

CHAPTER IV

DISEASES OF THE EXTERNAL GENITALS AND VAGINA

For clinical consideration it is convenient to take up the diseases of the external genitals and vagina in the following order:

Classification

GONORRHEA

OTHER TYPES OF VULVITIS—Intertrigo, Eczema, Herpes, Bacterial Infections, Parasitic Infections, Leucoplakic Vulvitis.

OTHER TYPES OF VAGINITIS—Simple Vaginitis, Diphtheritic Vaginitis, Emphysematous Vaginitis, Trichomonas Vaginitis, Monilia Vaginitis, Atrophic Vaginitis.

ULCERATIVE DISEASES OF VULVA AND VAGINA—Simple Ulcers, Chancroid, Syphilis, Tuberculosis, Granuloma Inguinale, Lymphogranuloma Inguinale, Rarer Ulcerations.

URETHRAL CONDITIONS—Widening of Meatus, Prolapse of Mucosa, Urethral Caruncle, Urethritis (Skene's Glands), Suburethral Abscess.

VULVOVAGINAL GLAND DISEASES—Inflammation, Abscess, Sinus, Cyst, Tuberculosis.

NONMALIGNANT GROWTHS AND SWELLINGS—Condylomas, Stasis Hypertrophy, Tumors, Pudendal Hernia, Pudendal Hydrocele, Varicose Veins, Hematoma, Injuries.

MALIGNANT DISEASES—Carcinoma, Chorionepithelioma, Sarcoma.

MISCELLANEOUS DISTURBANCES—Leucoderma of Vulva, Adhesions of Prepuce or Labia, Hyperesthesia of Vaginal Entrance, Pruritus Vulvae.

(The more pronounced Malformations are considered in Chapter XIII.)

GONORRHEA

Gonorrhea is inflammation of the genital organs produced by the gonococcus. The term, when not qualified, is understood to mean gonorrheal inflammation of the vulva, vagina, and urethra, i.e., gonorrheal vulvitis, vaginitis, and urethritis. If the process extends into the uterus or fallopian tubes or bladder, it causes complications known respectively as gonorrheal endometritis, gonorrheal salpingitis, and gonorrheal cystitis. Gonorrhea is sometimes referred to as "specific" vaginitis or vulvitis or urethritis.

Etiology

Gonorrhea is caused by contact of the affected organs with a gonorrheal discharge, usually in sexual intercourse. The infecting germ (the gonococcus) is a diplococcus, easily stained, and is found in large numbers in the pus cells of all acute gonorrheal discharges. In chronic gonorrheal discharges it is not found so abundantly—in fact, in some cases, it is so scarce as to be very hard to find, and may even disappear entirely for a time.

Though the usual cause of gonorrhea is sexual contact with an infected person, it may exceptionally be caused by other means, as by contact with an infected towel or douche nozzle or chamber utensil or closet seat.

All discharges containing the gonococcus are capable of causing gonorrhoea. The slight urethral discharge from a chronic deep urethritis or from a stricture, persisting months or years after an attack of gonorrhoea in the male, is very liable to cause gonorrhoea when brought in contact with virgin soil.

A sad exemplification of this fact is seen in the many instances in which a bride is infected by her husband, who had gonorrhoea years before but supposed himself well. The consequence of such infection is that, instead of a healthy, happy woman with sons and daughters, the wife becomes a confirmed invalid in a childless home. This danger is not sufficiently appreciated by men generally—in fact, the man usually does not know the danger until too late. The responsibility of physicians in this matter is great, for the physician must decide when a man who has had gonorrhoea may safely marry. The criteria of cure are given after treatment.

Pathology

In the adult, the thick squamous epithelial lining of the vestibule and vagina is resistant to the gonococcus, somewhat like the external skin surface though to a less degree. But the gonococcus flourishes on the mucous membrane of the urethra, vulvovaginal glands, and cervix uteri. The discharge from these foci irritates the vaginal and vulvar surfaces causing considerable vaginitis and vulvitis which, however, may subside within a short time. Usually only the meatus or lower third of the urethra is involved, hence the urinary symptoms in women are usually mild and of short duration, unless carried higher by too active treatment or by catheterization. Skene's glands, or ducts, in the urethra are likely to be penetrated, and there the process may remain indefinitely.

In the cervix upward extension is often limited for a long time by the internal os. During or following menstruation is the usual time for extension upward, causing acute endometritis and perhaps later acute salpingitis.

Though extension superficially along the mucosa is a striking characteristic of the gonococcus, it does penetrate deeply at times and may be carried to distant parts. The occurrence of gonorrhoeal joint troubles and gonorrhoeal endocarditis shows the penetrating power of the germ and indicates the serious complications that may come from the infection. In addition, it opens the way for invasion by other bacteria and, all in all, is a common cause of distant "focal" infections.

In reinfection in adults the process is comparatively mild and is usually limited to certain areas, for example, the urethra or the cervix.

Symptoms

Within a few days after suspicious coitus the patient complains of slight irritation about the genitals. The parts feel dry and uncomfortable, and there may be a slight burning sensation. The feeling of discomfort increases and a discharge appears. About the same time or a little later, there is noticed a smarting or burning on urination and increased frequency of urination. Within two or three days of the beginning of the trouble the discharge is profuse and the signs of irritation (burning and itching and frequent painful urination) are marked.

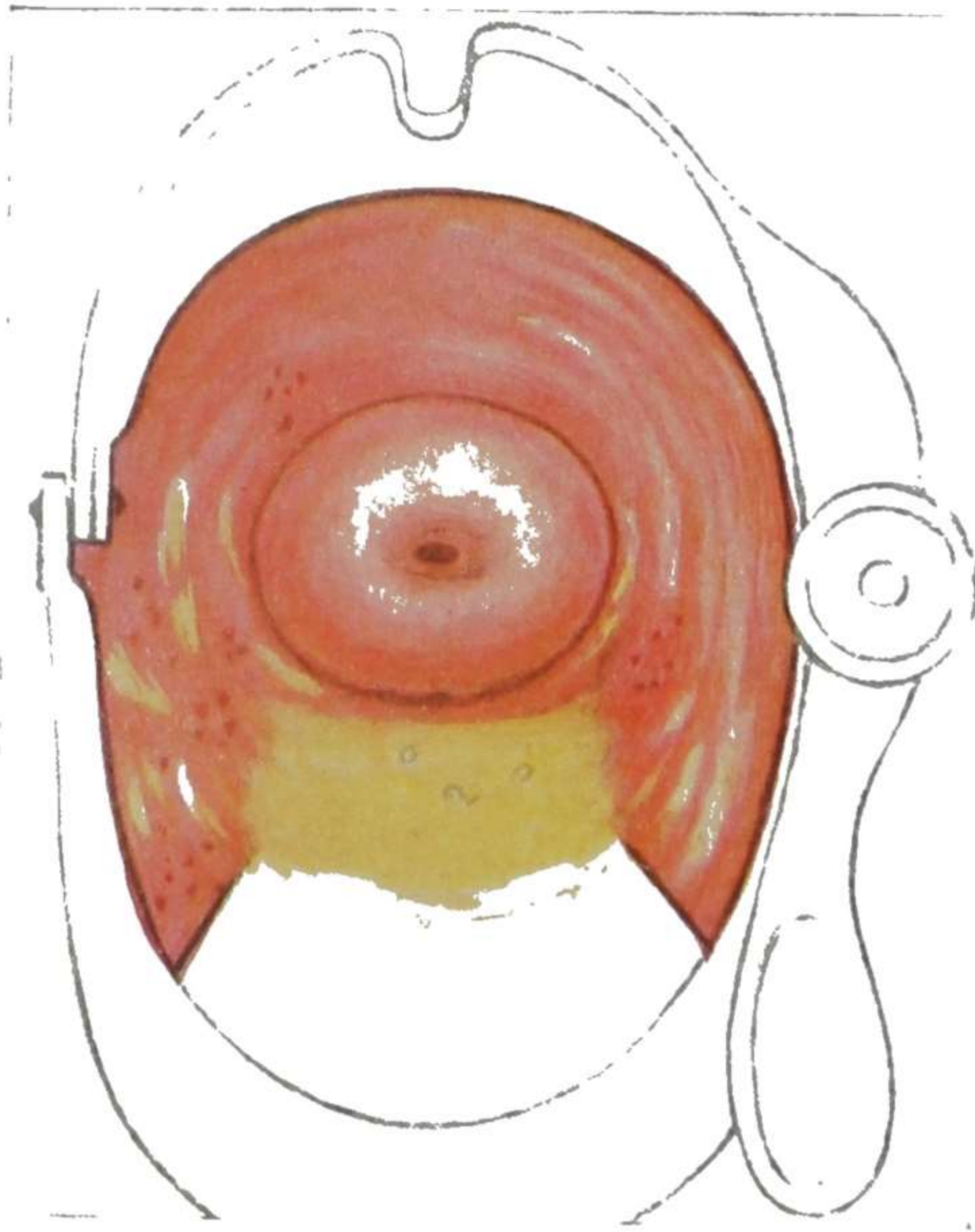


Fig. 338.

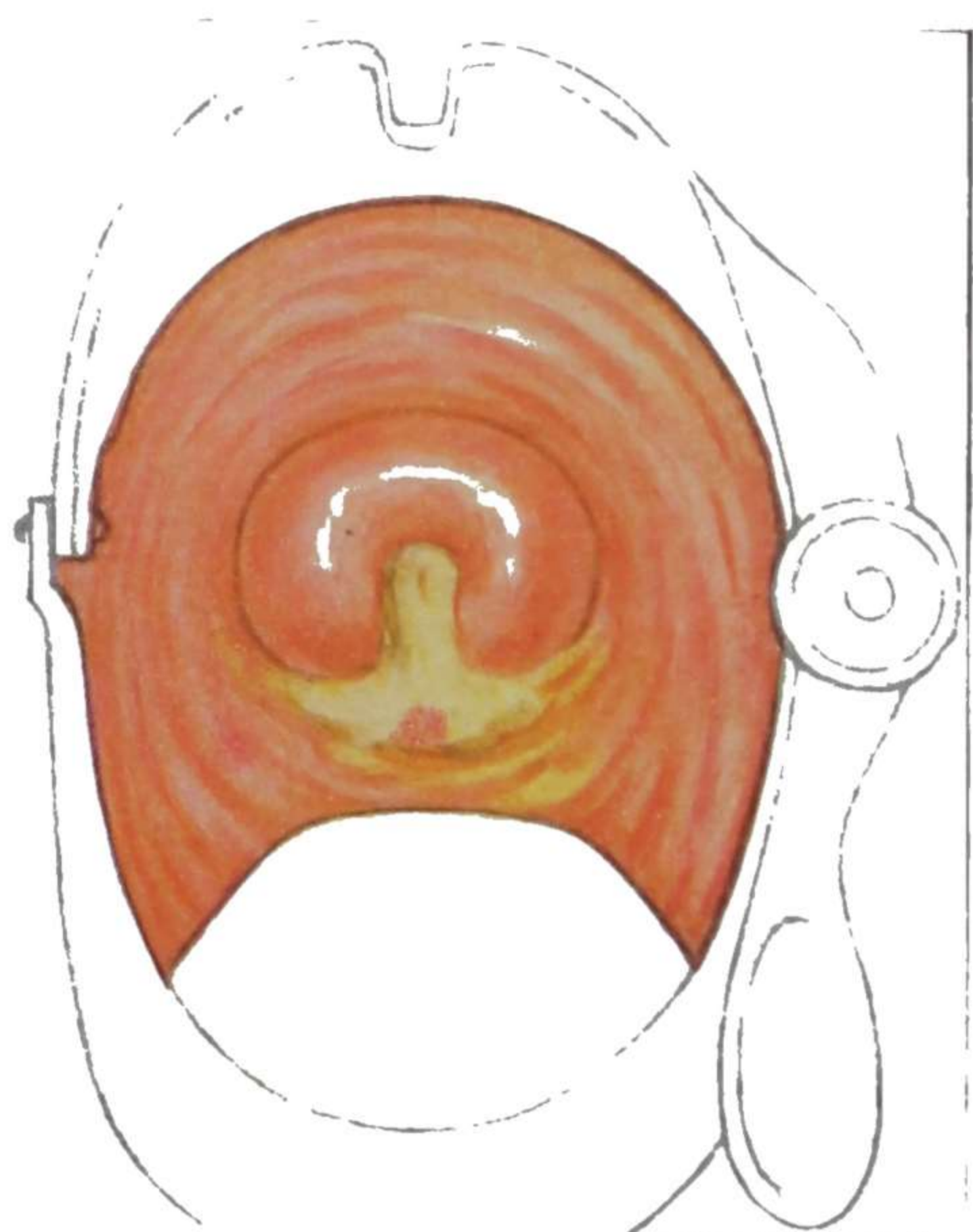


Fig. 339.

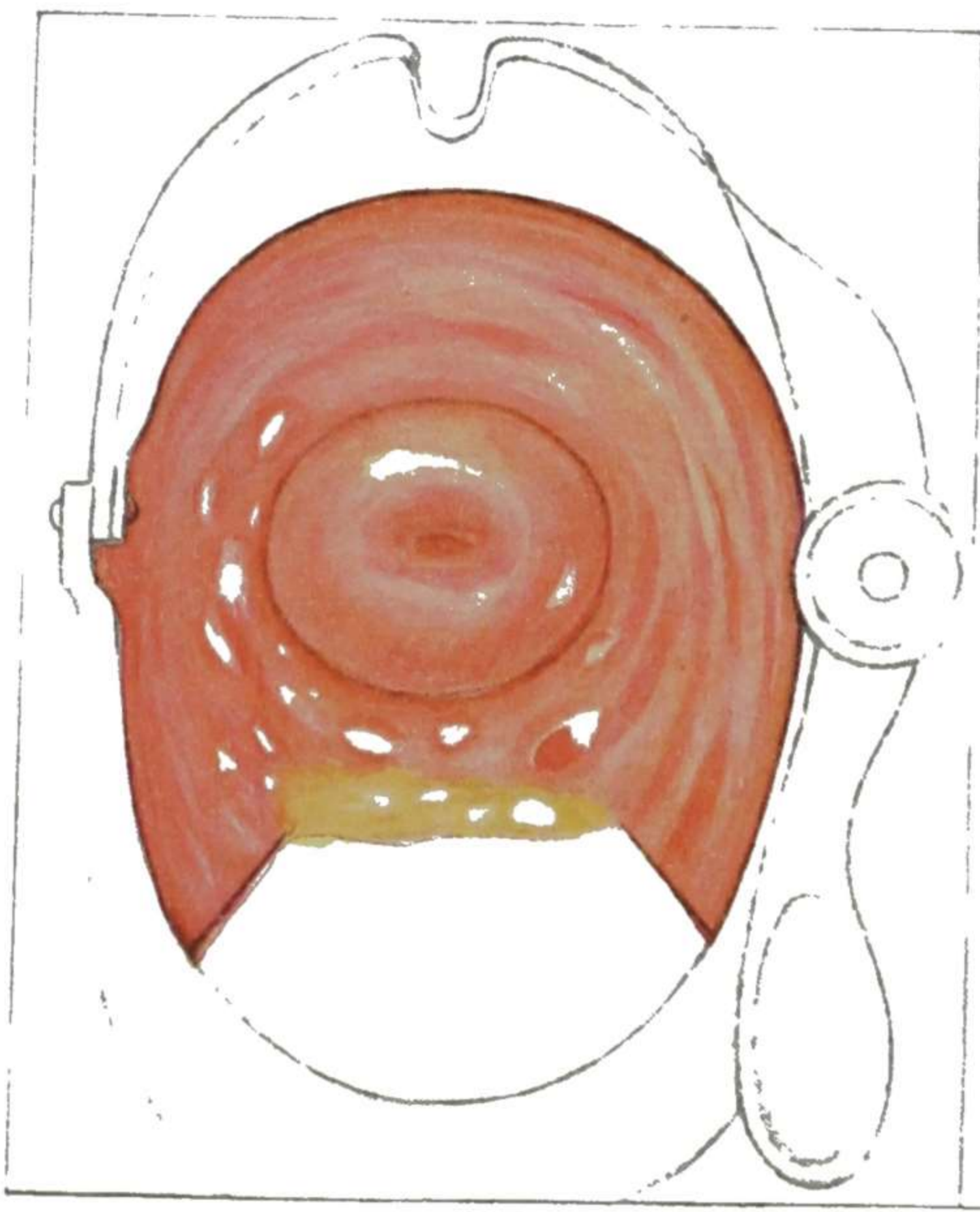


Fig. 340.

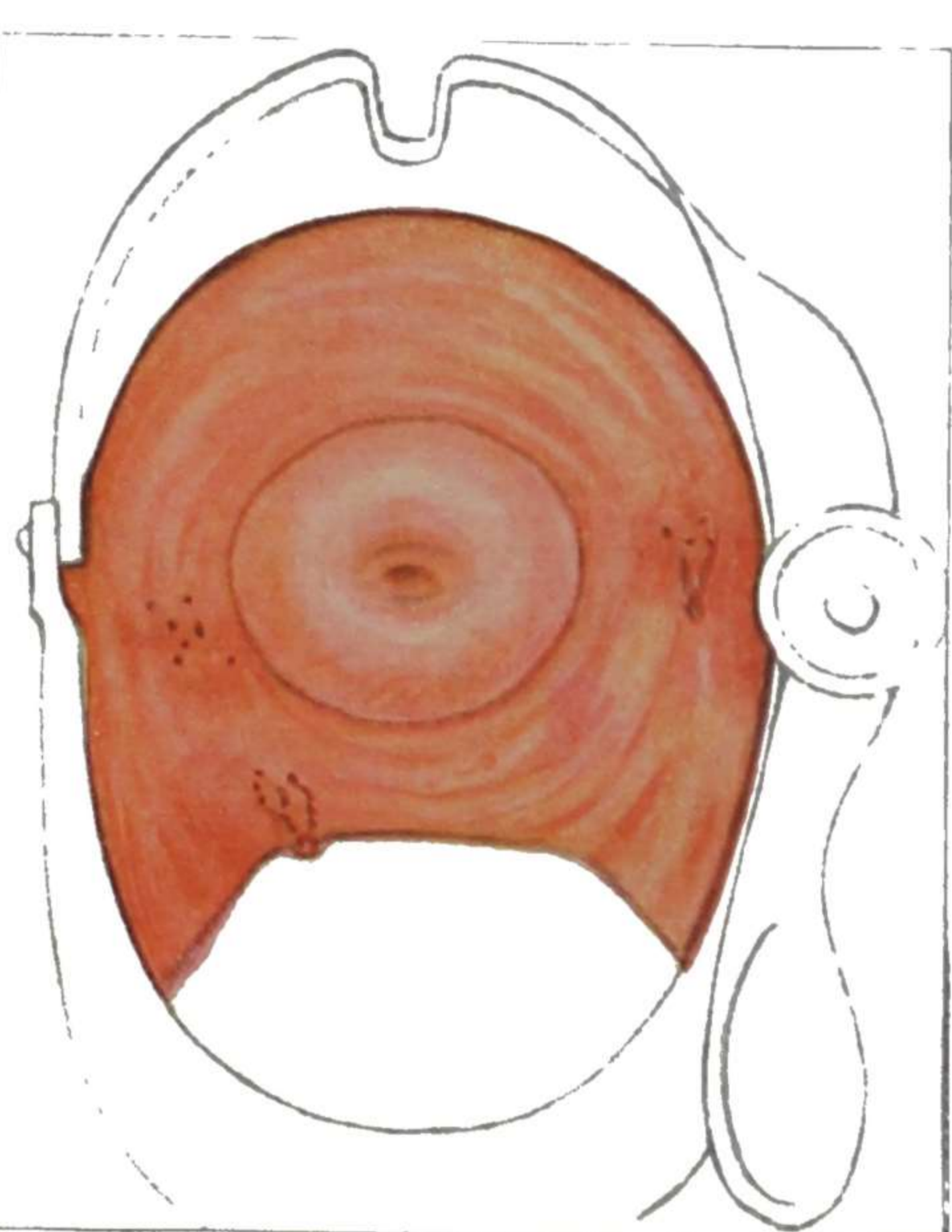


Fig. 341.

Fig. 338.—*Trichomonas* vaginitis, showing the thin yellow discharge with general redness of the vaginal wall and hemorrhagic spots (minute ulcers). In some cases there are gas bubbles in the discharge. The cervical canal is clear—no yellow plug as in gonorrhoea.

Fig. 339.—Gonorrhoeal vaginitis. The inflammation is principally in the cervical canal, which is filled with a yellow plug of tenacious mucus. This tenacious yellow discharge extends out into the vagina, causing some vaginitis. But there is no severe vaginal inflammation with hemorrhagic spots as seen in *trichomonas* vaginitis.

Fig. 340.—*Monilia* vaginitis, showing the general redness and the white areas of membrane. When the membrane is scraped off there is likely to be a raw red surface underneath. The discharge is usually small in amount.

Fig. 341.—Atrophic (senile) vaginitis, showing the general redness, due to the atrophic thinning of the epithelial layer of the mucosa and the tendency to punctate bleeding wherever the wall is rubbed. The discharge, if any, is scanty and mostly clear. (Modified from Karnaky's drawings as reproduced by G. D. Searle & Co.)

On inspection, the structures immediately surrounding the vaginal orifice are found reddened and painful on pressure. There is a yellow discharge from the vagina and frequently some discharge from the urethra.

On digital examination, the vaginal walls are found rough and hot and tender. Pressure on the anterior vaginal wall directed from the upper end of the urethra to the meatus, may bring to view one or more drops of urethral pus. If the case has passed beyond the acute stage, the pain and discomfort are not so marked, but the discharge, more or less profuse, is still present.

Diagnosis

Gonorrhoea must be distinguished from vulvitis and vaginitis due to various other causes. When a patient comes with a rather severe vaginitis, there are four types in particular to be considered, namely, trichomonas, gonococcal, monilia, and atrophic. The special features of each are shown in Figs. 338 to 341. *Trichomonas vaginitis* is the type present in a large proportion of the cases of persistent or recurrent vaginal inflammation of considerable severity. If examination be made after omission of douche for a few days, one may usually observe the characteristic appearance shown in Fig. 338. Covering the tip of the speculum is a pool of thin yellow pus. In addition to the general redness of the vaginal wall, punctate hemorrhagic spots may be seen. These are likely to be grouped; the grouping perhaps representing the activity of one organism or of two or more working close together. The wall presents also streaks of the yellow pus, but no patches of membrane and usually no yellow roll of cervical pus.

In *gonorrhoeal vaginitis*, there is generally a thick and tenacious yellow roll of pus coming out of the cervical canal, as shown in Fig. 339. This jelly-like yellow roll is stringy and difficult to clear out of the cervix. The discharge in the vagina is somewhat similar though there is admixture of thinner discharge from the vaginal wall. *Mycotic vaginitis* (usually monilia) is less frequent and the patches of membrane as shown in Fig. 340 is characteristic. Brushing off a patch of membrane reveals the red inflamed surface beneath it. *Atrophic vaginitis* may be quite severe, with distressing burning and itching, with very little discharge. The scarcity of discharge with the annoying symptoms is one of its features. In addition, there is the general redness of the vaginal wall due to the atrophic (senile) thinning of the lining epithelium. Also, wherever the wall is brushed with some pressure there appear fine bleeding points, as shown in Fig. 341. The slight trickle of blood from the points may join and form a drop, rolling down on the speculum. In addition to the above-mentioned special appearances, there are often associated conditions which assist in differentiation. In gonorrhoeal inflammation, there is a tendency to involve the urethra and the vulvovaginal glands as well as the cervical mucosa. The decisive diagnostic factor is the demonstration of the gonococcus by staining and if necessary by culture.

Staining the Gonococcus.—A specimen for staining is made by smearing a little of the discharge, preferably from the urethra or from a Bartholin gland, on a slide near the end. The corresponding part of another slide is then pressed on the film and the two are drawn apart. This gives two identical specimens, one for the blue staining and one for the

gram-negative staining if that should be found necessary. It is advisable to make specimens from the urethra, from a Bartholin gland, and from the cervix if discharge is found in these locations. The slides are allowed to dry and are labelled.

The specimen to be stained blue is fixed to the slide by being passed two or three times through the flame. It is stained by flooding for fifteen seconds with a 1 per cent solution of methylene blue. It is then rinsed with water, the excess of which is removed by gently blotting with filter paper. After the slide is thoroughly dry it is examined with the oil emersion lens. A cover glass is not needed, the immersion oil being dropped directly on the stained specimen.

The gonococcus and other bacteria stain very dark in comparison with the cell nuclei. The characteristic distribution of the gonococci is well shown in Fig. 342. The roll-shaped diplococci are grouped within the pus cell. This fact is shown by the relation of the group to the stained nuclear parts of the cell and by the rounded outline of the group, the spread of which is limited by the outer cell wall (which does not stain). Cells may disintegrate and release gonococci which are then seen free in the intercellular spaces. A general view of the specimen with the characteristic grouping of intracellular colonies (Fig. 342) is of course best seen with the medium high-power objective, while the individual shape and pairing of the cocci (Fig. 343) are clearer with the oil immersion.

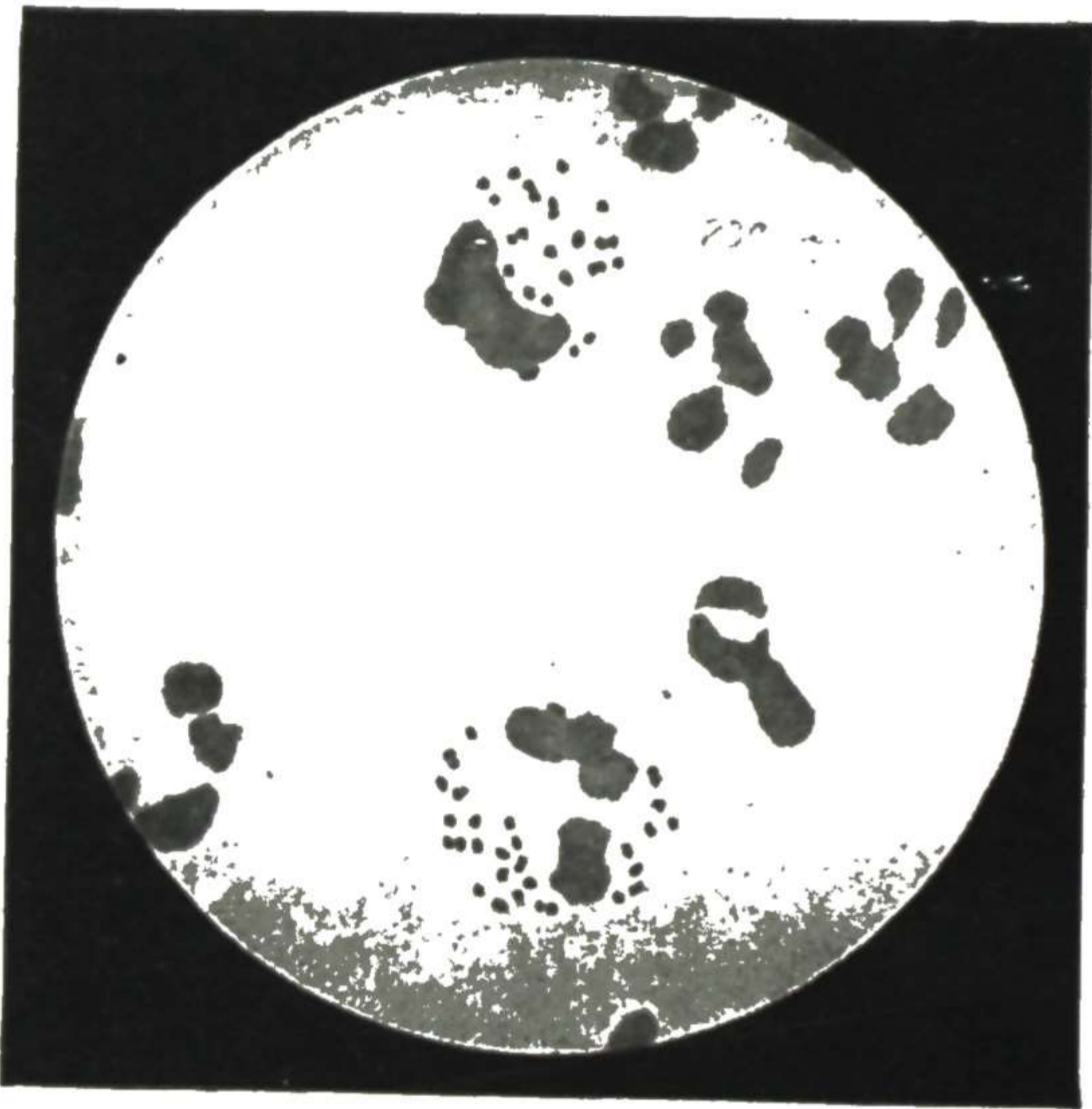


Fig. 342.

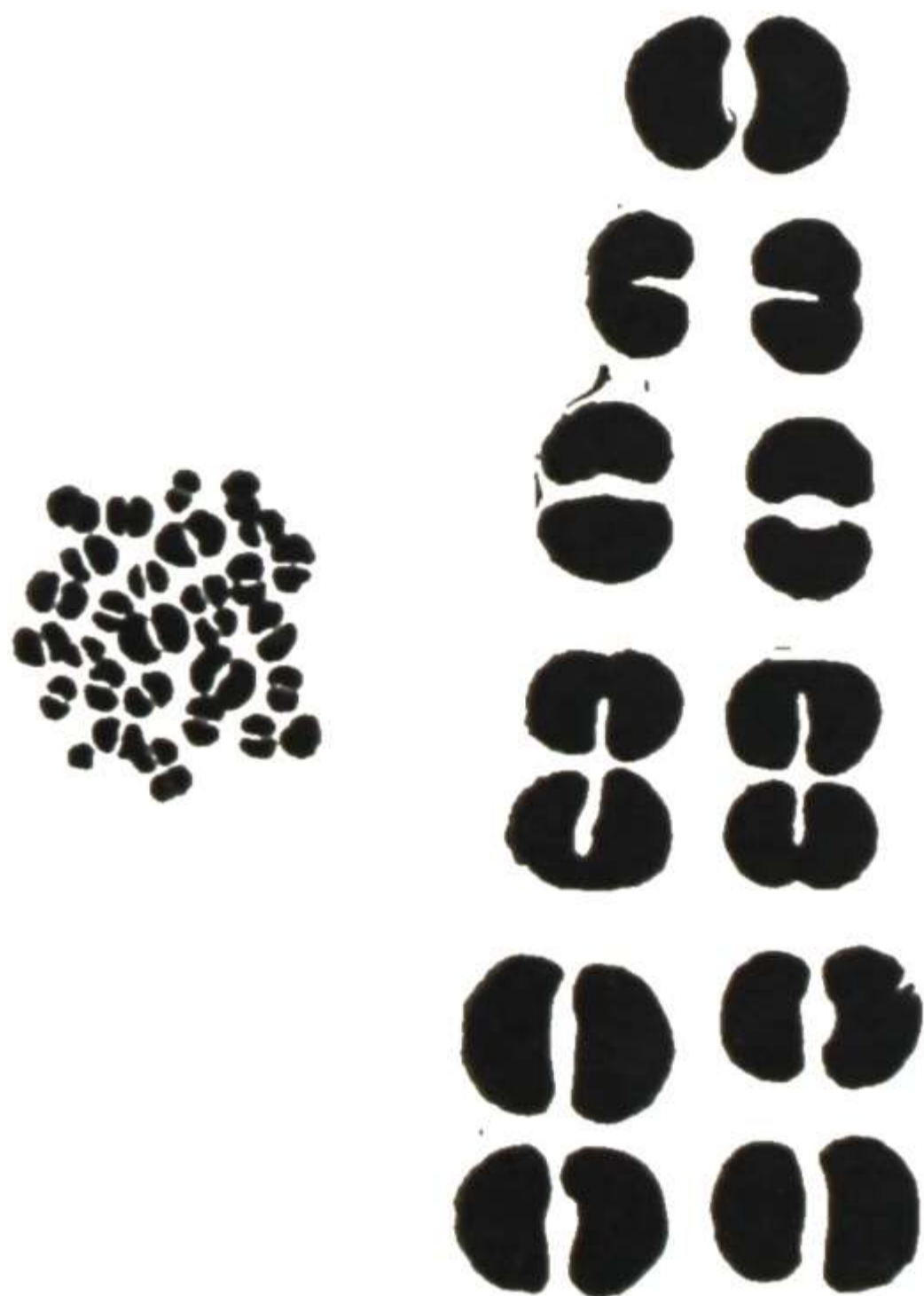


Fig. 343.

Fig. 342.—Specimen of pus from a case of gonorrhoea, stained with methylene blue. This field contains two gonococcus colonies, each within a pus cell. Only the nuclei of the pus cells are seen. The lower colony has the circular outline of the cell containing it. (Kolle and Wassermann—*Handbuch der Pathogenen Mikroorganismen*.)

Fig. 343.—Indicating the shape of the diplococcus of gonorrhoea (gonococcus). (Byford—*Manual of Gynecology*.)

In chronic cases, however, this picture is not usual. There may be only a few organisms and of these only one or several pairs may be found within the cells. In that case, the diagnosis cannot be made positively, since other organisms found in the vagina may give the same picture. Since many, if not most, of these organisms are gram-positive, staining by Gram's method will help clear the doubt. The diplococcus catarrhalis, however, which is found in the vagina occasionally, cannot be thus distinguished, since it is an intracellular organism and is gram-negative. In doubtful cases it may be necessary to differentiate these organisms by cultural methods.

Tiedemann's Modification of Gram's Stain. A thin smear is dried without heat and flooded with a 2 per cent solution of crystal violet (Hoechst) in methyl (wood) alcohol. The stain is allowed to act for fifteen seconds and is then removed by allowing distilled water to drop slowly from a burette onto the slide for fifteen seconds. It is then washed briskly with distilled water.

The slide is now flooded for fifteen seconds with a solution containing 1 gram of iodine and 2 grams of potassium iodide to 100 c.c. of distilled water. This solution is poured off and the slide flooded with 95 per cent alcohol until no more color is given off. This takes about ten seconds. The slide is then washed with water and dried. It is advisable to counterstain very lightly with a solution of carbolfuchsin diluted with ten times its volume of water. Gram-positive bacteria appear bluish black, while gram-negative bacteria, if counterstained, appear a pale red.

Significance of Microscopic Findings

As already stated, in *acute* or subacute cases there is rarely any difficulty in determining certainly whether the trouble is or is not gonorrhoea, the symptoms and bacteriological findings coinciding and settling the matter.

In *chronic* cases, on the other hand, there is often great difficulty. If a few apparent gonococci (shape, groupings, situated in pus cells, decolorized by Gram's method) are found, the diagnosis is not positive, though the strong probability is that the lesion is gonorrhoeal, if the history and ordinary examination findings point that way. The difficulty is due to the fact that the micrococcus *catarrhalis*, mentioned above, has the same staining points. Consequently, in cases where the history and clinical findings do not conform to the staining evidence, further differentiation should be made by culture. Though difficult to culture, bacteriologists have developed a satisfactory method by which the gonococcus may be cultured and identified. Also, the blood serum fixation test (complement fixation test) may assist in deciding whether or not a deep inflammatory focus is gonococcal.

It is important to trace down the diagnosis thoroughly in all doubtful conditions. The following is a case in point:

A middle-aged couple, referred for treatment for gonorrhoea, gave no history of suspicious contacts, were clearly people of good standing and respect in their community, and with full trust in each other. They were greatly distressed by this strange thing which had come into their lives. Even without suspicions and on the assumption of innocent extragenital contamination, the presence of this loathsome disease which might spread to internal organs or contaminate some other member of the household was a consuming worry. Both husband and wife had developed a troublesome discharge which persisted in spite of treatment. Their physician sent specimens to a laboratory, and the report came back "gonorrhoea."

Our examination, the vaginal discharge showed apparent gonococci—intracellular and gram-negative. But they were very few compared to the free discharge, which if gonorrhoeal should have shown gonococci in abundance. Also, the inflammation did not have the usual localizations of subacute gonorrhoea (urethra, Bartholin glands, cervix) but involved the surfaces in a more general way. Examination for trichomonads showed none, but there had been frequent douching. Specimens were sent to a reliable laboratory for cultural differentiation of the gram-negative intracellular cocci, and the douches were stopped. By means of cultural differentiation, complement fixation test, and examination of repeated specimens from wife and husband, it was established that (a) the inflammation was of the trichomonas type (trichomonads eventually found in both wife and husband), (b) the gram-negative intracellular coccus was the *Micrococcus catarrhalis*, and (c) there was no gonorrhoea. Such an experience emphasizes the importance of coordinating the laboratory and clinical findings, and the necessity of most careful investigation in an atypical case.

In addition to staining, culture, and complement-fixation test in a doubtful chronic case, the following items may give some help: (a) evidence of invasion of Bartholin's glands or of Skene's glands, (b) history of salpingitis, following the vaginal inflammation, (c) sterility, and (d) history of former gonorrhoea in the husband.

Treatment

Before stating in detail the methods, it is desirable to make clear the principal purposes of the treatment. They are as follows:

a. **To Prevent Extension Upward** of the disease to the endometrium and fallopian tubes. The extension to the fallopian tubes is a most serious result of gonorrheal infection and condemns a large proportion of the victims to chronic invalidism or to a serious operation. In either case, there will probably be sterility.

b. **To Relieve the Discomfort** attendant on the inflammation and to prevent contamination of the patient's clothing and surrounding objects with the discharge.

c. **To Eradicate Completely the Infection** from the lower genital tract so that no infective discharge will remain. As long as one spot of gonorrheal inflammation remains in the vagina, in the vulvovaginal glands, in the urethra, or in the uterus, the discharge is infective and is a source of danger to the patient and to those around her. At any time, there may be an extension upward to the tubes or there may be infection of the eyes of the patient or of someone else in the household. It is probable that a considerable number of the cases of gonorrheal vulvitis in children come from accidental infection from a contaminated towel or closet seat, in the home or elsewhere.

Details of Treatment

Since the discovery of the drugs of the sulfonamide group the treatment of acute gonorrhea has been revolutionized. At present, the member of the group giving the quickest and most reliable results is sulfathiazole. Fortunately it is also the one which is usually best tolerated. Other sulfonamides which have been used are sulfanilamide, neo-prontosil, and sulfapyridine. A new one under investigation at present is sulfadiazine. In patients who cannot take any of the sulfonamides, pyridium is fairly successful.

In the Washington University Gynecological Out-patient Clinic a five-day treatment of acute gonococcal infections with sulfathiazole was carried out by Dudley R. Smith, who in a personal communication gave the following summary of 70 patients treated. Each patient was given four grams (60 gr.) of sulfathiazole daily for five days. She was instructed to stop the medicine if she noticed persistent nausea or dizziness or other unusual disturbance. No blood count nor check as to blood level of the sulfathiazole was made. In only one case was it necessary to discontinue the medication. This patient had severe headache after the first and second dose, so the treatment was stopped. The patients were seen once a week for culture, and only those with negative specimens for sixteen weeks were considered cured.

Of the seventy cases, 64 per cent were cured, as evidenced by bacterial cultures for sixteen weeks, and 36 per cent lacked proof of cure. This 36 per cent was distributed as follows: 12 per cent admitted promiscuous reinfection, 12 per cent did not return, 6 per cent were uncooperative, 2 per cent were transferred to the hospital on account of abscess, and 4 per cent did not respond to the drug. Of the 36 per cent, 6 per cent were frank failures, while the remaining 30 per cent may or may not have been cured, but they were counted not cured by the criterion adopted. If the series included only those who cooperated, the percentage of cures rises to 94 per cent.

A lactic acid douche to remove irritating material helped to make the patients more comfortable. Eight of the patients were pregnant. One of these miscarried (twins) two months after treatment. Six were delivered, each with normal child, normal puerperium, and negative culture six weeks post partum. One is still undelivered, with negative culture.

In cases which do not respond to sulfathiazole, a combination of sulfathiazole and fever therapy will usually effect a cure. In patients who cannot take the sulfonamides, pyridium is the next choice of drugs. Two tablets are given three times a day until the urine is a brick-red color. Then the daily dose is regulated so that that color of the urine is maintained for ten days to two weeks, and the smear is checked.

In explaining to the patient the necessity of keeping the infected surfaces covered, and of changing the pad often and of washing the hands well afterward each time, take particular care to **arouse no suspicion** that might lead to domestic infelicity.

Your work is to lessen suffering, not to cause it. If the patient should become apprised of the fact that her husband has been untrue to her and in addition has brought to her a loathsome disease, her suffering would be far greater than any physical distress that might result from the disease, even though it goes on to pelvic suppuration requiring operation.

The authors have no sympathy for the man who commits adultery and brings a disease of the women of the streets to the pure woman whom he has promised to love, cherish, and protect. He reaps his reward in due time. It is not to protect him that the need of caution is mentioned, but to protect the woman herself from unnecessary suffering. This can usually be accomplished by the exercise of a little tact. To the patient's question, "What is the trouble?" a good answer is "Inflammation." Then pass quickly to the directions concerning treatment. At a convenient time, mention that the discharge is irritating and that she must be careful that none be carried to the eyes on contaminated fingers or serious inflammation of the eyes may result. The patient usually becomes so interested in the treatment that she forgets to inquire as to the cause of inflammation. However, if she asks, as they sometimes do even when having no suspicion, "Doctor, what is the cause of inflammation?" the usual reply is: "Inflammation is due to various causes," in a tone that shows that the physician has neither the time nor the inclination to give the patient a course in medicine in order that she may understand all the details about inflammation. This rarely fails to stop troublesome questions. Of course, some patients are so suspicious that they will not stop questioning until they have all the information they can possibly secure, while others are well aware of the nature of the trouble and question the physician out of curiosity or to see whether he has a grasp of the situation. With such, much time need not be wasted. Do not tell them the exact nature of the trouble when you do not think best to do so, neither tell them an untruth. When pressed too closely, simply remind them that their principal desire is to get well, that they have come for treatment, that they are receiving treatment, and have been given all the information necessary to treatment. If not satisfied with that they may go elsewhere for care.

Of course, some patients know or will probably find out in a short time the nature of the trouble. But it is preferable that they find out from some other source, if at all. Your imparting the information, or confirming that imparted by some of their anxious friends, will probably do no good and may do much harm.

Criteria of Cure

In the authoritative symposium on The Gonococcus and Gonococcal Infection published in 1939 by the American Association for the Advancement of Science, the criteria of cure are considered at length, the following quotations and data applying to the female.

"Adult. In the female the problem of determining the cure is considerably more difficult than in the male. Here the accurate determination of the absence of all clinical evidence of the infection is of the utmost importance, probably more so than the bacterio-

logic procedures. Such an examination presupposes adequate training in the recognition of the slight evidences of gonococcal infection in women."

Such a thorough search, besides determining the presence or absence of symptoms such as frequency, dysuria, discharge and pain, includes careful expression of the urethra and periurethral glands (Skene's glands) for discharge, examination of the Bartholin gland of each side, the cervix uteri, the parametrial tissues, and the tubes and ovaries, and the securing of the following microscopic data.

1. Series of successive smears and cultures from the urethra, cervix, and Bartholin's glands must be negative. The time for taking the specimens should be arranged so as to secure a series before, during, and after menstruation.

2. Provocatives, if used, should be followed by smears and cultures from the above sites.

3. Repetition of above series of examinations five times at monthly intervals is recommended.

"Child. In female children the infection of the vagina as well as the cervix makes it difficult to determine the point at which the patient is ultimately cured. Relapse after apparent cure is very common. Here again the absence of discharge and signs of inflammation of the vulva, vagina, and cervix are the first essentials."

Following this come the same series of specimens for microscopic examination and culture as mentioned above for the adult, except that for the child rectal specimens also are advised.

Comments

The publication covers the various ramifications of the subject including review of the use of sulfanilamide and allied drugs, the social-community aspects of the problem and the place of the laboratory in the diagnosis.

"Cultures. The inclusion of culture for the gonococcus in the above procedures is an essential additional laboratory check. In order that it may have any significance, proper facilities for taking and transporting the specimen, a well-equipped laboratory and well-trained technician must be available. Without such facilities very little additional reliable information can be obtained.

"If such facilities are at hand both the smear and cultural evidence must be considered. While the cultural examination records a greater percentage of those having gonococci, a number of cases will present positive smears and have negative cultures. Since the advantage of cultures has been amply demonstrated by Carpenter, Leahy and Wilson (1938) it follows that the above facilities should be available and used in conjunction with smears.

"Blood Test. The meaning of the complement-fixation test for gonococcal infection is at the present time too ambiguous to be of much value in determining the presence or absence of the disease. It is not possible to ascribe any consistent uniformity of interpretation to the results obtained by this test as evidenced by the evaluation made by Jacoby, Wishengrad and Koppman (1938). The test at present with the best technique shows too large a percentage of false positive results to be used as a criterion of cure.

"Provocatives. The ability of provocative measures to liberate tissue-locked gonococci is extremely meager. This is particularly true in the female where there is a greater diversity of tissue involvement. The types of provocatives employed include local irritation by instrumentation or chemicals, or physiological stimulation of secretion by parasympathetic stimulants such as eserine compounds applied locally or choline compounds introduced by iontophoresis, or by producing increased glandular activity in the cervix by negative galvanism, or by general stimulants, such as injection of vaccine, the metabolic products of the gonococcus, foreign proteins such as milk or nonspecific organisms.

"The recently inflamed mucosa is naturally sensitive, and irritation whether of local or general origin may cause an appearance of discharge. Only if such irritation produces a liberation of the gonococci deep in the tissues is it of any value as a means for determination of cure. In our experience such gonococcal liberation has been extremely rare. In spite of this it may be well, especially at this time, not to overlook any procedure that may possibly bring into the open even as little as 1 per cent of uncured gonococcal infection."

Treatment of Chronic Gonorrhoea

A chronic gonorrhoeal discharge is due to persistence of the specific inflammation in one or more isolated areas. When such a discharge persists after the inflamed surfaces generally have returned to normal, make careful search for its exact source. The situations in which the inflammation is likely to persist are the following:

Skene's glands, in the urethra.	Cervix uteri.
Vulvovaginal glands or ducts.	Corpus uteri.

In Skene's Glands.—When the gonorrhoeal inflammation invades these periurethral ducts, it may remain there indefinitely, causing symptoms of chronic urethritis or chronic cystitis and a persistent infective discharge. There is redness about the urethra and pouting outward of the swollen urethral mucosa. If the patient has passed through parturition, the opening of the duct on each side may usually be seen by rolling out the urethral mucosa as explained under Examination in Chapter II. If the duct is open, a drop of pus may be pressed from it. If the duct is closed, a small abscess forms.

To **treat** these conditions, the infected glands may be destroyed by excision or cautery or coagulation, using a small needle electrode, or the Corbus electrode with diathermy may be used for local heat treatment.

In Vulvovaginal Glands or Ducts.—Persistence of the gonorrhoeal inflammation in the duct of a vulvovaginal gland is indicated by reddening about the mouth of the duct and by a discharge from it, a drop of which may usually be pressed out. Microscopic examination of this discharge usually shows gonococci in abundance, though in some old cases they may disappear temporarily. If the gland shows evidence of chronic involvement (firm nodule in that situation) it requires extirpation, for as long as it remains it prevents complete cure and the discharge from it is a source of danger.

If an abscess forms in the gland, it is opened freely. If the abscess is well developed so that all septa are destroyed and the recesses form part of the main cavity, there may be complete healing afterward and an end of the trouble. If a second abscess forms later, however, that means that portions of the infected gland remain, and in such a case, all the involved indurated tissue should be extirpated.

While waiting for a vulvovaginal abscess to mature for opening, the free application of unguentum Credé may assist in relieving the discomfort, if hot packs are not sufficient. In cases with any focus of inflammation which cannot be extirpated, for example, salpingitis, sulfathiazole internally is to be considered. Persistent inflammation at the vaginal vault is due usually to an irritating and infective discharge from the cervical canal. The chronic uterine infection may be located in the cervix or in the body of the uterus. When there is persisting inflammation at the vaginal vault without involvement of the cervical canal, the cervical discharge being clear mucus, suspect trichomonas vaginitis or other type, and investigate and treat accordingly.

Fever Therapy.—Fever therapy has been used in extensive gonorrhoeal inflammations, with remarkable effects in relieving pain and resolving exudates.

