal experience of the authors. Under the old regimen of keeping the patients in bed three weeks it was rather frequent, occurring in about 2 per cent of the abdominal operative cases.

13. Pain During Convalescence.—Aside from the conditions already mentioned and the natural soreness of the recently disturbed structures, pain during convalescence is usually due to gastric or intestinal indigestion, with gas formation and resulting painful intestinal peristalsis. The treatment for this condition is to remove the irritating material from the intestinal tract by an enema and laxatives, and, if necessary, to administer some remedy for the gastric or intestinal indigestion. Of course, patients who have been operated upon are subject to neuralgic and neurasthenic pains the same as other persons, and these are likely to be more pronounced at the menstrual time.

An abdominal operation often causes the menstrual flow to appear ahead of time. Not infrequently there is also a slight bloody flow from the uterus, without any relation to menstruation, within a few days after the operation. Such need occasion no alarm, as it disappears in a short time.

14. **Subsequent Disturbances.**—As the patient begins to walk about, there may be more or less **soreness** in the pelvis for some time, until the hyperemia of the healing tissues has disappeared and the new connective tissue is firm.

In drainage cases a **sinus** sometimes persists. The persistence of such a sinus may be due to sloughing tissue or to a ligature. In the case of a catgut ligature or sloughing tissue, the troublesome material will usually disintegrate and come away in the course of some weeks. The sinus tract, in the meantime, should be kept clean by frequent cleansing with hydrogen peroxide—every day or two, depending on the amount of discharge. The patient can care for the fistula at home after being shown how to apply the peroxide and the dressing.

If a silk ligature is at the bottom of the sinus, it may come out itself after some weeks or months, or it may have to be taken out. Sometimes it may be caught up by “fishing” with a silkworm-gut or other contrivance. Otherwise, it must be removed by operation. A rare cause of persistent fistula is a sponge or forceps left in the cavity.

Occasionally a **fistula** connected with the bowel follows abdominal section. Ordinarily such a fistula should be treated by a simple cleansing for some time, for in a considerable portion of the cases it will heal spontaneously within a few weeks. If it persists indefinitely, it requires operative treatment. Such an operation should not be undertaken lightly, for it may prove very difficult and dangerous.

A **hernia** in the scar indicates defective healing of the wound. This is usually due to the necessity for drainage, which prevents perfect approximation of the sides of the wound. If the hernia is small, it may in some cases be held back satisfactorily by an abdominal support. If large, or if persistently troublesome even though small, it requires operative treatment.

AFTER-TREATMENT IN VAGINAL OPERATIONS

The general after-treatment of vaginal operations is practically the same as for abdominal operations.

A lysol douche $\frac{1}{4}$ per cent or permanganate 1:5,000, once daily, is started on the third day. If there is a drain from the peritoneal cavity into the vagina, the douche should be given under very low pressure, making sure that there is a good return flow. By the end of a week the drain will have either come away of itself or be loosened so it can be easily removed. The douches are continued as long as the discharge continues. It is but seldom necessary to replace the drain.

After a vaginal or perineal operation, the vulva and adjacent surfaces must be kept covered with an aseptic dressing, the same as any other wound region. Here, however, on account of the necessity of evacuation of the bowel and bladder, the problem of wound protection is more complicated. The dressing must be changed several times daily and with each change of dressing there is danger of contamination.

When it is necessary to change the dressing, the nurse should disinfect her hands and then cleanse the operative field with an antiseptic solution (e.g.,

potassium permanganate 1:5,000). The cleansing may be conveniently accomplished by means of the "pitcher douche." After the cleansing, a fresh dressing is put on and the T-bandage again applied.

If preferred, the "dry" after-treatment may be used in vaginal cases. With this after-treatment no internal or external douches are given until ten days after operation. Sterile pads are changed as often as necessary.

In perineal cases, ointments applied once or twice daily may diminish the soreness and discomfort. If there should be much pain in spite of an ointment, a perineal ice bag will sometimes give relief. Also, sedatives are to be given if needed for sleep.

If the patient can pass the urine, she should ordinarily be permitted to do so, whatever the character of the vaginal work. Catheterization is more likely to do harm than urination.

In many cases, however, the patient cannot urinate at first, and must be catheterized for two or three, or more, days. Catheterization must be carried out under strict antiseptic precautions. The catheter is boiled, the nurse's hands are disinfected, and the vestibule and meatus of the patient are carefully cleansed with an antiseptic solution. After the labia are once separated and the vestibule cleansed, the labia must be kept separated, so that there is no recontamination of the vicinity of the meatus, until the catheter is introduced. Care should be taken to avoid touching the part of the catheter which enters the bladder. The catheter should be grasped well back from the point. In order to prevent cystitis, it is well to give the patient some reliable internal urinary antiseptic while she has to be catheterized and for several days after the urine is passed.

Where repeated catheterization is necessary for several days, it is better to fasten an ordinary soft rubber catheter in place with adhesive and keep the bladder drained for forty-eight hours. When the catheter is removed after this time most patients will be able to void. However, as previously mentioned, in these cases, catheterization with the accompanying bladder irrigation should be carried out at least once daily immediately after urination until all residual urine disappears.

The special points in the after-care in the various vaginal operations have already been given in the chapters treating of those operations.