This form of treatment requires extensive and reliable apparatus, specially trained attendants, and careful selection of cases by a physician familiar with the indications and contraindications. Under proper precautions and experienced supervision this type of therapy may bring great relief in cases not responding to less radical measures. Fever therapy is especially helpful in treating serious gonococcal complications, such as ophthalmia, arthritis, and endocarditis.

Gonorrhoea in Children

Gonorrhoeal infection in female infants and children is more frequent than is generally appreciated. Most of the infections are due to accidental contamination from soiled clothing or toilet seat or from the fingers of the mother or attendant. The diagnosis should be made by culture, as it is very difficult to differentiate the *micrococcus catarrhalis* from the gonococcus by ordinary staining methods.

The inflammation usually stops in the vagina. Extension upward to the tubes and peritoneum is infrequent but occasionally occurs. Asch calls attention to the fact that this should be kept in mind as a possible etiologic factor in obscure cases of peritonitis in children and also in tubal occlusions found later in life without apparent cause. Gonorrhoeal vaginitis in early childhood may cause adhesions of the vaginal walls, which obliterate the vagina to a greater or less extent. Such condition seen in later life may be mistaken for a congenital atresia of the vagina.

Treatment

It is now established that estrogenic treatment by means of vaginal suppositories is a satisfactory method of handling chronic vaginitis (gonorrhoeal or otherwise) in children.

In 1934, R. M. Lewis reported on the use of theelin in the treatment of gonorrhoeal vaginitis in children. The results were obtained through the action of theelin on the vaginal epithelium.

Principle of Treatment.—In the immature girl the vaginal epithelium is only three or four cells thick, while in the adult it is many-layered. With infection in the immature, the epithelium becomes still more thinned and in some cases disappears in areas. Allen, experimenting on monkeys, found that estrin injection caused a marked hypertrophy of the vaginal epithelium, so that it became many layers thick, resembling the adult type. Lewis applied this principle to the treatment of children with gonorrhoeal vaginitis, and found that the thin immature epithelium became greatly thickened and that the gonococci disappeared.

Since this original work by Lewis, instructive reports have been made by Brown, Miller, TeLinde, and others. Miller states, "The apparent simplicity of the reports might lead one to the hasty conclusion that a lasting cure is easily obtainable. The questions which must be answered are (a) is it an arrest or cure that takes place, (b) how often and permanent are the 'cures,' and (c) are there any deleterious effects on the children?" His conclusions from the study of his series were: 1. Gonorrhoeal vaginitis in children may be cleared

up promptly in most cases by the estrogenic treatment. 2. Relapses are frequent. 3. Acute cases require longer treatment than the chronic. 4. Other vaginal infections respond to this treatment.

TeLinde, in a paper at the American Gynecological Society meeting in 1935, presented the results of a careful study of different methods of administering the estrogenic hormone in these cases. He used amniotin, and gave it in four ways: orally, hypodermically in solution, hypodermically in oil, and

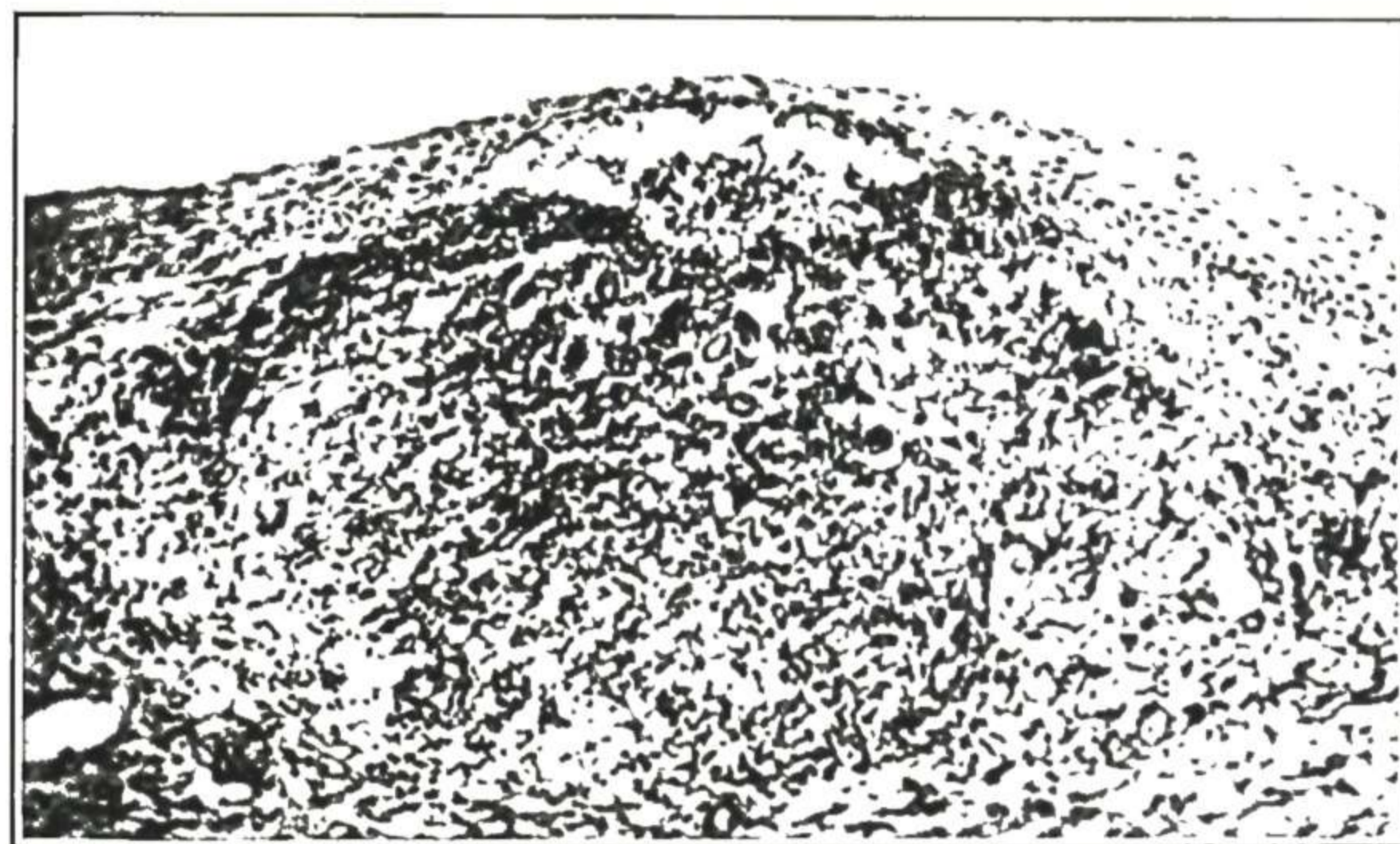


Fig. 344.—Gonorrheal vaginitis in a child. Note the immature, ineffective epithelial covering of the vagina. (TeLinde—*Am. J. Obst. and Gynec.*)



Fig. 345.

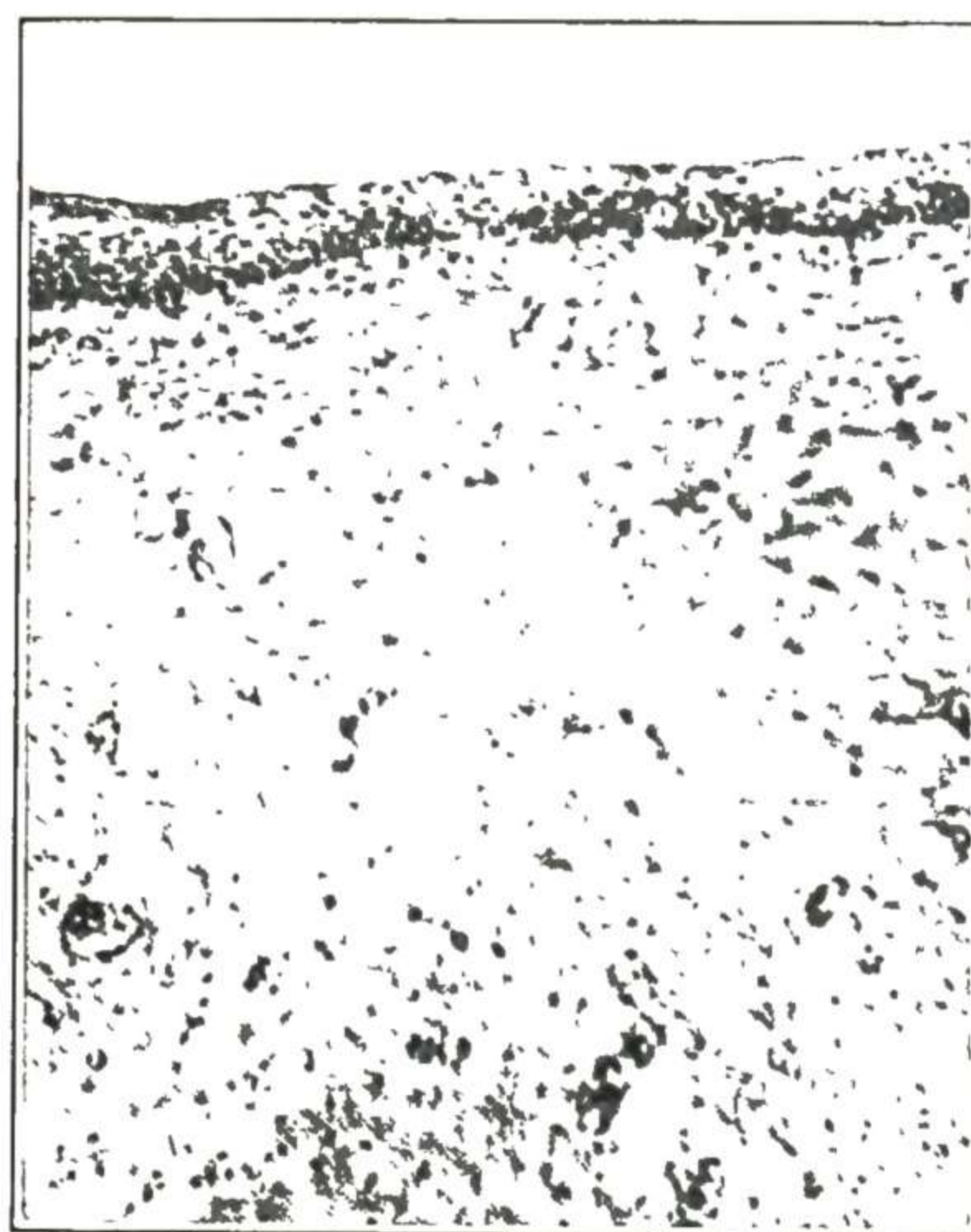


Fig. 346.

Figs. 345 and 346.—Fig. 345, estrogenic effect in building up a protective epithelium and eliminating infection, in an immature vagina. Fig. 346, same case as shown in Fig. 345, showing return to normal immature epithelium after cessation of the estrogenic treatment. (TeLinde—*Am. J. Obst. and Gynec.*)

vaginally by suppositories. The results were checked by microscopic examination of specimens of the vaginal mucosa excised for that purpose, and also by examination of the vaginal discharge.

Fig. 344 shows gonorrheal vaginitis in the immature vagina with its ineffective epithelial covering. Fig. 345 shows the effect of potent estrogenic treatment in building up protective epithelium and eliminating the infection. Fig. 346 shows the return to the normal immature epithelial layer after cessa-

tion of the treatment. From this instructive experimental work, checked by sections of the affected mucosa, TeLinde obtained results as shown in the accompanying table:

METHOD	PATIENTS	CURED	PER CENT CURED	AVERAGE DAYS OF TREATMENT	AVERAGE NUMBER ESTRIN UNITS USED
Oral	6	1	16	123	191,600
Hypo-Ethylene-Glycol Sol.	10	1	10	19	950
Hypo. in Oil	22	16	72	27	4,206
Vaginal Suppositories	17	17	100	27	2,024

In clinical work, the effect of the treatment is checked by examination of spreads of the vaginal discharge, as shown in Figs. 347 and 348. As the built-up epithelium goes back to the normal immature thinness when the estrogenic effect wears off, it is important to continue the treatment until the infection is entirely eliminated; otherwise there will be reinfection when the protective thickening of the epithelium disappears. Sources of reinfection, especially in the rectum, must be discovered and removed.

In a later report, TeLinde summarizes his results and conclusions as follows:

We have reported the cure of 175 patients with gonococcic vaginitis by amniotin. All (except sixteen of those to whom the product was given hypodermically in oil) were cured by the use of amniotin vaginal suppositories. We have yet to encounter a patient who failed to get well by this method of treatment, and we consider it a very satisfactory way of dealing with the disease. A follow-up of our first 100 patients, from three months to two and one-half years after the last treatment, showed ninety-eight of them well. We saw no clinical evidence of harm due to the treatment, and laboratory investigations confirm this observation.

We feel that the increased acidity brought about in the vagina by the action of the estrogen is a factor in overcoming the infection, but, since our results were not nearly so good when another acidifying suppository was employed, we believe that amniotin introduces an additional factor. We are inclined to think that this other factor is the covering of the vagina with thick epithelium, which prevents reinfection of the subepithelial tissues and thus permits the inflammatory process in them to subside. Our clinical observations and biopsies have indicated that the essential lesion of gonococcic infection of the lower part of the genital tract in female children is vaginitis.

An instructive study of 250 cases was presented by Schauffler, Kanzler and Schauffler. Their conclusions in regard to treatment were as follows:

"1. A clinical evaluation of our experience with distention with silver nitrate ointment in ninety-nine cases, amniotin by vaginal application in thirty-one cases, pyridium suppositories in nineteen cases and various other methods in smaller series leads to the conclusion that amniotin by vaginal application is the most satisfactory method of management we have used to date.

"2. This study includes 261 cases in which sulfanilamide was used orally. Only a few of these cases have been reported elsewhere. The results and opinions indicate that the method is unsatisfactory as used to date. The reason may be inadequate or inconstant administration of the drug. The desired low pH of the vagina may be important in relation to the ineffectiveness of sulfanilamide. Meticulous care during treatment requires hospitalization—a disadvantage. The method as used thus far apparently does not compare favorably with other available methods.

“3. Evidence from a rather painstaking study indicates that the endocervix is seldom an important factor in relation to these infections—practically never so in younger children.”

They made also the following observations: “Endocervix. We agree with TeLinde that infection of the endocervix is seldom a factor of importance. In our experience we regarded the potential effect of estrogen on the endocervix with some concern. The possibility that the rudimentary glandular structure might assume the more infectible adult type seemed feasible . . . but did not materialize.”

Russ and Collins report the use of diethylstilbestrol in children. The child, irrespective of age, was given a 1-mg. tablet three times daily until twenty were given. The tablet was crushed and given in 60 c.c. of milk. They had very few adverse symptoms, and the treatment rarely required more than seven days. Their cures were close to 100 per cent. They feel that an advantage of the

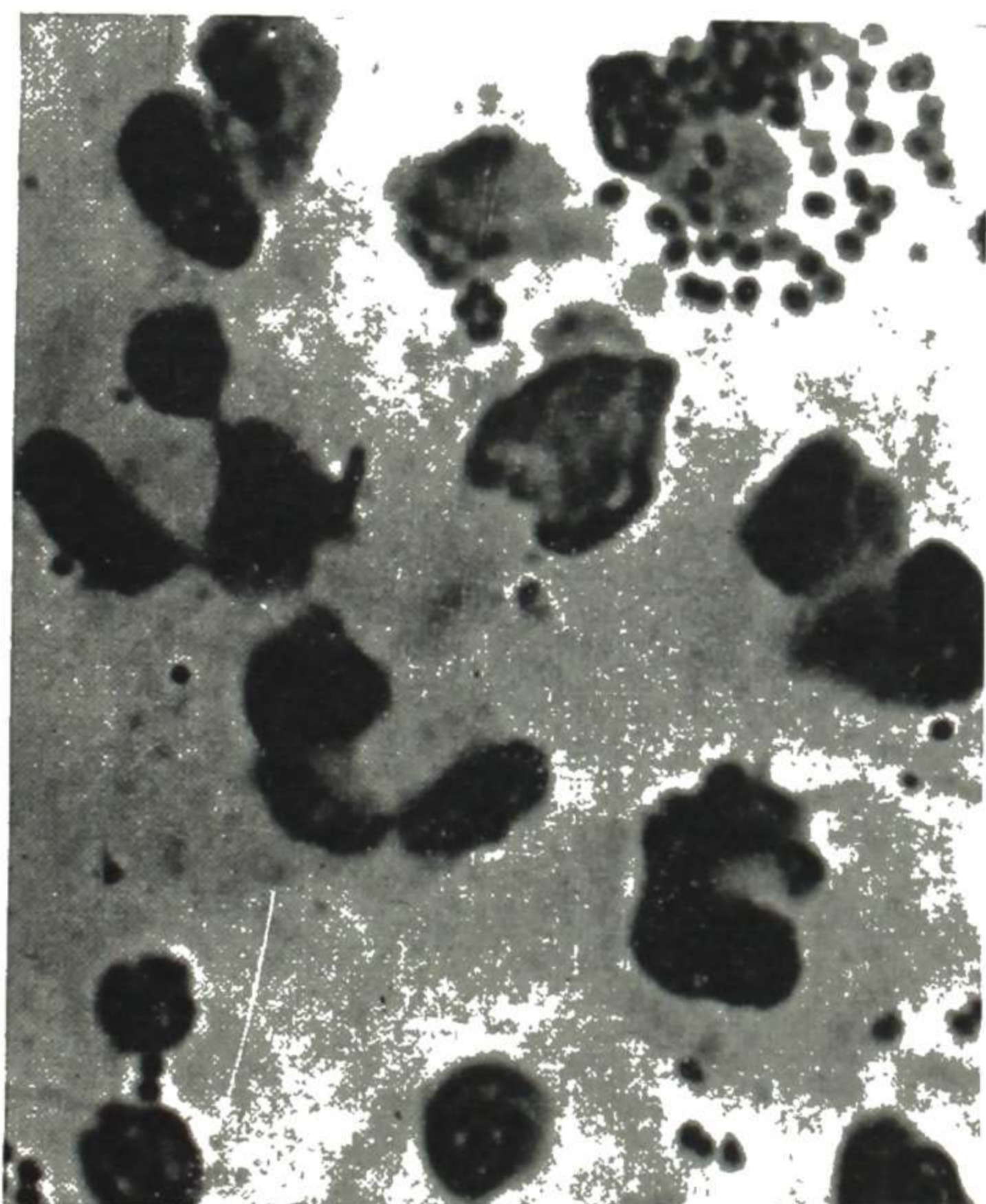


Fig. 347.

Fig. 347.—Vaginal spread in a case of gonorrheal vaginitis before treatment. (TeLinde—*Am. J. Obst. and Gynec.*)



Fig. 348.

Fig. 348.—Vaginal spread in a normal immature vagina after treatment. No bacteria or pus cells. (TeLinde—*Am. J. Obst. and Gynec.*)

oral administration over the suppositories is that it eliminates the chance of the child becoming “genital conscious” as well as the rapidity and permanence of the cure.

The sulfonamides have not displaced the estrogenic treatment yet, but since such excellent results are being obtained in adults with sulfathiazole, its use in children may soon be reported. Schauffler, Kanzler and Schauffler found sulfanilamide treatment unsatisfactory in children on account of the special care required to avoid danger, though it gave a high percentage of cures.

Gonorrhea After the Menopause

In gonorrheal vaginitis after the menopause, the same problem of dealing with a thin nonprotective epithelial covering due to lack of estrogen hormone is encountered, and the same treatment with vaginal suppositories is beneficial in taking care of this factor in the situation.

OTHER TYPES OF VULVITIS

In addition to inflammation of the external genitals due to the gonococcus, there are other inflammatory disturbances which occur in this locality, such as intertrigo, eczema, herpes, bacterial infections, parasitic skin diseases, and that atrophic condition designated leucoplakic vulvitis.

Intertrigo

Intertrigo is a hyperemic condition of the skin, with slight maceration and consequent irritation. The patients usually refer to it as "chafing" or "heat." It is due to prolonged contact and friction of opposed surfaces. The normal skin secretions are retained between the approximated surfaces and

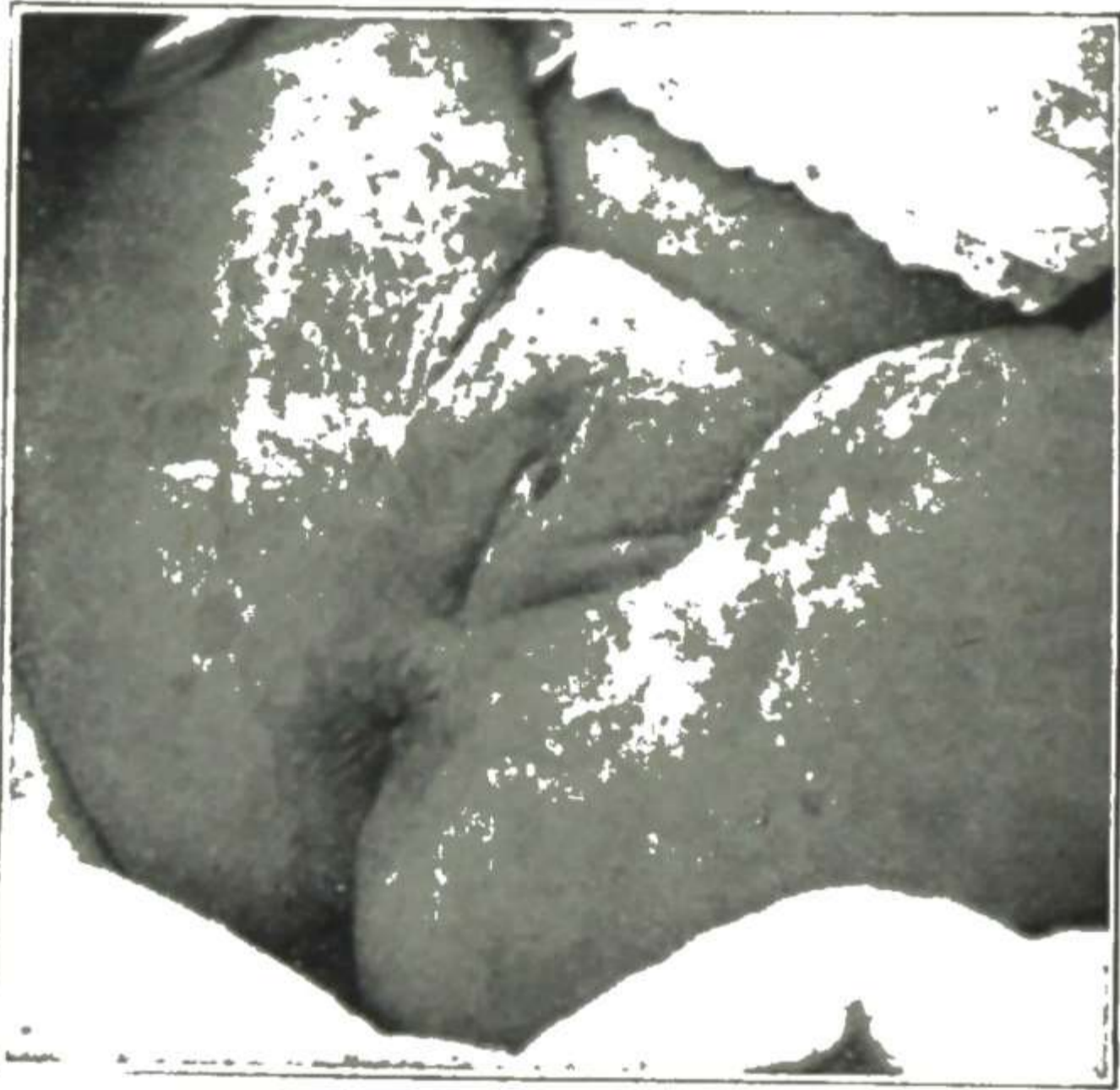


Fig. 349.

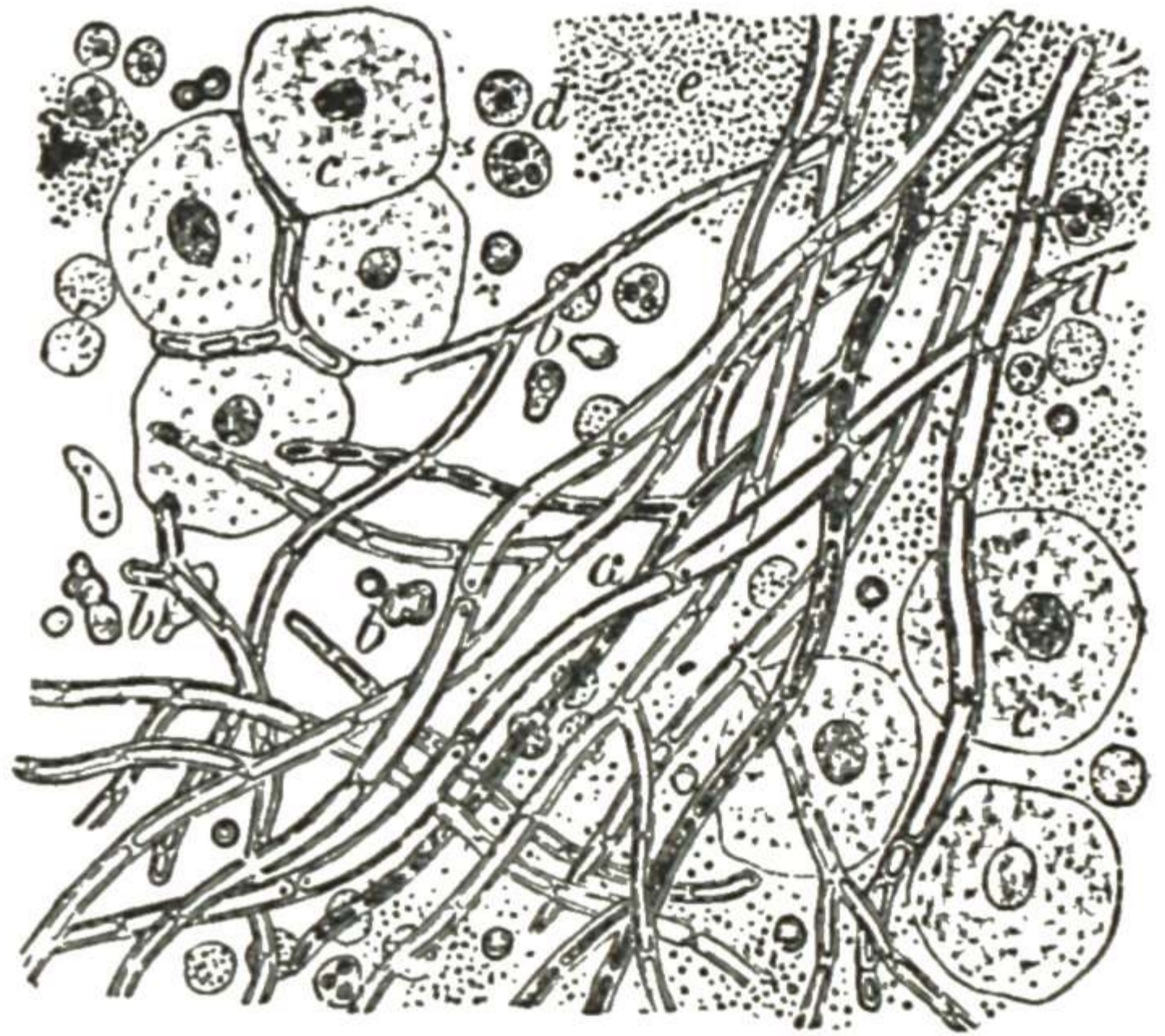


Fig. 350.

Fig. 349.—Monilia (thrush) vulvitis and intertrigo in a girl baby. (From Sutton and Sutton after Schamberg—*Diseases of the Skin*, The C. V. Mosby Co.)

Fig. 350.—Mycelium and spores of the thrush fungus (monilia). (Holt—*Diseases of Children*, D. Appleton-Century Company.)

become decomposed and irritating. It occurs most frequently in stout women and in infants, because in them the skin surfaces are in contact more constantly and over a wider area. It is aggravated by vaginal discharge and is usually worse in hot weather.

It is most often located in the genitocrural creases, but may spread inward over the labia or outward over the thighs and upward on the abdominal wall. At first, intertrigo consists simply of hyperemia and slight irritation of the skin, but may soon become complicated with monilia (thrush) (Figs. 349 and 350) or by trichophyton implantation (Figs. 351 and 352).

The treatment consists of cleansing and soothing applications, such as 10 per cent argyrol, the free use of a drying powder to eliminate moisture between opposed surfaces, and special measures required for any complication such as thrush infection or trichophytosis or eczema. In severe cases (probably complicated) Tulipan obtained best results by spraying the parts with a 5 per cent solution of tannic acid through an atomizer. This was applied two or three times daily. If there was much secondary infection, he used a spray of 2 per cent solution of brilliant green over the tannic acid. He found relief usually immediate, and the condition cleared in a few days.

Eczema of Vulva

Vesicular eczema of the vulva is most frequently located on the labia majora. The vesicles break and form crusts, and an itching, inflamed discharging surface persists. Chronic erythematous and squamous eczema also may occur, in which case the skin is infiltrated and may become nodular. The eczema may be limited to the vulva or it may extend to the adjacent cutaneous surfaces or into the vagina.

The causes and symptoms and treatment of eczema of the external genitals are practically the same as for eczema elsewhere. Consult dermatologic textbooks, as there is not space here for detailed consideration of the many features of eczema.

Herpes of Vulva

Herpes may occur on the vulva, where it is known also as "herpes pro-genitalis." The vesicles of the herpetic eruption are usually of larger size than those of vesicular eczema. Furthermore, they occur in groups and do not rupture easily, whereas the vesicles of eczema rupture spontaneously, causing a sticky discharge. Herpes is seldom accompanied by the intense burning and itching which characterize eczema. Herpes occurs especially in nervous women, particularly when there is marked pelvic congestion from any cause. With some women it occurs at nearly every menstrual period.

The discomfort from uncomplicated herpes is so slight that not much treatment is required. The parts should be kept clean and dry and may be dusted frequently with some drying powder, for example, equal parts of zinc oxide and prepared chalk. All irritation should be avoided. If there is troublesome pruritus or burning or smarting, a sedative lotion or ointment may be used.

Bacterial Infections of Vulva

Staphylococcus and streptococcus infections may occur about the external genitals, either localized to the skin glands or as a diffuse process as in erysipelas or cellulitis.

Follicular vulvitis occurring in adults is characterized by the inflammation being confined principally to the hair follicles and sebaceous glands. The inflamed structures are represented by small red tender papules scattered over the labia somewhat on the order of local acne or furunculosis.

Erysipelas of the vulva, like erysipelas elsewhere, is a rapidly spreading inflammation produced by the *Streptococcus pyogenes*. In the beginning there is usually a chill, followed by considerable fever, and the general disturbance usually associated with fever. The patient complains of heat and throbbing in the external genitals. The fever continues and swelling of the vulva is noticed. The patient then comes for examination. In the diagnosis, differentiate from scarlatinal rash on vulva, from intertrigo, from bichloride rash, from cellulitis of vulva, and from hematoma.

Cellulitis of vulva is that form of vulvitis caused by ordinary pus bacteria (usually the *Staphylococcus pyogenes aureus* or *albus*) penetrating to the subcutaneous connective tissue and causing inflammation there. It is known also

as "phlegmonous," vulvitis and as "lymphangitis" of vulva. It lacks the superficial parchmentlike induration of erysipelas.

Anything that causes an abrasion about the vulva, through which bacteria may reach the connective tissue, may lead to phlegmonous vulvitis. Any of the previously mentioned forms of vulvitis may be followed by this form. Injuries to the vulva or furunculosis may lead to the same. The pathologic changes are the same as in cellulitis elsewhere.

Gangrenous vulvitis is known also as "noma." It is inflammation of the vulva of such severity that the nutrition of the structures is cut off and they become gangrenous. Extensive sloughing may take place.

Gangrenous vulvitis occurs almost exclusively in patients in whom the normal tissue resistance has been destroyed by exhausting general or local diseases. Local conditions interfering with the pelvic circulation, such as pregnancy and pelvic tumors, predispose to this affection.

Its most frequent victims, however, are children who are poorly nourished and poorly cared for. In such it is often fatal. The exanthemas, particularly when occurring in sickly children, may cause gangrenous vulvitis. Diphtheria infection, which occasionally is located about the genitals, may lead to sloughing unless recognized and treated promptly.

Treatment.—In the treatment of these bacterial invasions of the external genitals, the determination of the cause or type of infection is the important step, for that indicates the type of treatment required in that particular case. In the mild cases, a soothing local application and the use of a lactic acid douche to remove any irritating discharge may be all that is required. In acute inflammatory conditions, such as cellulitis and erysipelas, rest in bed and cold or hot applications may give temporary relief. Surface discomfort and irritation may usually be relieved by application once or twice daily of an argyrol or other soothing solution or ointment. Unguentum Credé applied freely often gives marked relief, and is supposed to have some effect in checking the underlying inflammation. For internal administration, the sulfonamides are to be considered as in other serious infections. In erysipelas not yielding promptly to other measures, erysipelas antitoxin is to be considered, and also bacterin or vaccine treatment.

Parasitic Infections

Trichophytosis of Vulva (Tinea of Vulva, Tinea Cruris).—This is one of the four ordinary parasitic diseases of the skin, the other three being moniliasis, pediculosis, and scabies. These parasitic invasions occur about the external genitals as elsewhere on the body surfaces. They give rise to much irritation and, unless search is made for the fungus or other parasite, the patient may be treated ineffectually for a long time.

Trichophytosis or tinea vulvitis is ringworm of the genitocrural region, which masquerades under a variety of designations. It is due to the tinea trichophytosis or large-spored ringworm fungus, of which there are several slightly different varieties. The variety most frequently found here is the epidermophyton, hence the affection has been termed "epidermophytosis inguinale." In tropical countries, where it is more frequent and severe, it is often designated "dhobie itch," to indicate its origin from contamination of clothing in laundry operations ("dhobie" meaning laundry).

Trichophytosis of vulva should be suspected whenever a mild dermatitis of the vulva and adjacent portions of the thighs resists cleansing antiseptic and drying treatment, especially if spreading by a well-defined margin. If allowed to persist it may become extensive, as in Fig. 351. The usual method of examining for the skin fungi is to put some scraped-off scale on a microscopic slide, add a small drop of 10 per cent potassium hydroxide solution, put on a cover glass, and examine for the mycelium and spores, stopping down the light to give outlines. Trichophyton fungi are shown in Fig. 352.

Blumenthal and Snow call attention to the fact that the fungus does not always show in this direct examination, and advise cultures and describe a rapid and convenient method.



Fig. 351.—*Tinea cruris*, showing extensive involvement. The parasitic and inflammatory lesions about the external genitals produce some troublesome diagnostic problems. (From Sutton and Sutton after Mackee—*Diseases of the Skin*, The C. V. Mosby Company.)

As to **treatment**, an effective antiseptic and antipruritic solution is the compound resorcinol lotion (mercuric chloride, 0.18; resorcin, 9; 70 per cent alcohol, q.s. ad. 180 c.c.). The temporary smarting is usually followed by prolonged relief from the pruritus. Rubbed into the affected surfaces night and morning it stops the growth of the fungus, and eventually eradicates it, though skin irritation or possibly bichloride absorption from prolonged use on large surfaces are to be kept in mind. If talcum is used, watch to see if the patient is allergic to the powder employed.

If the above solution stirs up too much irritation, the following ointment may be used:

R _x	Gm.
Pine tar ointment	1.2
Salicylic acid	2.4
Precip. sulphur	4.8
White vaseline	60.0

Sig.: Apply as directed.

It may be advisable at times to use these two prescriptions alternately—the ointment at night and the resorcinol lotion during the day.

The varied lesions of epidermophytosis and the accompanying dermatophytids (specific skin reactions to tinea products) and dermatitis from prolonged application of tineacides, may create such a complex clinical picture that special dermatological study is necessary for differential diagnosis and successful treatment, hence the advisability of consulting a systematic work on dermatology in any resistant case.

Moniliasis of Vulva (Diabetic Vulvitis).—*Monilia* (yeast fungi) invade the vagina and external genitals when conditions are favorable. Mild skin irritations such as intertrigo in children favor such invasion, as shown in Fig. 349. The diagnosis is confirmed by finding the mycelium and spores of the yeast fungus (Fig. 350) in a microscopic specimen prepared as just explained for showing the trichophyton fungus. The **treatment** is the same as given for monilia vaginitis, with which it is usually associated.



Fig. 352.—Microscopic characters of common pathogenic fungi. (From Dr. George Lewis and Dr. Mary Hopper, New York Skin and Cancer Unit.)

A, *Trichophyton gypsum*. Spirals are characteristic of *T. gypsum*.

B, *Trichophyton crateriforme*. Microconidia may be attached or unattached singly or in clusters, and are seen in many species of fungi. (From Sutton and Sutton—*Diseases of the Skin*.)

In diabetic individuals the excretion of sugar in the urine favors the growth of yeast fungi, and often leads to marked vulvar irritation and pruritus. Diabetic vulvitis presents a characteristic glazed edematous appearance, with uniform redness but no ulceration or papules or other circumscribed lesion to account for the burning and itching.

Examination of the urine shows sugar, and the vulvitis will continue until it is cleared. In all persisting pruritic conditions about the genitals, the urine should be carefully checked for sugar or other substances that may irritate the surfaces. Hesseltine has emphasized that monilia infection is an important

factor in the distressing vulvitis of diabetics, and he was able to make a mild monilia infection in a nondiabetic patient worse by applying glucose to the vulva.

Pediculosis Pubis.—Pediculosis pubis is an infrequent parasitic disease of the vulva. The pediculus pubis or "crab louse" (Fig. 353) differs from the pediculi found on other parts of the body. It inhabits the pubic hairy region and may give rise to much irritation. It is conveyed from one person to another by contact, usually in sexual intercourse.

There is itching and consequent scratching, with resulting abrasions and vulvitis. The diagnosis is made by finding the parasites, which are attached to the hairs near the skin. At first they may not be noticed, but on close inspection they are seen as small brownish particles attached to the hairs very close to the skin.

The **treatment** is to apply oleate of mercury (10 per cent) once daily, rubbing it well into the hairy region. After the remedy has been applied for four or five days it may be washed off, and need not be applied again unless there develops evidence that some of the parasites escaped destruction. At the end of the treatment, a soap and water bath and complete change of under-clothing must take place. An excellent and effective preparation used in the

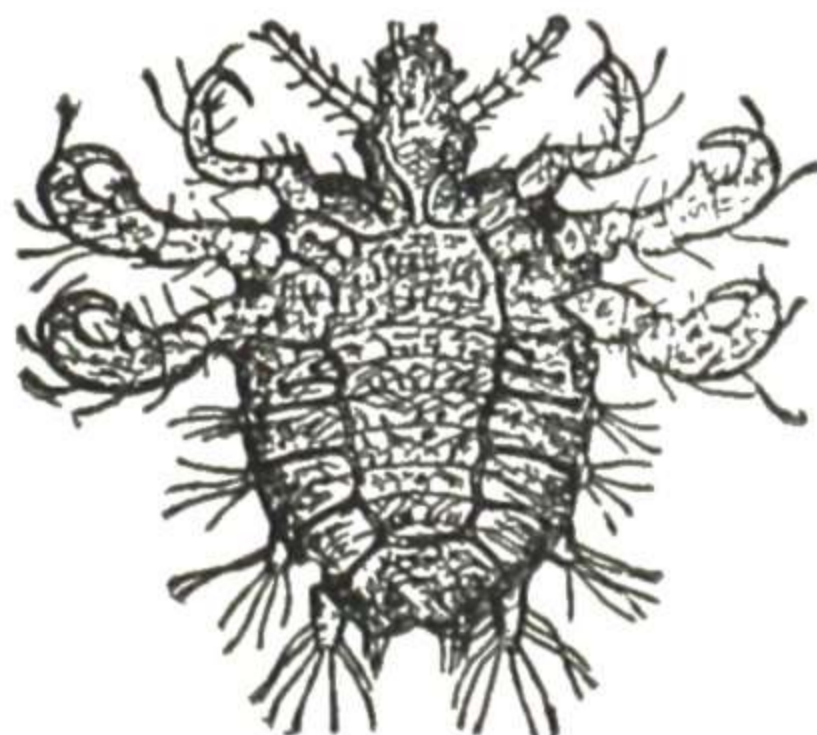


Fig. 353.—The pediculus pubis, magnified. (Stelwagon—*Essentials of Skin Diseases*, W. B. Saunders Company.)

same way is Kaposi's petroleum salve. Some recommend to shave the pubis or to clip the hair there, but that is usually not necessary. If there is much local irritation remaining after the parasites are killed, soothing applications may be required.

If a solution is preferred, the following is advised by Fantus and Cornbleet:

Acetous Mercurial Lotion (Mild)

R		
	Mercury bichloride	0.06 Gm.
	Diluted acetic acid	6.00 c.c.
	Diluted alcohol .	120.00 c.c.
M.	Label: Apply to affected parts twice daily.	

Scabies.—Scabies may appear about the external genitals as part of an extensive development of scabies, the infection usually appearing first on the fingers. There are the usual symptoms—severe itching, worse when the body is warm, and the abrasions and irritation resulting from scratching. The diagnosis is made by finding the burrows of the itch mite on other portions of the body, usually on the fingers.

The **treatment** consists of a warm soap-water bath followed by the free use of sulphur ointment. Immediately after the bath, the patient should rub the ointment thoroughly into all the infected areas, and put on clean underclothing. The inunction should be repeated night and morning for three days, the same underclothing and the same bed linen being used during the course. On the fourth day a warm soap bath should be taken and clean underclothing put on. If some irritation of the skin remains, a mild ointment, such as zinc oxide ointment or vaseline, may be used for a few days. If any of the burrows containing the *Acarus scabiei* escape the first unction course, another similar course must be carried out.

If something other than ointment is desired, there are "sulphur foam" applications on the market (Wyeth) put up with three cloth applicators to the box.

Leucoplakic Vulvitis

Leucoplakic vulvitis is an affection of the external genitals characterized by whitening and atrophy and shrinking of the skin, with obliteration of the normal folds and a change in the consistency of the epidermis by which it becomes inelastic and parchmentlike and cracks easily.

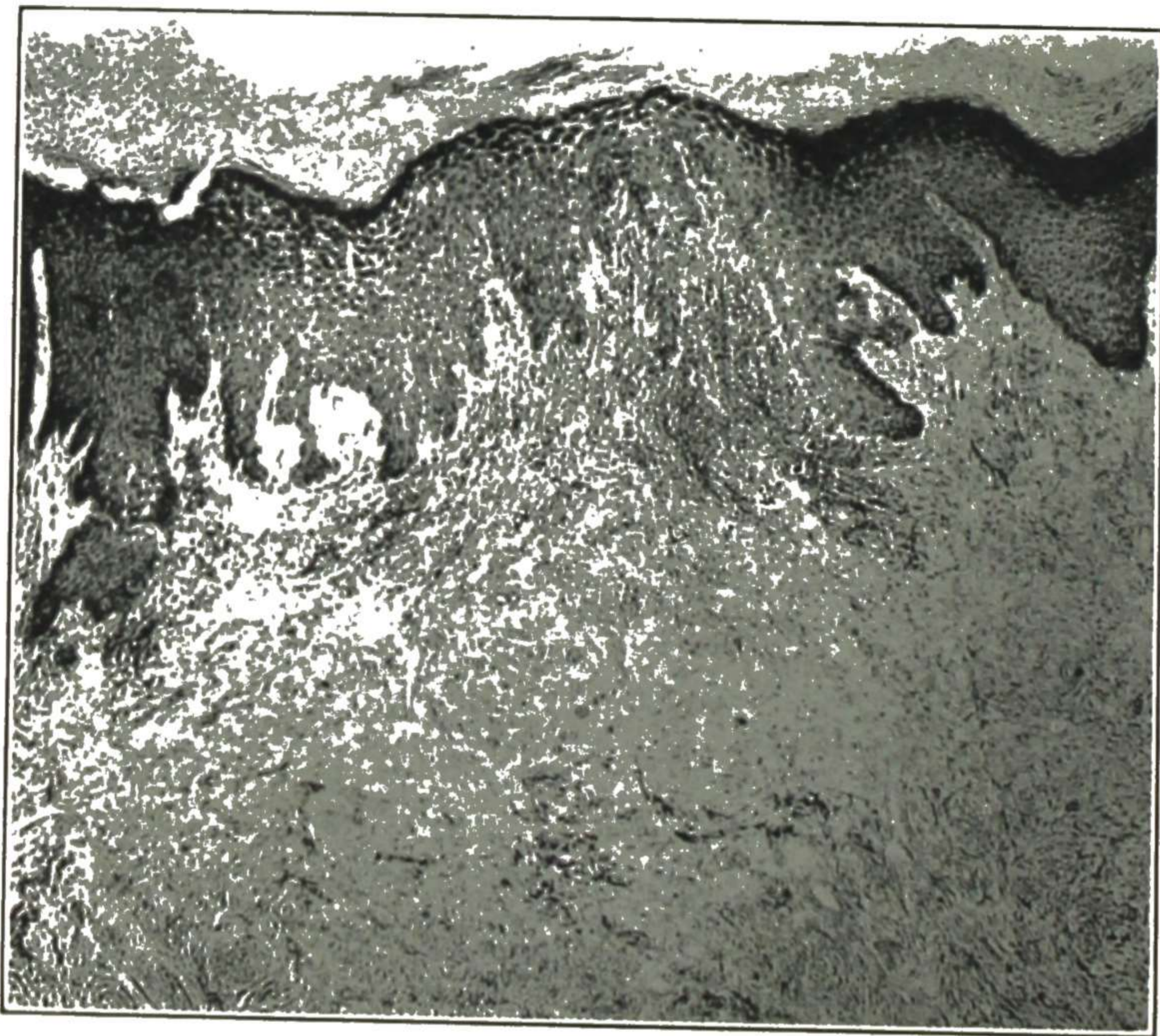


Fig. 354.—Leucoplakic vulvitis: hyperplastic stage. Note from above downward: first, the greatly thickened layer of keratin cells (hyperkeratosis); second, the increased number of eleidin cells, forming an almost black band; third, the granular zone sending long papillary processes of epithellum into the connective tissue (acanthosis); fourth, the connective tissue showing marked round cell infiltration, most marked directly beneath the epithellum. (Taussig—*Am. J. Obst. and Gynec.*)

Under "atrophic diseases" of the vulva are classed leucoderma (vitiligo, pigment atrophy, "white spots") and leucoplakic vulvitis (atrophic sclerosis, chronic atrophic vulvitis, kraurosis). Kraurosis is a term applied by Breisky to a condition of marked contraction about the vulvar entrance. The word is

derived from the Greek and means "shriveling up," and describes this feature of the lesion very well. This feature, however, may be due to different pathological conditions. It is only a symptom, and hence is not a satisfactory term for a distinct disease. Leucoplakic vulvitis and other conditions presenting atrophy and contraction at some stage are still designated "kraurosis" in the

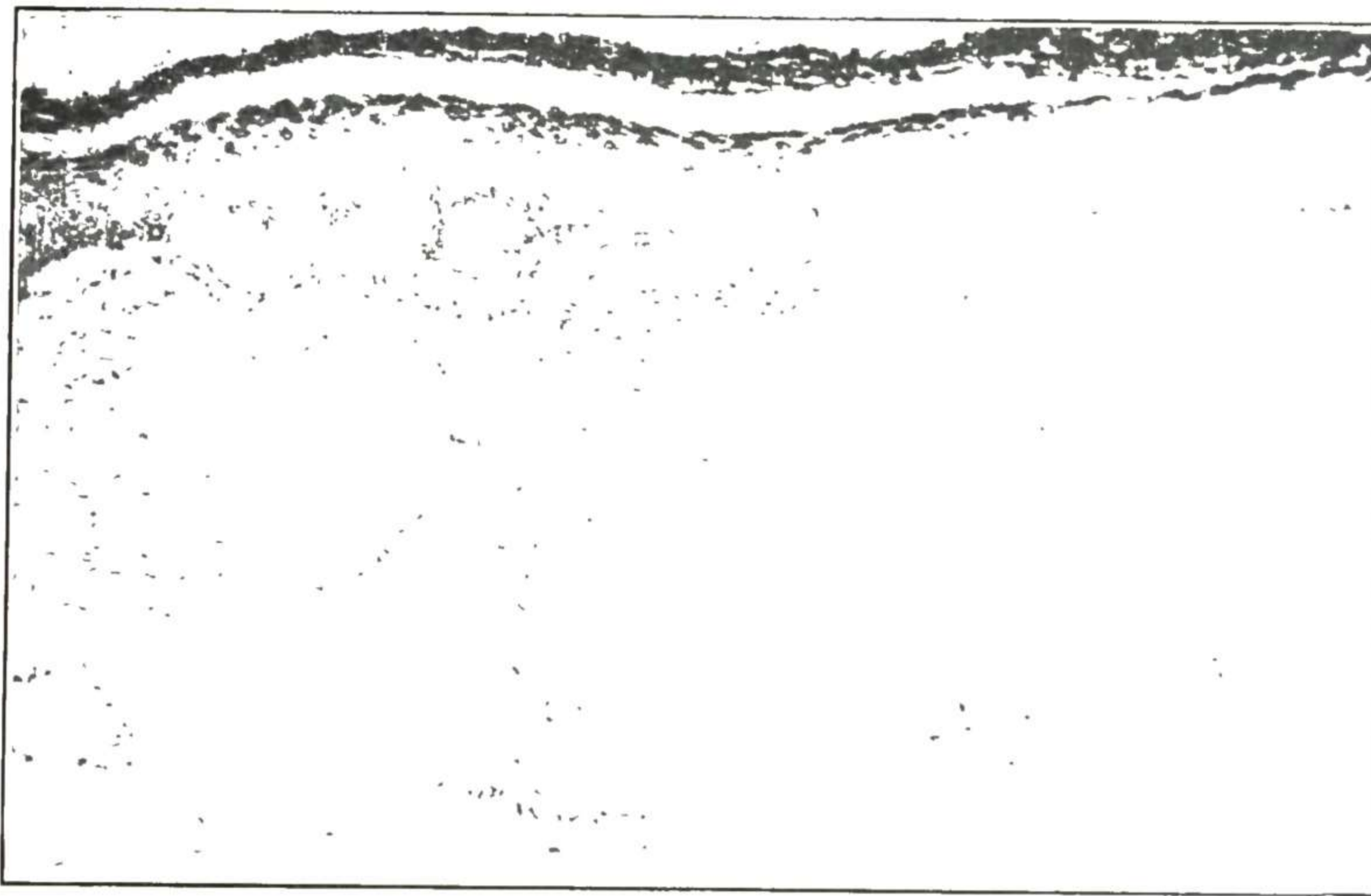


Fig. 355.

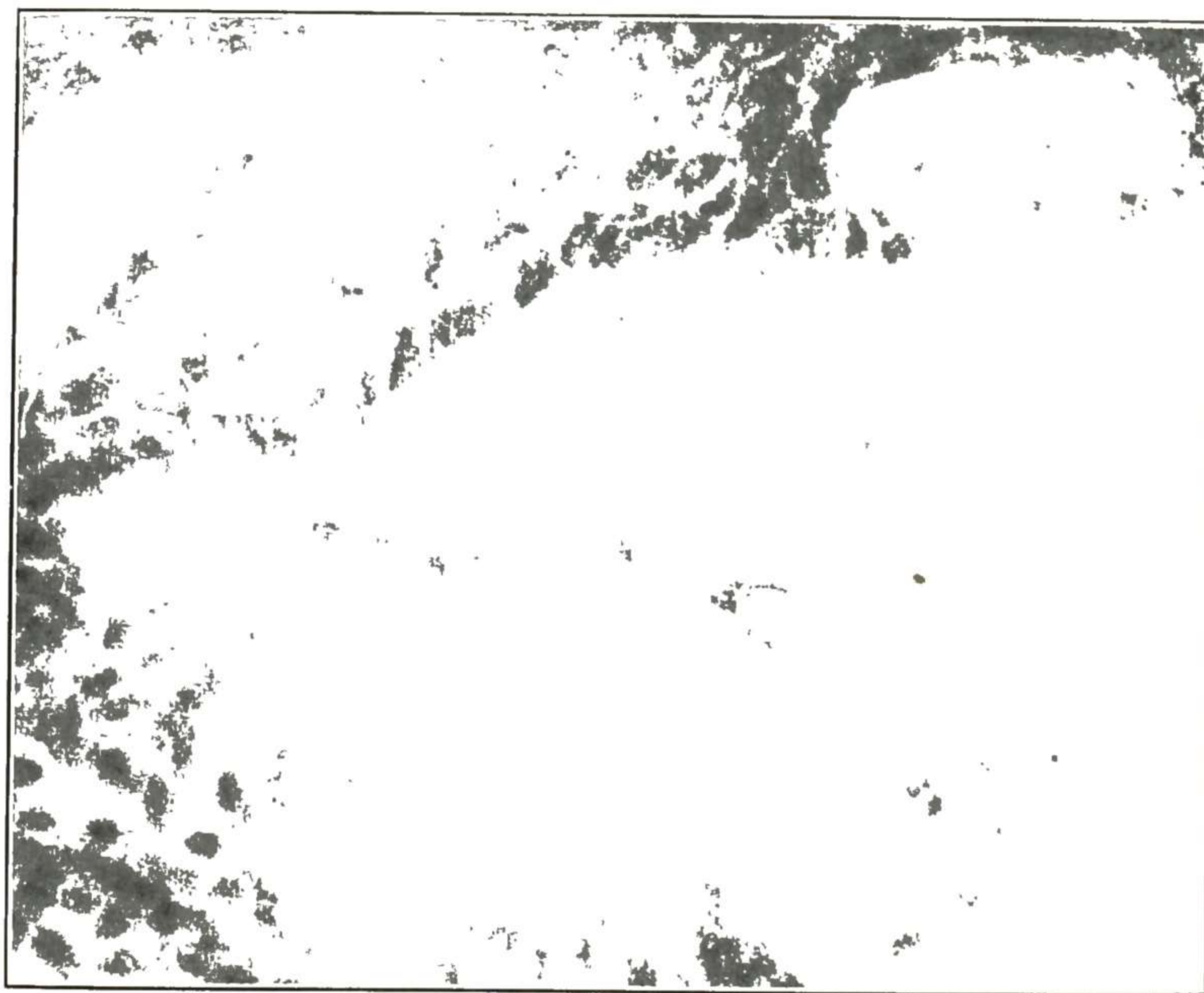


Fig. 356.

Figs. 355 and 356.—Leucoplakic vulvitis. A stage midway between the hyperplastic and atrophic condition. Fig. 355, Low power field, showing a zone of pigmented hyperkeratosis, eleidin layer still marked, epithelial layer sending short processes downward, and beginning development of collagenous areas in the connective tissue directly beneath the epithelium. Fig. 356, High power of area outlined in Fig. 355, showing collagen formation in the connective tissue. (Taussig—*Am. J. Obst. and Gynec.*)

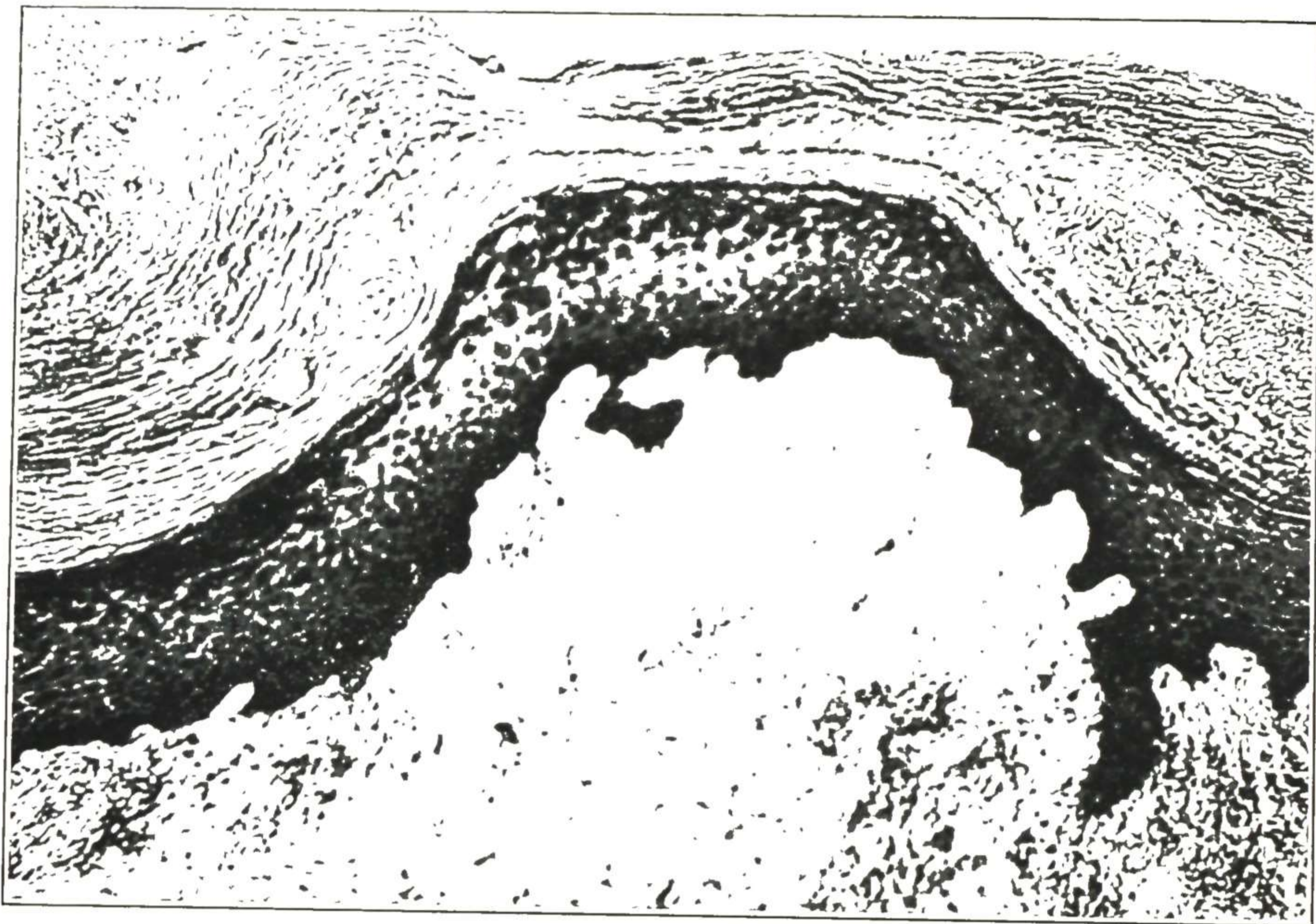


Fig. 357.—Leucoplakic vulvitis, showing a stage farther advanced than that in Fig. 354. Middle stage. Marked collagen formation in the connective tissue. Gyn. Lab.

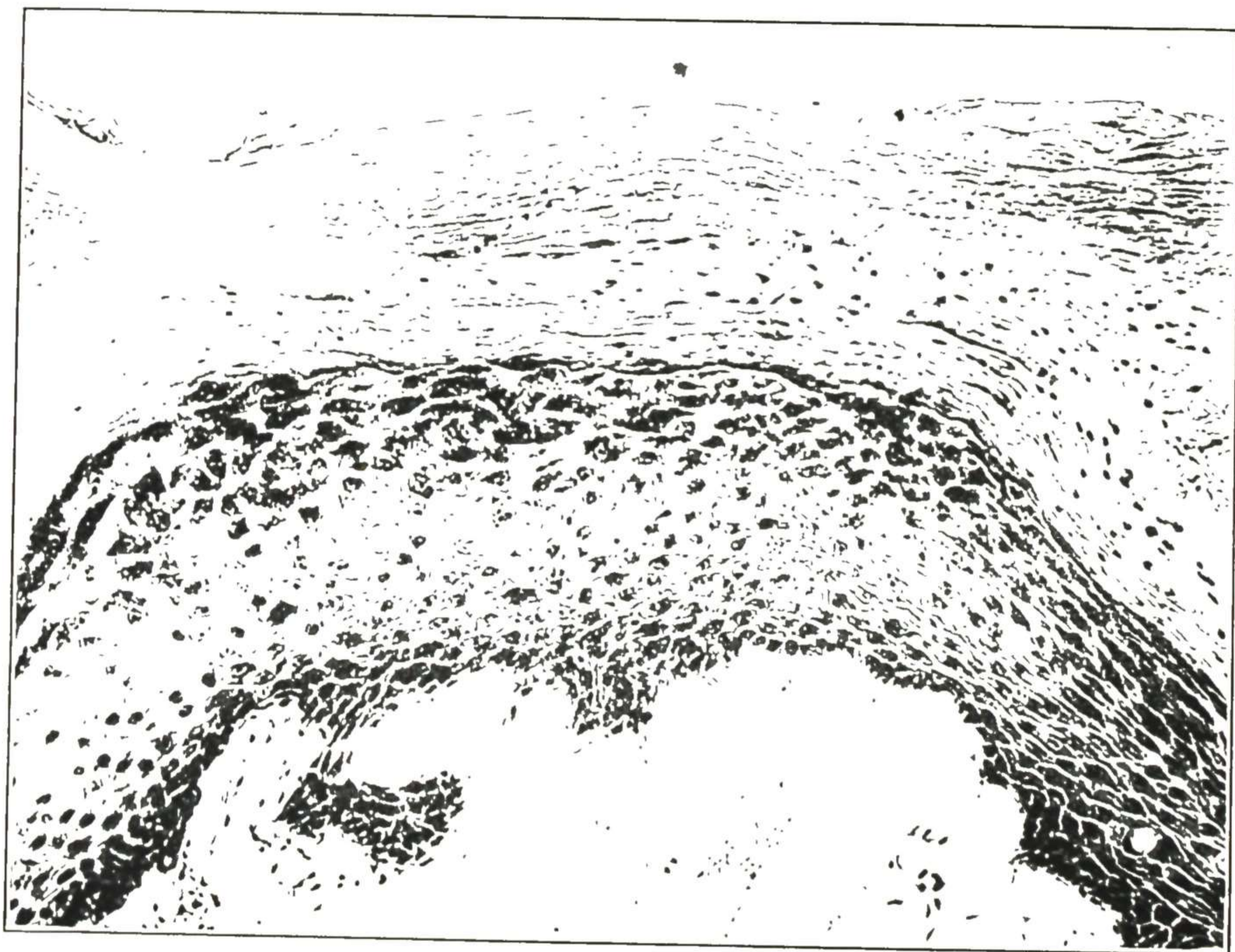


Fig. 358.—High power of Fig. 357, showing, from above downward, the layer of hyperkeratosis, the black band caused by the increased number of melanin cells, the short papillary projections of epithelium, and finally the collagenous connective tissue. Gyn. Lab.

literature of European countries but, as Taussig points out, the use of this old ambiguous blanket term serves only to confuse the picture, and should be dropped.

As to **etiology**, leucoplakic vulvitis has in different cases been preceded by eczema and other chronic inflammatory diseases of the vulva, by pruritus vulvae with resulting scratching and traumatism, by removal of the uterine appendages and by chronic vaginal discharge. It has been attributed to each of these conditions, but apparently none of them constitutes the essential factor in its development.

Age seems to be a definite factor in the etiology, for it occurs almost exclusively in women near or past the menopause. This would seem to indicate that it is connected with the senile atrophic changes and absence of ovarian hormones, but that does not explain why it occurs only occasionally. As cutaneous atrophy is such a marked feature, it has been surmised that it is due to an atrophic affection of the nerves of the parts. Marked changes in the nerves have been demonstrated, but whether such changes are primary or secondary is uncertain.

Pathology.—Taussig's investigations and accurate recording and analysis of extensive clinical experience with the disease have established leucoplakic vulvitis as one of the important diseases of the external genitals. It causes marked distress at various stages of its progress, effective treatment usually requires an extensive and particular plastic operation, and if allowed to persist it is very likely to eventuate in cancer.

The lesion is generally bilateral, being unilateral or asymmetric in only about one-third of the cases. When bilateral, it is usually symmetric and is present as a butterfly area of parchmentlike skin. In the early stages the skin is red, swollen, dry, and excoriated. In the second stage there is thickening of the skin and a flattening of the labial folds. There are white semiopaque patches on the skin. In the third stage the skin is parchmentlike, cracked, and a bluish white color. In the fourth and final stage there is a smooth white shiny skin, and a complete obliteration of all folds.

As to microscopic features, in the early stage there is a marked edema, round cell invasion, and increased vascularity. In the epithelial layer there is a marked prolongation of the papillae. Deposits of eleidin or keratohyalin are seen in the upper layers of the epithelium. The keratin layer is a little thicker than normal. One of the characteristic changes noted in this condition is the absence of the normal elastic fibers in the spaces between the papillae. This shows as a very light staining area.

In the later stage the epithelial layer becomes thinned out and the papillae are flattened. The keratin layer becomes markedly thickened and occupies from one-half to two-thirds of the epithelial layer. The basement layer of cells is not distinct as it is in the early stage but presents a frayed-out appearance. The tissue beneath the epithelium loses its cellular character. The elastic fibers are entirely absent in the affected area. In the cellular area there is a large amount of glairy, collagenous tissue containing some mast cells, plasma cells, and occasionally clumps of round cells. The microscopic characteristics are shown in Figs. 354 to 359, with normal skin in Fig. 360 for comparison.



Fig. 359.

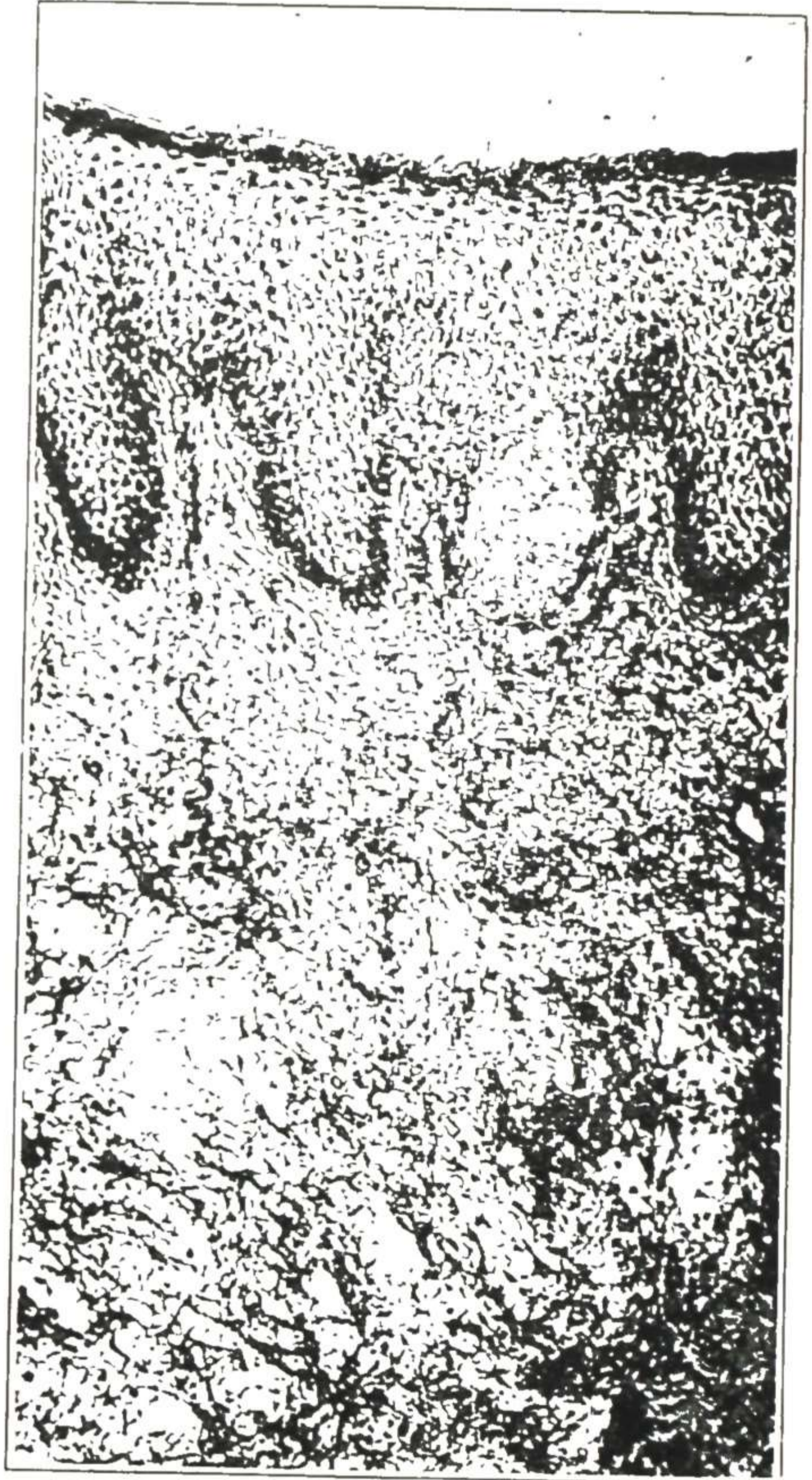


Fig. 360.

Fig. 359.—Leucoplakic vulvitis, advanced, showing the marked atrophic change in the epithelium and underlying tissues. Weigert-van Gieson stain showing the absence of elastic fibers. Gyn. Lab.

Fig. 360.—Normal vulvar tissue showing normal epithelial layers and subepithelial tissue. Weigert-van Gieson stain showing normal quantity of elastic fibers, which stand out black with this stain. Gyn. Lab.



Fig. 361.—Squamous-cell carcinoma of the vulva on a leucoplakic basis. At the right edge of the section is seen the leucoplakic epithelium. This ends abruptly at the edge of the carcinoma which is seen in the right central portion of the picture. Gyn. Lab.

As to **malignancy**, over half of the extensive series of vulvar cancer cases reported by Taussig had leucoplakic vulvitis as an etiologic factor. An example is shown in Fig. 361, and the matter is considered further later under vulvar cancer.

Symptoms and Diagnosis.—In the beginning there may be a low-grade inflammation appearing in spots just outside the vaginal opening on the labia. As the disease progresses the older portions lose their color and elasticity, and become white and dry and crack easily and tend to shrink (Figs. 362, 363). The atrophic contraction may progress to a marked narrowing of the vaginal opening, as shown in Fig. 364. The glandular structures (sweat glands, sebaceous glands, and hair follicles) are slowly obliterated by pressure atrophy, leaving simply atrophic decolorized inelastic tissue covered with a thin layer of epithelium.



Fig. 362.

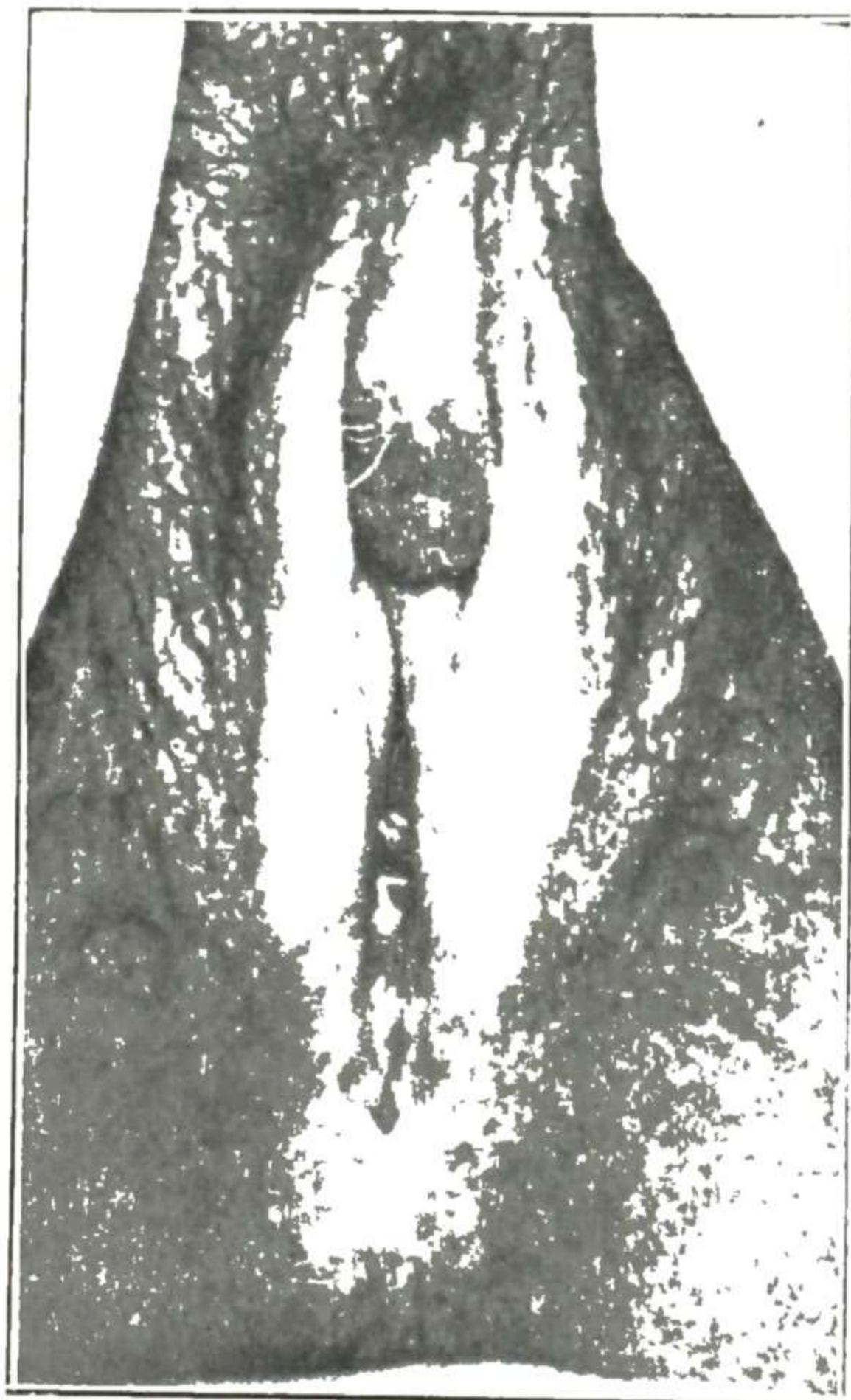


Fig. 363.



Fig. 364.

Fig. 362.—Leucoplakic vulvitis with kraurosis (early stage). The prepucial and perineum show leucoplakia. (Taussig—*Am. J. Obst. and Gynec.*)

Fig. 363.—Carcinoma of the prepucial clitoris, an everted cauliflower nodule developing from the parchment-like leucoplakic vulvitis involving both labia, prepucial, and perineum. (Taussig—*Am. J. Obst. and Gynec.*)

Fig. 364.—Leucoplakic vulvitis with marked shrinkage. (Hirst—*Diseases of Women*, W. B. Saunders Company.)

The tissue changes mentioned are usually accompanied with burning and itching and tenderness. Owing to the sensitive spots and narrowing of the vaginal orifice, coitus may be painful or impossible. As the tissues are brittle, care must be exercised in the examination to avoid causing additional fissures to add to the patient's discomfort. Leucoplakic vulvitis is one of the causes of severe and persistent pruritus vulvae, though not all of the patients are so disturbed.

The differential diagnosis presents little difficulty, as the appearance and palpable signs are characteristic. In ordinary leucoderma of this region, the affected skin is normal except for the absence of color, there are no troublesome symptoms, and there may be leucodermic spots elsewhere on the body.

Treatment.—Temporary relief may be afforded by the applications mentioned under Vulvitis and under Pruritus Vulvae. The probability that the atrophic changes are partly due to diminution in ovarian function would indicate a thorough trial of ovarian hormones to aid in checking the progressive process. X-ray treatment, carefully administered, may give considerable temporary relief, but its use carries danger in two directions. First, the temporary relief afforded may postpone effective treatment until cancer develops. Second, x-ray treatments in this situation may start an x-ray dermatitis which is more troublesome than the original affection.

When the involvement is extensive or troublesome, excision of the affected tissue is indicated—not only to relieve the patient's suffering but also to forestall the development of carcinoma. The chronic irritation and cellular changes of leucoplakic vulvitis constitute an important factor in the origin of malignant disease in this situation. As leucoplakic vulvitis is a progressive disease, the excision should include those structures likely to be later involved, which are the labia majora, labia minora, clitoris, and most of the perineal surface. This requires particular work in avoiding troublesome scar contraction about the urinary meatus and vaginal opening and in covering the raw surfaces, without too much tension. It should be undertaken only by one experienced in surgical work in this region. It is taken up in detail in our Operative Gynecology.

OTHER TYPES OF VAGINITIS

In addition to vaginal inflammation due to gonorrhoea there are other types to be considered, namely, simple vaginitis, diphtheritic vaginitis, emphysematous vaginitis, trichomonas vaginitis, monilia vaginitis, and atrophic vaginitis.

Simple Vaginitis

Simple vaginitis is inflammation of the vagina due to irritation or to the ordinary pus germs.

Etiology.—The normal vaginal secretion is destructive to the ordinary pus germs and tends to protect the vaginal wall, as well as the cervix uteri, from infection. Anything that lowers the nutrition of the vaginal wall interferes also with the protective action of the vaginal contents and hence predisposes to inflammation. Debilitating diseases of every kind have that effect to some extent as have also the exanthemas. An irritating uterine discharge or bacteria introduced from without may cause vaginal inflammation. A pessary worn too long without care may cause local inflammation or even ulceration. In children, foreign bodies sometimes keep up inflammation over a long period before discovery. Fig. 365 shows the method of investigating for a foreign body in any case of persistent vaginitis in a child.

The **symptoms** are discharge and discomfort. There is serous and cellular exudate in the vaginal wall, and the superficial layers of epithelium are thrown

off and form part of the discharge. The **diagnosis** of simple vaginitis depends on excluding the various special forms of vaginitis, such as gonorrheal, trichomonas, monilia, and atrophic (senile, adhesive).

The **treatment** consists in removing the cause (see etiology) and giving a mild douche, such as a teaspoonful of lactic acid to two quarts of warm water. In children and in patients past the menopause, estrogenic suppositories assist in restoring the protective epithelial covering and in throwing off the infection.

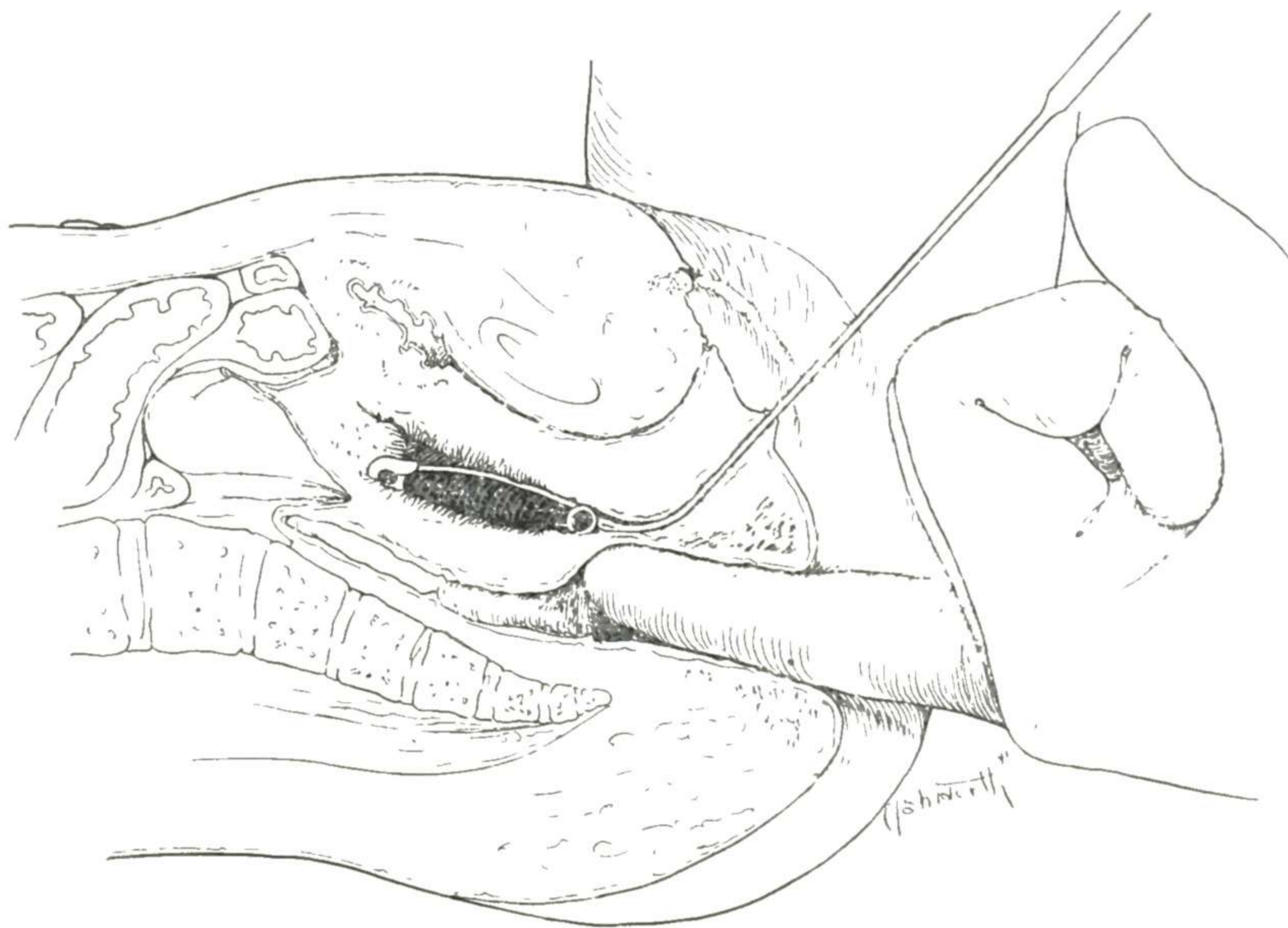


Fig. 365.—Schematic drawing illustrating diagnostic method and methods of removal, with little finger of left hand in the rectum. The rectal finger greatly facilitates location of the foreign body and appears definitely to distract the child's attention from the vaginal manipulation. Small forceps may be used for extraction in the same way. (Schauffler—*Calif. and Western Medicine*.)

Diphtheritic Vaginitis

Diphtheritic vaginitis may be found in a child suffering with throat diphtheria or it may be even a primary lesion. It may occur also in an adult in the home with a diphtheritic child. Many years ago when diphtheria was frequent, in examining a patient brought into the hospital with puerperal fever, some small patches of membrane were noticed in the vagina. It was a question whether they were streptococcic or diphtheritic. Microscopic examination showed the latter, and the disease responded promptly to antitoxin.

In diphtheritic vaginitis in a child, atresia of the vagina may follow. We had one such case, in which there was almost complete occlusion of the vagina by a circular scar in the upper third. Careful dissection under the guidance of rectal palpation, followed by treatment with estrogenic suppositories, gave a good result.

Emphysematous Vaginitis

In emphysematous vaginitis, small collections of gas appear under the epithelium or in the meshes of the connective tissues. It is a rare form of vaginal inflammation and occurs almost exclusively in pregnant women. Its

seat is the upper part of the vagina and the vaginal portion of the cervix. The little air vesicles vary from the size of a pinhead to several times as large. They are frequently surrounded by an area of hyperemia, but the inflammatory reaction is slight. When punctured the air escapes and the vesicle collapses. There is rarely any secretion from them. The gas contained in them is, in part at least, trimethylamine. The vesicles show little tendency to re-form after puncture. The affection is due to a mild gas-producing bacillus. Apparently, however, it bears no relation to infection with the gas-forming bacillus known as the *Bacillus aerogenes capsulatus*, for this deadly germ gives rise to a severe and rapidly spreading phlegmonous inflammation.

As to the treatment of emphysematous vaginitis, nothing more is usually required than puncturing the air vesicles and washing the vicinity with an antiseptic solution. If there is an irritating discharge, mild antiseptic douches may be given. If the patient is pregnant, great care must be exercised not to cause much irritation, as an abortion might result.

Ingraham and Hall presented an instructive study of emphysematous vaginitis, with sections of vaginal wall showing the gas vesicles.

Trichomonas Vaginitis

There is a very troublesome form of vaginitis associated with the presence of the *Trichomonas vaginalis*. This protozoan, which is ordinarily considered nonpathogenic, is frequently found in the vagina. It is found in a considerable proportion of all free vaginal discharges, but of course in less proportion when all gynecologic patients are checked. Schroeder and Loeser investigated the bacteriology of the vagina in over two thousand gynecologic patients, and found the *Trichomonas vaginalis* in only about 6 per cent. They felt, with previous observers, that the organism came from the intestinal tract. However, Bland and Rakoff, in a study of two hundred women, concluded that vaginal trichomonads did not originate in the intestinal tract, though other types of trichomonads are found in the intestinal tract. Kessel and Gafford were unable to infect the vagina of women or of monkeys with *Trichomonas intestinalis*.

The vaginal type of trichomonads has been found in cervical secretions, in urine of both women and men, and in prostatic secretion and semen. Hees reported ascending *Trichomonas vaginalis* infection, and was able to culture it from endometrium, tubal contents, ovarian cysts, peritoneum, and blood stream of patients, and from viscera of a fetus and from semen. Schroeder and Loeser stated that in most cases of colpitis presenting a large number of trichomonads there is present also the *Micrococcus gazogenes alcalescens* which is responsible for the foamy character of the discharge. They concluded that the *Trichomonas vaginalis* is not essentially pathogenic and that its presence in large numbers in certain cases of vaginitis is simply incidental to the abnormal flora that favors its growth, hence they felt that the term "trichomonas vaginitis" was hardly justified. Most writers, however, favor retaining the term as expressive of an important clinical type of vaginitis characterized by the presence of large numbers of the *Trichomonas vaginalis* and subsiding when this organism is eliminated.

Pattysen, in a carefully controlled laboratory and clinical study of 250 cases of trichomonas vaginitis, states that "the trichomonads are not dependent upon any coexisting organism to produce the symptoms seen in this condition" and that "enough conclusive

evidence has been presented by many investigators to prove beyond a doubt the pathogenicity of the *Trichomonas vaginalis*." Later, Trussell and Plass confirmed this, using pure cultures of the vaginal trichomonads.

Hibbert and Falls were able to produce clinical symptoms similar to those seen in trichomonas vaginitis by inoculating four women with a culture of *Streptococcus subacidus*.

These women developed immune reactions and were cured by a filtrate of a culture of this streptococcus, administered subcutaneously and per vaginam. The colored plate in their article shows an evident inflammatory reaction in the vaginal mucous membrane, but none of the punctate hemorrhagic areas characteristic of trichomonas vaginitis. As mentioned later under Streptococcus Acidus Vaginitis, this streptococcus is apparently the important factor in some cases of vaginitis just as the *Trichomonas vaginalis* is the important factor in other cases, and it is possible that still other organisms will prove to be the etiological factor in other cases as the large group of severe and persistent vaginal inflammations are studied and different types identified.

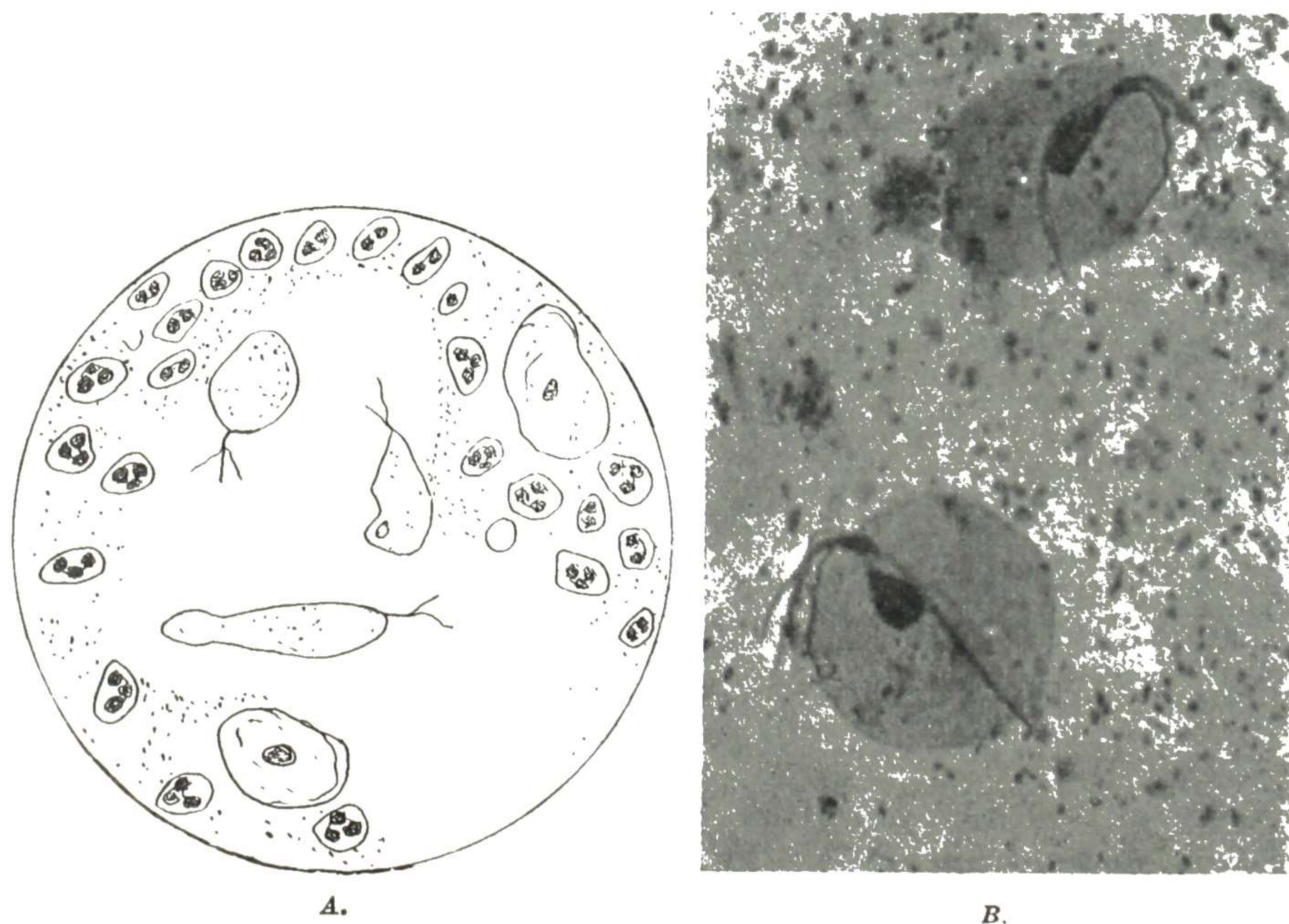


Fig. 366.—A, Composite field in a case of trichomonas vaginitis. Three of the organisms stand out well in the center of the field. They are three or four times the size of the adjacent pus cells. The flagellum moves rapidly sweeping particles into the ostium of the organism and at the same time causing the organism to move forward, flagellum-end first. The two upper trichomonads were in the same field, while the lower one was in the next field. The lower one and the middle one varied much in shape while under observation. When moving rapidly, the flagellum is not seen—only the resulting movement of the trichomonad or adjacent cells, as mentioned in the text.

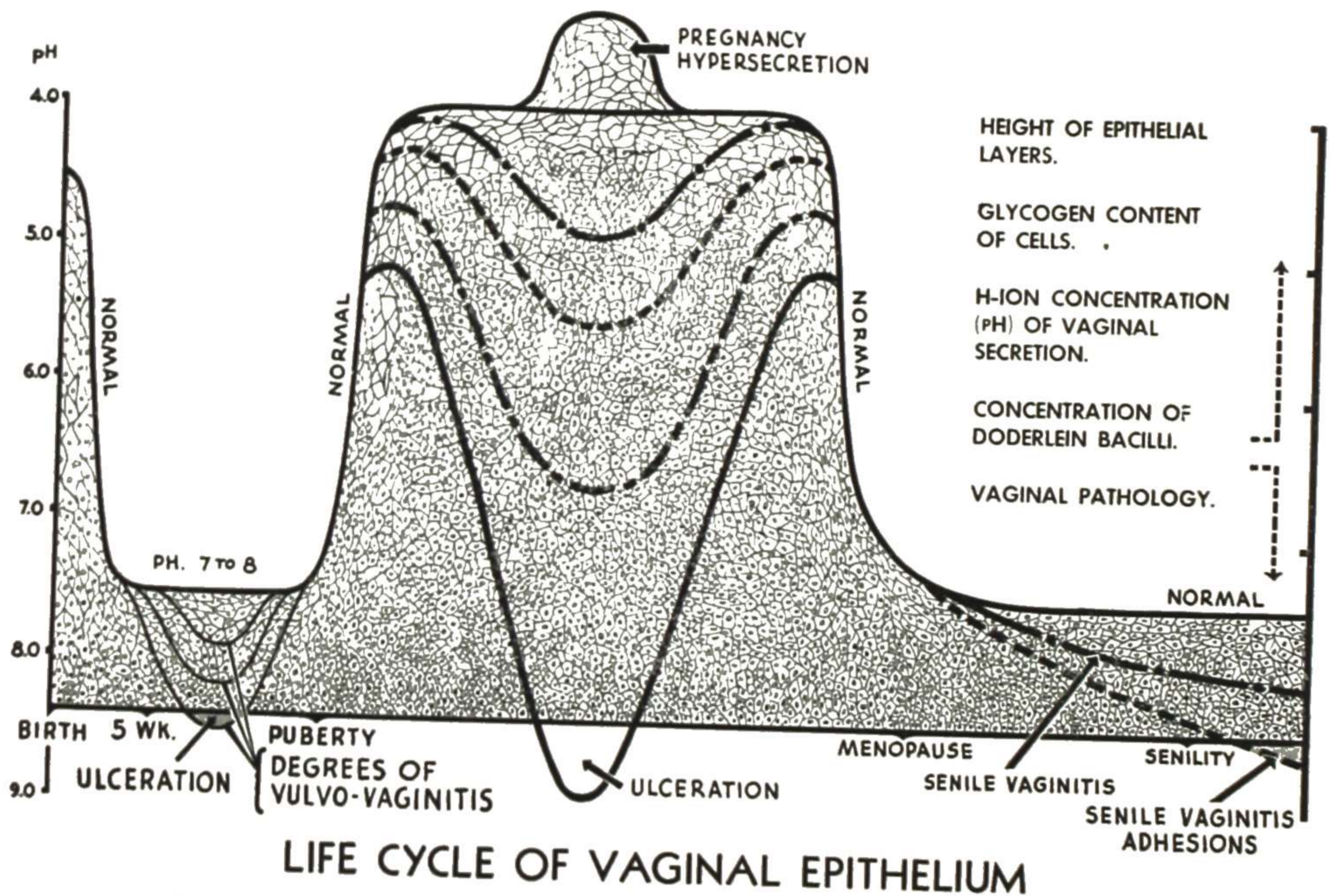
B, Human vaginal trichomonads. (Wagner and Hess—Zentralbl. f. Bakt., 1937.)

Symptoms and Diagnosis.—The patient complains of a constant free vaginal discharge, which is usually very irritating. The discharge persists despite ordinary douching and often despite a prolonged course of local treatments, and consequently the patient may be much discouraged as to prospect of cure. Examination shows a yellow discharge, suggestive of gonorrhoea but without the distinct localization in the urethra or vulvovaginal glands or cervix. Spec-

ulum examination shows vaginitis, and if acute, usually small hemorrhagic spots may be seen as in the colored illustration, Fig. 338. The vaginal vault contains yellow discharge, which sometimes has some bubbles, giving a foamy character. Microscopic examination of smear eliminates gonorrhea.

The clinical characteristics mentioned and the elimination of the gonococcus indicate the probability of trichomonas vaginitis. The diagnosis is made by demonstrating the trichomonads (Fig. 366).

The presence of trichomonads in vaginal discharge may be easily and quickly ascertained by microscopic examination of a warm spread. A drop of warm water is placed on a slide, a bit of the discharge mixed with it, a cover-slip placed over, and the specimen examined before it becomes chilled.



LIFE CYCLE OF VAGINAL EPITHELIUM

Fig. 367.—Life cycle of vaginal epithelium. (Karnaky—*Medical Record and Annals*.)

Examined with the light stopped down to show outlines, the field contains pus cells, vaginal cells, and debris. At a thin spot in the field an irregular movement of pus cells and debris may be noticed. This movement is produced by the waving action of the slender flagellum of a trichomonad, and further examination will show the dim outline of the protozoon, as indicated in Fig. 366, *A*. The outline may be traced by focusing slowly up and down the cell.

In some cases the trichomonads may be active and move about the field, while in other cases they are motionless except for the flagellum. Because of its thinness and movement the flagellum is not seen, its presence being indicated only by the movement of adjacent debris. When the patient has been taking douches the trichomonads may be inactive, their presence being indicated only by suspicious forms. If such a specimen be left on the microscope stage with the light on for several minutes, the warmth may revive the trichomonads so that identifying movement of debris may be seen.

Details of structure of the trichomonad may be demonstrated by staining. Of course dead trichomonads, stained or unstained, have the spherical shape of the resting or dead single-cell organism, as shown in Fig. 366, *B*.

The pH of the vaginal contents is shifted markedly toward alkalinity in vaginitis, and this in turn favors additional growth of the pathogenic organisms. With these conditions, the thickness of the protecting epithelium is seriously diminished, as shown by the lines for vaginitis and ulceration in Fig. 367.

Another point in the pathology and diagnosis is that the *Bodo urinaris* (Fig. 368) is present at times in vaginal discharge, and may be mistaken for the *Trichomonas vaginalis*. In a doubtful case special staining will bring out the differences, as in Fig. 368.

Treatment. Numerous articles have appeared dealing with the treatment and other phases of this interesting subject. Karnaky conducted extensive cultural investigations of the various trichomonads and other organisms associated with vaginal inflammation. Davis reported a helpful series of experiments determining the trichomonad-killing power of practically all the common vaginal applications and douches.

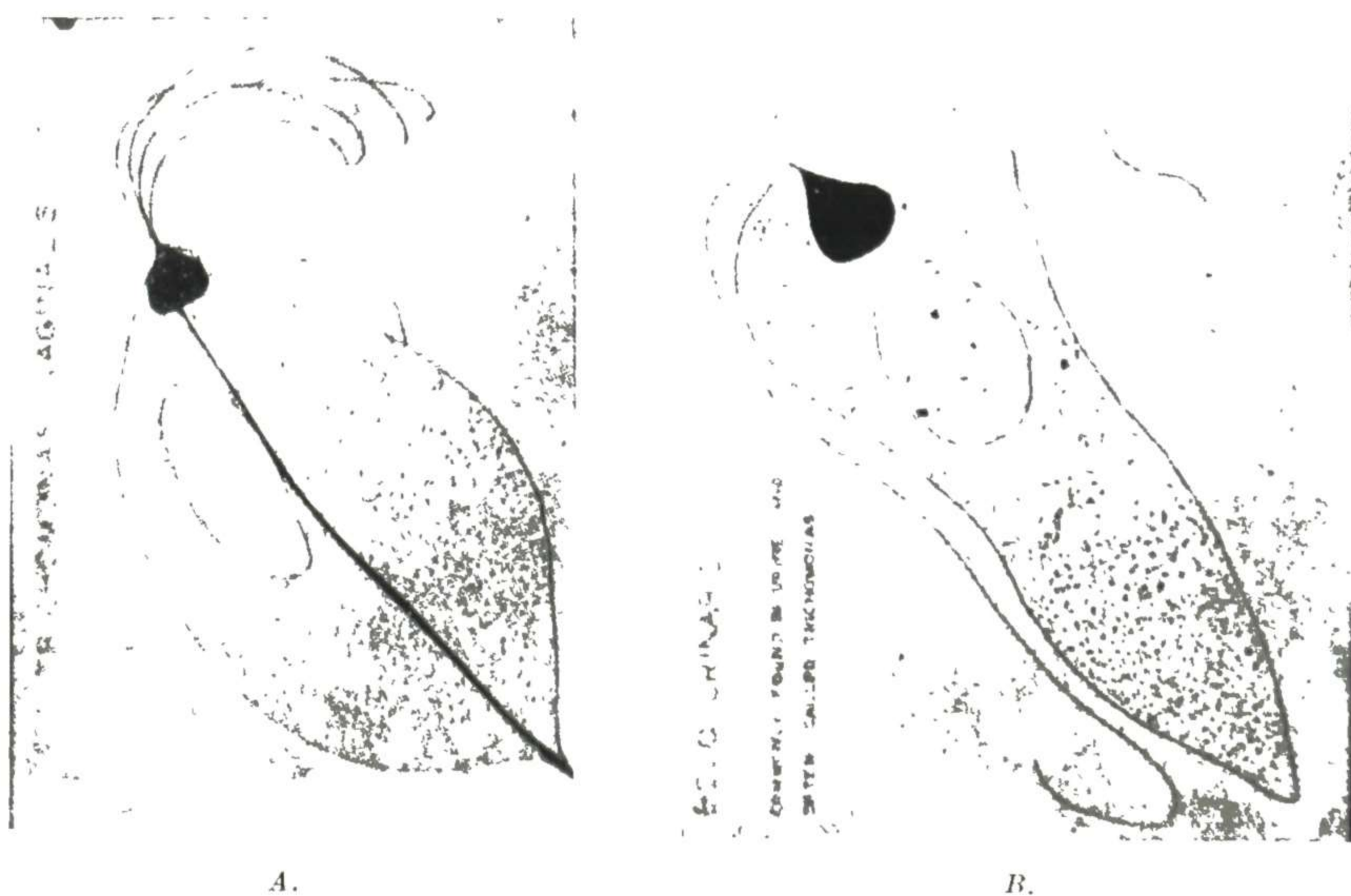


Fig. 368.—Showing the differences between the *Trichomonas vaginalis* and the *Bodo urinaris*. A, *Trichomonas vaginalis*. B, *Bodourinaris*. (Karnaky—*Urol. and Cutan. Rev.*)

Important in connection with treatment are the extensive investigations made to determine the normal content of the vagina at different ages and the factors which keep it in normal condition. The fundamental work of Cruickshank and Sharman on vaginal acidity and the many other helpful studies on various ramifications of the subject as indicated in the reference list, have brought out the following items of information:

1. In the age of ovarian activity (puberty to climacteric) the normal vaginal contents have a decided acid reaction. This acid reaction is due to the activity of acid-forming bacilli (Döderlein bacillus), and it is ordinarily maintained at such concentration that only acid-resistant bacteria can propagate. This forms a defense-mechanism against pus bacteria, which multiply in neutral or alkaline media, and is usually effective against ordinary moderate contaminations. The activity of the acid-forming bacilli depends on the glycogen content of the vaginal epithelial cells. This normal glycogen content of the vaginal cells is due to the estrogenic activity of the ovaries, and is absent in childhood and after the climacteric. Consequently, in those periods the acid-forming bacilli do not flourish, the contents become alkaline, and even slight contamination often results in prolonged vaginitis (persistent vaginitis of childhood, troublesome and recurrent atrophic or "senile" vaginitis).

2. When the vagina becomes inflamed the normal supply of glycogen in the cells is diminished, the acid-forming bacilli die off, the contents shift toward alkaline reaction, and pus bacteria multiply rapidly and dominate the picture. As the acid hydrogen-ion content diminishes, the pH rises, producing first diminished acidity and finally distinct alkalinity of the discharge. The chemical and bacteriological work has progressed sufficiently to permit correlation of the pH (tendency toward alkalinity) with the growth of various pathological organisms. In round numbers, pH 3 to 4 is normal for the vaginal contents, and at pH 5 to 6 trichomonads and monilia flourish. This increases the tendency toward alkalinity and opens the way to pus bacteria (staphylococci, streptococci, *B. coli*) which grow especially well at pH 6 to 8. At pH 7 the discharge becomes neutral, and beyond that it is distinctly alkaline. In this connection, see Fig. 250.

3. For the cure of vaginal inflammation (trichomonas or other type) restoration of growth of the normal acid-forming bacilli is necessary. With ordinary inflammation, the killing of the pus bacteria with antiseptic douches may be all that is needed to initiate a chain of events leading to recovery. But when the inflammation is complicated by trichomonas infestation its eradication requires more aid to the acid-forming bacilli, such as acid-forming material (glucose, glycogen, etc.) for them to work on. If this additional aid is given for a sufficient length of time, the damaged vaginal mucosa gradually recovers and its cells again supply the required glycogen for maintaining the normal acid-bacillus protection.

4. The treatment of trichomonas vaginitis requires (1) acidifying of the vaginal contents to discourage the growth of pus bacteria and trichomonads and (2) supplying of material for the acid-forming bacilli to utilize in their growth until the vaginal cells recuperate sufficiently to furnish again the normal supply of glycogen. The first objective is attained by giving vinegar douches (three tablespoons of a good grade of white vinegar to two quarts of warm water) or lactic acid douches, once or twice daily, depending on the severity of the discharge, and then less frequently as the discharge diminishes. A convenient prescription is as follows:

R Lactic Acid. U. S. P. 1 lb.

Sig.: For local use only. One teaspoonful to two quarts of warm water. Use as directed.

The second objective is attained by the frequent introduction of suitable carbohydrate material (glucose, glycogen) into the vagina. Manufacturers now supply such material in tablets, which usually contain also some antiseptic to aid in diminishing pathologic bacteria. Reliable pharmaceutical firms have given much aid to the profession by their prompt utilization of the scientific investigations above mentioned and the supplying of required materials in convenient form for clinical use. Such tablets may be prescribed under the various trade names, for example, Floraquin tablets (Searle & Co.) or Devegan tablets (Winthrop Chemical Co.).

As to general directions, the patient inserts one or two tablets into the vaginal vault once or twice daily, the number of tablets and frequency of introduction depending on the severity of the process and diminishing as it subsides. The manufacturer gives detailed directions for his product, and it is well to get full information concerning the one used. In acute cases, the ordinary soothing applications used in office treatment also help in relieving discomfort. When traveling or other circumstances make douches impracticable or undesirable, the tablets may be used alone—douches being omitted or used only when the discharge is irritating.

5. The bloody menstrual flow lowers the acidity of the vagina and hence there is a tendency to recrudescence of trichomonas or other inflammation at that time. Consequently the acid treatment with douches and tablets should be continued during menstruation. If the douche taken once daily is just comfortably warm, it should have no influence in increasing or diminishing the normal menstrual flow. This alkaline tendency during menstruation, with resulting increase in activity of any remaining trichomonads, is utilized in testing for cure. When it is thought a cure has been effected, have the patient stop all treatment at the onset

of menstruation and then come a few days after cessation of the flow for check up as to clinical and microscopic evidence of trichomonads, having taken no douche in the meantime.

6. Urethritis in the husband is occasionally caused by trichomonas vaginitis and the accompanying free growth of pus bacteria. This may lead to suspicion of gonorrhea and an embarrassing family situation. The diagnostic elimination of gonorrhea is complicated by the fact that the *Micrococcus catarrhalis* is also gram-negative and intracellular. In one such case, in which a diagnosis of gonorrhea had already been returned by a laboratory on the strength of gram-negative intracellular cocci without inquiry as to clinical findings, we were able clearly to exclude gonorrhea by correlation of clinical findings and additional laboratory work including cultures and complement-fixation tests covering both husband and wife. Nitschke presented an instructive article on trichomonas infestation in the male.

Some prefer powders, and various kinds have been used. Karnaky in his earlier work employed a mixture of cornstarch, glucose, and boric acid, and later advised the addition of iodine to inhibit the growth of fungi in association with trichomonads. Adair and Hesseltine use a mixture containing lactose 95 per cent and citric acid 5 per cent. Roblee finds beta lactose the most satisfactory. In office treatments, the vagina is cleansed (with a 50 per cent solution of green soap, if preferred and not too irritating and uncomfortable) and then the selected powder is blown into the vagina or packed in with a spatula. Directions are then given for continuing the treatment at home. For home use the selected powder is put in large capsules (veterinary capsules, of which there are two of convenient size—No. 12 (70 grains) and No. 11 (120 grains). The patient is instructed to take the lactic acid douche at night and then insert the carbohydrate capsule to the top of the vagina, and to repeat this daily.

There are other successful methods of managing this troublesome form of vaginitis. Most of them are dependent for their effect upon protozoacides, such as carbarstone, picric acid compounds, quinine derivatives, acetarsone, aldarstone, cinquarsen negatan, and vioform. The picrate method reported by Buxton and Shelanski was successful in 97 per cent of their cases.

There is a great difference in cases as to how they respond to treatment, suggesting marked difference in the trichomonads or in the susceptibility of patients. Some yield quickly to a simple plan of treatment while others require prolonged care and strict handling, with special medication. The erratic and apparently unreasonable way in which some cases persist means, of course, that there is some unknown factor in the problem or perhaps several of them. In these resistant cases the elimination of trichomonads seems to depend on careful study and individual management, to eliminate harboring sites in the genital canal, e.g., in cervix or Skene's glands or vulvovaginal glands or in the husband. There is also the question of individual susceptibility and the possibility of diminishing that by general treatment, including the internal administration of antiprotozoal remedies. In persistent cases the bladder and rectum must be eliminated as sources of infection. The treatment of bladder infection recommended by Visser is 15 c.c. of 1 per cent mercurochrome instillations. For rectal infection, Drabkin advises 2 gr. carbarstone rectal suppositories, preceded by cleansing enemas, twice daily for a week and then every other night for two weeks.

Streptococcus Subacidus Vaginitis

Hibbert and Falls present an instructive study of the *Streptococcus subacidus* as a cause of vaginitis, and perhaps a large factor in many cases of vaginitis associated with trichomonads. They employ a vaccine made from this germ in treatment. They were able to show this gram-positive coccus in profuse growth in vaginal discharge before treatment, and the absence of pathogenic bacteria and the presence of the normal Döderlein bacilli after successful treatment. From their investigations they reach the following conclusions:

1. The *Streptococcus subacidus* found in patients presenting the clinical picture of *Trichomonas vaginalis* vaginitis is pathogenic, as shown by its fulfillment of Koch's laws.
2. It produces an immune reaction (agglutination) when injected intradermally.
3. Local clinical improvement was more rapid and apparently more lasting when general antibody reaction was stimulated by the vaccine in addition to the local antibody stimulation by the filtrate.
4. The pH of the vagina was found to be relatively high when there were large numbers of *Streptococci subacidus* present, and to be lower as they disappeared, irrespective of the presence or absence of the trichomonads.
5. The disappearance of the clinical picture and symptoms with the disappearance of the *Streptococcus subacidus*, occurring in the presence of the trichomonads, suggests the former as the chief factor in the production of the lesions.
6. Further efforts to eradicate this streptococcus from the genital tract, and to raise the general immunity to this organism, seem the logical way to attempt the control of this infestation.

Other Animal Parasites

There are other parasites of the ameba type which occasionally cause trouble in the vagina. These are the *Ameba urogenitalis*, which invades the bladder, causing hematuria, and the *Distoma hematobium* which also infests the urinary tract. The latter is found in a large percentage of Egyptian women. It may propagate in the vulvar epidermis and cause condylomas. It may cause chronic inflammation of the vaginal wall with infiltration, while on the cervix uteri the papillary outgrowths from it may resemble carcinoma.

MONILIA VAGINITIS

Monilia vaginitis is the term applied to inflammation of the vagina caused by various yeast fungi. It is known also as "aphthous vaginitis" and by other terms. The infection is carried to the genitals usually by the fingers of the patient, who has been handling some organic substance on which the fungus was growing. A mother whose baby is suffering with thrush may infect herself. It usually occurs in nursing women or in pregnant women or in cases of prolapsus uteri. It is said to occur sometimes as the result of sexual intercourse with a diabetic husband.

The pathologic changes are practically the same as in thrush in the mouth. There are white patches, representing the growing fungus, and accompanying inflammation of the adjacent tissues. The patient complains of burning, itching or smarting, but there is not much discharge. In the examination through the speculum, the vaginal wall presents the ordinary evidences of inflammation

and in addition it is studded with small white patches about the size of a pin-head. In some cases small ulcers may form. A scraping from one of the white patches, examined with a microscope, will show the fungus mycelium stalks and buds (Fig. 350). To prepare the scraping for microscopic examination, put it on a slide, add a drop of a 10 per cent solution of potassium hydroxide, put on a cover glass and examine, dimming the light so as to visualize outlines. If scanty, however, the fungus may be missed in this hasty method. So it is advisable to make the regular staining of a specimen of the discharge, so that any monilia elements present will show clearly. The ordinary methylene blue stain used for gonococci and other bacteria will bring out monilia if present. The monilia elements are gram-positive and hence will show in specimens in which gonococci are decolorized. In doubtful cases of suspected monilia infection, culture on Sabouraud's media will settle the matter.

Monilia should be suspected in any case of vaginitis without other evident cause, particularly if there is persistent or recurring burning and itching and still the pH shows normal vaginal acidity. This is one of the vaginal pathogenic organisms which grows well in an acid medium. It is a frequent accompaniment of diabetic vulvitis. It should be suspected also in cases where coitus causes burning and discomfort in husband and wife for a day or two without disturbance at other times.

Plass, Hesseltine and Borts, in their instructive article, give the following conclusions from their extensive study:

1. Monilia are frequently present in the vaginal secretions of patients suffering from vulvovaginitis, and appear to be concerned directly with the etiology of the clinical condition, although normal individuals may harbor the fungi for long periods without showing vaginal irritation.

2. Pregnancy and diabetes are definite predisposing factors, and menstruation may be, since sexually active women are more prone to the infection. Parous women are more often infected, but children, virginal adults, and senile women may likewise show the organisms. In the majority of instances the mode of infection cannot be demonstrated. High acidity of the secretion favors the growth of monilia, but is not essential.

3. The chief symptoms of the infection are itching, burning, and smarting of the lower vagina and vulva. Digital and speculum examinations, and coitus are painful. A profuse leucorrhoea rarely appears, and only occasionally is the secretion characteristic, when it contains small white flakes of thrush-like material. Varying degrees of vaginitis are encountered, with, occasionally, the appearance of vaginal or cervical thrush. Complications are rare.

4. Monilia vaginitis tends to undergo spontaneous relief, but occasionally becomes chronic and may produce recurrent irritation over a period of months or years. Delivery usually leads to complete relief in pregnant women, while menstruation generally has the same effect temporarily in the nonpregnant.

5. Gentian violet, in one per cent aqueous solution, applied locally affords the best method of treatment. Alkaline douches may be of some value.

6. Monilia vaginitis in pregnant women is a definite source of infection in sporadic outbreaks of oral thrush in the newborn.

Treatment.—In monilia vaginitis, gentian violet applications are made in the office treatment—1 per cent aqueous solution for the mild cases and 5 per cent in 50 per cent alcohol for the resistant ones.

ATROPHIC VAGINITIS

Atrophic vaginitis occurs almost exclusively in women past the menopause, hence the term "senile vaginitis," by which it is at times designated. There is considerable destruction of the covering epithelium, and such denuded areas may unite by adhesions, hence the designation "adhesive vaginitis."

The predisposing cause is the thinning of the protective vaginal epithelium from the diminishing estrogenic hormonal influences. The variations in the thickness of this epithelium at different ages, along with the characteristics of the corresponding vaginal smears, are well shown in Figs. 369 and 370. As mentioned later, vitamin E deficiency is a factor in some cases and vitamin A deficiency in others.

The exciting cause is probably a slight uterine discharge, which macerates the vaginal epithelium and favors bacterial growth. A certain amount of atrophic vaginitis is very frequent and often produces no symptoms. In fact, it is probable that a considerable proportion of women over sixty have some of this disturbance, with slight adhesions here and there.

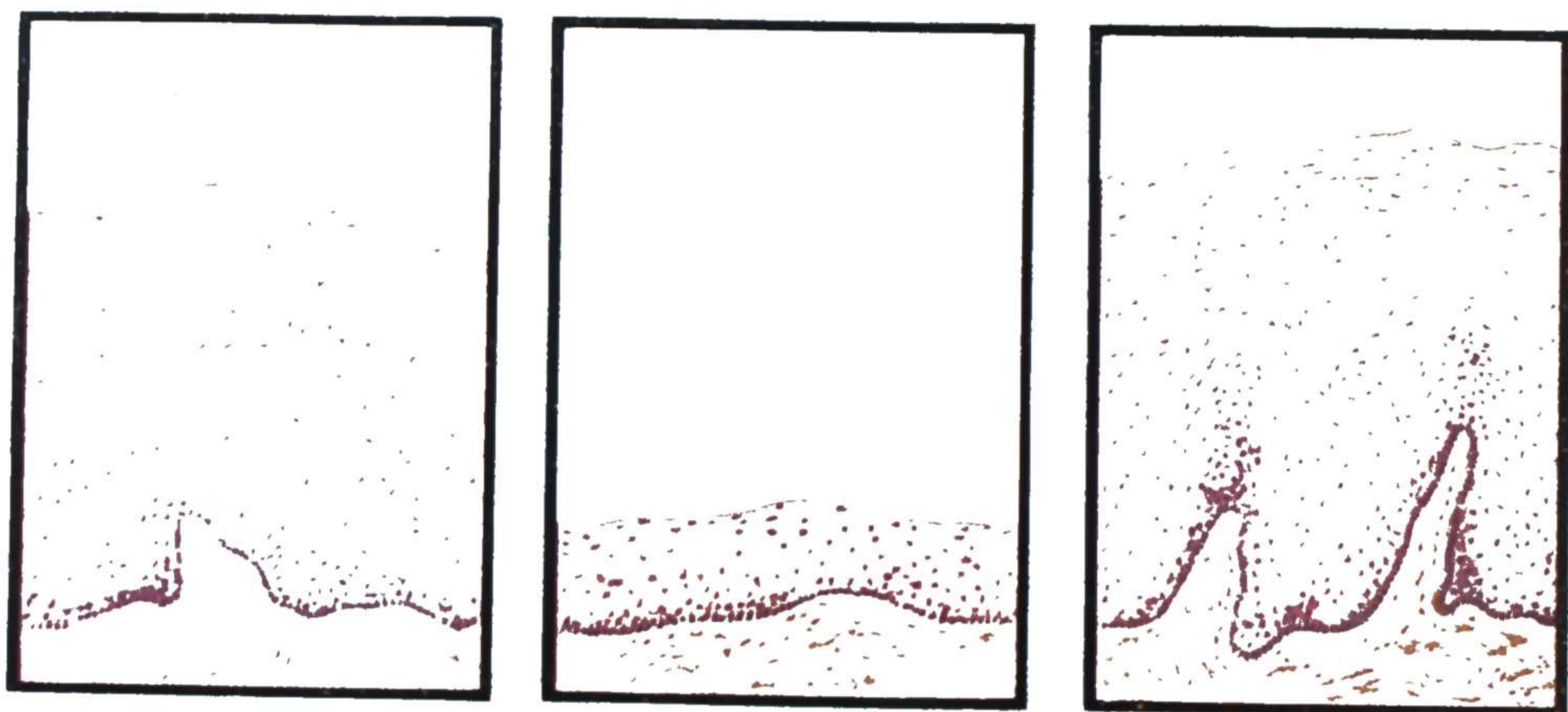
Over irregular patches the superficial layers of epithelium are thrown off (Fig. 371, *A*), forming erosions from which there is a scanty secretion. The eroded areas are tender and usually bleed on manipulation. When such areas develop on opposed surfaces of the vaginal walls adhesions take place between them. For a long time the adhesions are weak and the surfaces may be easily separated. If the process of adhesion is allowed to go on undisturbed, the adhesions become organized and firm (Figs. 371, *B*, 371, *C*), and in the course of time may become so extensive and strong that the vagina is practically obliterated. Atrophic vaginitis is accompanied by a slight "gluey" discharge, small in amount but irritating.

The **symptoms** are vaginal discharge, sometimes bloody, with some pain in the pelvis and vaginal burning and discomfort. There may be some burning or smarting on urination, from irritation of the vulva by the discharge.

On digital examination, the vaginal walls may be adherent in places, especially at the upper portion of the vagina, and the separation of the walls causes some pain and bleeding. Examination of the vagina through the speculum shows hemorrhagic areas of denudation and inflammation, principally in the upper part of the vagina.

Diagnosis.—The evidence of subacute vaginitis with marked tendency to adhesion of the walls in spots establishes the diagnosis of atrophic vaginitis. Vaginitis occurring after the menopause is usually of this form. Be careful to distinguish gonorrheal vaginitis which may complicate the atrophic form, as may also trichomonas and monilia vaginitis. Serious disease of the uterus causing discharge, particularly cancer, must be excluded.

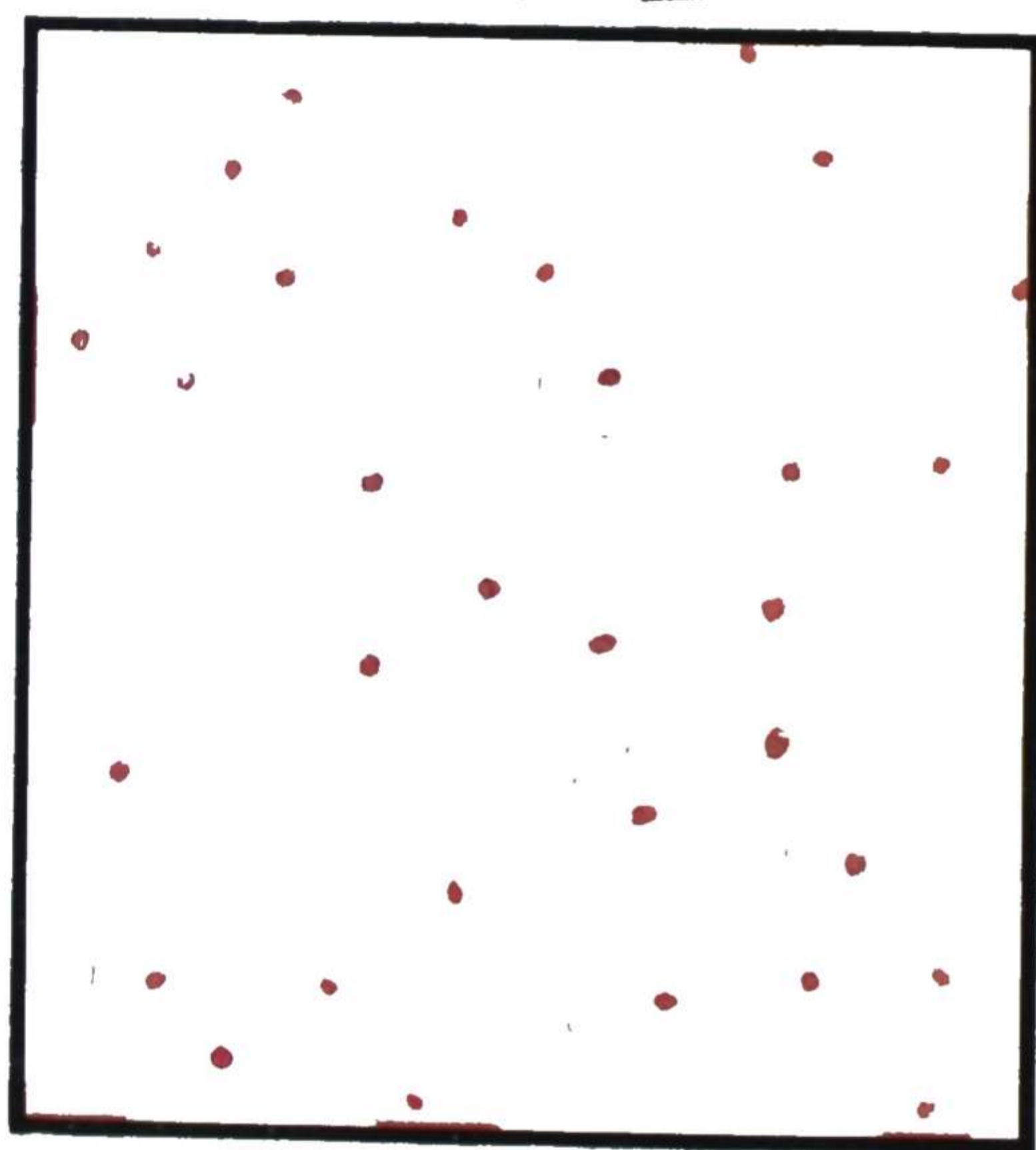
Treatment.—If the trouble is slight and causes no symptoms, it needs no treatment. The adhesions in themselves cause no trouble and consequently need no treatment, except when they become so extensive as to interfere with coitus.



NEW BORN

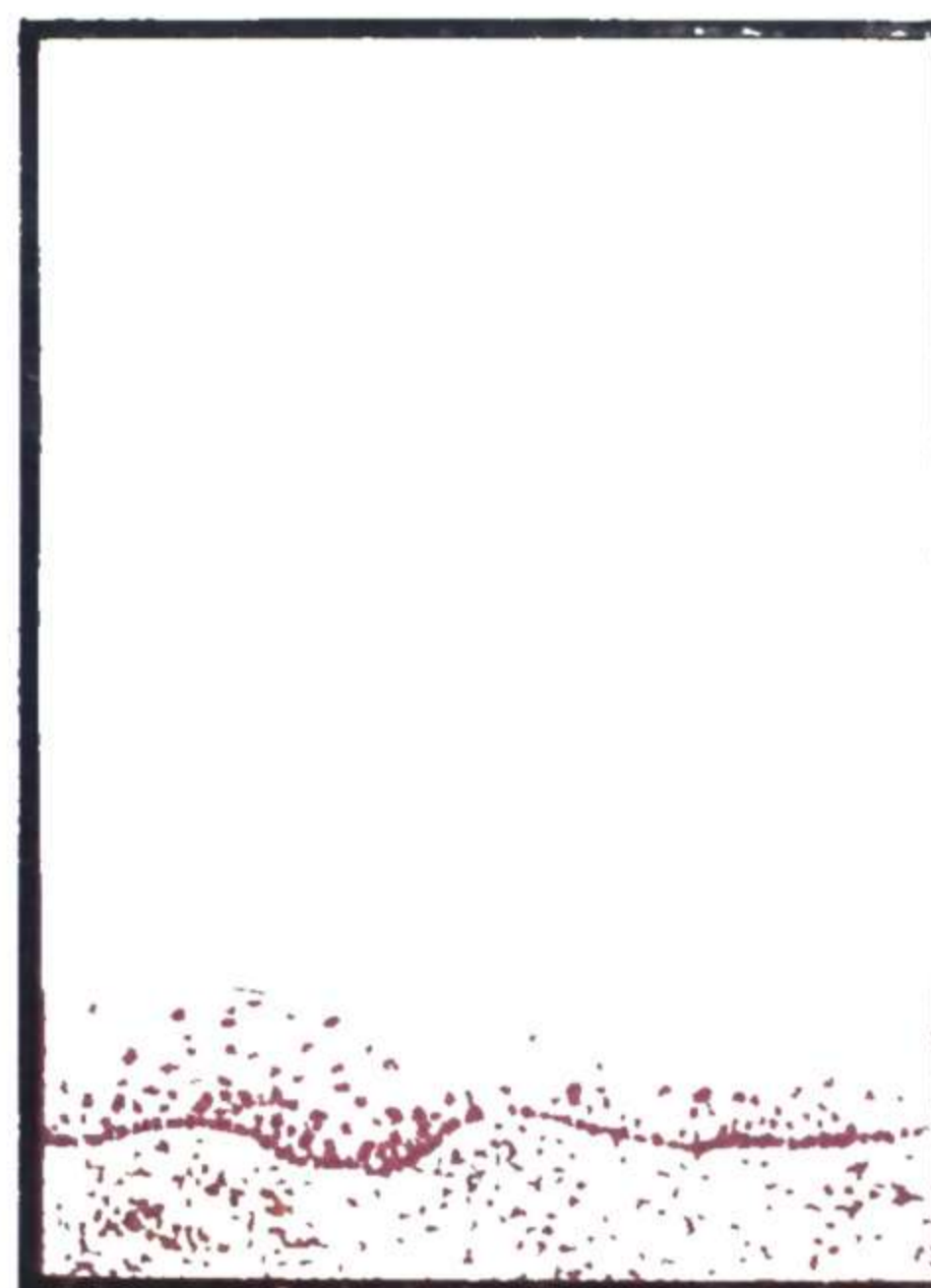
CHILD

NORMAL CYCLICAL
FEMALE



NORMAL
ESTROGEN EFFECT

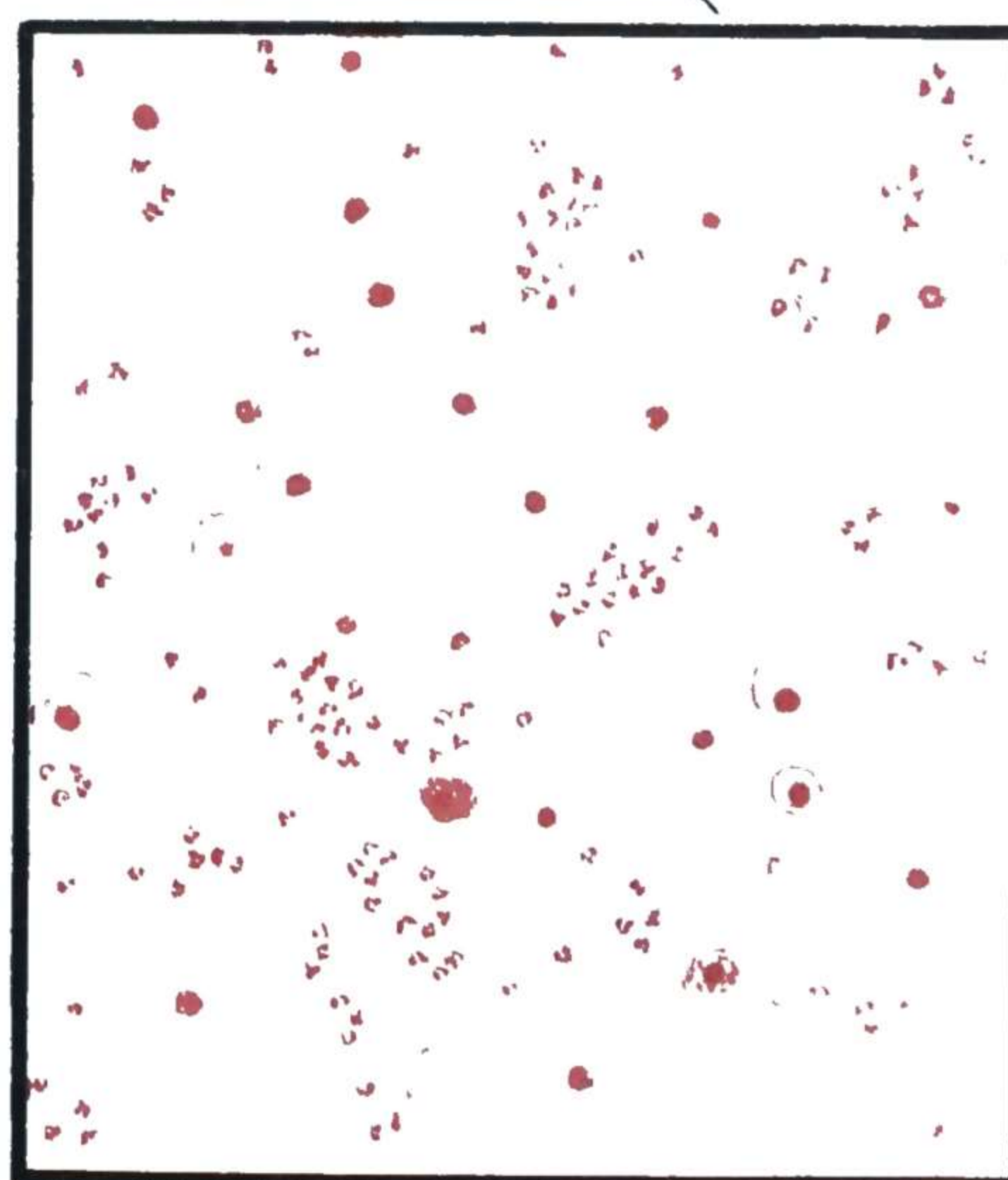
Fig. 369.—Estrogen effects on the vaginal mucosa at different ages. (Netter—Ciba Pharmaceutical Products, Inc.)



PREGNANCY
(Advanced)

PUERPERIUM

POST-MENOPAUSE



MODERATE
ESTROGEN DEFICIENCY

ADVANCED
ESTROGEN DEFICIENCY

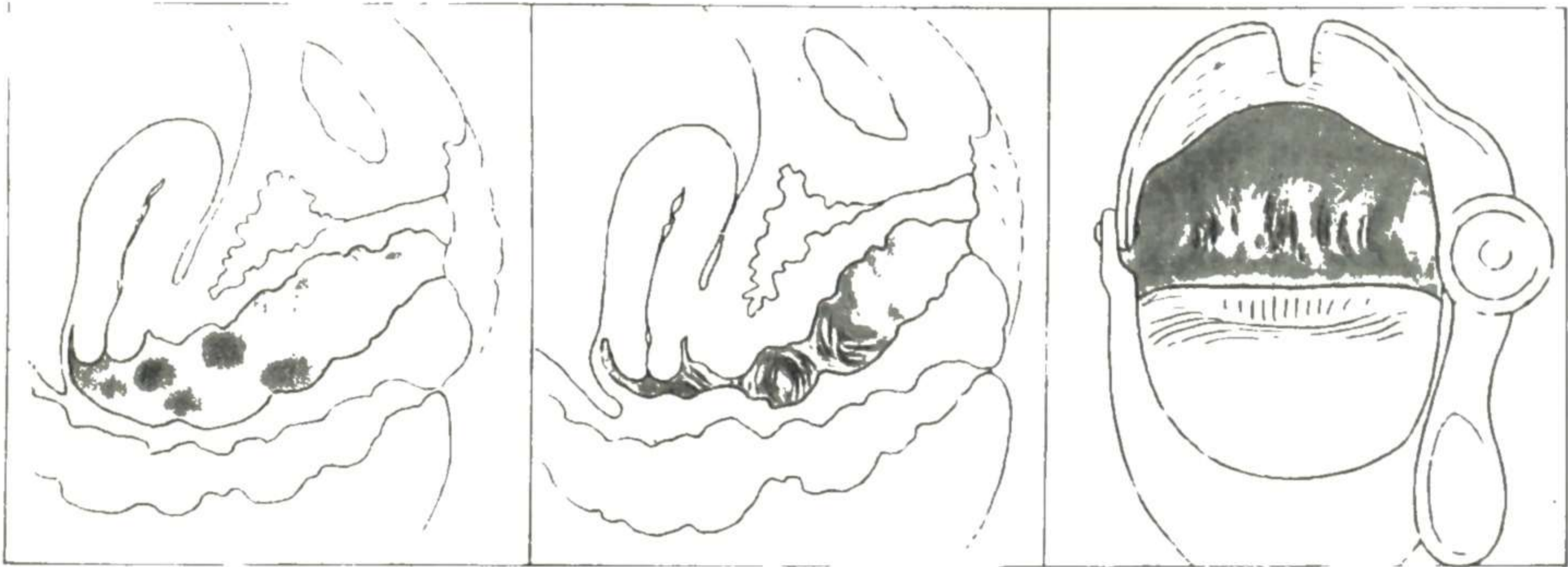
Netter 370

Fig. 370.—Estrogen deficiency effects on the vaginal mucosa and the vaginal smear in the climacteric. (Netter—Ciba Pharmaceutical Products, Inc.)

When there is persistent irritation, giving rise to an irritating discharge or bleeding, or pain, then the following treatment is indicated:

1. Put the patient in the best possible general health.

2. Keep the vagina free from the irritating discharge by the use of a lactic acid douche, which favors the growth of the normal vaginal flora. At



A.

B.

C.

Fig. 371.—Atrophic (senile) vaginitis. A, indicating scattered areas of adhesive vaginitis; B, adhesions resulting later from adhesive vaginitis; C, appearance of adhesions through the speculum.

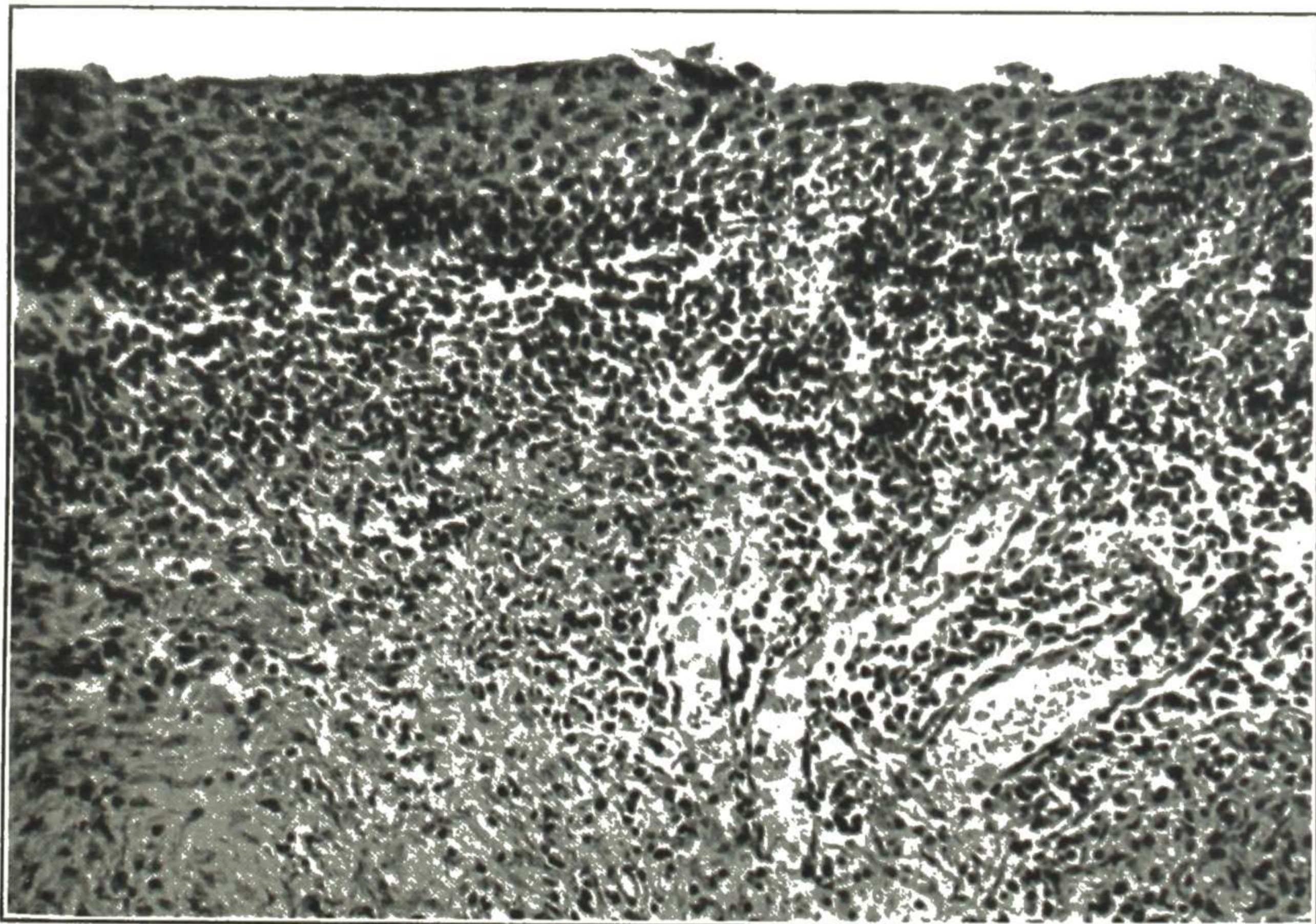


Fig. 372.—The atrophic squamous epithelium merges indefinitely with the subepithelial tissue. The basal layer of cells is irregular and moth-eaten in appearance. A dense infiltration of inflammatory cells, consisting chiefly of round cells, can be seen beneath the squamous epithelium. All microphotographs (Figs. 372-374) were magnified 100 times for accurate comparison of the squamous epithelium. (M. Edward Davis—*Surg., Gynec. and Obst.*)

office treatment, make application of soothing solution to relieve surface discomfort, such as 10 per cent argyrol.

3. The special treatment advisable depends somewhat on the type of case, that is, whether ovarian hormone deficiency or vitamin E deficiency or vitamin A deficiency predominates.

Ovarian Hormone Deficiency Type. These patients often have general climacteric disturbances for which they are receiving endocrine treatment, and this may help the atrophic vaginitis. For local effect in building up a protective epithelial covering, however, administration of some potent estrogenic preparation by vaginal suppositories also is advisable.

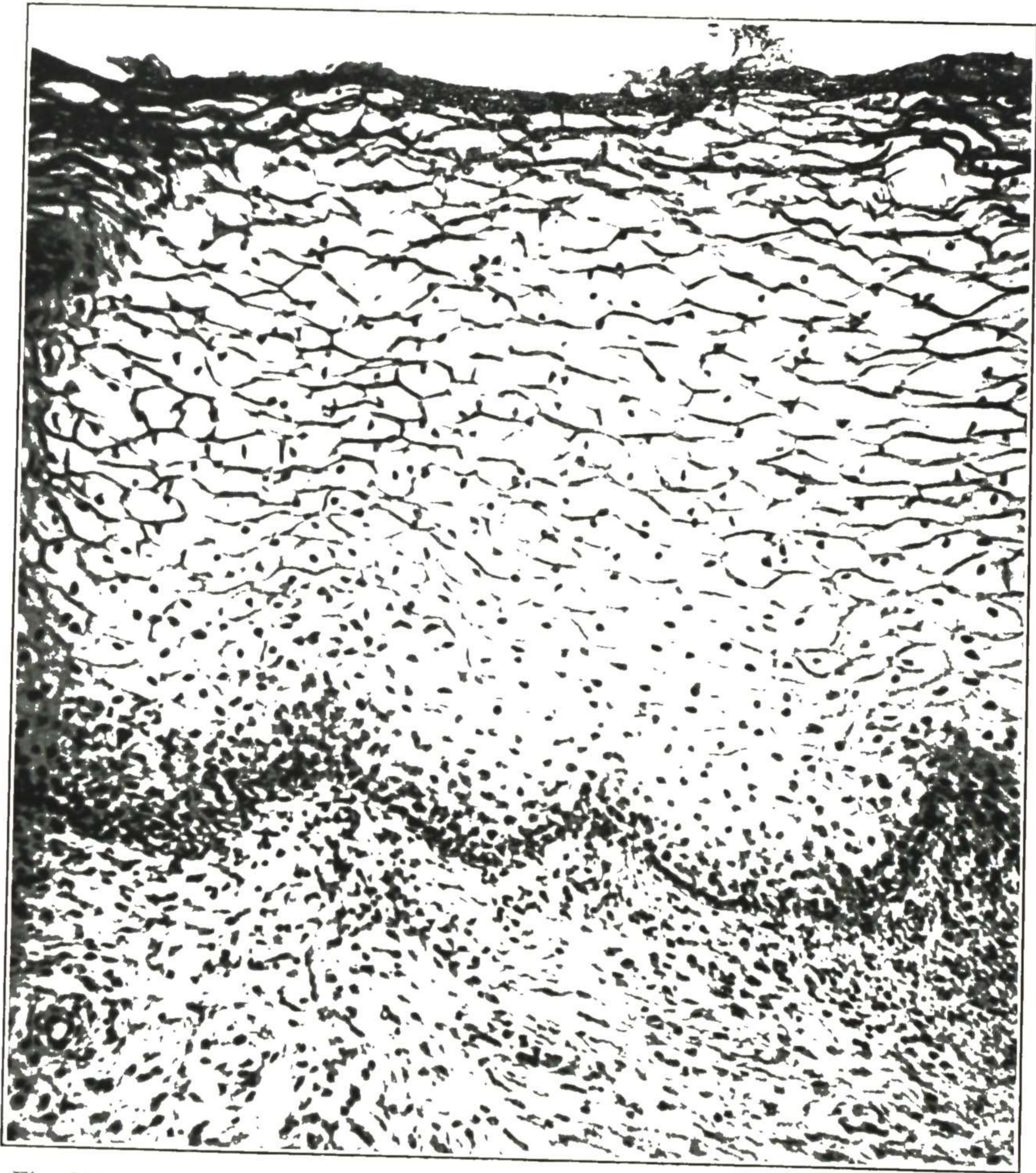


Fig. 373.—After four weeks' treatment. The squamous layer has been rebuilt to several times the previous thickness. The basal layer of cells is arranged regularly and shows signs of activity. The large clear cells of the basalis contain an abundance of glycogen. (M. Edward Davis—*Surg., Gynec. and Obst.*)

M. Edward Davis studied a series of cases of atrophic vaginitis treated with the estrogenic hormone. The results were very carefully checked by excision of specimens of the vaginal mucosa at various stages in the treatment, and the photomicrographs shown in Figs. 372 to 374, are from his paper. The typical conditions found in atrophic vaginitis are shown in Fig. 372. This and the two succeeding photomicrographs are from the same patient, aged sixty-five years. The effect of four weeks of treatment is shown in Fig. 373. For accurate comparison, the magnification is the same. A later stage of the treat-

ment is shown in Fig. 374. This latter photomicrograph facilitates detailed study of the arrangement and individual characteristics of the new epithelial cells.

Quoting from the article, the details of treatment were as follows:

The cases were divided into several groups, according to the types of treatment. The largest group received 100 rat units of amniotin (Squibb) subcutaneously three times weekly. In addition to this, a vaginal suppository containing 75 rat units of

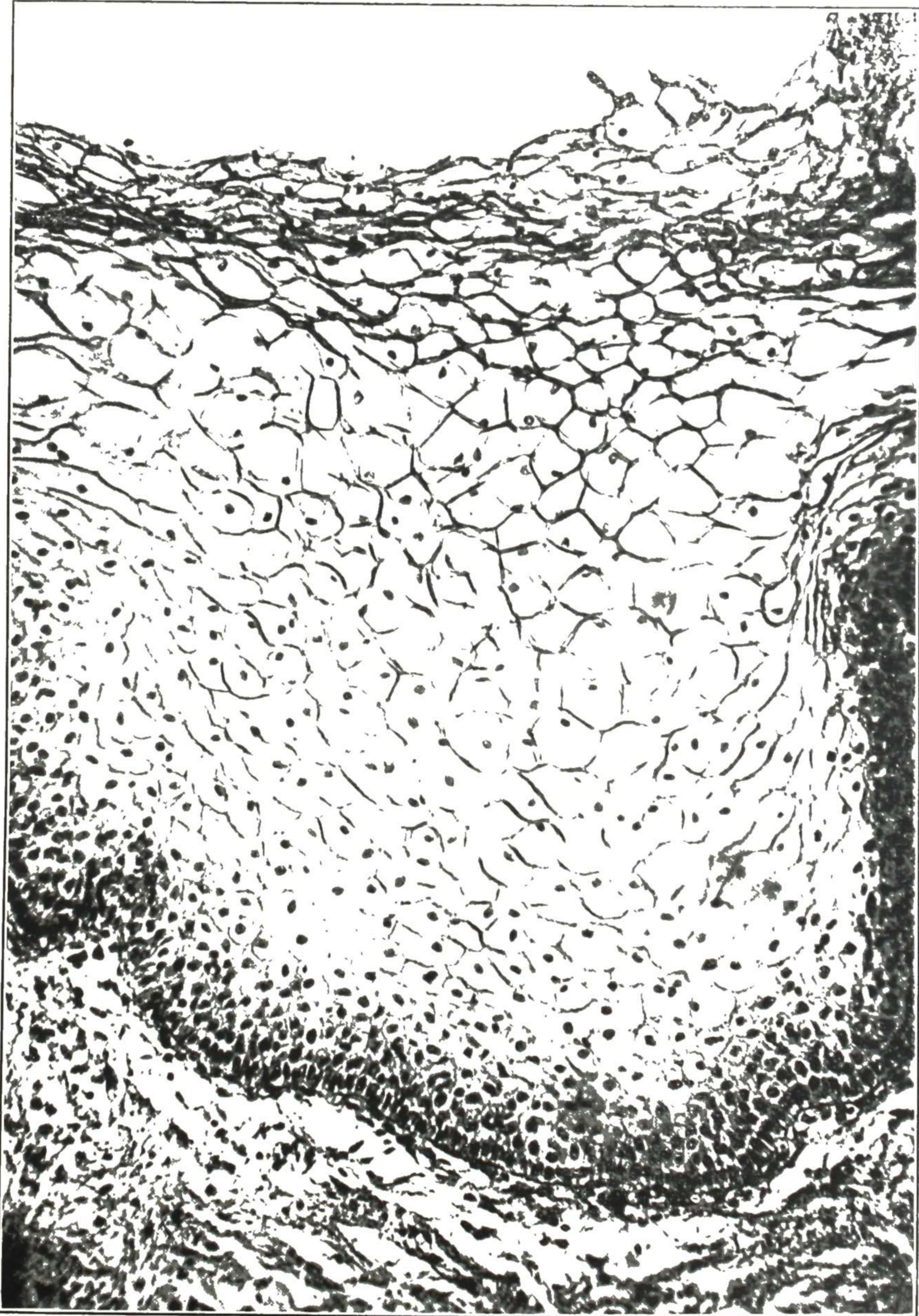


Fig. 374.—Under continued treatment an increasing thickness of the squamous epithelium can be seen. The individual cells have increased in size. A well-developed functionalis is now apparent. The interepithelial zone of cornification likewise can be noted. (M. Edward Davis—*Surg., Gynec. and Obst.*)

amniotin was used each night. The duration of the treatment averaged six weeks, although in most instances the symptoms disappeared after the first ten days. A second group of patients received only subcutaneous injections of 100 rat units of amniotin. This was done to eliminate the effect of the inert ingredients of the suppositories as an important factor in the therapy. The last group of women received only suppositories. These patients responded very poorly, so the subcutaneous administration of amniotin was added to the therapy.

The small amount of estrogenic substance required for a complete restoration of the normal mucosa and the rapidity of action was a distinct surprise. The marked responses of the atrophic epithelium to the dosage used made the present therapy easy and entirely feasible.

The changes in the vaginal mucosa as a result of treatment with estrogenic substance are indeed interesting. The inactive basal cells rapidly begin to proliferate, and abundant mitoses can be seen in them. The number of cells in the basalis rapidly increases. They exhibit all the signs of active growth. Under continued stimulation the basalis develops a good functional layer and the typical zone of intraepithelial cornification can be seen. The cells soon contain an abundance of glycogen. The inflammatory foci beneath the squamous epithelium, usually seen in senile vaginitis, disappear. A marked increase in the vascularity of the submucosa likewise occurs. All of these striking changes can be followed accurately in the photomicrographs which are all of the same magnification, so that proper comparisons may be made.

The patients show improvement within a few days after treatment, and in most instances their symptoms have all disappeared in about ten days. A general feeling of well-being is usually present and some of the elderly women insist that they feel better than they have for years. Grossly, the changes are quite apparent. The mucosa becomes somewhat velvety, more elastic, and more distensible. All signs of inflammation and irritation disappear. Petechial hemorrhages, superficial ulcerations, and filmy adhesions likewise disappear and

These changes, however, are not permanent. Several weeks after the cessation of treatment the mucosa rapidly returns to its previous atrophic condition. Within four to six weeks the usual mucosa is again present. However, the patient's symptoms do not return unless she has not received enough treatments and some inflammation still remains. If she has been treated for a sufficiently long time so that the mucosa has healed completely and all subepithelial inflammation has disappeared, then the symptoms do not return until the factors which produce senile vaginitis again are present. If trauma and infection are again introduced, senile vaginitis will undoubtedly recur. In our series it was found that the patients should be treated for a period of four to six weeks. The patients with marked changes should be treated for six to eight weeks. In all of our cases the results were good, the symptoms all disappeared and remained cleared up for at least six months, during which time the patients were carefully followed. This sequence of events demonstrates conclusively that the physiologic changes in the vaginal mucosa in themselves do not produce symptoms. If trauma and infection are introduced, senile vaginitis develops.

In some of our cases the patients were treated for trichomonas vaginitis for a considerable length of time. These were the most stubborn and difficult cases because they did not respond to the usual therapy for this condition. A few of these cases were treated with estrogenic substance and, to our surprise, they cleared up rather promptly.

The results of estrogenic therapy in atrophic vaginitis may be followed and checked by vaginal smears, as explained under Ovarian Hormone Therapy in Chapter III. If the estrogenic hormones are not available or the expense prohibits their use, the carbohydrate treatment outlined under trichomonas vaginitis may be used; the results, however, are not as prompt nor as certain.

Vitamin E Deficiency or Excess Estrogen Type.—Notes concerning this type and the vitamin A deficiency type are quoted from Robert J. Crossen's contribution to the three-volume work *Modern Medical Therapy in General Practice*, by Barr (Williams & Wilkins Company).

Shute described a type of senile or atrophic vaginitis which he attributed to an excess of estrogenic substances in the circulating blood. That estrogenic activity should still be apparent after the menopause at first seems paradoxical. Salmon and Frank, however, using the vaginal smear method, found 60 per cent of a group which included twenty-four surgical castrates, ten women during natural menopause, and eleven who had had a sterilization dose of deep roentgen ray, still positive for estrogen. Shute studied the estrin level in women who suffered from vaginitis following the menopause and found that, in those who were not relieved or were made worse by administration of estrogenic substances, there was either a constant excess of estrogen in the blood or a true estrus cycle. Since this type of vaginitis gives the same symptoms and findings as the other two types it can only be differentiated from them by hormone studies and the failure to improve on the estrogenic therapy.

The problem in these cases was to find something which would counteract the excess estrogen in the blood. Shute had previously shown that vitamin E was effective in preventing threatened abortion because of its neutralizing action on the estrogenic anti-proteolytic substance found in the blood serum of such cases. In these cases it was found that there was a wide variation in the amount of vitamin E needed to neutralize the estrogenic factor; this was later found to be true in the cases of atrophic vaginitis. The majority of the cases in Shute's series were controlled on the following regime. During the first twenty-four hours three doses of 15 c.c. of cold-pressed wheat germ oil were given to insure the neutralization of excess of the estrogenic substance in the circulating blood, and this was followed by 4 c.c. a day as a maintenance dose until the vaginitis was improved. In one of his cases 45 c.c. was needed daily for five days to effect a cure. Shute states that he has given many patients 20 c.c. daily for several months without ill effects, and one of his patients took an ounce daily for two months. Shute found that wheat germ oil, in bulk or in capsules, retains reliable potency for about eight weeks; this time is shortened unless the oil is kept cool. It is important, therefore, in using oil to make certain that it is fresh when purchased and is kept cool until used.

A concentrate of the unsaponifiable matter from wheat germ oil in a vegetable oil is on the market under the trade name of Germol E (Ayerst-McKenna). The glycerides, which because of their tendency to become oxidized probably account for the instability of the oil, are removed and the concentrate represents about ten times the concentration of the oil from which it is made. Tests made by this company showed that the capsules retained their full potency for at least a year.

An idiosyncrasy to wheat germ oil was noted by Shute in six patients and was characterized by a rash, urticaria, gastro-intestinal symptoms, or a sensation of heat. Patients who are known to be sensitive to wheat should be carefully controlled if it becomes necessary to give them Vitamin E therapy.

Vitamin A Deficiency Type.—This type which was described by Simpson and Mason has symptoms and signs similar to the types of vaginitis described above. These workers in a study of fifty patients suffering from atrophic vaginitis found that their diets were low in vitamin A. Also in some of the patients the absorption of vitamin A was impaired because of chronic digestive disturbances or the habitual use of mineral oil.

The patients in this series were given cod liver oil 16 c.c. three times daily for a week and then 4 c.c. daily until cured. Three-fourths of the patients followed were symptom-free by the end of the second month of treatment and in only one instance did the symptoms continue as long as four months after therapy was begun. Vaginal studies made on some of the patients showed that as the symptoms improved, there was a rapid repair of the vaginal epithelium.

ULCERATIVE DISEASES

of Vulva and Vagina

The ulcerative diseases include simple ulcer, chancroid, syphilis, tuberculosis, granuloma inguinale, lymphogranuloma inguinale, and rarer ulcerations.

Simple Ulcer of Vulva and Vagina

A simple ulcer is an area of ulceration due to simple irritation or inflammation. A pessary or other foreign body may cause simple ulceration, if long in place without care, as may also infection at any point with ordinary pus germs.

The diagnosis of ulceration presents no difficulty, as it is established by finding an area devoid of epithelial covering presenting a granulating surface. An eroded area on the vulva or in the vagina, which is sensitive and bleeds easily, may be mistaken for an ulcer, but close inspection will show that the surface is still covered with a thin layer of epithelium. The diagnosis of simple ulcer is made by excluding the special types of ulceration, the characteristics of which will be found under each special disease.

As to treatment, removal of the cause and the use of a simple cleansing wash or douche will take care of a simple ulcer. Sometimes the cause is general instead of local. Endocrine or vitamin deficiency may be a factor. Kreis reported a persistent ulcer in a sixty-four-year-old patient with bloody vaginal discharge from it. A specimen showed that it was not malignant nor from any of the granulomas. He treated it for six months, including cauterization, without healing. He then gave estrin treatment by injection and by mouth. Bleeding ceased and the ulcer disappeared. Two years have elapsed with no return of the ulcer. Estrin was evidently needed for epithelization over the denuded area. Reifferscheid calls attention to the increased rapidity of healing secured by estrogenic therapy in the chronic ulcers in the vagina in aged patients, usually associated with prolapse. Those formerly requiring treatment for ten to fifteen weeks now heal, under local estrogenic treatment, in two to three weeks, and he reported thirty cases under intramuscular injections of estradiol benzoate in which healing occurred in an average of eight days. The injections were given at four- to five-day intervals. No local applications were used, but tampons were employed to correct uterine prolapse.

We recall a case without prolapse in which a persistent ulcer at the vaginal vault causing bloody discharge in an aged patient was cleared by treatment with estrogenic vaginal suppositories. In such an ulcer carcinoma must of course be definitely excluded, and then if it does not clear promptly under local and oral estrogenic therapy it would be well to employ intramuscular administration of a potent preparation. Following radiation treatment for cancer, the estrogenic-deficiency type of ulcer may appear and require estrogenic treatment. It is possible that epithelization of chronic ulcers in other locations in the estrogen-deficient patient may be aided by estrogenic therapy.

Chancroid of Vulva and Vagina

Chancroid (Fig. 375) is an infectious ulcer, entirely local in its effects and due to inoculation with secretion from another chancroid. It is known also as "soft chancre" and as "soft sore." It constitutes one of the three so-called "venereal diseases" (gonorrhoea, chancroid, syphilis).

It is due to a specific infectious agent which causes chancre and nothing else. It is invariably due to contact with virus from another chancre, and sexual intercourse is nearly always responsible for this contact.

The infectious principle of chancre is much more exclusively conveyed by sexual intercourse than is syphilis. Conversely, chancroidal virus is much less liable than syphilitic virus to be conveyed in an active state simply by contaminated articles. However, such method of conveyance is probably possible and must be guarded against. The chancroidal virus does not penetrate healthy epithelium but makes its entrance through a crack or abrasion.

The infectious agent is a short bacillus, discovered by Ducrey and hence designated as the **Ducrey bacillus**. It occurs in the discharge, but may be somewhat difficult to identify because of contaminating material.

In the case of enlarged glands, the **serum** secured by puncture with a large hollow needle will usually show the bacillus.

Within twenty-four to forty-eight hours after infection, there appears a small pustule on an inflammatory base. This point of infection may be situated at any part of the external genitals or in the vagina. This beginning lesion may not be noticed by the patient, so that according to her statement the lesion may not have appeared for several days or a week after coitus. In a short time the epithelial covering over the infected spot is lost and a small ulcer is thus formed. This ulcer has sharp, punched-out margins, a rough and sometimes necrotic base, is surrounded by a red inflammatory zone, and is accompanied by more or less inflammatory edema. In cases of long standing or of much inflammation, there may be considerable round-cell infiltration and induration around the ulcer and under it, but there is rarely, if ever, the marked parchmentlike or cartilage-like induration that develops under the primary lesion of syphilis.

Diagnosis.—The diagnosis of chancre is based on the following points: (a) development within a few days or a week after suspicious coitus; (b) location and mode of development and appearance of the lesion; (c) two or more lesions, indicating autoinoculation (Fig. 375); (d) absence of parchmentlike or cartilage-like induration under the ulcer; (e) presence of painful bubo, tending to suppuration; (f) in a doubtful case, bacteriologic examination is made to establish the presence of the Ducrey bacillus.

Treatment.—For chancroidal ulcer, cleansing and soothing treatment have supplanted the severe cauterizing applications formerly employed, which stirred up too much reaction. Washing with hot water and hot applications are employed, and if the ulceration is extensive, hot sitz baths. Between the hot applications, the ulcer may be kept covered with a weak solution of iron and potassium tartrate, which seems to help very much in some cases.

X-ray treatment has been used with much benefit in various acute inflammations, and a trial of it is advisable in this severe type if not yielding to other measures.

When the ulcer begins to spread rapidly, more severe cauterizing treatment may be advisable. Jacobsen reports strikingly good results with formalin treatment, which he describes as follows:

After the parts involved have been anesthetized and the lesion has been thoroughly cleansed of all secretion and debris, undiluted solution of formaldehyde (U.S.P. 37 per cent),

commercially known as formalin, should be applied to every portion of the lesion. The swabbing and application should continue for three to five minutes. Then the excess of formalin and secretion should be wiped off and a sterile unctuous dressing applied. For subsequent dressings we have used an ointment containing 1 or 2 per cent of camphor.

Formalin thus thoroughly applied acts as a specific. In the majority of instances, one application will suffice. For extensive ulcerations a second or third application may be necessary. Immediately after the first treatment, the pain and distress, previously experienced, are entirely relieved and the patient is comfortable. As one patient expressed it, "the ulcer quit eating." Formalin has a strong bactericidal action. When applied early, it prevents suppurative inguinal adenopathy, probably due to the fact that formalin is absorbed by the lymphatics. On the other hand, formalin does very little damage to the normal tissue. The lesion so treated soon becomes covered with a crust under which healing rapidly takes place.

For chancroidal adenitis, rest and sedatives are advisable, with cold or hot applications, whichever give most comfort. The electric baker is a convenient apparatus for applying dry heat. In this severe type of adenitis, a trial of x-ray treatment is advisable, along the lines of such treatment of acute inflammation generally.

As to special general treatment, a Ducrey vaccine is now available for diagnosis and for treatment. Also, the sulfonamides may be helpful.

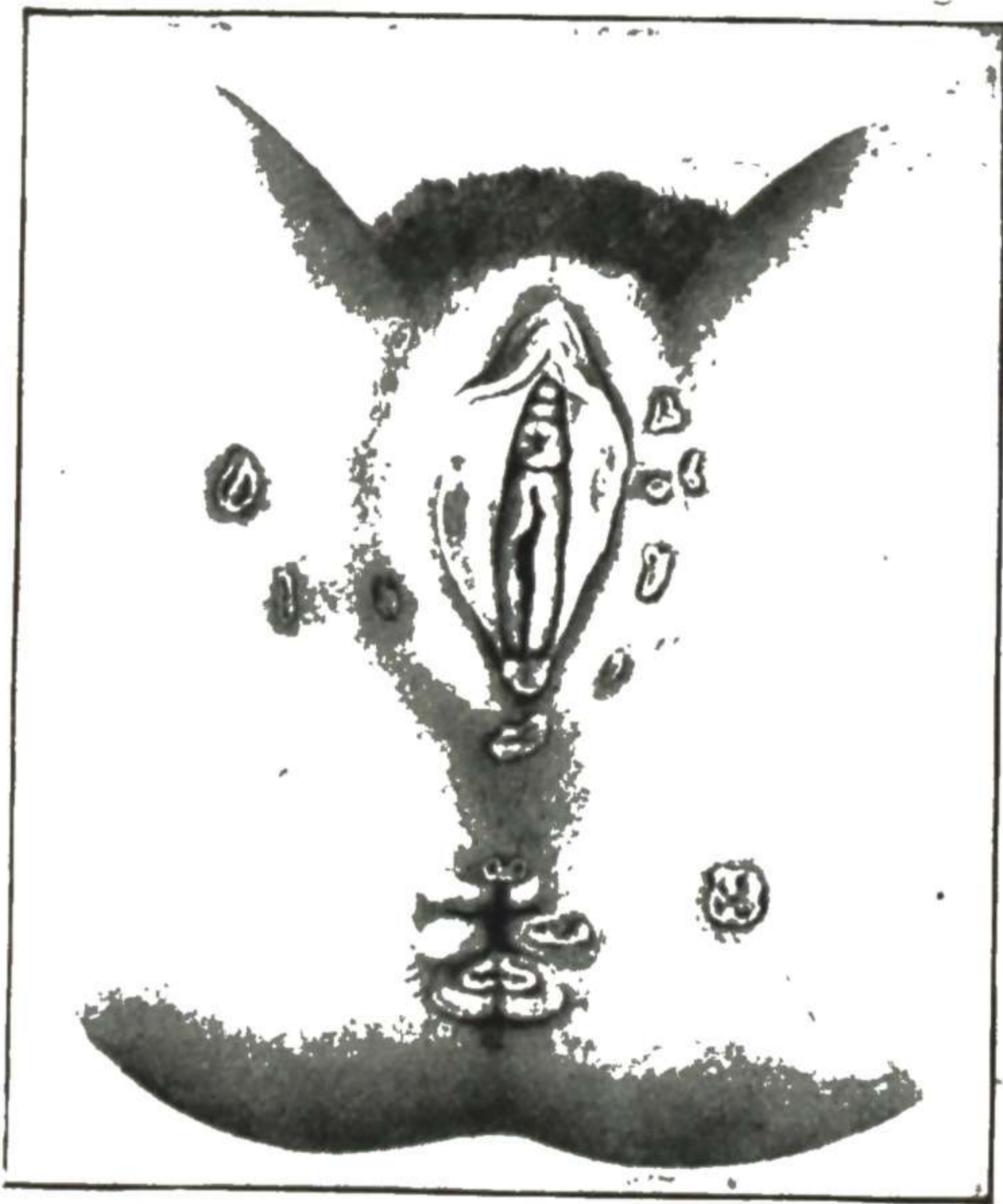


Fig. 375.

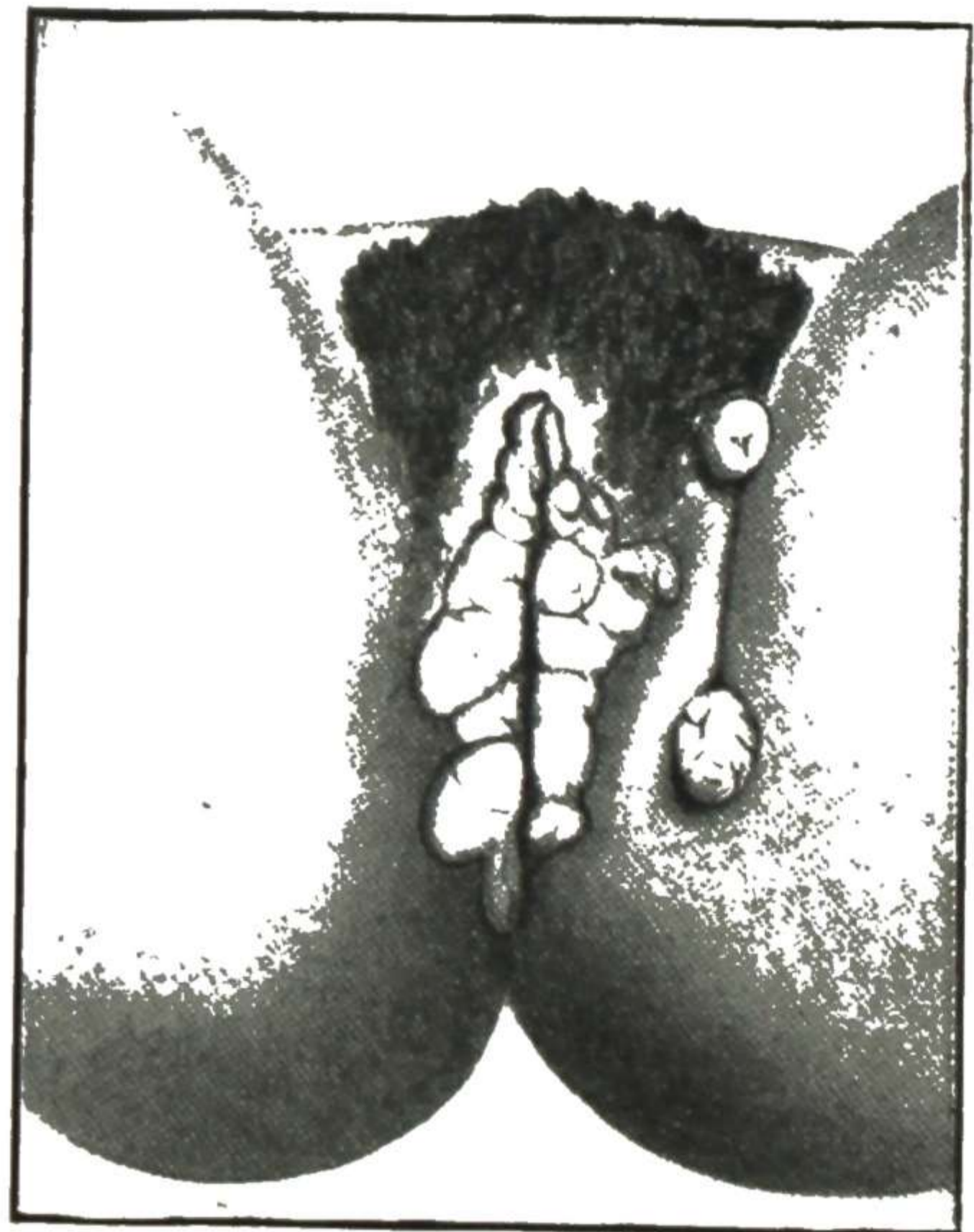


Fig. 376.

Fig. 375.—Chancroidal ulcers of the vulva. (Bovée—*Practice of Gynecology*.)

Fig. 376.—Secondary syphilitic lesions. (Bovée—*Practice of Gynecology*.)

Syphilis of Vulva and Vagina

Syphilis is a general infectious disease, characterized by an initial sore (the point of entrance of the infecting germ) and by general secondary manifestations after several weeks and by tertiary lesions, localized in various parts of the body, usually only after several years.

The infectious agent is the *Spirocheta pallida*, a very small microbe which is found in all lesions (primary, secondary, and only rarely in tertiary). The demonstration of this germ, by proper staining methods or by examination in the dark-field, makes possible a positive diagnosis of syphilis at once, even in the primary stage and long before the positive clinical evidences appear. The positive identification of this infectious germ requires considerable bacteriologic experience, hence the specimens should be sent to a pathologist.



Fig. 377.

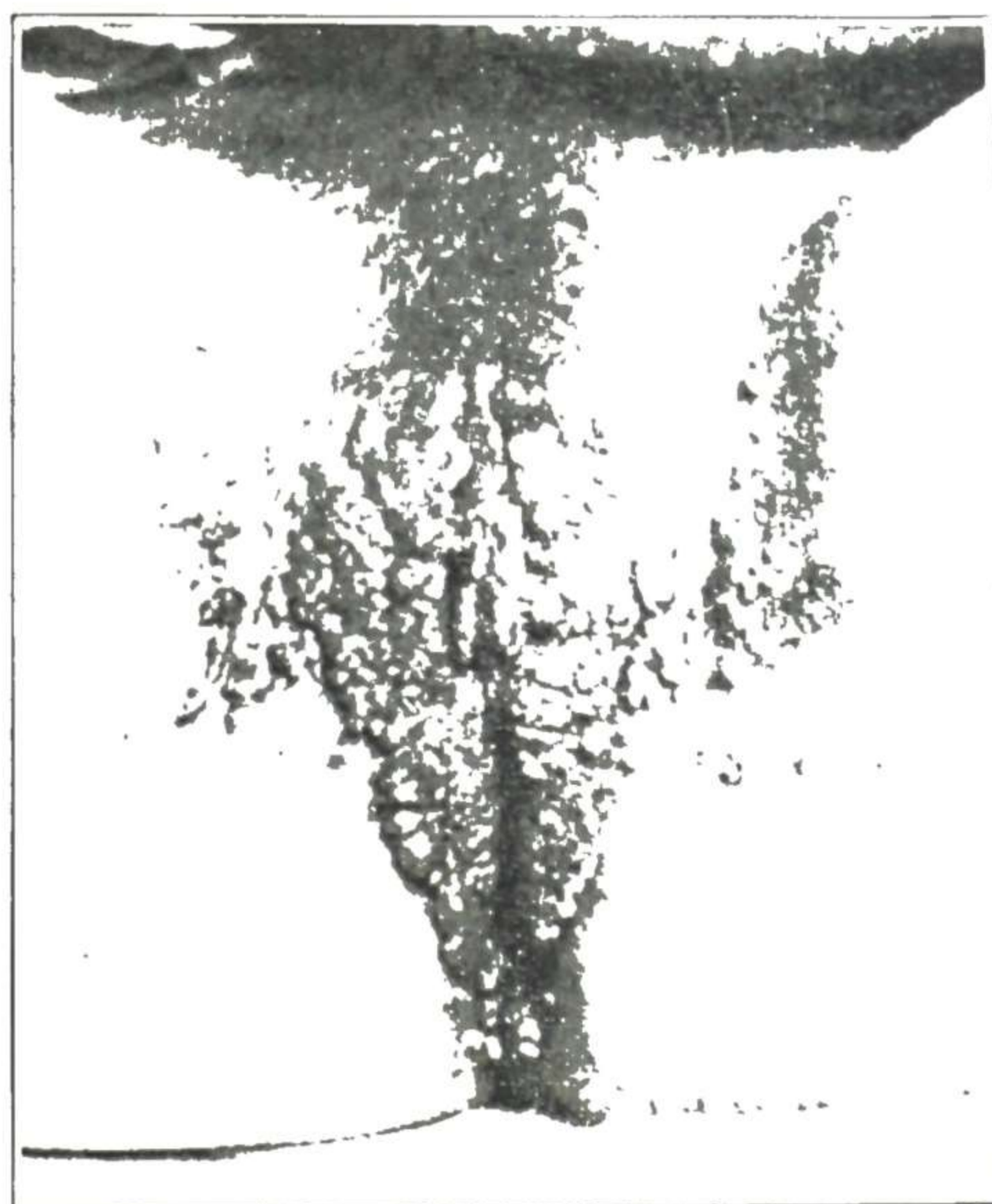


Fig. 378.

Fig. 377.—Syphilitic infiltration and condylomata about the vulva. (Hirst—*Diseases of Women.*)

Fig. 378.—Syphilitic condylomata. (Ravogli—*J. A. M. A.*)

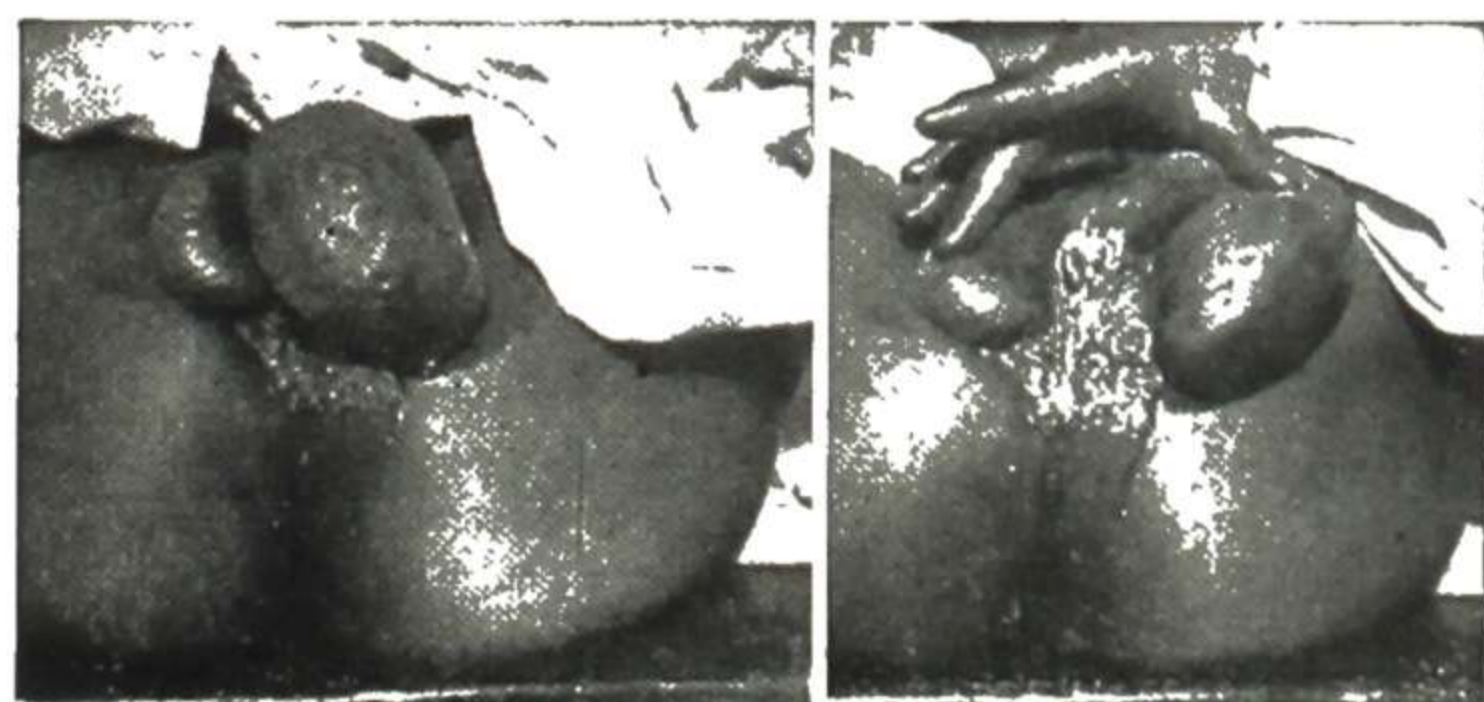


Fig. 379.



Fig. 380.

Fig. 379.—Syphilitic ulceration of vulva, with resulting stasis hypertrophy. Two views of the condition. (Gallagher—*Surg., Gynec. and Obst.*)

Fig. 380.—Syphilitic ulceration of vulva, with resulting stasis hypertrophy. Two views of the condition. (Gallagher—*Surg., Gynec. and Obst.*)

The directions for preparing specimens are as follows:

In case of a suspected PRIMARY LESION (chancre), wipe the surface of the ulcer with cotton or gauze thoroughly; avoid causing bleeding. From the "irritation serum" which results, make a **spread-preparation** on a slide or cover glass, just as in making a preparation of blood. Half a dozen specimens are made and dried and then packed for transmission.

In SECONDARY LESIONS (mucous patches, moist papules, dry papules), a spread-preparation of the "irritation serum," made as above directed, will usually suffice for a diagnosis. A negative finding, however, does not certainly exclude syphilis. Consequently, to make the diagnosis certain, a **tissue specimen** should be examined. This is easily secured by clipping off a small papule. Preserve all tissue specimens to be examined for the *Spirocheta pallida*, in 10 per cent formol solution. Specimens preserved in alcohol do not stain so well.

In TERTIARY LESIONS only **tissue specimens** can be used for bacteriologic diagnosis, though of course the Wassermann blood reaction is effective in all stages of the disease. For the details of the primary and secondary and tertiary manifestations of syphilis, see descriptions in general medical works. Fig. 376 shows vulvar "mucous patches" of the secondary stage, and Figs. 377 and 378 show syphilitic condylomas. Figs. 379 and 380 show syphilitic ulceration of the vulva, with stasis hypertrophy of the affected parts.



Fig. 381.



Fig. 382.

Fig. 381.—Syphilis of vulva, microscopic section. Low power. Notice epithelial proliferation and areas of round cell infiltration. (Gallagher—*Surg., Gynec. and Obst.*)

Fig. 382.—Syphilis of vulva. High power, showing giant cell.

When the diagnosis remains doubtful, because of absence of general confirmatory signs or because of the possibility of a mixed lesion, excision of tissue for microscopic examination may be advisable. The microscopic tissue alterations are shown in Figs. 381 to 383.

Treatment.—A patient should not be given constitutional treatment for syphilis until the diagnosis is positive. As a rule, a positive diagnosis before the appearance of the "secondaries" is not possible by the ordinary clinical evidences, not even by the Wassermann reaction, which at this time still may be negative. By bacteriologic examination, however, a positive diagnosis may be made at once, even in the very earliest stage of the primary lesion, when typical spirochetes are present.

When the diagnosis is thus made early, it is recommended by some authorities that the primary lesion be at once completely excised—not with the idea of

preventing general syphilis, but to modify it and lessen the effect of the succeeding stages. This excision treatment of the primary lesion is still experimental.

Otherwise the only treatment that the primary lesion requires is local cleansing and antiseptic measures, supplementary to constitutional treatment. The secondary and tertiary lesions require regular constitutional treatment for syphilis, the details of which can be found in works treating of that subject.

The local treatment for the secondary and tertiary lesions of the vulva and vagina is simply cleansing and antiseptic and astringent, i.e., the same as for simple ulcers.

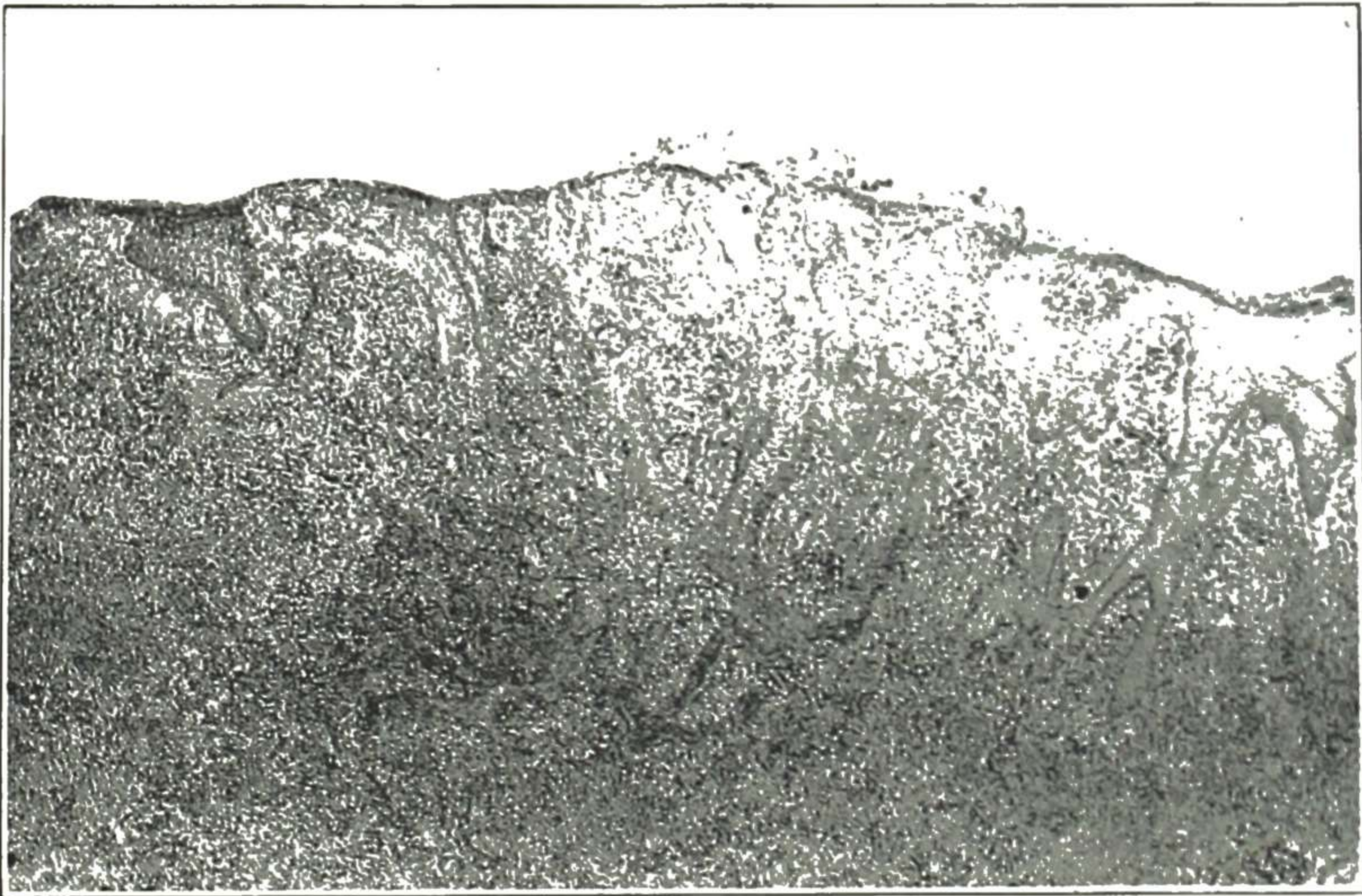


Fig. 383.—Syphilis of vulva. Microscopic section, showing very marked epithelial prolongations into the underlying tissues. Gyn. Lab.

Tuberculosis of Vulva

Tuberculosis of the vulva is the term applied to those lesions of the external genitals produced by tubercle bacilli (Figs. 384, 385). Tuberculosis of this region and other forms of persistent vulvar ulceration were formerly described together under the terms "lupus vulvae," "lupus hypertrophicus," "lupus perforans," "ulcus rodens," "destructive ulcer of vulva," and "perforating ulcer of vulva." As the pathology of the various forms of ulceration was gradually worked out, it was found that in many of the cases of destructive ulceration, tubercle bacilli were present. The tuberculous lesions were then formed into a class by themselves and this class includes a large number of the cases of persistent ulceration formerly described under the titles above mentioned.

Tuberculosis of the vulva is due to local infection with the tubercle bacillus. The infection may take place through an abrasion, in which case the infecting germ may be brought to the abrasion by a tuberculous discharge from the uterus or vagina, or possibly by coitus with a husband having a tuberculous lesion of the genitourinary tract or by fingers or clothing infected with tuberculous discharge either from the patient or from some other person.

On the other hand, tissues may, in rare cases, be infected without any break in the epithelial covering. In such a case the tubercle bacilli come by way of the blood or lymph.

Diagnosis.—Tuberculosis of the vulva begins as a small nodule, usually situated near the meatus or the clitoris or at the posterior commissure. After a time the nodules break down and form small ulcers. The ulcers have hard margins and an irregular base and are very liable to have an area of irregular infiltration about them.

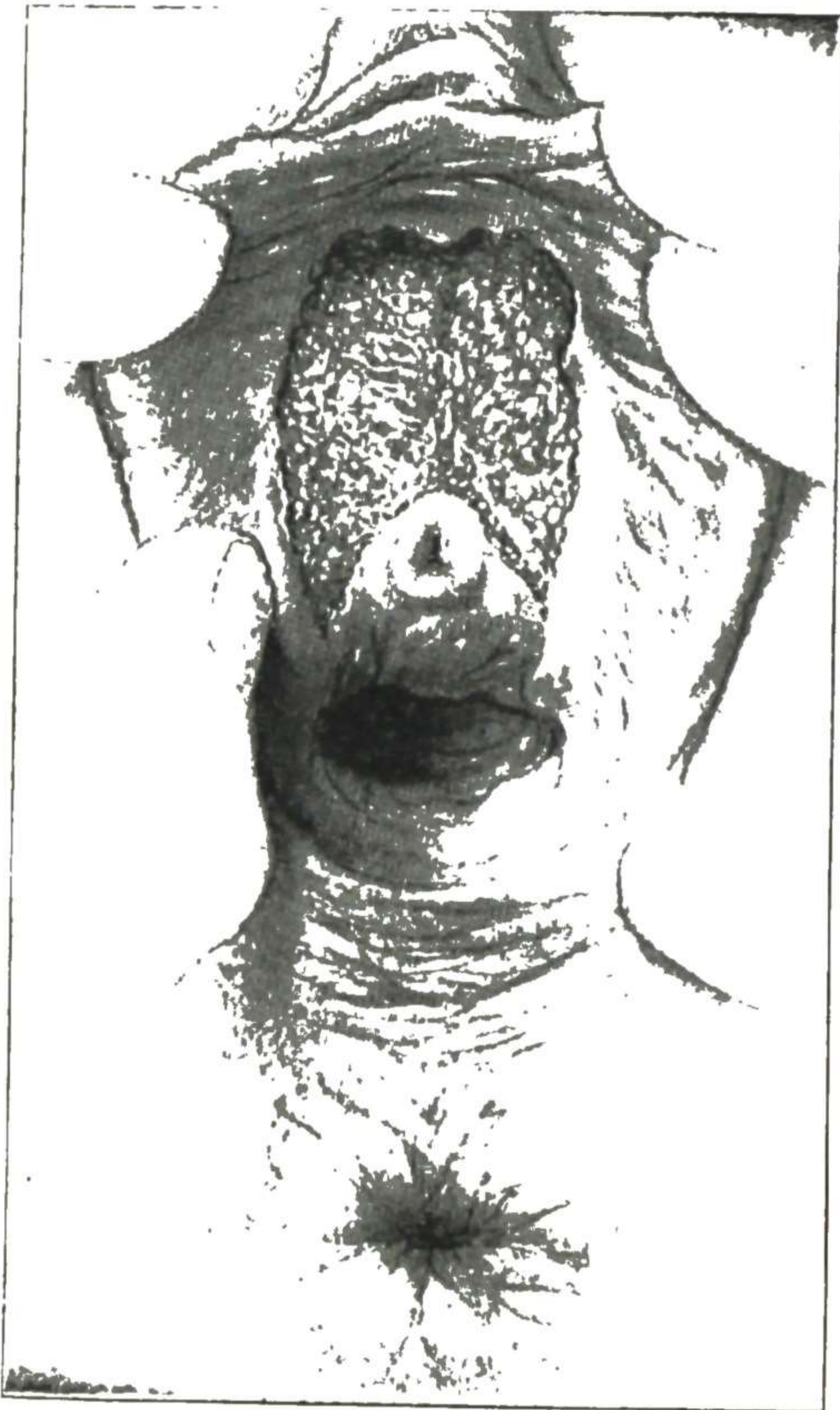


Fig. 384.

Fig. 384.—A tuberculous ulcer of the vulva. (Kelly—*Operative Gynecology*.)



Fig. 385.

Fig. 385.—Tuberculosis of vulva. (McGlinn—*Am. J. Obst. and Gynec.*)

Tuberculous ulcers are chronic and persistent and may extend deeper and deeper until fistulous openings are formed into the rectum or bladder or urethra, hence the name "perforating ulcer." Even when adjacent cavities are not opened, the ulcers, in conjunction with the contracting scar tissue, may form sinuses and discharging surfaces extending deeply in various directions, and sometimes causing perforations through the labia.

A positive diagnosis requires a microscopic examination. In a doubtful case the crucial test of the character of the ulceration consists in finding tubercle bacilli in the secretion or in demonstrating the characteristic pathologic changes in a specimen of tissue removed from the margin of the ulcer.

Treatment.—If there are no marked tuberculous lesions elsewhere, the chance of eliminating the local lesion by x-ray or radium treatment is very good. If the involved area is so situated that it can be completely and easily excised, it is well to thus eradicate it. If, however, the lesion is at all extensive, excision involves considerable uncertainty as to complete removal and occasions considerable subsequent deformity. As a rule, it is better to use x-ray, and if that is not successful, then radium. Beware of the sloughing effect of radium about the urethra. Actinic light therapy is used extensively in Norway, Sweden and Denmark for such ulcerations.

Tuberculosis of Vagina

Tuberculosis of the vagina (Fig. 386) is usually secondary to tuberculosis of the uterus and tubes, the vaginal surface being infected from the tuber-

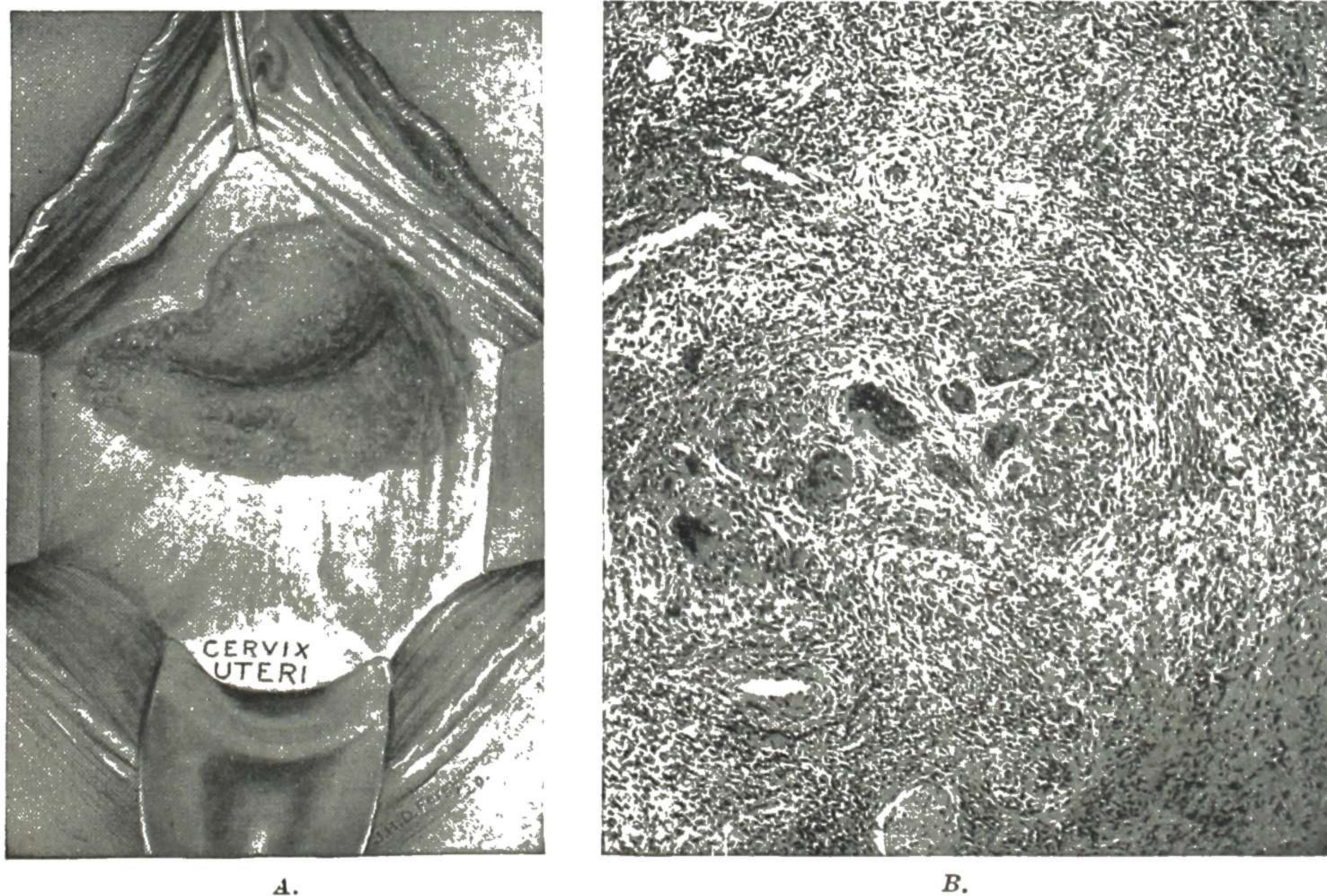


Fig. 386.—A, Tuberculosis of vagina. B, Microscopic section showing giant cells. (Cullen—*Surg., Gynec. and Obst.*)

culous discharge from above. Some cases occur, however, in which there is no tuberculous trouble higher in the genital tract. In such a case the vaginal tuberculosis may be due to sexual intercourse with a husband having a tuberculous lesion of the genital tract, or to the use of an infected douche nozzle or to the extension inward from tuberculosis of the vulva.

The most common site for vaginal tuberculosis is the posterior vaginal fornix, which region comes most in contact with the uterine discharges. It is supposed that the resistance of the vaginal epithelium must be lowered by an irritating discharge, or otherwise, before invasion by the tubercle bacillus can take place. The first manifestation of tuberculosis of the vaginal wall is the development of a number of miliary tubercles. These may be confined

to a small area, for example, to the posterior fornix, or may appear over a large part of the surface at once.

Each miliary tubercle is a small, raised, grayish or yellowish dot, the size of a millet seed or smaller. As the lesions develop they break down and form small ulcers, which may coalesce and form ulcers of various sizes. The tuberculous ulcer has a punched-out appearance, the edges being perpendicular, and the base is yellowish gray and may show many miliary tubercles. The miliary tubercles frequently occur in large numbers in the hyperemic zone about the ulcer.

Symptoms and Diagnosis.—The stage of ulceration is usually the time at which the patient consults the physician, complaining of discharge and discomfort. Examination reveals the suspicious ulcer or ulcers and further investigation will usually show tuberculous disease of the uterus or tubes.

The discharge from a tuberculous ulcer contains tubercle bacilli, but sometimes in such small numbers that they are not found when the discharge is stained and examined. In a doubtful case, some tissue from the margin of the suspected ulcer may be submitted to microscopic examination. In such a specimen, in addition to the tubercle bacilli, there are found the characteristic giant cells and necrotic areas. Another way of testing for tuberculosis in the laboratory is by injecting some of the secretion into the peritoneal cavity of a guinea pig, where in time it causes tuberculous peritonitis with characteristic lesions.

Treatment.—The treatment is the same as that described under Tuberculosis of Vulva.

Granuloma Inguinale

(Due to the Donovan Bacillus)

This tropical form of ulceration about the genitals (Figs. 387, 388) has been found to occur not infrequently in temperate zones. Following the early report of Symmers of two cases in Bellevue Hospital, New York, Randall, Small and Belk reported sixteen cases from the Philadelphia General Hospital. This latter is a very extensive and complete article, and the reader is referred to it for a most satisfactory consideration of the many features of the subject. The main points of the affection may be stated as follows, quoting from the article:

1. Granuloma inguinale, long considered a tropical disease, is endemic in the temperate zone of the United States.

2. Its diagnosis is dependent on (a) the characteristic local lesion, (b) the marked predominance in the negro race, and (c) the finding of the specific organism originally described by Donovan (Figs. 389, 390).

3. Wassermann tests have been negative with a few exceptions, where undoubtedly a double infection has been present, and in these, energetic antiluetic treatment has been devoid of effect upon the granuloma.

4. Treatment with tartar emetic intravenously acts as a specific, and rapid healing may be expected (Figs. 391, 392) with the prompt disappearance of the specific organism.

The usual history is that the lesion started as a small papule, noninflammatory, which after rupture and the exudation of a slightly purulent fluid, refused to heal, and exhibited progressive tendencies toward slow proliferation and spreading. The typical lesion (especially seen when involving the inguinal region, see Fig. 387) is a flesh-red, exuberant overgrowth of soft granulation tissue.

As indicated by the name, the most frequent location is in the groin, spreading upward as far as the anterior superior spine and downward through the fold of the groin, frequently involving the perineum, and in some cases following the fold of the nates and

spreading to the buttocks. In certain patients the history apparently points to granuloma infection superimposed upon a prior existent genital lesion.

We have based our diagnosis on the fairly characteristic clinical pictures, and also especially on the bacteriologic findings of the specific organism. This latter is done by making smears from the exuding surface in which will be found numerous large mononuclear plasma cells, the protoplasm of which, on proper staining, will be found studded with the characteristic encapsulated bacillus originally described by Donovan.

The smears are dried quickly in air and stained either by the Wright's or the Giemsa method. Wright's staining is the more rapid and has given satisfactory results. The proper differentiation of the stained smear in distilled water is the chief technical



Fig. 387.



Fig. 388.

Fig. 387.—Granuloma inguinale, showing the inguinal ulceration. (Symmers and Frost—*J. A. M. A.*)

Fig. 388.—Granuloma inguinale, showing extensive vulvar ulceration. (Randall, Small and Belk—*Surg., Gynec. and Obst.*)

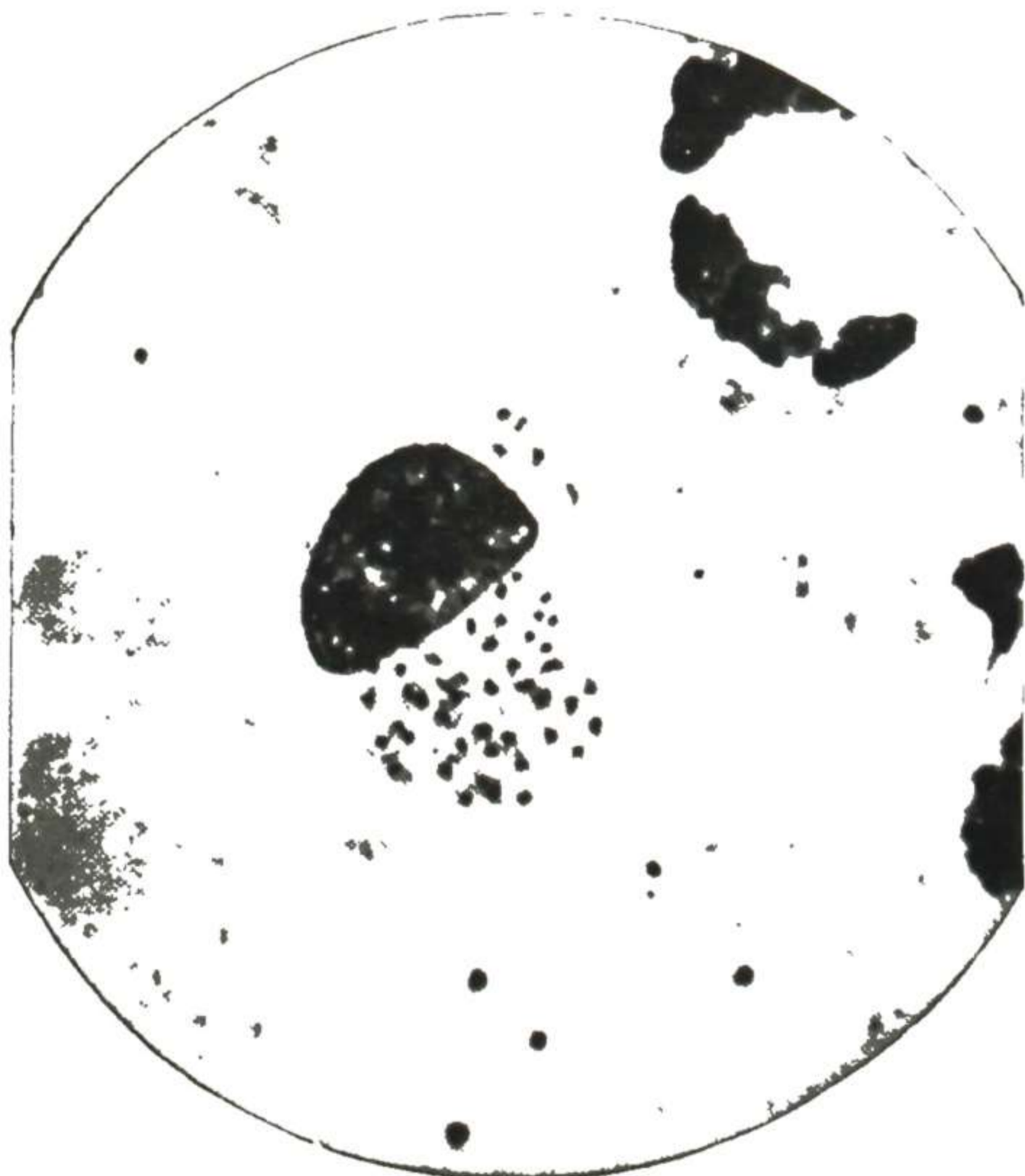


Fig. 389.



Fig. 390.

Fig. 389.—Granuloma inguinale. The organisms stained in cells. (Randall, Small and Belk—*Surg., Gynec. and Obst.*)

Fig. 390.—Granuloma inguinale. The isolated organisms stained. (Randall, Small and Belk—*Surg., Gynec. and Obst.*)

difficulty. Even with the most intense staining this differentiation should not be carried out for more than fifteen to twenty seconds. Overdifferentiation completely decolorizes the capsules of the organisms; while underdifferentiation fails to bring out detail and contrast between the body proper and the capsule. The best staining results show the organisms as small, rounded, pink bodies with a dark blue coccoid body in the center; or, more frequently as oval pink bodies with a blue bacillary or diplococoid body occupying the longitudinal axis. The pink outer zone is a wide capsule. The dark blue central bodies represent metachromatic granules within the body proper. The true outline of the body proper can be studied only after the capsule has been entirely decolorized (Fig. 390).

Some cases of this disease affecting the cervix uteri have been reported, hence it is considered also along with other nonmalignant cervical lesions.

The therapeutic result from the use of antimony intravenously may likewise be taken as indicative of the accuracy of the diagnosis, for, after three or four administrations, the organism disappears entirely from the surface and cannot be found in the smears, and healing promptly follows. Any pudendal sore, resistant to the ordinary surgical antiseptics, unimproved by arsenical therapy, of long duration, and especially when devoid of pain, should be searched for the specific organism of granuloma inguinale and given the advantage of antimonial treatment.

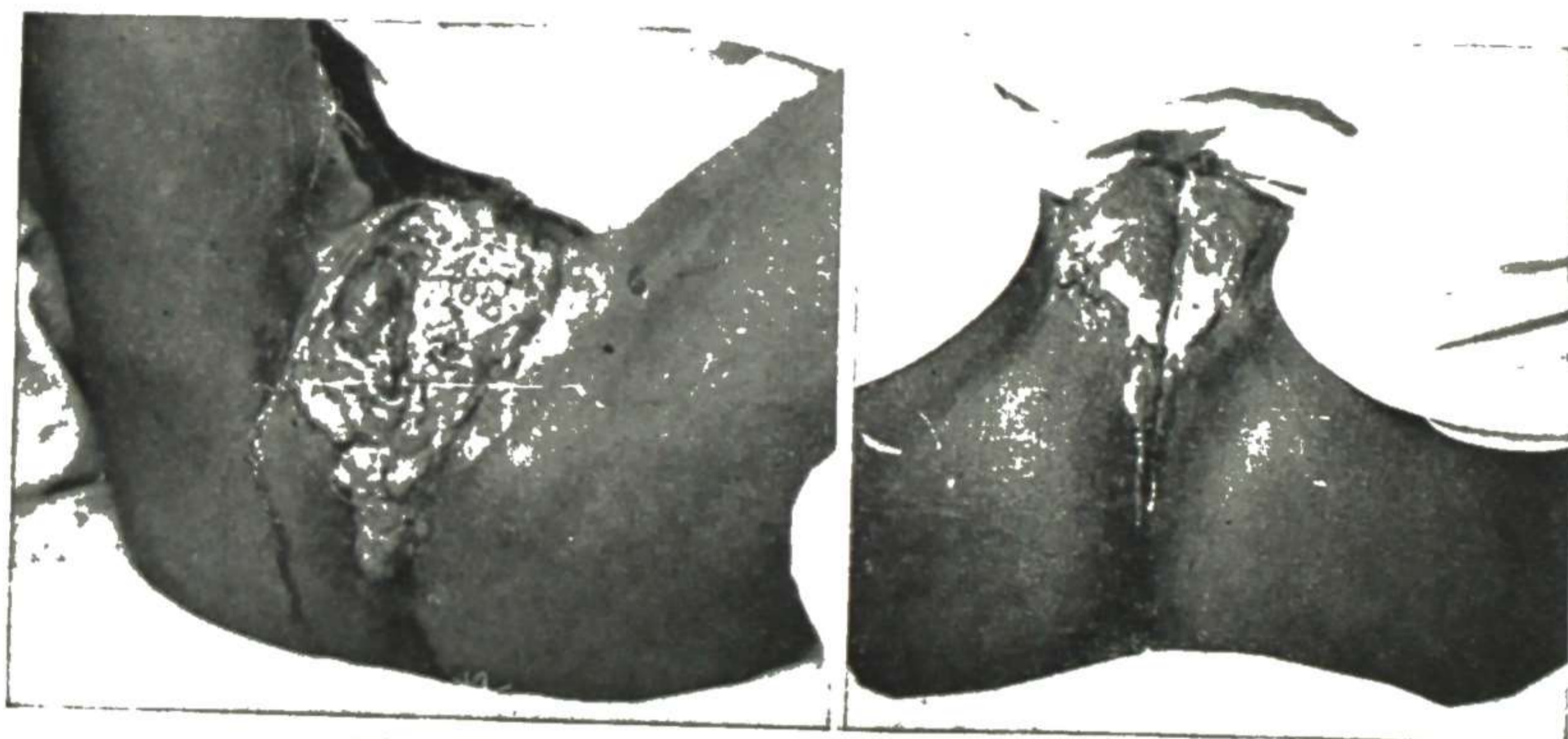


Fig. 391.

Fig. 392.

Figs. 391 and 392.—Granuloma inguinale, showing effect of treatment. Fig. 391 shows extensive ulceration which had persisted more or less for three years in spite of antisyphilitic and other treatment, including x-ray. Fig. 392 shows the ulceration entirely healed after two months of tartar emetic administration. (Randall, Small and Belk—*Surg., Gynec. and Obst.*)

Treatment.—Quoting from the article mentioned:

Following Vianna's work, we started giving antimony intravenously in the form of tartar emetic. The initial dose of 0.04 gram was used, and this quickly advanced to a maximum dosage of 0.10 gram. Our first treatments were given daily and most patients tolerated this until about ten doses had been given, but nearly all after that amount showed some symptoms of intolerance for the drug. We then began intermitting the daily dosage, governing the time by symptomatic data. This intolerance consisted of rheumatoid pains in the joints associated with stiffness, especially seen in the early morning on rising, most frequently located through the shoulder girdle, and as a rule wearing off during the course of the day. There have not been in any case symptoms of alarming character.

The drug has been prepared by dissolving 0.1 gram in 10 cubic centimeters of sterile normal saline solution and is best preserved in sealed sterile ampules. Intravenous administration is essential.

The typical encapsulated organisms cannot be demonstrated in smears from the lesion after the second or third dose of the tartar emetic. Healing commences within forty-eight hours after the first administration, and from then on almost daily progress can be appreciated.

Wolfe in a recent article advised the use of a new antimony compound called faudin.

If the ulceration does not yield promptly to the specific treatment, it would be well to supplement with x-ray therapy for the accompanying inflammation.

Lymphogranuloma Inguinale (Due to a Filtrable Virus)

The use of the term "lymphogranuloma inguinale" for a disease occurring in the same location as granuloma inguinale and somewhat resembling it clinically, but entirely different etiologically, is confusing and unfortunate, but seems established for want of a better term. The two are entirely distinct diseases, granuloma inguinale being an ulceration of the skin due to the Donovan bodies (encapsulated bacilli), while lymphogranuloma inguinale is a disease of the lymph channels and nodes due to a filtrable virus.



Fig. 393.

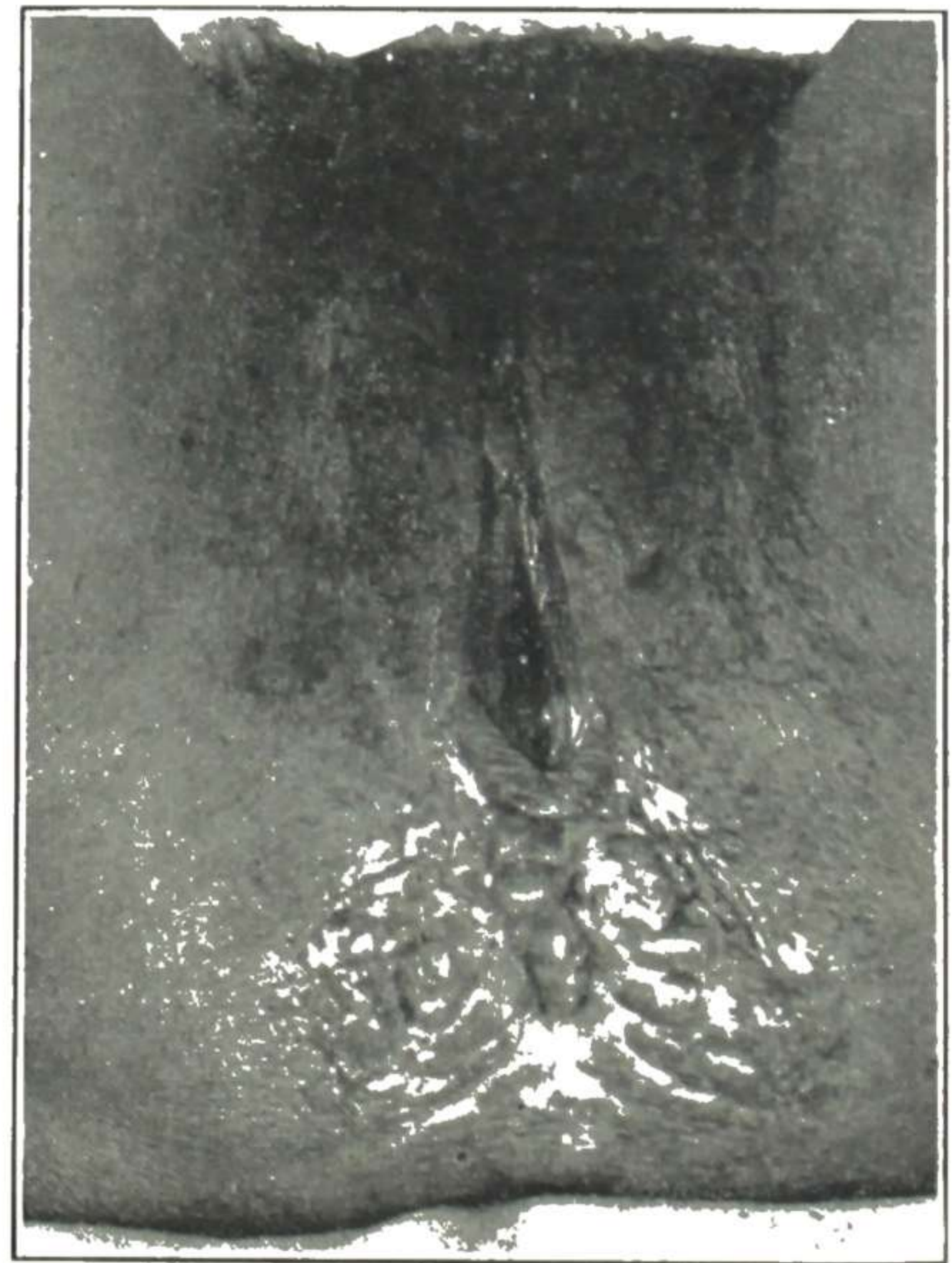


Fig. 394.

Fig. 393.—Extensive fistulous estiomene of long duration, showing perianal fistulous opening. The Frei reaction was positive. (H. N. Cole—*J. A. M. A.*)

Fig. 394.—Chronic perianal nodules and scar formation accompanying a high grade stricture of the rectum. The Frei reaction was positive, the Wassermann reaction negative. (H. N. Cole—*J. A. M. A.*)

Lymphogranuloma inguinale in this country is seen most frequently in the negro. While in the male it usually appears as an inguinal lymphadenitis (hence the term "climatic bubo"), in the female it is more frequently seen as rectal ulceration. This location of the ulceration in the female is due to the perirectal distribution of the lymph nodes draining the perineum and posterior vaginal wall, which are the usual points of entrance of the virus.

There seems to be no special disturbance at the point of entrance. The lymphatic inflammation comes later, accompanied at times with fever and abdominal pain and occasionally multiple arthritis. Still there is ulceration of the rectum which may be accompanied by extension of ulceration out onto the

external genitals, as shown in Figs. 393 and 394. Marked involvement of the inguinal glands is rare in the female, but common in the male owing to the lymphatic distribution from the usual points of infection. Figs. 395 and 396 give the characteristics of the inguinal lymphadenitis. The ulceration in the rectum is likely to result later in stricture.

H. N. Cole called attention to the disease in this country and gave an interesting historical and clinical account of it. The Frei test and the differential diagnosis of the disease generally are gone into deeply. Some years ago W. R. Rainey and W. H. Cole reported several cases from the rectal clinic of the Washington University (St. Louis) School of Medicine, and from a more recent review of the subject by Rainey the following quotations are taken:

Pathogenesis.—The primary lesion is very insignificant and is usually overlooked. This appears in ten days to three weeks following exposure. The primary lesion may be a simple papule or multiple papules. The most frequent secondary manifestation is the inguinal bubo. This occurs more often in men, but may occur in women when the lesion is about the external genitalia. The chief characteristic of the bubo is its chronicity. It is generally unilateral and in time breaks down into multiple fistulae. The skin overlying



Fig. 395.



Fig. 396.

Fig. 395.—Characteristic bilateral lymphogranuloma inguinale. Three Frei reactions on the right forearm still positive after ten days. (H. N. Cole—*J. A. M. A.*)

Fig. 396.—Bilateral lymphogranuloma inguinale, showing a multiple fistulous opening. (H. N. Cole—*J. A. M. A.*)

the inguinal bubo becomes attached to the underlying inflamed glands and is of a bluish-red cast. A single gland may be involved or a conglomerate mass of glands involving the inguinal and femoral regions.

The second most frequent lesion is stricture of the rectum. This usually occurs in women and particularly in colored women, although there is no doubt that this lesion as well as all other manifestations of the disease are appearing more frequently in the white race. Where rectal stricture occurs, it is assumed that the primary lesion is within the vagina or about the cervical outlet. The third manifestation of the disease occurring in women is esthiomene or the deforming lesion about the external vagina resulting in massive fibrous infiltration which may tend to contract the vaginal outlet.

The fourth manifestation of the disease occurring in men may result in chronic or even permanent elephantiasis of the penis and scrotum. In rare instances partial destruction of the penis has been known. In atypical types the lesion has occurred upon the finger with secondary glandular manifestations at the elbow and in the axilla. The primary lesion has been known to come in the mouth with glandular involvement in the floor of the mouth and the glands of the neck. Recently, lesions occurring in portions of the large intestine have been recognized as manifestations of lymphogranuloma. Certain eye changes and involvements of the meninges have been observed in the acute stages and in

exacerbation of the disease. Other symptoms are: general temperature accompanied by abdominal soreness; and multiple arthritis with painfully swollen joints.

Diagnosis.—Since the clinical manifestations of the disease are now well recognized, the diagnosis is most easily arrived at, but the confirmation of the diagnosis depends upon the Frei Test. With an aspirating syringe the contents of an inguinal bubo are removed and diluted one to ten or one to four in normal saline solution. This is treated to one hour of 60° Centigrade on one day and followed by a second hour the next day. The antigen is now tested by culture for bacteria and to prove its efficiency is tested upon a known case of lymphogranuloma venereum. The Frei test is made by introducing about .01 c.c. of the antigen into the forearm. The maximum reaction is within 48 hours and results in an area of induration encircled by a ring of erythema. The readings are classed one, two, three or four.

Treatment.—The treatment was unsatisfactory until the advent of the sulfonamides. Antimony and potassium tartrate were used with indifferent results. The Frei antigen was employed for treatment. Some results were reported from x-ray treatment. With the appearance of sulfanilamide, excellent results were reported by Rainey and by Shopshear and by others. Sulfathiazole has given about the same results as sulfanilamide, and the treatment with the sulfonamides appears most promising.

Rarer Ulcerations

Though these conditions are infrequent, they may be encountered and hence are mentioned to call attention to them.

Actinomycosis.—Actinomycosis of this region occurs usually as an indurated area in the groin, which may ulcerate with the ulcerating surfaces presenting yellow granules. The disease is easily identified microscopically.

The treatment is by thymol, and Meyer reports on six cases he treated. The drug was given by mouth in the form of thymol crystals in capsules, 1.5 grams in one dose on alternate days for twenty to thirty days. The capsules are given in an empty stomach, to avoid retention and also to obtain as high a concentration in the circulation as possible. Locally a solution of 10 to 20 per cent thymol in olive oil is injected into the lesion. Of the six cases, four were cured, one still had draining sinuses and one who refused to continue treatment died of extension of the disease to the lungs.

Tularemic Bubo.—Pasternack reported two cases of this condition and mentioned that there are six cases in the literature. The disease is caused by the bite of wood ticks, dog ticks, and certain other species of ticks which are hosts of the *Bacterium tularensis*. The symptoms are those of an undulant fever plus enlarged tender inguinal glands. Francis pointed out that certain ticks are important agents in the transmission of tularemia. Ticks bite under the clothing in the hairy regions, and the perineum and genitalia are favorite sites, result in inguinal lymphadenitis.

Foreign-Body Granuloma.—In the differential diagnosis of chronic ulcerations it must be kept in mind that powder grains of various kinds may become embedded in tissues and give rise to foreign-body granulomas which may be persistent and troublesome. Antopol and Robbins report instances of lycopodium powder causing puzzling granulomas of the peritoneum, from use on operating gloves, and of the rectum from use on suppositories. They show lycopodium

spores in sections of the granulation tissue. McCormick and Ramsey review the subject extensively in a recent article.

Ulcus Rodens Vulvae.—From the large group of affections formerly classified roughly under the terms “rodent ulcer,” “lupus,” “esthiomene,” “perforating ulcer” and similar names, there have been cut out distinct classes, until now these cases are pretty well divided up as syphilis, tuberculosis (to which the term lupus is now restricted), granuloma inguinale and malignant disease, with special characteristics for each. There still remain, however, certain persistent destructive ulcers, but rarely seen, whose etiology is not definitely known. These are designated by the noncommittal term “ulcus rodens” (gnawing ulcer).

URETHRAL CONDITIONS

These are eversion of urethral mucosa, prolapse of urethral mucosa, urethral caruncle, Skene’s gland infections, and periurethral abscess.

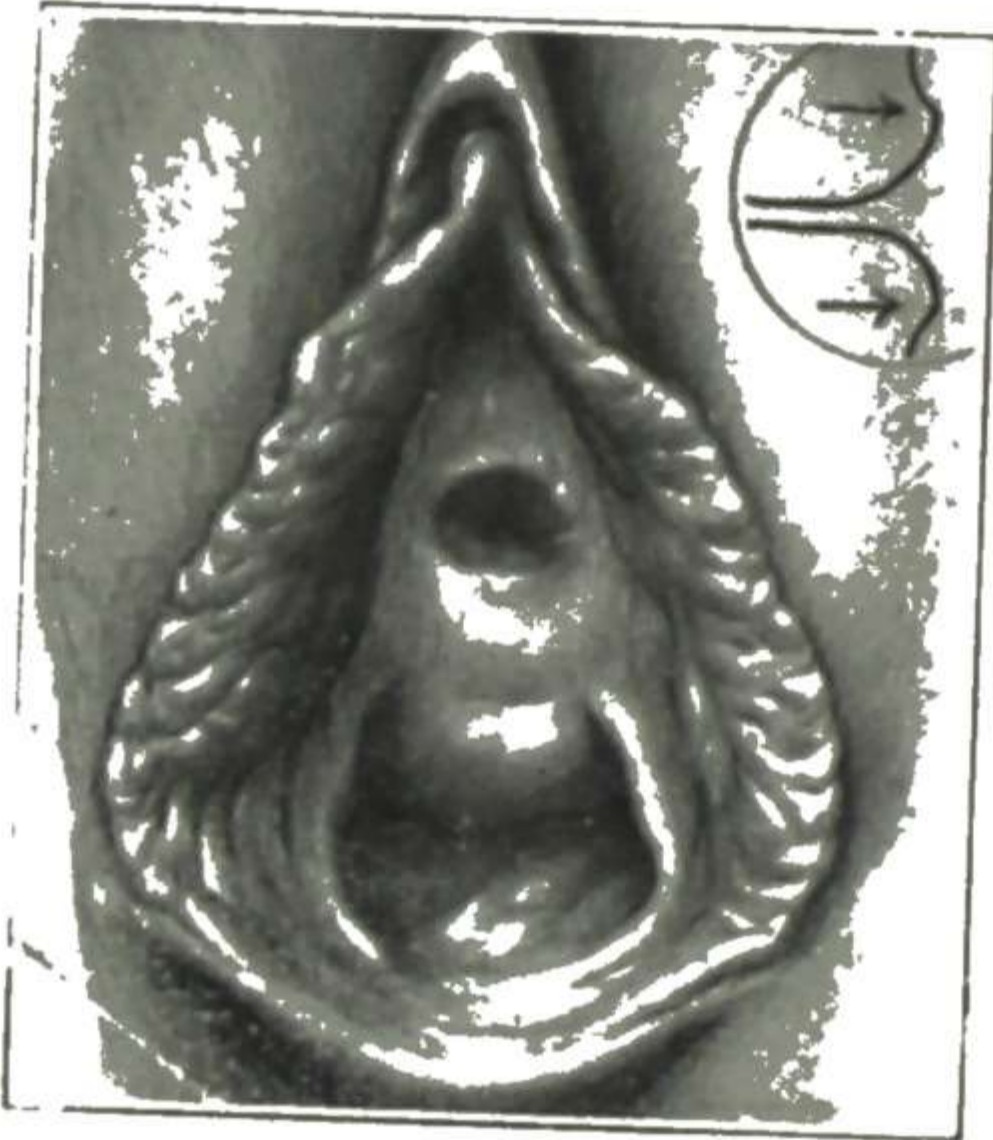


Fig. 397.

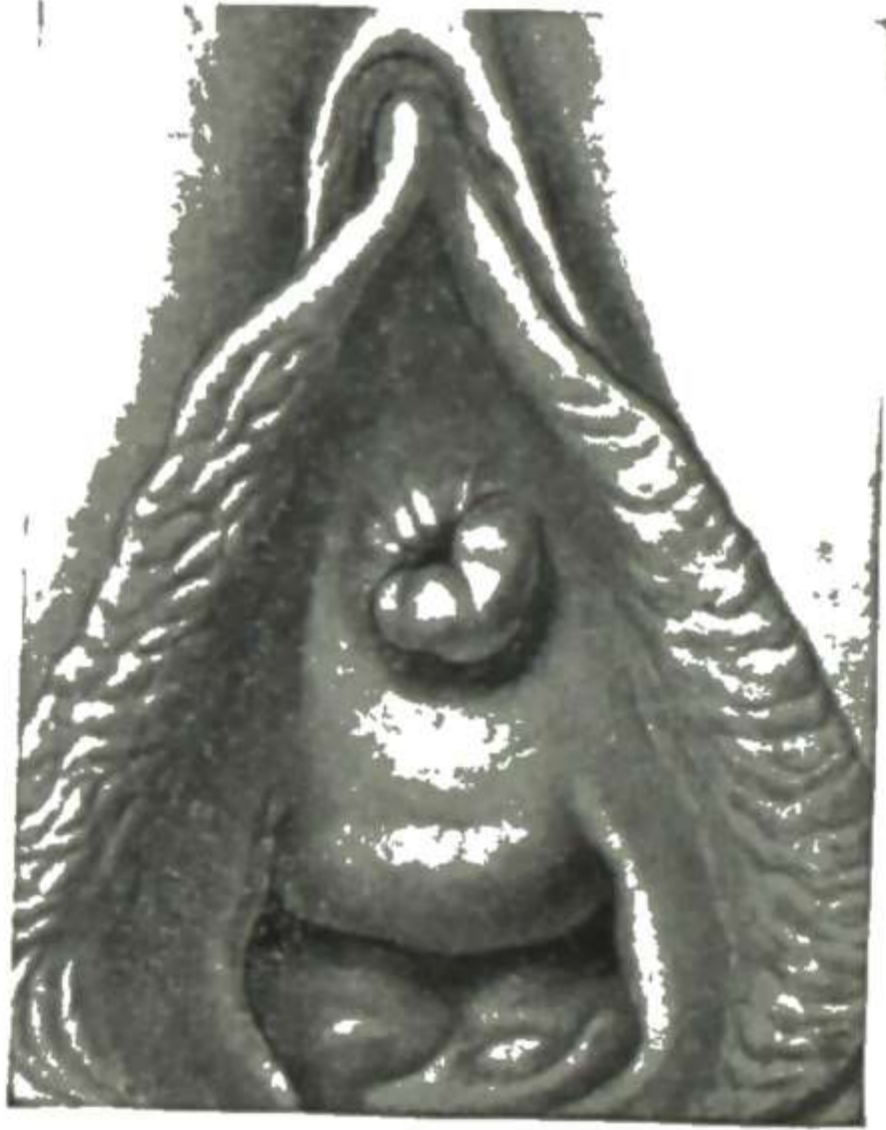


Fig. 398.

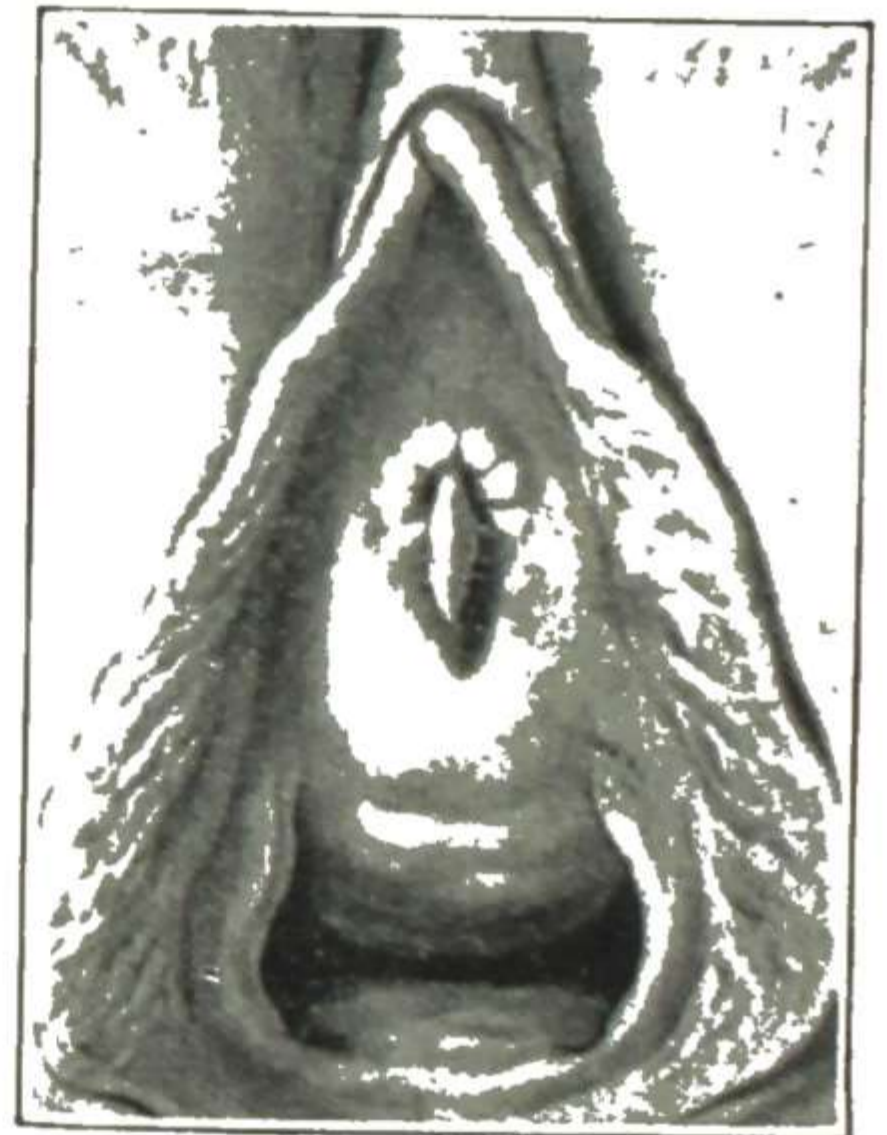


Fig. 399.

Fig. 397.—Relaxation of urinary meatus, with slight eversion of mucosa. A rather common condition in multiparas.

Fig. 398.—Prolapse of the urethral mucosa. (Montgomery—*Practical Gynecology*.)

Fig. 399.—Urethral caruncle. (Montgomery—*Practical Gynecology*, The Blakiston Company.)

Widening of Meatus

This condition of widening of the ureteral meatus, so that a considerable area of red urethral lining shows, is due usually to stretching from childbirth. It is not of much clinical importance, rarely giving rise to discomfort, though the exposed mucosa is of course liable to irritation from any irritating vaginal discharge. The appearance is shown in Fig. 397. It is to be distinguished from prolapse of the mucosa, caruncle, skenitis or other definite chronic irritation requiring elimination.

Prolapse of Urethral Mucosa

Prolapse of urethral mucosa is known also as “procidencia urethrae.” It consists of a prolapse of urethral mucous membrane, accompanied by more or less proliferation of the submucous connective tissue.

The red projecting membrane surrounds the meatus (Fig. 398). It often bleeds easily and is somewhat sensitive to the touch, though not nearly so sen-

sitive as a caruncle. It usually gives rise to considerable irritation, with frequent painful urination and some discharge. It is distinguished from polypus and caruncle by the fact that it surrounds, or almost surrounds, the meatus.

Marked prolapse of the urethral mucosa is not a common affection, though slight gaping of the urethra, through which the mucous membrane may be seen (eversion of urethral mucosa, Fig. 397), is very common in women who have had urethritis or have passed through several labors.

If symptoms are absent or slight, no treatment is necessary. If the prolapse is marked enough to be troublesome, the part may be cocainized, or the patient anesthetized, and the redundant portion of mucous membrane excised and the wound closed by sutures.

Urethral Caruncle

Urethral caruncle is a small papillary growth occurring about the meatus, most frequently near the lower portion. It is usually very sensitive and often gives rise to excruciating pain on urination. It is known also as "irritable caruncle" and "urethral angioma." The cause of urethral caruncle is not known. Probably chronic inflammation of Skene's glands has some influence in its causation, as it usually occurs in the neighborhood of the gland openings. Inflammation of the urethra, particularly gonorrheal inflammation, is supposed to be a causative factor.



Fig. 400.—Urethral caruncle, showing thickened epithelium, dilated vessels, and inflammatory areas. Gyn. Lab.

The growth is seen as a deep red mass at the meatus (Fig. 399) or just within the canal. It is sensitive when touched and may bleed easily on manipulation. It may have a distinct pedicle or a broad base. Usually there is but one growth, but sometimes there are two or more. The microscopic appearance is shown in Fig. 400.

The principal symptom is pain on urination. It may be slight or it may be very severe.

Polypi of the urethral mucous membrane and prolapsed mucous membrane differ from caruncle in being less vascular and less sensitive. Also, polypi are attached higher, while in prolapse of the mucous membrane the base of the mass includes the larger part, if not all, of the circumference of the meatus (Fig. 398).

The treatment for caruncle is removal, preferably by electric current.

Skene's Gland Infection

The anatomy of these small urethral glands, described long ago by Skene, is shown in Figs. 118 to 121. It will be readily appreciated that infection in these may be harbored there indefinitely unless exposed and eradicated. Such infection is usually due to the gonococcus, but not always. The diagnosis is made by finding swelling or tenderness of the glands, and pressing out discharge, as explained in Figs. 182 to 184. The treatment of inflammation of Skene's glands is given under gonorrhoea, with which urethritis also is considered.

Suburethral Abscess

This term is applied to an abscess due to infection from the urethra and located in the tissues about it, such abscess being situated under the urethra (either primarily or gravitating there) between it and the vaginal wall, as shown in Figs. 401 and 402. The pocket of pus may communicate with the urethra or may be shut off from it, and be pointing toward the vagina.

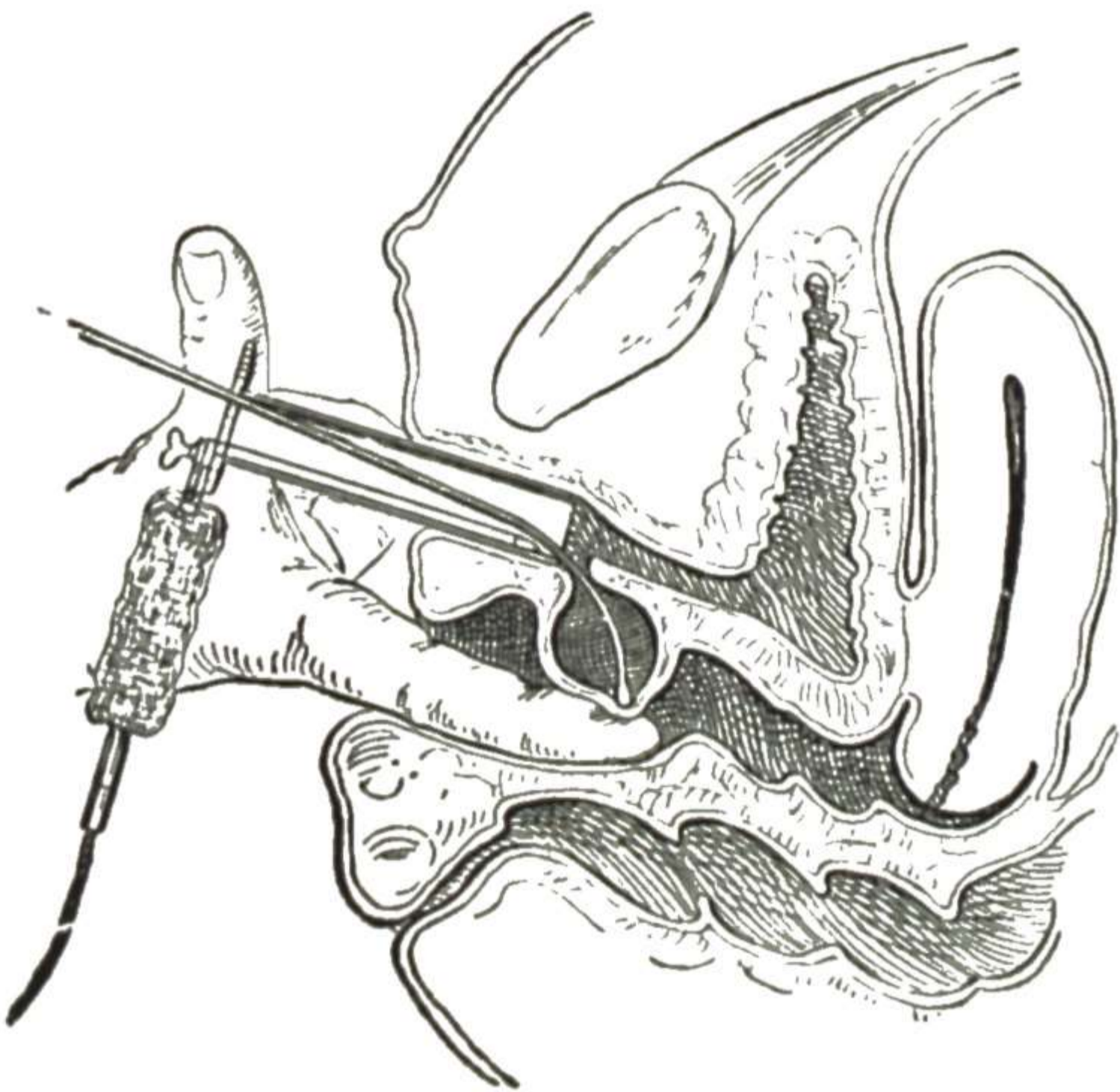


Fig. 401.

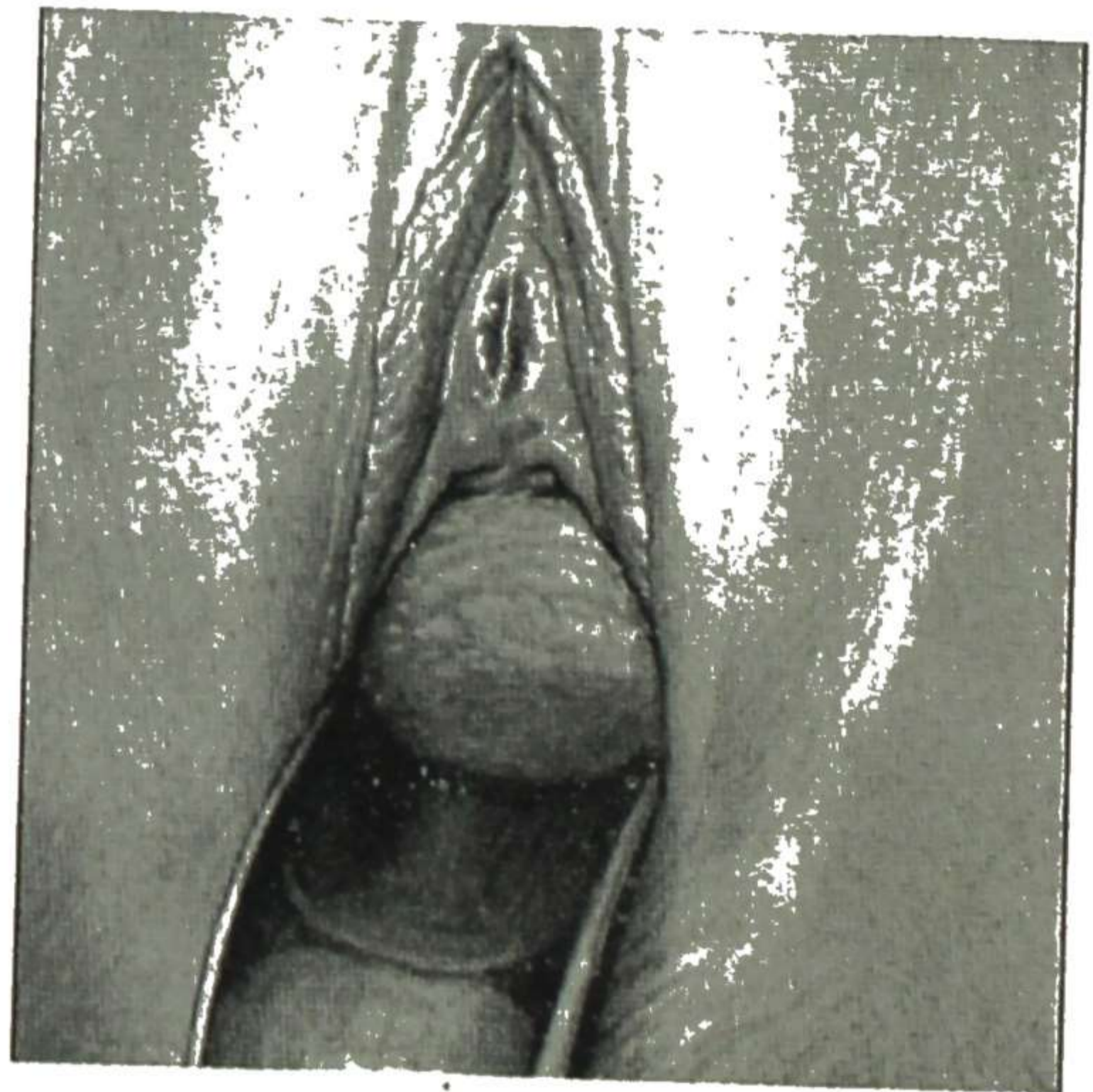


Fig. 402.

Fig. 401.—Testing for suburethral abscess. (Ashton—*Practice of Gynecology*, W. B. Saunders Company.)

Fig. 402.—Suburethral abscess. View from in front. (Kelly—*Operative Gynecology*, D. Appleton-Century Company.)

The treatment for this condition is to drain the cavity at the most dependent part, that is, where it comes closest to the vaginal wall. At this point a large opening should be made and the incision should be kept open by gauze packing or a drainage tube until the cavity heals from the bottom.

VULVOVAGINAL GLAND DISEASES

The nonmalignant conditions include inflammation, abscess, sinus, cyst, and tuberculosis. Cancer of the gland is considered under malignant disease of the vulva.

Inflammation of Vulvovaginal Gland

Inflammation of the duct of the vulvovaginal gland and of the gland proper has been considered under Gonorrhoea. Inflammation in this gland of Bartholin is sometimes referred to as "Bartholinitis."



Fig. 403.

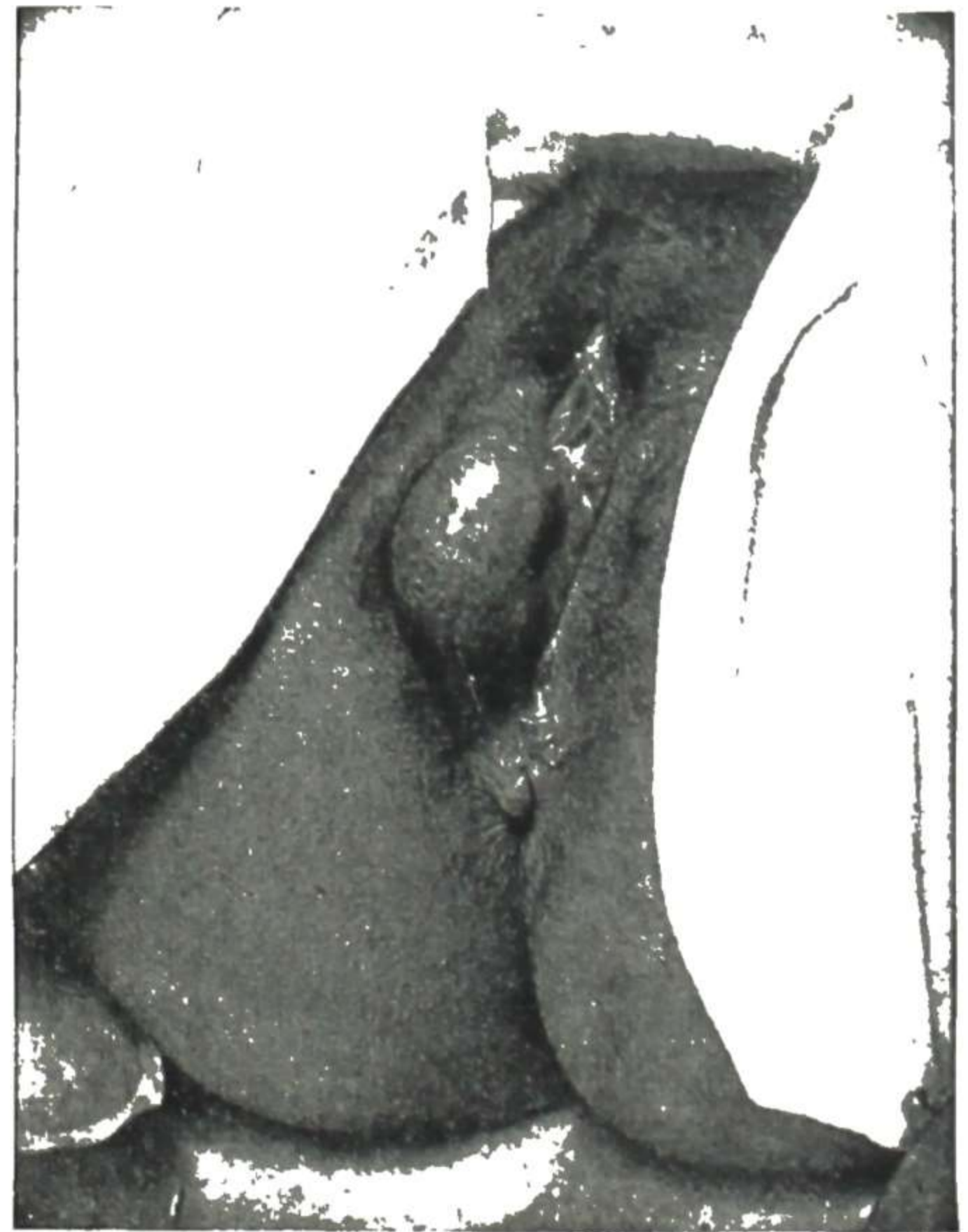


Fig. 404.

Fig. 403.—Abscess of vulvovaginal gland, left side. (Kelly—*Operative Gynecology*.)

Fig. 404.—Another case of abscess of vulvovaginal gland, right side. (Hirst—*Diseases of Women*.)

Abscess of Vulvovaginal Gland

The cause is infection with the gonococcus or ordinary pus germs, or trichomonads. The first is by far the more frequent, and the gonorrhoeal inflammation often persists in the gland long after the vaginal inflammation has disappeared.

The infection enters at the mouth of the duct and progresses along the duct to the gland proper. The secretion of the gland is increased, the duct becomes obstructed and a collection of pus forms, distending the gland and pointing in the direction of least resistance. Sometimes the duct alone is involved, the gland proper escaping. This is indicated by the swelling being small and confined to the region of the duct.

Pathology.—Microscopically one sees a marked round cell invasion about the gland. In the acute cases, pus is seen in the lumen and duct of the gland. In chronic cases the alveoli are dilated, and the lining mucous membrane shows flattened cylindrical epithelium.

Symptoms and Diagnosis.—The symptoms are a painful swelling at the side of the vaginal opening with some fever. Examination reveals a swelling the size of a small egg situated in the tissues at one side of the vaginal orifice and projecting beyond the median line (Figs. 403, 404). The swelling is tender on pressure and there is fluctuation. The following conditions must be differentiated:

CYST OF VULVOVAGINAL GLAND is a chronic affair, the patient usually giving a history of the swelling having been there for a long time, and the inflammatory signs (heat and pain and redness) are absent.

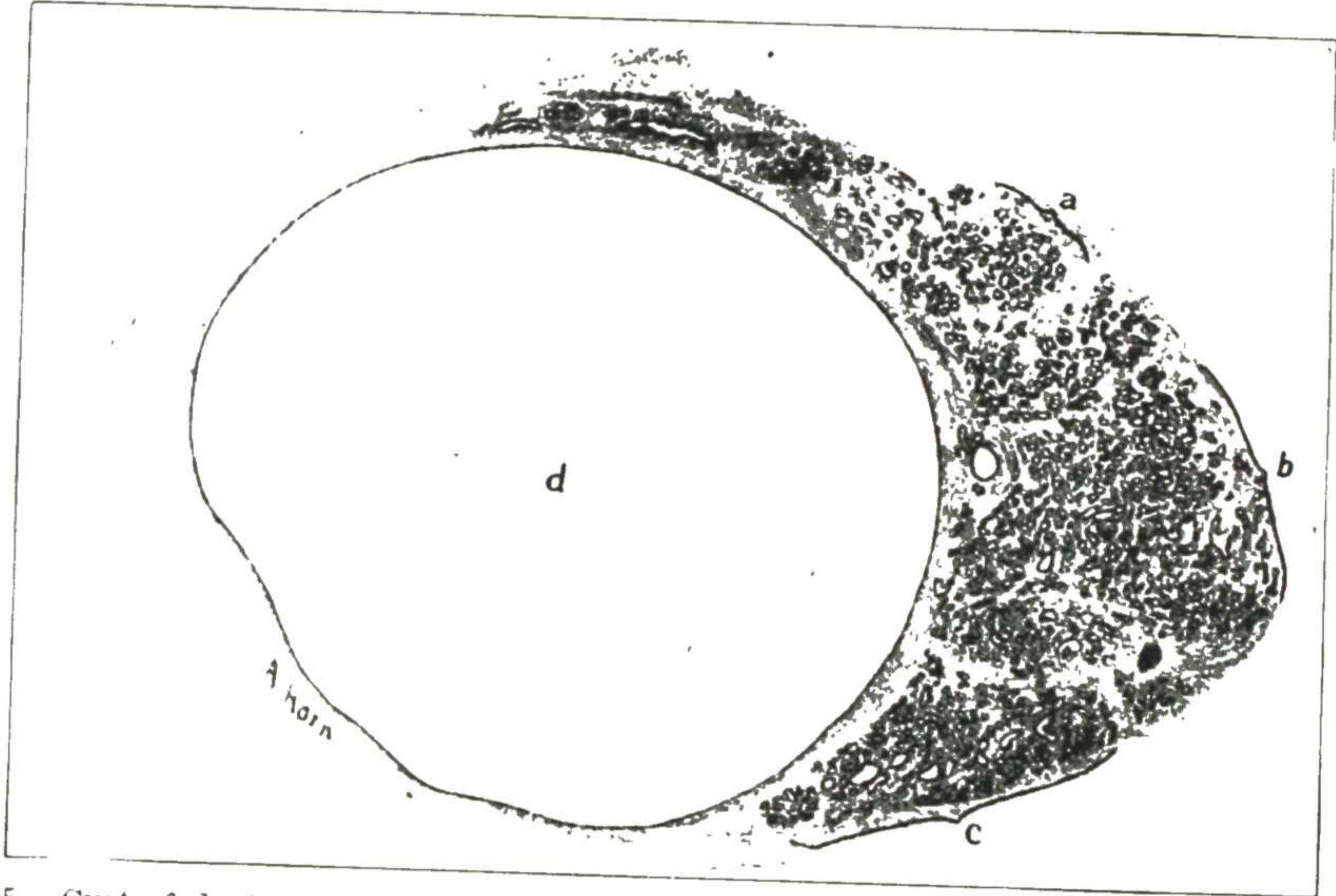


Fig. 405.—Cyst of duct of vulvovaginal gland. Notice how the gland substance has been pushed aside by the cystic duct. (Cullen—*J. A. M. A.*)

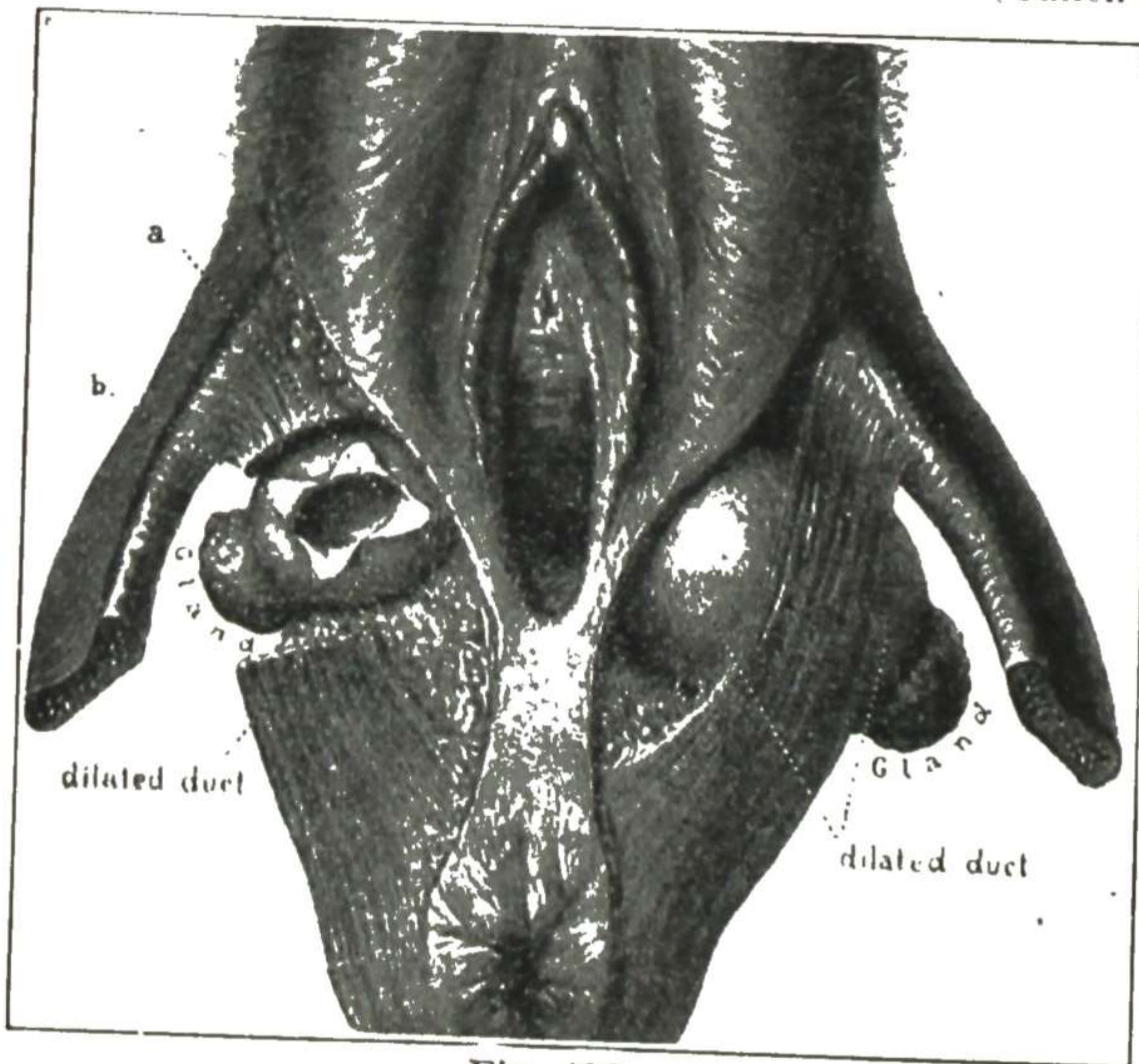


Fig. 406.



Fig. 407.

Fig. 406.—Deep relations of vulvovaginal glands when ducts become cystic. (Cullen, after Hugler—*J. A. M. A.*)

Fig. 407.—Cyst of right vulvovaginal gland and duct. (Montgomery—*Practical Gynecology.*)

PUDENDAL HERNIA must always be taken into consideration in determining the character of a swelling of the vulva. Hernia presents one or more of the hernial signs, such as impulse on coughing, reducibility, intestinal obstruction, resonance on percussion. The first evidence of hernia is usually noticed at once after some straining effort or injury, much more promptly than either abscess or cyst would appear.

TUMOR OF LABIA differs from abscess in the absence of inflammation, in growing slowly and in presenting the signs that distinguish the various kinds of vulvar tumors.

Treatment.—Open the abscess freely by an incision where the pus is nearest the surface, and provide for subsequent drainage that the edges of the incision may be kept separated until the cavity granulates from the bottom.

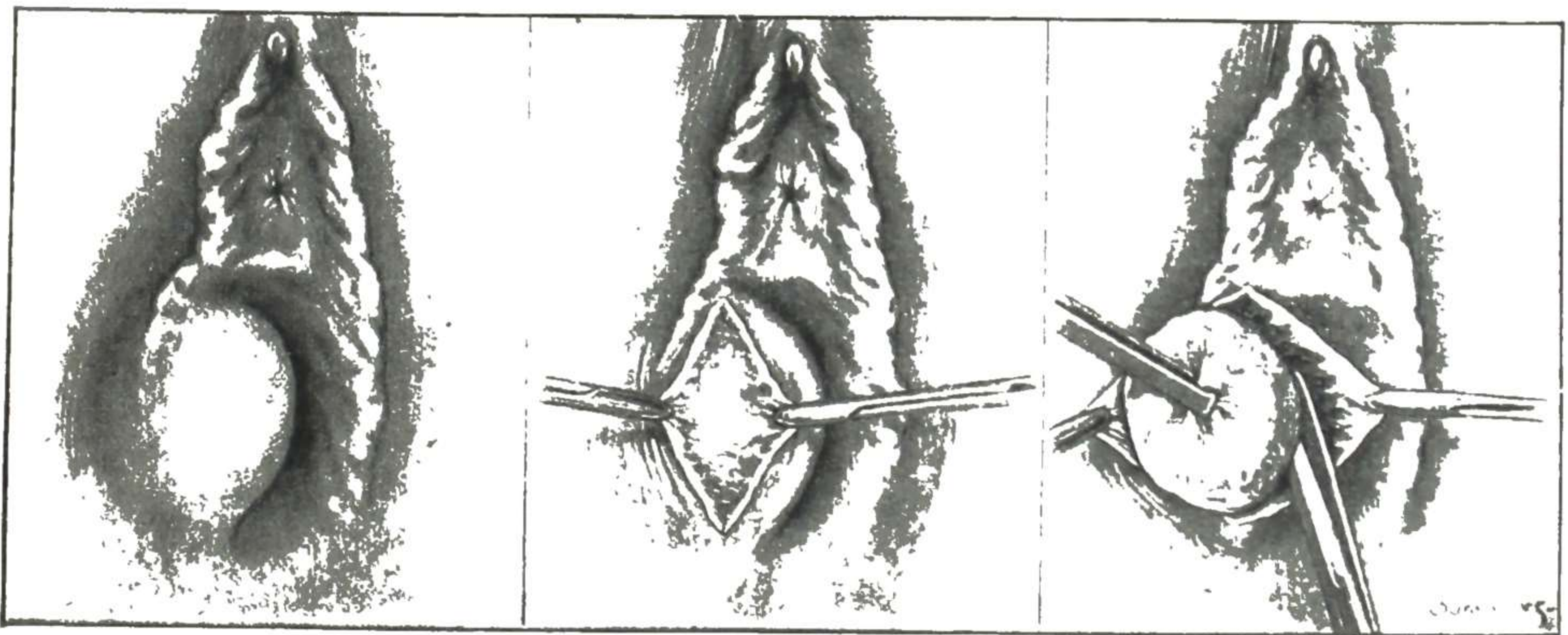


Fig. 408.

Fig. 409.

Fig. 410.

Figs. 408-410.—Enucleation of the cyst of a vulvovaginal gland.

Fig. 408.—Showing the relations of the cyst.

Fig. 409.—The incision through the overlying tissues.

Fig. 410.—The cyst almost enucleated.

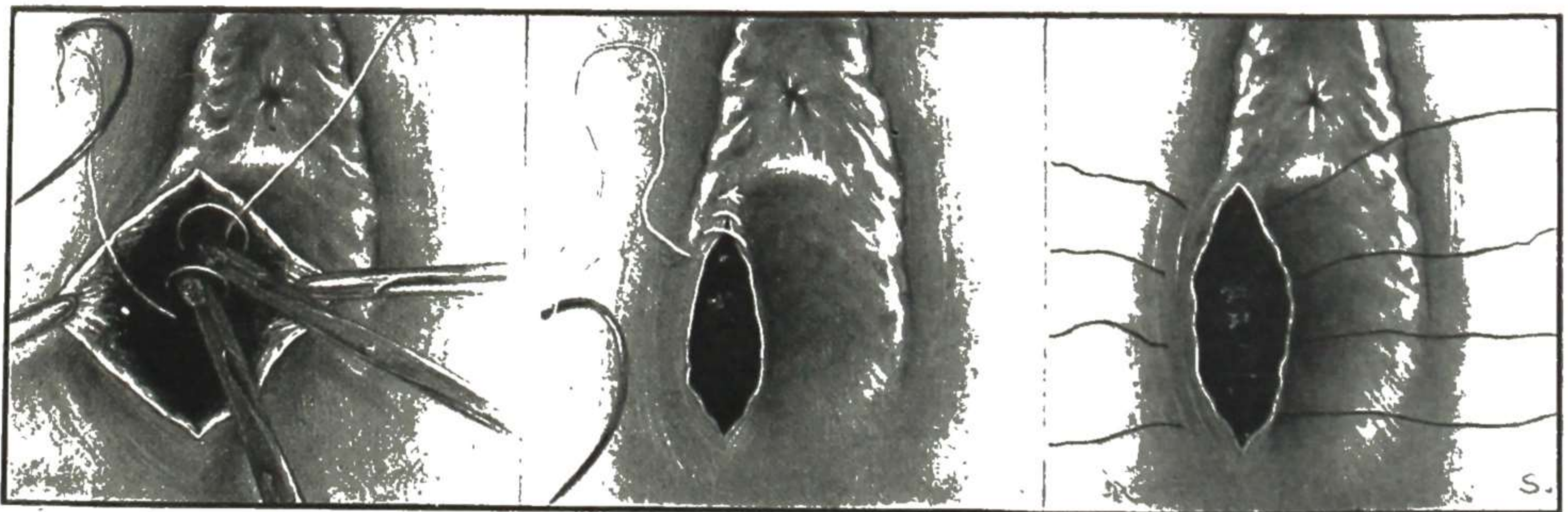


Fig. 411.

Fig. 412.

Fig. 413.

Fig. 411.—Ligating the vascular pedicle.

Fig. 412.—Closing the wound with a continuous suture of forty-day catgut.

Fig. 413.—Another method of closing—with silkworm-gut suture. (Crossen—*Operative Gynecology*.)

Sinus of Vulvovaginal Gland

In many cases of abscess of the gland, after the pus is discharged the cavity closes entirely and there is permanent cure. In other cases a sinus persists, giving rise to a constant slight discharge. The outer end of the sinus

may close and a reaccumulation of pus take place, forming another abscess. This may be repeated several times in the course of a few years. Again, in inflammation of the vulvovaginal gland, the duct may remain open, giving exit to the pus as it forms and constituting a sinus or discharging tract.

The diagnosis of sinus of the vulvovaginal gland is made by the history of inflammation of the gland associated with a sinus in that locality. By palpating the gland, as explained in Chapter II, it can often be felt as a small hard lump, indicating infiltration and enlargement. Pressure on this lump will sometimes cause pus to flow from the sinus.

As to treatment of a persisting sinus, the way to effect a permanent cure is to extirpate the sinus tract and the infiltrated gland.

Cyst of Vulvovaginal Gland

A cyst of this gland is due to obstruction of the duct, causing it and the gland to become dilated with retained secretion, as shown in Figs. 405 to 407. In some cases of inflammation, gonorrheal and otherwise, cyst of the gland results instead of abscess.

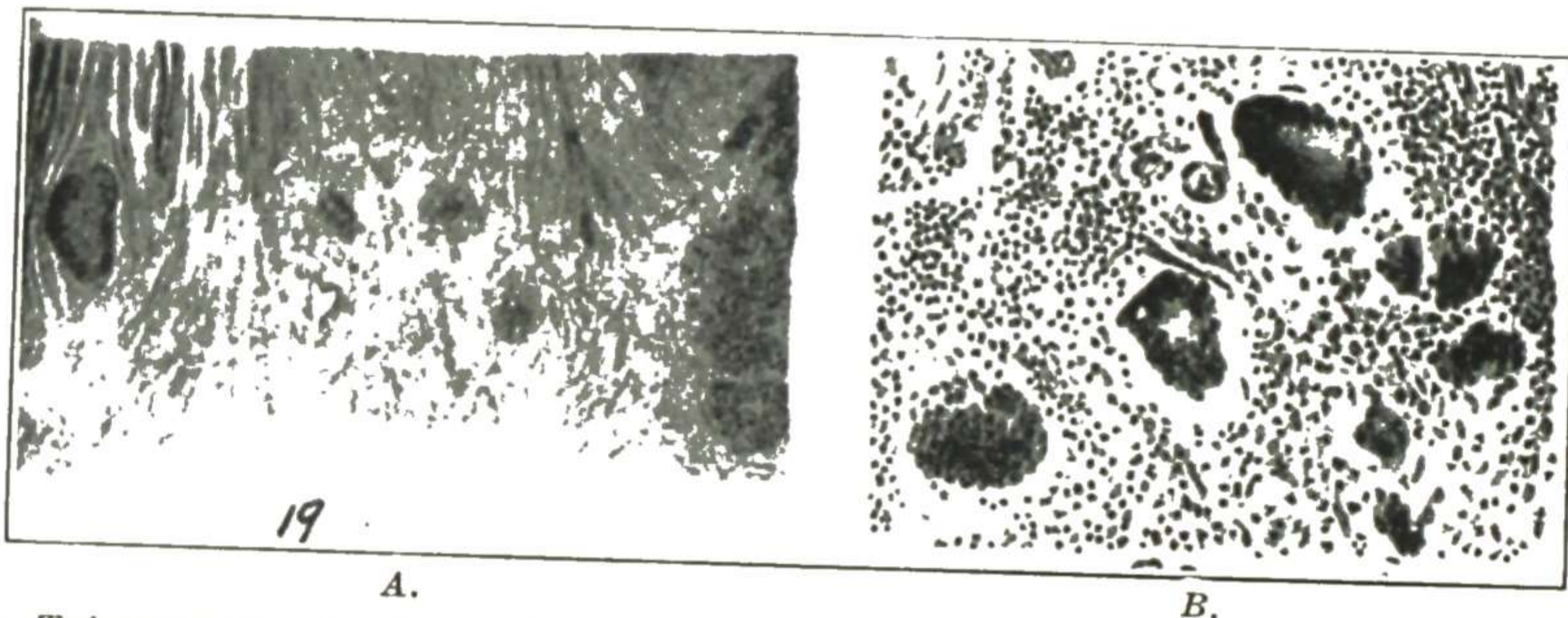


Fig. 414.—Tuberculosis of vulvovaginal gland. A, Microscopic, low power. B, High power, showing giant cells. (Davis—*Tr. Am. Assn. Obst. and Gynec.*)

As to diagnosis, the form and location of the swelling are like that of an abscess of the gland but none of the acute inflammatory symptoms are present. The only affection that is liable to be confounded with this cyst is pudendal hernia. The distinguishing characteristics of hernia are marked increase of the trouble on straining, obstructive bowel disturbance, impulse in the mass on coughing, tympanitic percussion note over the mass (if containing bowel) and the possibility of partial or complete reduction into the peritoneal cavity.

Treatment.—If the cyst is large enough to give trouble mechanically or is tender at times, extirpation is advisable. Though this may appear to be a small operation, it is really rather extensive, for the enlarged gland extends deeply, the parts are vascular, and much suturing is needed for hemostasis and approximation, and to draw in tissue for diminishing the hollow left by removal of the mass. The steps are indicated in Figs. 408 to 413.

Tuberculosis of Vulvovaginal Gland

Tuberculosis of the vulvovaginal gland occurs occasionally and must be kept in mind in any persistent ulceration in this region. Microscopic examination of curetted granulation tissue or an excised specimen will settle the matter (Fig. 414). The treatment is the same as for tuberculosis elsewhere in this region, for which see tuberculosis of vulva.

NONMALIGNANT GROWTHS AND SWELLINGS OF VULVA

These include condylomas, stasis hypertrophy, tumors, hernia, hydrocele, varicose veins, and hematoma.

Condylomas of the Vulva

Condylomas are small nonmalignant growths occurring about the vulva. There are three varieties: the common wart (*verruca vulgaris*), the pointed condyloma (*condyloma acuminatum*), and the flat condyloma (*condyloma latum*). The common wart occurs frequently about the vulva. It is usually situated on the labia majora or mons veneris. The particular cause for it is not known. It is dry and sometimes much pigmented, but rarely causes any disturbance. Moles also may occur here as on other skin surfaces.



Fig. 415.



Fig. 416.

Fig. 415.—Scattered condylomata of the vulva. (Hirst—*Diseases of Women*.)

Fig. 416.—Small masses of condylomata. (Gilliam—*Practical Gynecology*, F. A. Davis Company.)

The POINTED CONDYLOMA or moist wart occurs on those parts of the vulva which are frequently moist, namely, the vestibule, the vaginal entrance, the labia minora, the perineum, and about the anus. In some cases they occur on the labia majora and even on the thighs. (Figs. 415, 416.)

They are usually associated with venereal disease but not necessarily so. They are small, pointed, papillary masses with a thick covering of epithelium (Figs. 417 to 419). They occur singly or in groups or in large numbers. They may vary in size from that of a pinhead to that of a large cauliflower mass, covering half or more of the vulva.

They are due to some irritating discharge, usually gonorrhoeal. Sometimes they are due to a simple discharge as, for example, the increased vaginal discharge of pregnancy. When present during pregnancy they grow very rapidly.

Whenever they are found, a careful search should be made for evidences of previous gonorrhoea or other cause of persistent vaginal discharge.

The FLAT CONDYLOMAS (Figs. 376, 377) constitute the characteristic vulvar lesions of secondary syphilis. If the overlying epithelial layers are thrown off, the flat condyloma becomes a superficial ulcer, as mentioned under Syphilis.

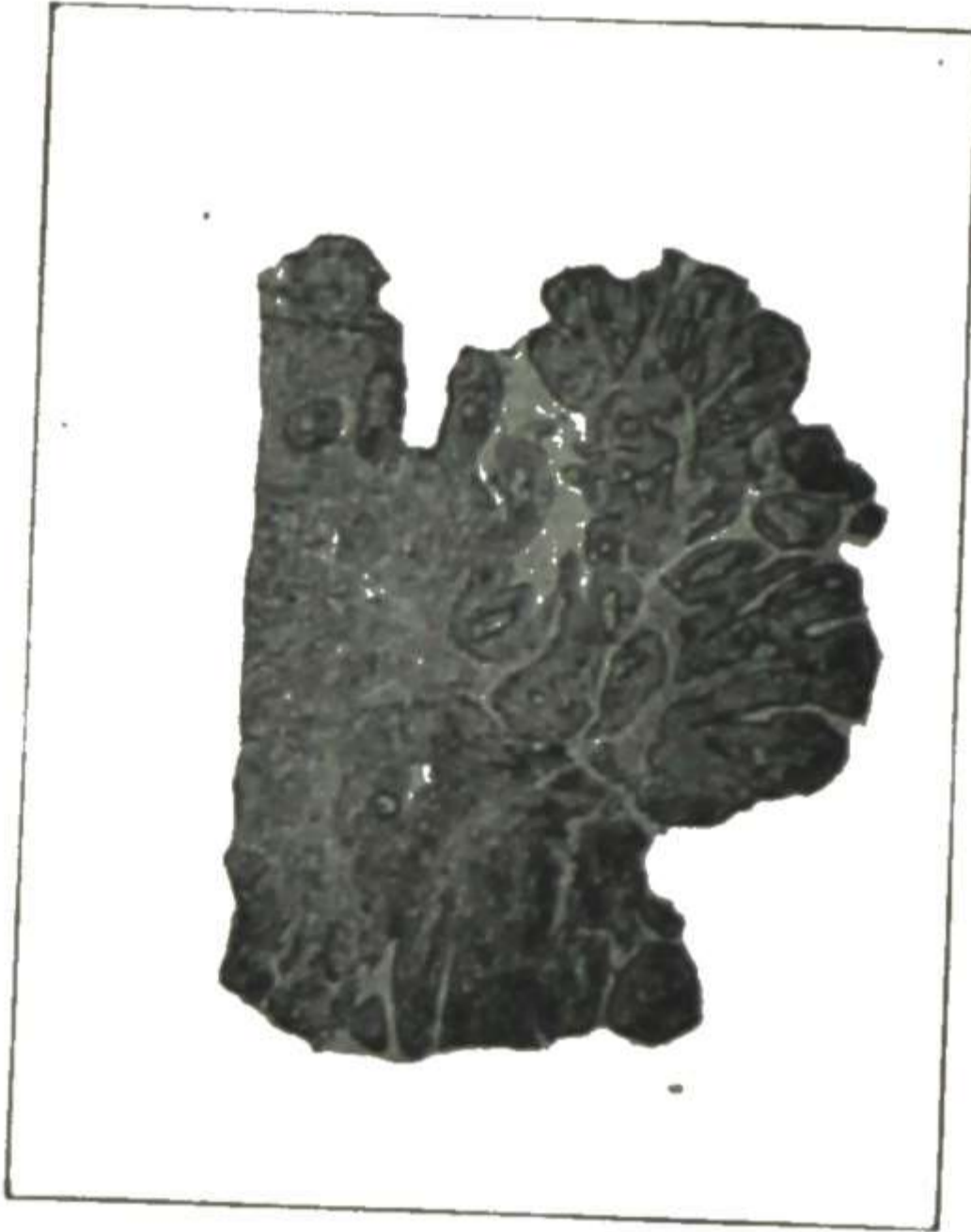


Fig. 417.



Fig. 418.

Fig. 417.—Pointed condyloma of vulva. Longitudinal section, low power. Gyn. Lab.

Fig. 418.—Pointed condyloma of vulva. Cross-section, showing distribution of the epithelium. Gyn. Lab.



Fig. 419.—Pointed condyloma of vulva. Longitudinal section, showing the marked thickening of the surface epithelium, and the distribution of the epithelium in the secondary projections. Gyn. Lab.

Treatment.—The common wart in this situation is likely to show frequent irritation and hence is best removed, especially if pigmented.

The pointed condylomas are treated by stopping any irritating discharge, with douches and local treatments, and keeping the condylomas clean and dry.

The latter may be accomplished usually by washing several times daily with a mild antiseptic solution, drying, and then dusting freely with some drying powder, such as talcum powder, stearate of zinc, calomel, or equal parts of calomel and salicylic acid.

If persistent and troublesome in spite of palliative measures, excision may be advisable.

The flat condylomas require the regular constitutional treatment for syphilis. Locally cleanliness should be secured by frequent washing with some mild antiseptic, and if there is much vaginal discharge, douches should be taken. After the washing, the parts are to be carefully dried and then dusted freely with some drying powder, such as calomel.

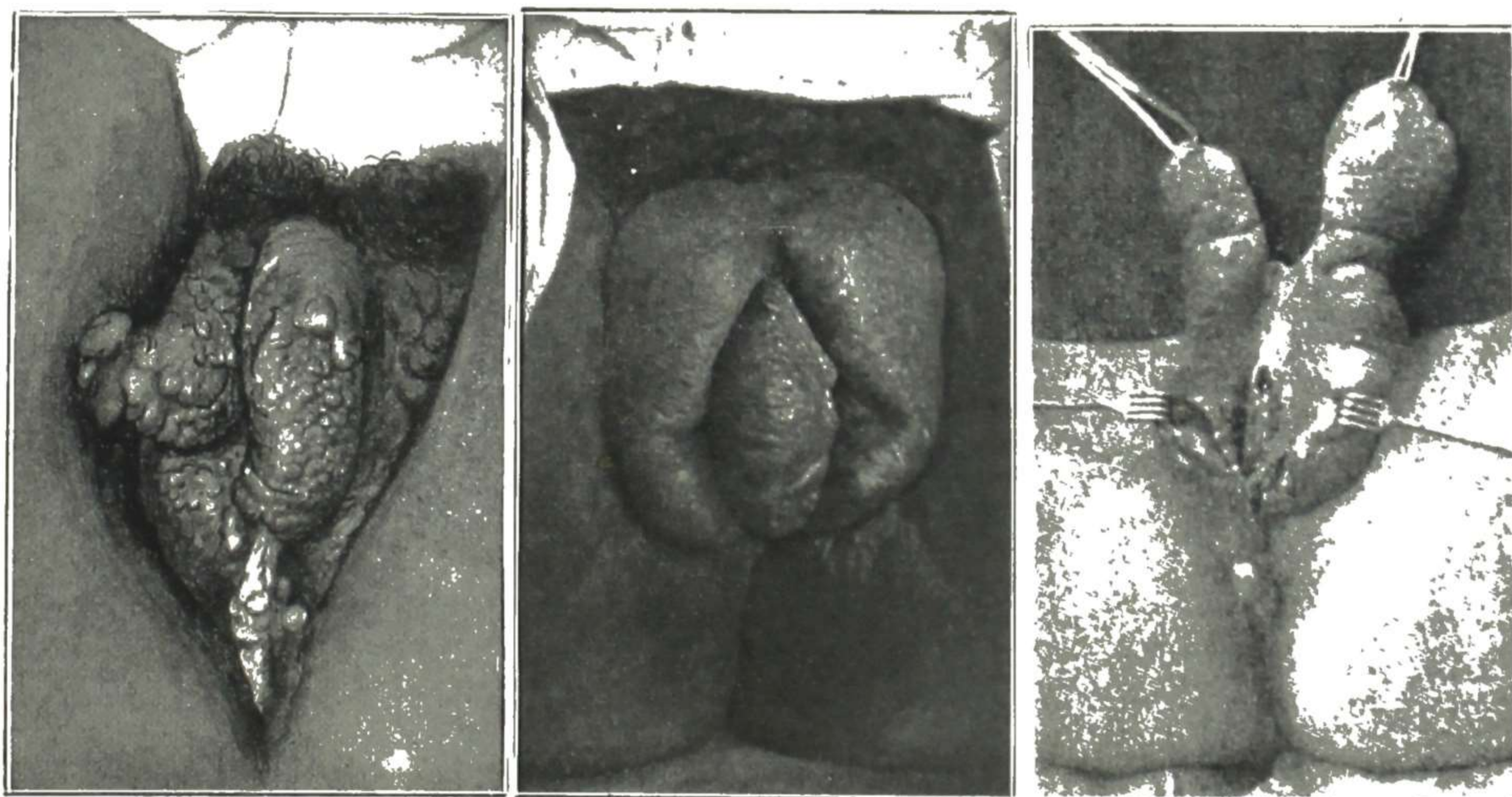


Fig. 420.

Fig. 421.

Fig. 422.

Fig. 420.—Stasis hypertrophy of the vulva. (Hirst—*Diseases of Women*, W. B. Saunders Company.)

Fig. 421.—Stasis hypertrophy of the vulva. (Hirst—*Diseases of Women*.)

Fig. 422.—Stasis hypertrophy of the vulva. The masses have been raised, showing remnants of the old ulceration and scar tissue about the pubic arch, which is usually responsible for this condition. (Killiani—*Surgical Diagnosis*, William Wood and Company.)

Stasis Hypertrophy of Vulva

Stasis hypertrophy of the external genitals is a chronic enlargement of them, due principally to interference with the lymph circulation (Figs. 420 to 422). "Elephantiasis" is the term under which most authors describe this condition, but the import given to this word varies so much that its use leads to confusion. It has been applied on the one hand indiscriminately to nearly all chronic enlargements of the labia and, on the other hand, as a special term for the designation of the swelling due to the local invasion of the lymph channels by a parasite (*Filaria sanguinis-hominis*). To prevent this confusion it is best to adopt another term, one about which there can be no misunderstanding and which indicates the most important factor in the evolution of the clinical picture. The essential lesion is a stasis hypertrophy, whatever the cause of the stasis may be.

Etiology.—There are three causative factors, as follows:

1. Chronic ulceration of the vulva. This has long been recognized as the etiologic factor in most cases. In Fig. 422 the masses are raised to show the ulceration beneath. Syphilis is present in a high percentage of the cases, but any form of chronic ulceration may lead to it.

2. Obstructive changes in the inguinal lymphatic glands. The closing of the lymph channels through the glands may be brought about by extirpation of the glands or by their damage by suppuration.

3. Local invasion of the vulvar lymphatics by the *Filaria sanguinis-hominis*. This is rare or unknown in this country, but it occurs as an endemic affection in some countries (India, Barbadoes, and the Antilles). Mosquitoes are thought to deposit the embryo beneath the epidermis. There the parasite multiplies to such an extent as to choke the lymph channels, the obstruction being due to both the parasites proper and the ova.

Diagnosis.—Examination reveals the enlargement and usually also the ulceration and scar tissue (Fig. 422). In the absence of infection, there are no acute inflammatory symptoms and usually but little congestion. The patients complain of some discharge and itching about the genitals and not infrequently symptoms of irritation on the part of the bladder and rectum. What usually brings the patient to the physician is the discharge and enlargement, with resulting discomfort and inconvenience in walking and difficulty in coitus. It must be differentiated from new growths and from hernia and from hypertrophies of special parts, as of the clitoris in masculinization or of the labia.

Treatment.—Stasis hypertrophy in temperate zones is practically always due to some type of chronic ulceration. Consequently, treatment calls for determination of the type of ulceration present and the adaptation of treatment accordingly. Occasionally excision of a troublesome mass is required along with the other measures.

Nonmalignant Tumors of Vulva

Fibrous tumors (fibromas) may occur in the connective tissue of the vulva. They are rare. When present they usually involve one of the labia majora (Fig. 423).

In some tumors there are also bundles of muscular tissue, evidently derived from the muscle fibers of the round ligament or of the skin. Such tumors are, of course, fibromyomas. Some tumors have a preponderance of fat (lipomas), the connective tissue simply forming trabeculae between the fat lobules. Still other tumors contain myxomatous tissue, giving the myxofibromas and the myxolipomas. A very rare form of tumor in this region is the chondroma. A few cases of chondroma of the clitoris have been reported, in at least one of which considerable ossification had taken place.

These nonmalignant tumors of the vulva may vary in size from that of an acorn to that of a child's head. They present, in this locality, the same symptoms and signs that characterize them elsewhere. The patient complains principally of the weight of the growth and of its being in the way. When large, they become pedunculated. On account of the friction the surface may

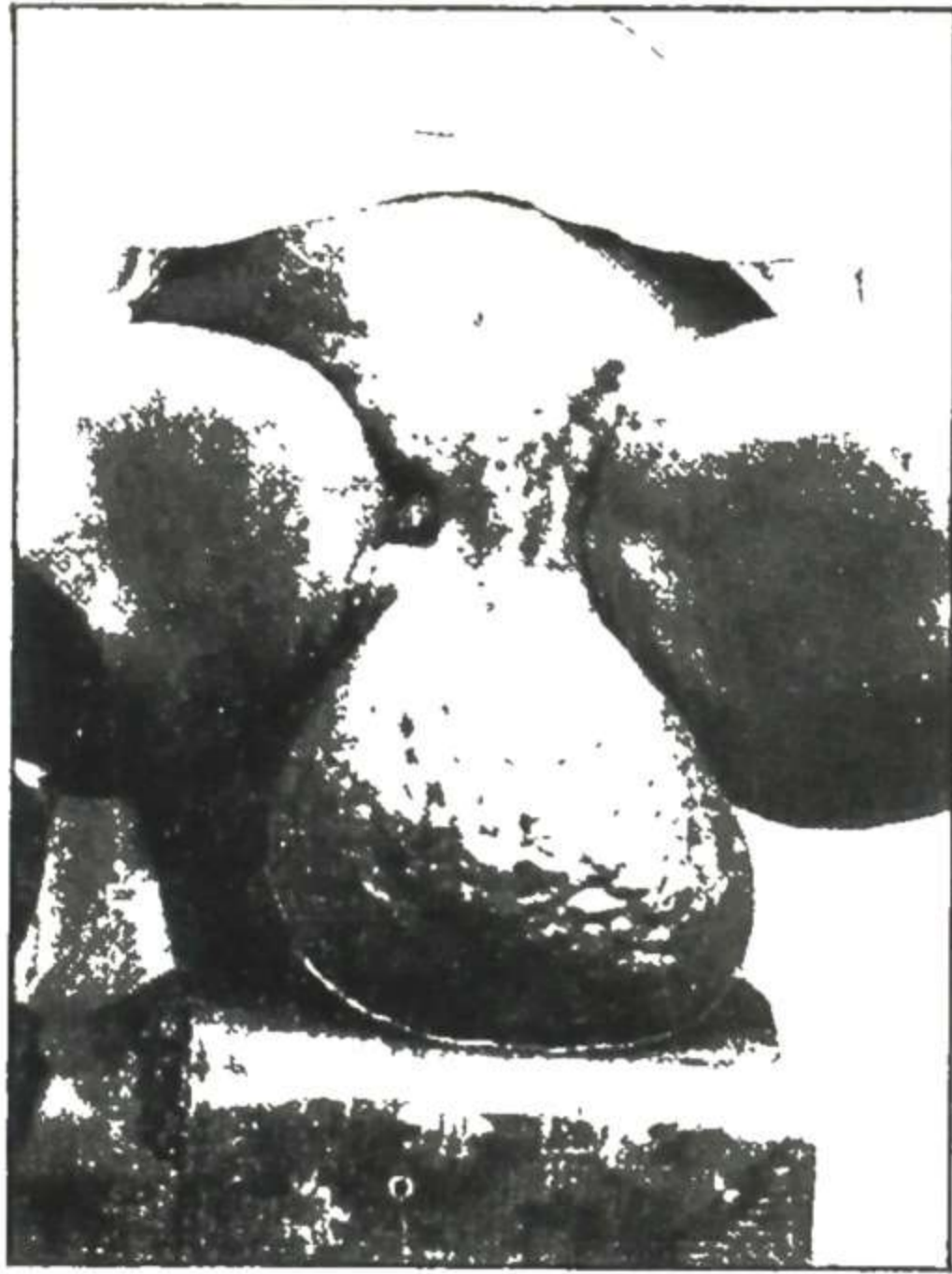


Fig. 423.



Fig. 424.

Fig. 423.—A large fibroma of the labium. (Montgomery—*Practical Gynecology*.)
 Fig. 424.—Another large labial cyst. (Hirst—*Diseases of Women*.)

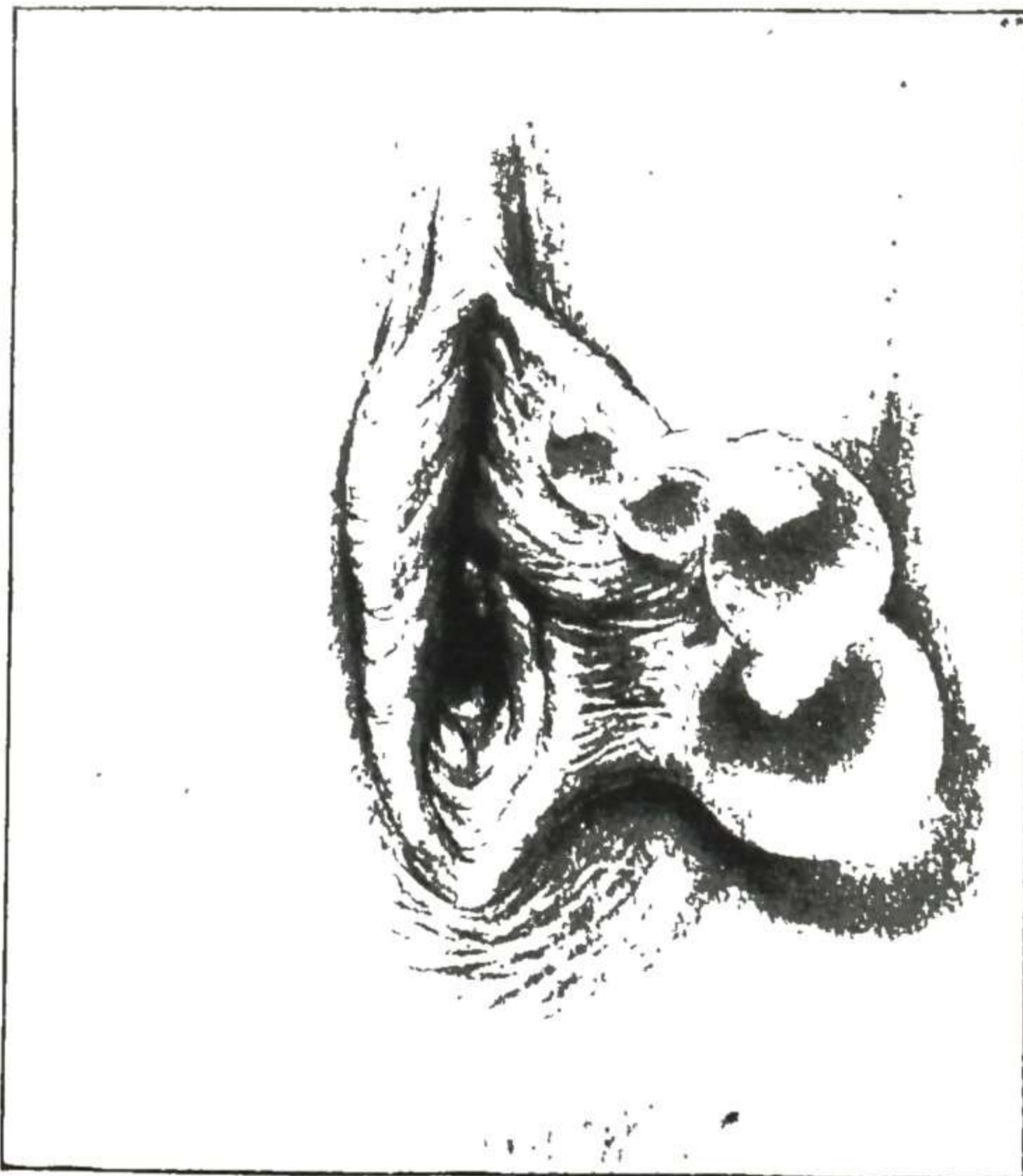


Fig. 425.

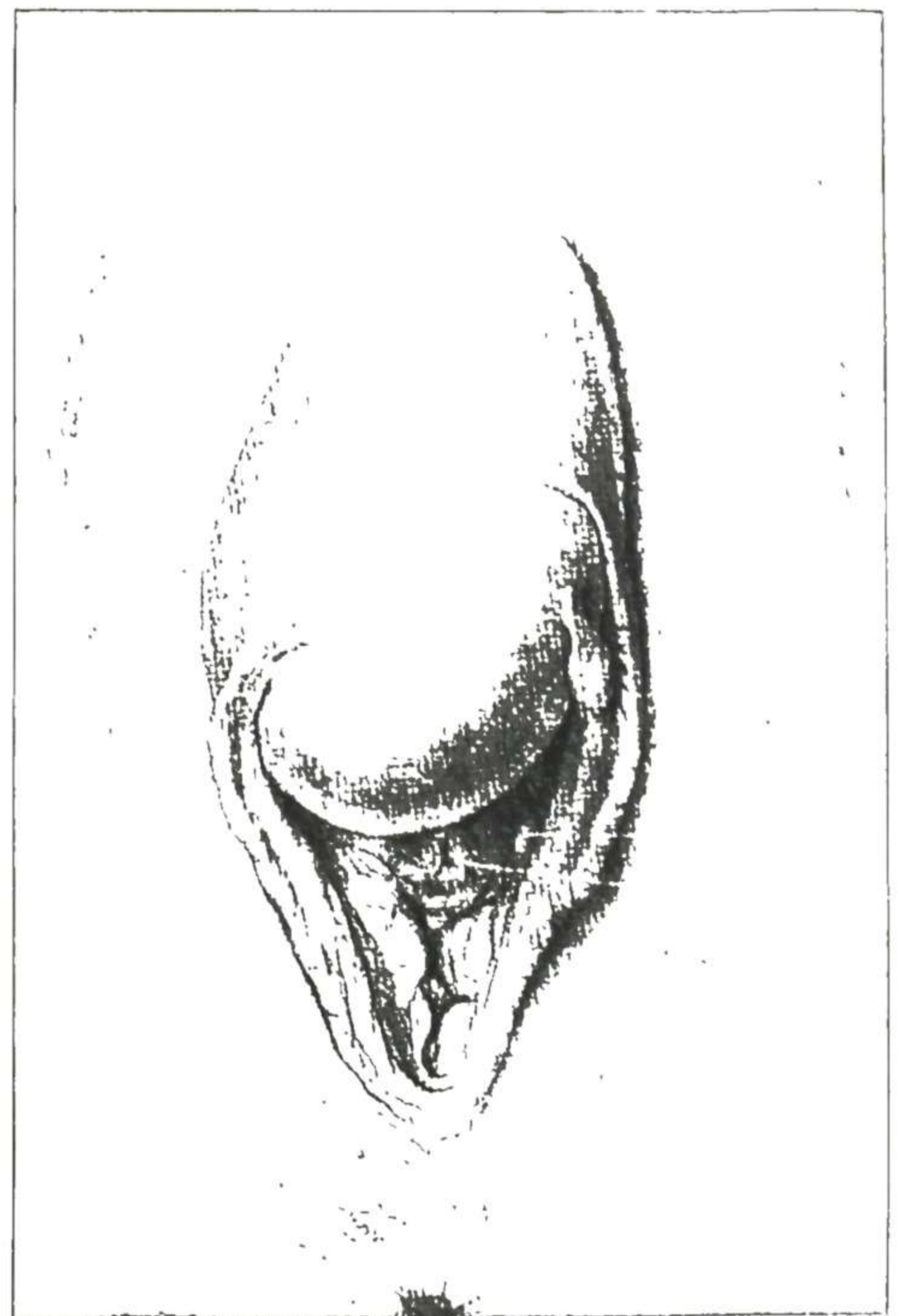


Fig. 426.

Fig. 425.—Small cysts of the left labium minus. (Kelly—*Operative Gynecology*.)
 Fig. 426.—A cyst of the clitoris. (Kelly—*Operative Gynecology*.)

become abraded and infected and ulcerated, adding greatly to the patient's distress. The treatment for these growths is excision.

Occasionally sebaceous cysts occur on the labia majora or the mons veneris. They present the same characteristics and require the same treatment as sebaceous cysts elsewhere. Other cysts occur from remnants of fetal structures. Fig. 424 shows large labial cysts. Cysts of the vulvovaginal gland have already been considered.

Several cysts of the labia minora have been reported (Fig. 425). It is generally supposed that they arise from embryologically misplaced glandular rests. If large enough to be troublesome they are to be excised. Fig. 426 shows a cyst of the clitoris.

Pudental Hernia

A pudental hernia is a protrusion of the intestine or omentum or other intra-abdominal structure into the external genitals. It may take place by way of the inguinal canal in which case the hernia is designated as "inguinolabial" or "superior labial."

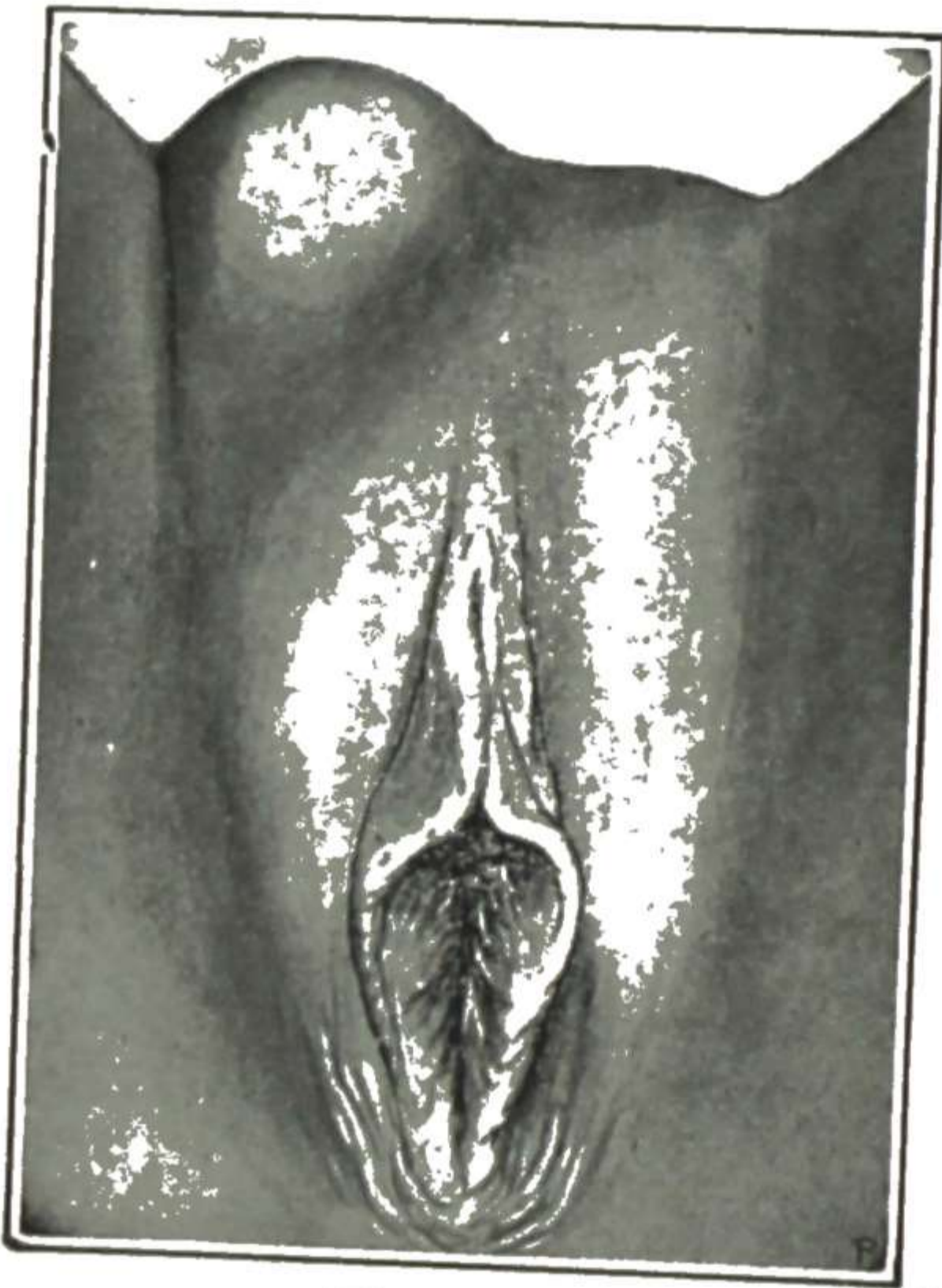


Fig. 427.

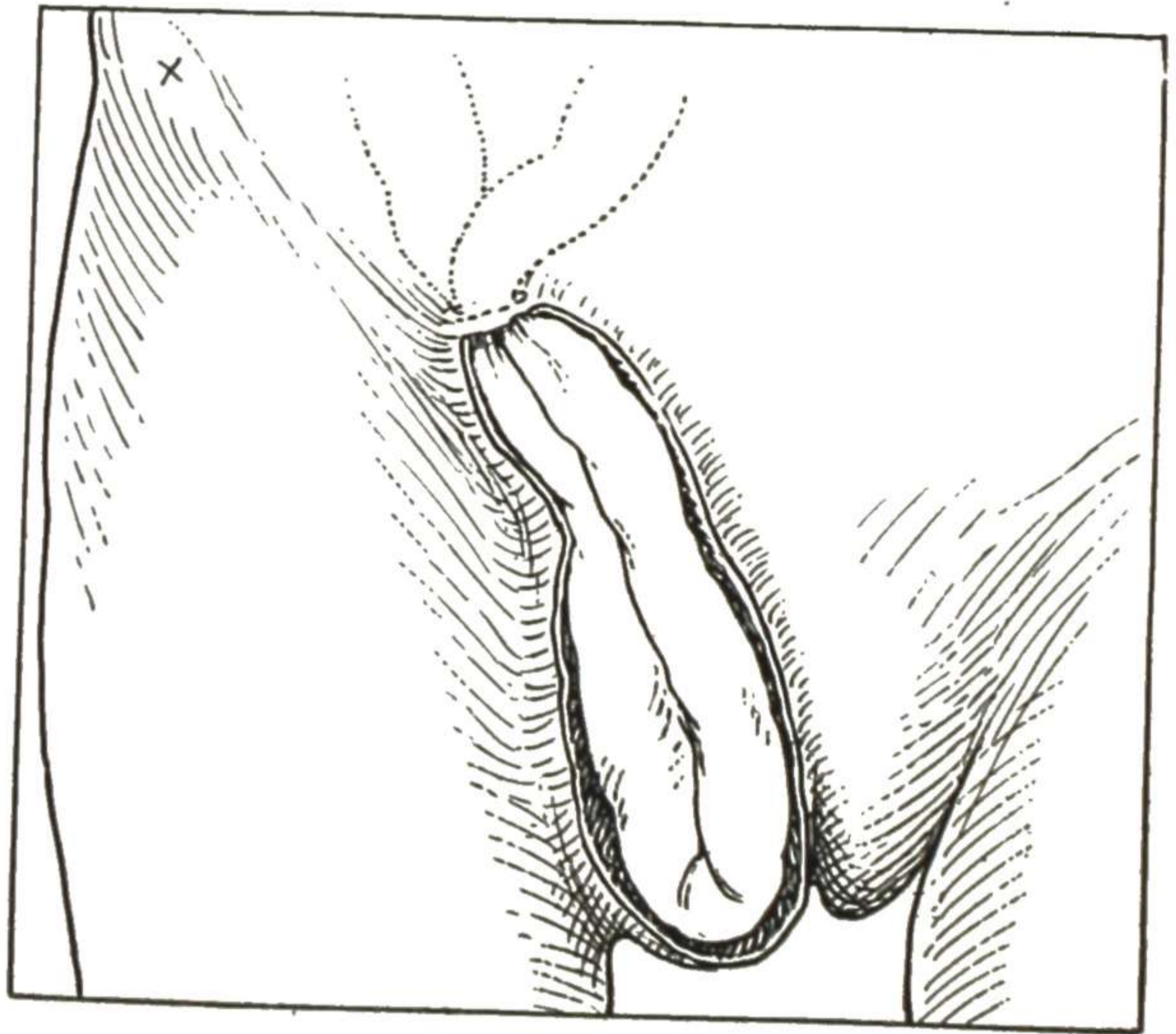


Fig. 428.

Fig. 427.—Pudental hernia. Inguinal hernia becoming labial. (Dudley—*Practice of Gynecology*, Lea and Febiger.)

Fig. 428.—Inguinolabial hernia, diagrammatic.

The protrusion may take place by way of the vagina, in which case the hernia is designated as "vaginal," "vaginolabial" or "inferior labial."

Inguinolabial Hernia.—The round ligament ends in the tissues at the top of the labium majus. In the fetus, the ligament is accompanied along the inguinal canal by a prolongation of the peritoneum, forming a small cavity. This is usually obliterated in the full-term fetus. In some cases, however, it is not obliterated but remains open, forming a small pocket or "canal of Nuck," and along this canal an inguinal hernia may take place. The hernia may advance no further than the inguinal ring or, on the other hand, it may protrude more and more, involving the upper part of the labium majus and

later the whole labium (Figs. 427, 428). It corresponds to scrotal hernia in the male and presents practically the same pathology and symptoms. In some cases other structures than the intestine or omentum have been found in such a hernial sac, for example, the ovary, fallopian tube, uterus, and even the pregnant uterus.

Vaginolabial Hernia.—In rare cases a hernial protrusion may take place through the pelvic outlet by way of the vagina (Figs. 429 to 433). In such a case the hernia may descend in front of the broad ligament through the obturator foramen or between the uterus and the bladder, or behind the broad ligament, between the uterus and the rectum.

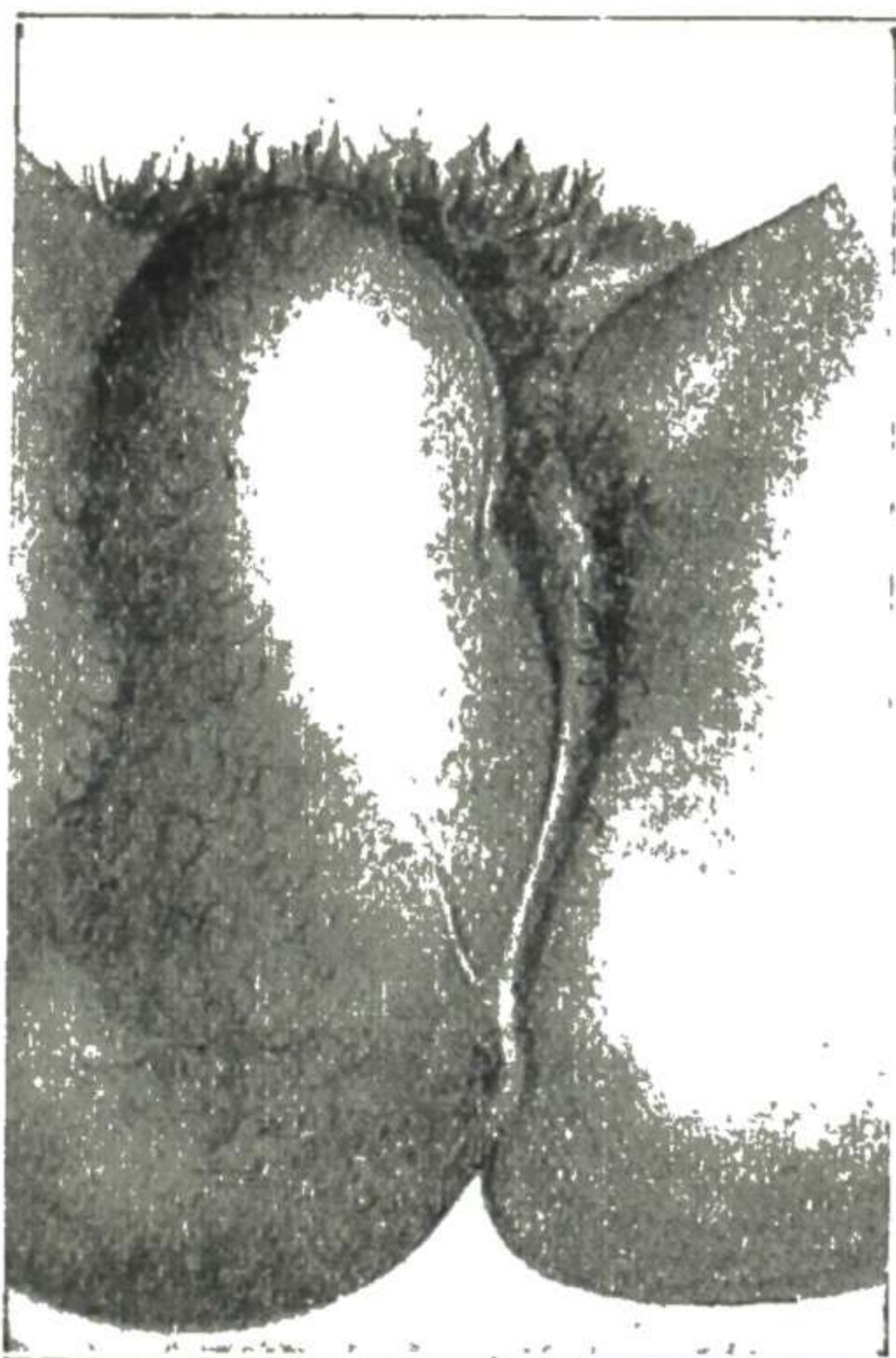


Fig. 429.

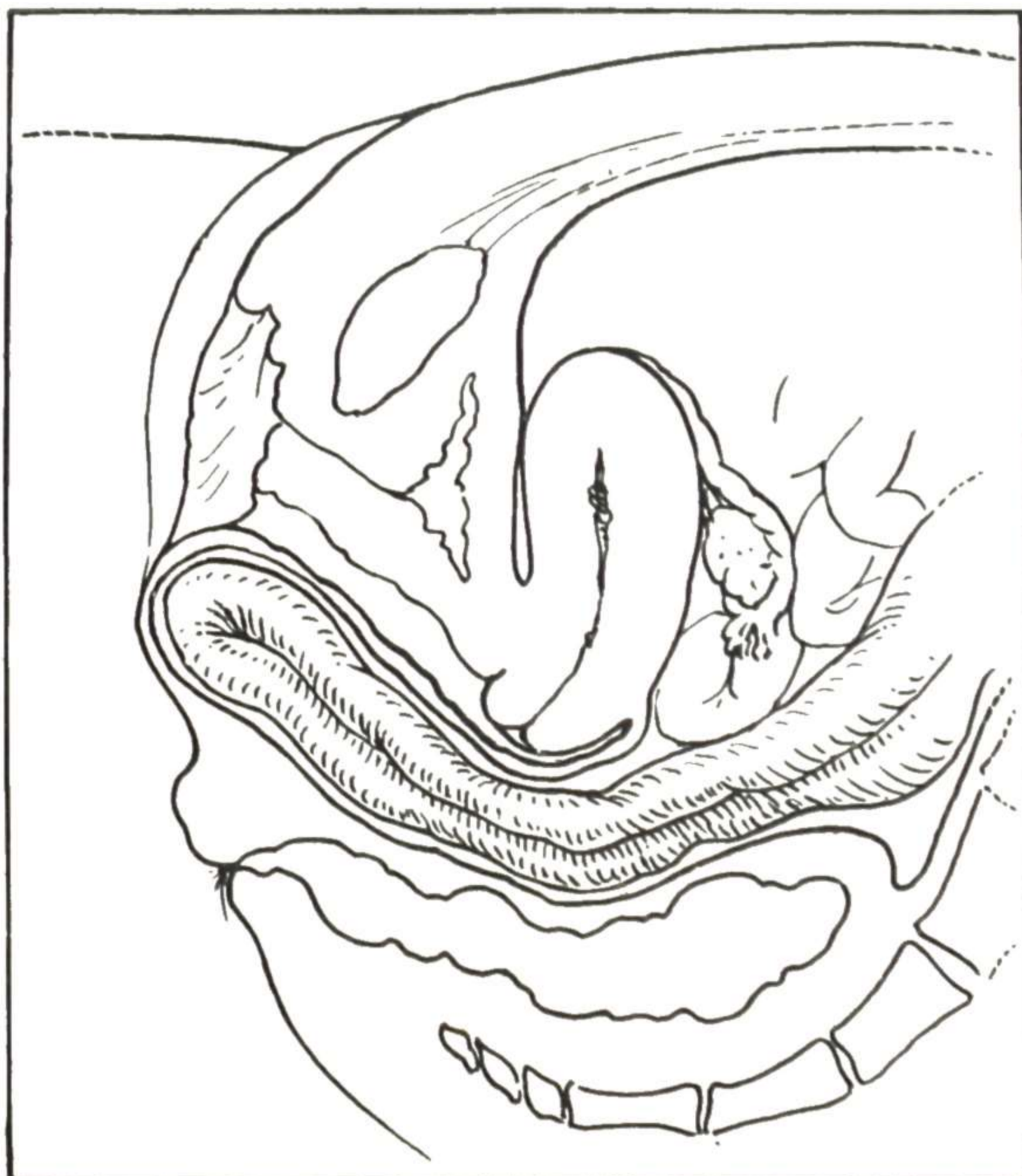


Fig. 430.

Fig. 429.—Vaginolabial hernia. (H. Macnoughton-Jones, after Winkel—*Diseases of Women.*)

Fig. 430.—Vaginolabial hernia, posterior type (cul-de-sac hernia), diagrammatic.

The latter type develops by pushing down the posterior peritoneal cul-de-sac between the vagina and the rectum. This "cul-de-sac hernia" (Figs. 430 to 433) is the most common form of vaginal hernia. It is prone to develop with prolapse of the uterus, and may be mistaken for simple rectocele. Unless the associated cul-de-sac hernia is taken care of along with the prolapse operation, it will persist and give trouble later.

Diagnosis.—Hernia differs from other swellings in this region, for example, hematoma, cyst, fibroma, stasis hypertrophy, cellulitis, in the following particulars:

IMPULSE ON COUGHING, however, may be absent if strangulation has taken place.

RESONANCE ON PERCUSSION is present only if the mass contains intestine. It is not found with omentum or ovary or tube.

MAY BE REDUCED INTO ABDOMINAL CAVITY.—This, of course, is possible only in reducible hernia. If the supposed hernia cannot be reduced with the patient in the dorsal position, she may be placed in the knee-chest posture and the reduction again attempted. This is especially effective in the vaginal form of hernia.

INTESTINAL OBSTRUCTION.—Usually there is not enough obstruction to produce serious symptoms or interfere with the passage of the intestinal contents, but when evidence of such obstruction does occur, it is a very important diagnostic symptom.

HISTORY.—Hernia usually appears in conjunction with some straining effort. Hematoma of the vulva is usually due to some external injury. Cellulitis follows a wound or ulcer. Stasis hypertrophy is preceded by chronic ulceration and scar-tissue formation. The other swellings of this locality (cyst, tumor) develop gradually and without apparent cause.



Fig. 431.

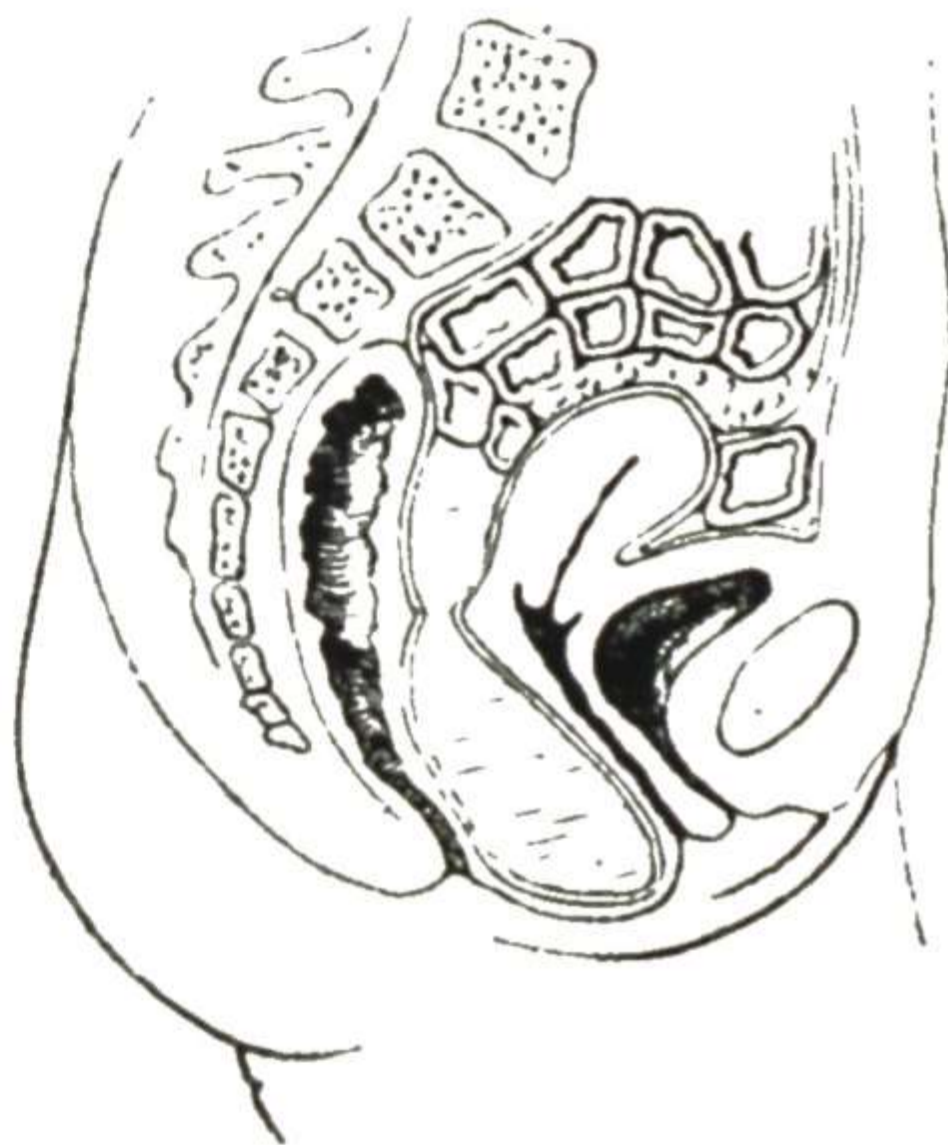


Fig. 432.

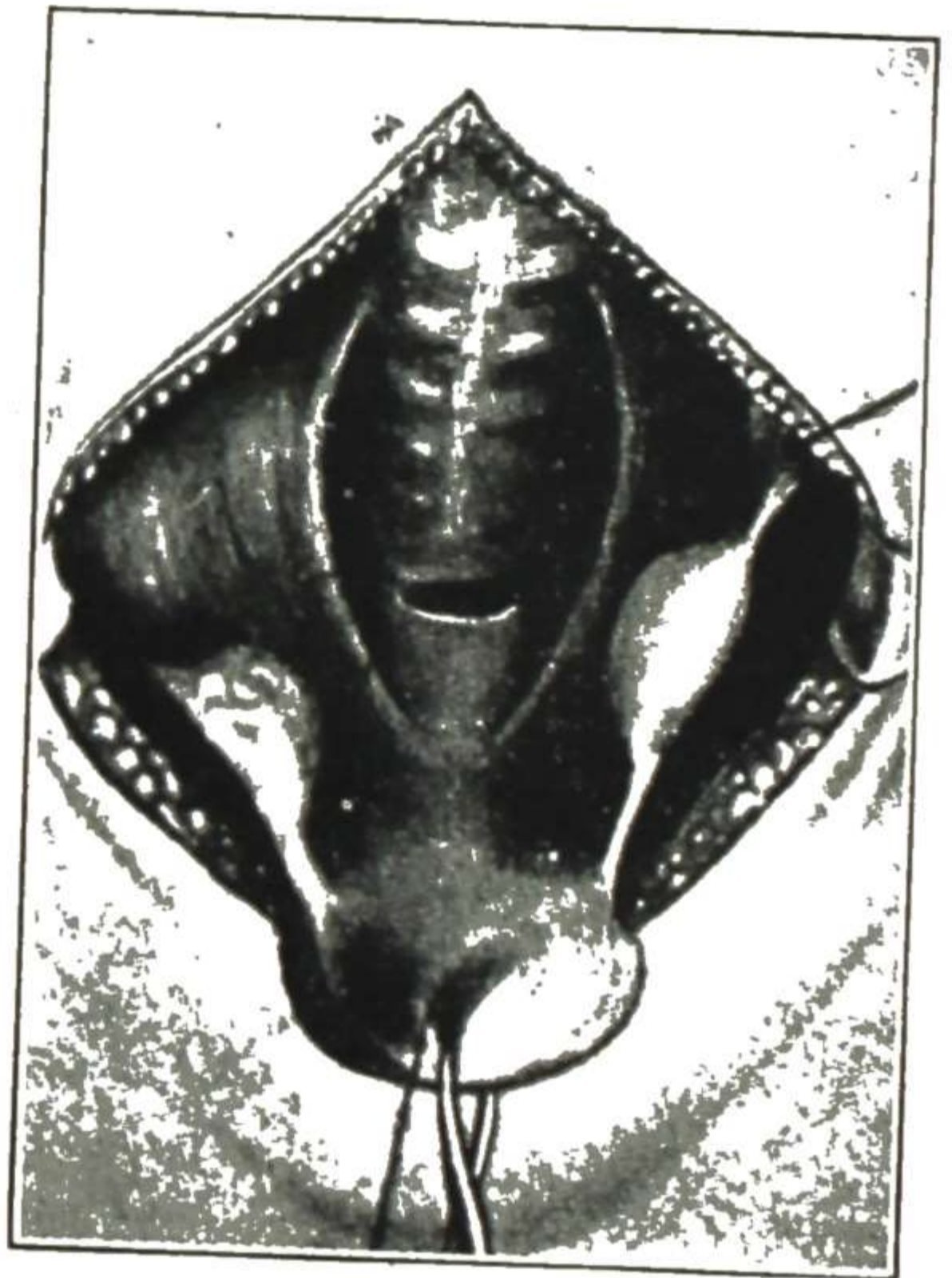


Fig. 433.

Figs. 431-433.—Case of vaginolabial hernia, posterior type (cul-de-sac hernia). Fig. 431. Appearance of genitals. Notice the distention of the posterior vaginal wall and the perineum. Fig. 432. Sectional view, diagrammatic, indicating the location of the hernial sac and the point of constriction. Fig. 433. Appearance internally with the abdomen opened. Notice the hernial opening at the bottom of the retrouterine peritoneal cul-de-sac. (Sweetzer—*Ann. Surg.*)

Treatment.—The treatment for hernia in this situation is the same as for hernia elsewhere, namely, reduction and retention of the replaced viscera within the abdominal cavity, if that can be satisfactorily accomplished. An INGUINOLABIAL hernia can frequently be retained with the ordinary hernia truss. If the reduction cannot be accomplished or if satisfactory retention cannot be secured, then operation for the radical cure of the hernia is indicated.

In the form of pudendal hernia in which the protrusion takes place by way of the pelvic outlet and vagina (VAGINOLABIAL), there is seldom enough obstruction at the hernial opening to produce intestinal symptoms.

Pudental Hydrocele

In some patients, a canal persists along the round ligament, the internal end of the canal being closed. If a collection of fluid takes place in the sac thus formed, the result is a pudental hydrocele, corresponding to hydrocele of the cord in the male. It is called also "labial hydrocele" and occupies the same location as an inguinal hernia.

It differs from hernia in that it is dull on percussion, cannot be reduced, gives little or no impulse on coughing, is not associated with evidences of intestinal obstruction, and has developed gradually without apparent cause. Great care is necessary in diagnosing this rare affection, for it would be serious to mistake hernia for hydrocele and treat it by injection. It must be differentiated also from cystic adenomyoma of the round ligament. Several such cases have been reported. In hydrocele, the cyst wall would be thinner than in the cystic adenomyoma, though in some of the cases the adenomyoma can only be distinguished microscopically. Pudental hydrocele must be differentiated also from hernia of the ovary with cystic degeneration.

Treatment.—If the collection of fluid is small and causes no inconvenience, leave it alone. If the swelling causes trouble, the sac may be opened and extirpated, and the wound closed by sutures. This is more certain of cure and much safer than injection treatment.

Varicose Veins of Vulva

The veins about the external genitals may become markedly varicose, the irregular dilatation being due to some obstruction to the pelvic circulation, such as pregnancy or a pelvic tumor. The dilatation of the veins only rarely gives rise to troublesome symptoms. Sometimes the patient complains of itching or of tension in the parts. Sometimes she becomes alarmed on account of the enlargement and consults the physician simply to know the cause. Occasionally, however, there may be marked enlargement (Fig. 434), with aching in the parts and much irritation of the skin. The danger in these cases is that a severe hemorrhage may take place, or a large hematoma form from slight injury or from spontaneous rupture of a varicose vein.

Treatment.—Usually no treatment is required beyond directing the patient to keep the bowels well open and to avoid lifting or straining as much as possible. Anything that increases the intrapelvic pressure or interferes with the pelvic circulation tends to increase the venous dilatation. In advanced pregnancy, an abdominal supporter takes some of the weight of the uterus from the anterior part of the pelvis and in that way may improve the circulation there. If the dilatation is sufficient to give the patient trouble, some relief may be afforded by a pad and T-bandage, so applied as to support the veins and prevent further dilatation. The patient should take the recumbent posture several times daily, and in some cases it may be advisable to keep her in bed continuously in the later weeks of pregnancy.

If there should be subcutaneous rupture of a vein, employ the treatment given under Hematoma.

If there should be external rupture, employ the treatment given below for open hemorrhage following injury.

When in the nonpregnant patient the veins are so much enlarged that they are troublesome, they may be excised. They are exposed by an incision through the skin covering them, the affected veins are isolated and ligated at each end and excised, the stumps are brought together, and the incision closed by sutures.

Hematoma of Vulva

A hematoma is a collection of blood in the tissues. The genitals are very vascular and also present much loose subcutaneous tissue into which hemorrhage may take place with but little resistance until a large mass is formed (Fig. 435).

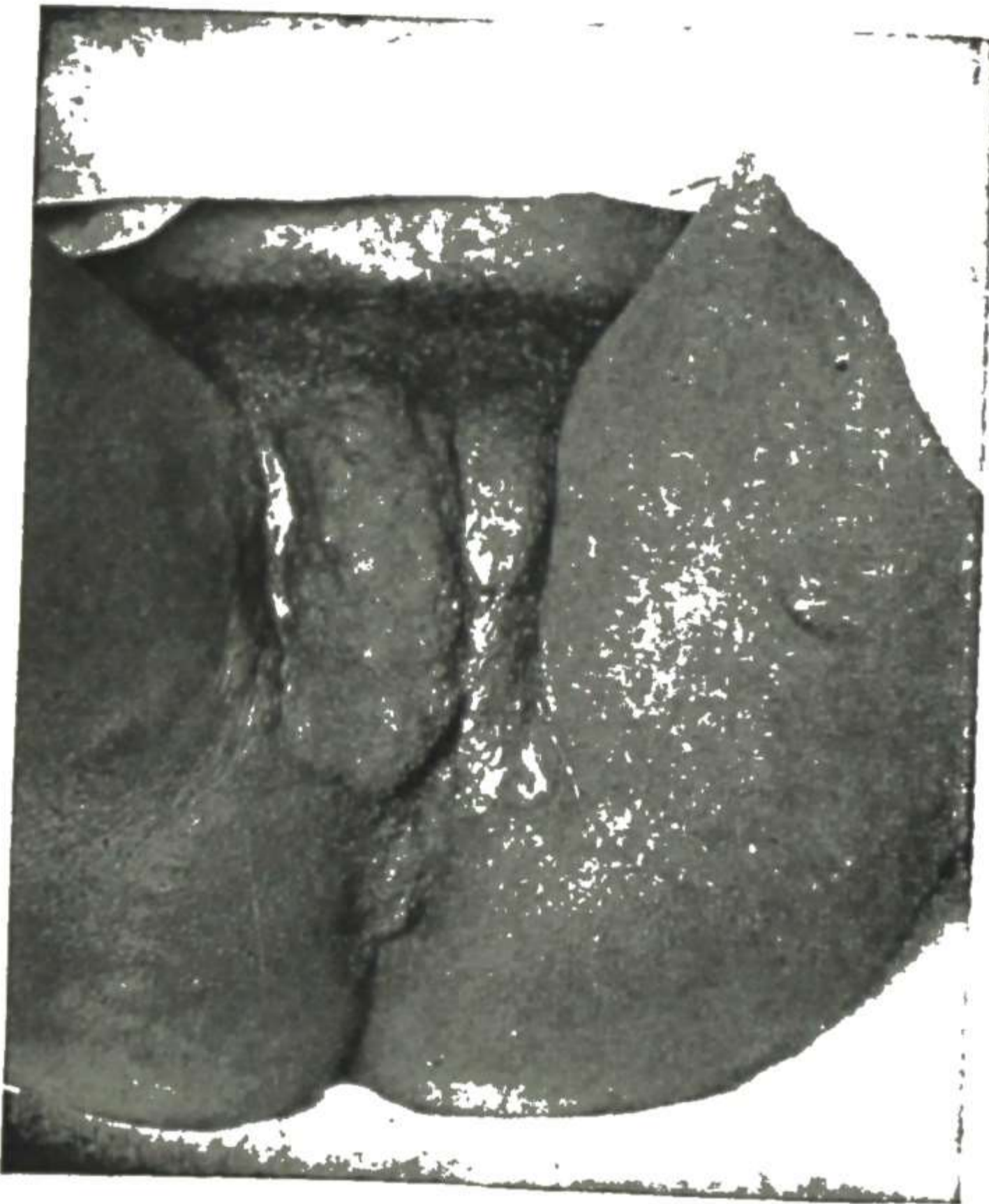


Fig. 434.

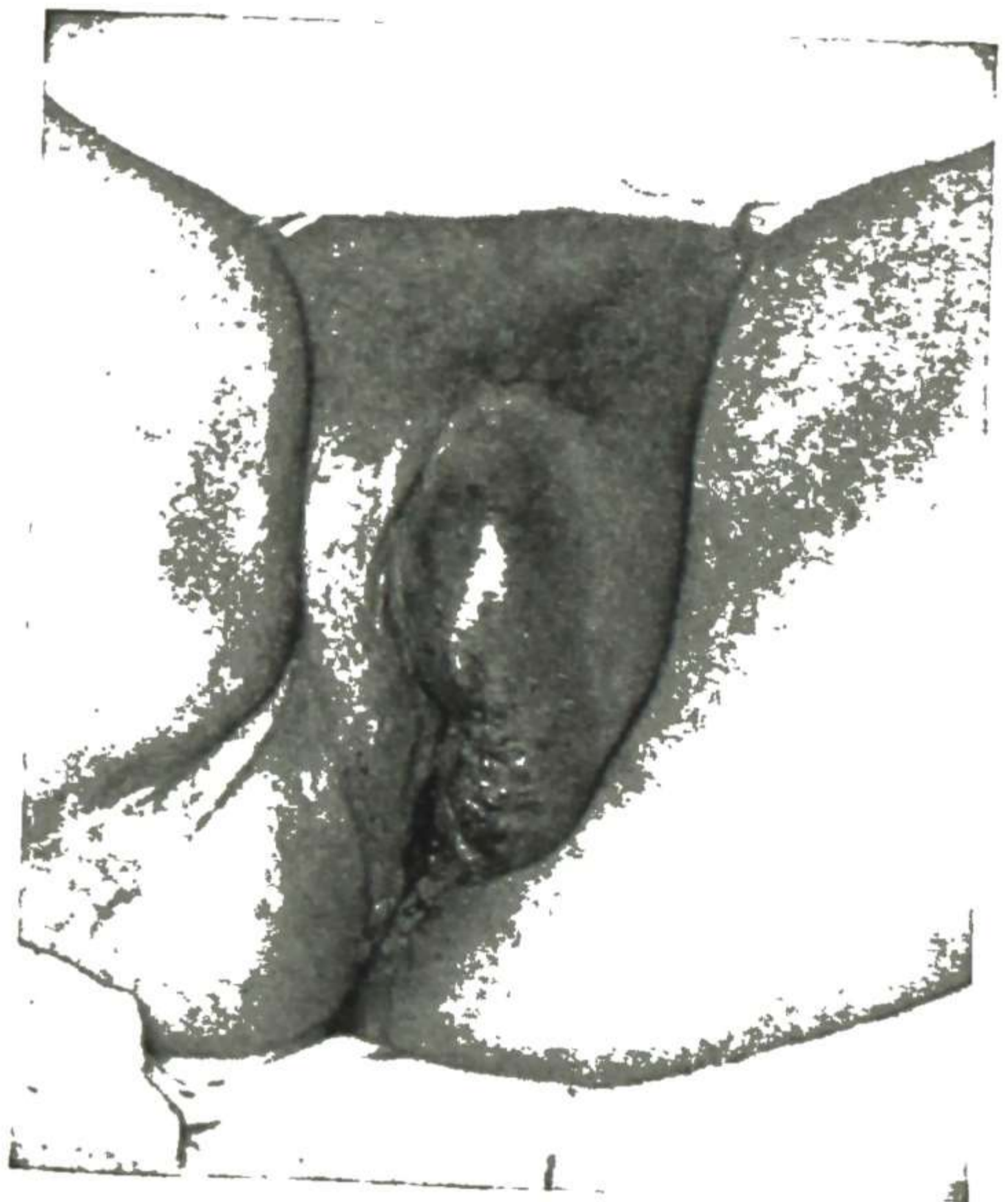


Fig. 435.

Fig. 434.—Varicose veins of the vulva. (Hirst—*Diseases of Women.*)

Fig. 435.—Hematoma of the vulva. (Hirst—*Diseases of Women.*)

After some slight injury, a swelling is noticed, which increases rapidly in size and is accompanied by considerable pain, especially when the patient is standing. If large, the swelling distorts the parts very much, in some cases so much that the individual structures are identified with difficulty. The swelling presents induration and, if a large collection of blood has formed, there may be fluctuation.

Treatment.—Put the patient to bed and elevate the hips by placing a pillow under them, at the same time arranging a pillow under the knees so that the patient will be comfortable, and apply an ice bag over the swelling. The patient should be kept perfectly quiet in this position until the hemorrhage ceases—several hours if necessary. If there is much pain, sedatives should be given to keep the patient quiet. The cessation of the hemorrhage is indicated by the swelling ceasing to increase in size and by diminution in the pain.

If the hematoma is very large and increasing in size, it may be advisable to incise the swelling, under antiseptic precautions, turn out the clots, ligate the bleeding vessel or vessels, cleanse the cavity, and obliterate it with sutures.

Injuries of External Genitals

The genitals are in such a well-protected situation that injuries are rare. Such injuries as do occur, apart from labor, are due usually to a fall astride some object or to kicks and blows intentionally inflicted, or to injuries from coitus.

Injuries in this locality should be treated on the same general principles that govern the treatment of injuries in other localities; viz., stop hemorrhage, secure asepsis as far as possible, approximate divided tissues sufficiently to restore function, and afterward protect the wound with a suitable dressing.

There are two special characteristics of injuries in this locality that must be kept in mind:

1. **Free Hemorrhage.**—The parts are very rich in blood vessels, particularly veins, and slight injury may cause severe bleeding, either as external hemorrhage from an open wound or as subcutaneous hemorrhage from a bruise, giving rise to a hematoma.

An instance of troublesome hemorrhage from a slight injury is the persistent bleeding that occasionally follows the small tear of the hymen in the first coitus. On account of modesty and embarrassment, the newly married couple hesitate to call in assistance, and sometimes the bleeding persists for hours—until they do finally call a physician, who may find the bedding soaked with blood and the bride almost exsanguinated.

OPEN HEMORRHAGE from injury to genitals should be stopped by packing or by sutures or by forceps or by ligature of separate vessels or by ligature of the bleeding tissue *en masse*, as indicated by the nature of the wound. After treatment of the wound, the patient should be kept in bed with hips elevated until all tendency to hemorrhage is past. In attempting to stop hemorrhage, either from a wound or during an operation, if the bleeding vessels cannot be made out and the bleeding is free, the most satisfactory plan is to pass one or more sutures through the bleeding area and tie them.

In case of injury about the venous masses called the bulbs of the vestibule, the hemorrhage, whether open or subcutaneous, may often be controlled by packing the vagina firmly and then putting a firm compress over the vulva, such as a folded towel held in place by a strong T-bandage, making firm pressure.

In SUBCUTANEOUS HEMORRHAGE (hematoma) the patient should receive the treatment described elsewhere for that affection.

2. **Marked Swelling.**—In this locality the subcutaneous tissues are loose and decided swelling is liable to follow an injury, either immediately from subcutaneous hemorrhage or serous effusion or later from inflammatory exudate.

To prevent the swelling, or diminish it if present, put the patient to bed, elevate the hips and apply an ice bag over the parts. If the swelling is from inflammation, hot applications may give more relief than the cold.

For further treatment of vulvar swelling see Hematoma and also Cellulitis of Vulva.

NONMALIGNANT GROWTHS AND SWELLINGS IN VAGINA

Colpocele, **cystocele**, and **rectocele** are considered along with pelvic floor relaxation in Chapter V. A less common type of swelling in the vagina is the **cul-de-sac hernia** (Figs. 430, 431) which is considered in detail under uterine prolapse with which it is usually associated. **Obturator hernia** and other rare types of swelling, such as **pelvic lipoma**, must be kept in mind when making differential diagnosis of an uncertain soft mass in the vagina.

Endometriosis of the posterior peritoneal cul-de-sac involving the vaginal wall in that region presents the same features as endometriosis elsewhere. Figs. 436 and 437 show the microscopic features by low power and high power. Papillomas and also fibromas occur occasionally in the vagina.



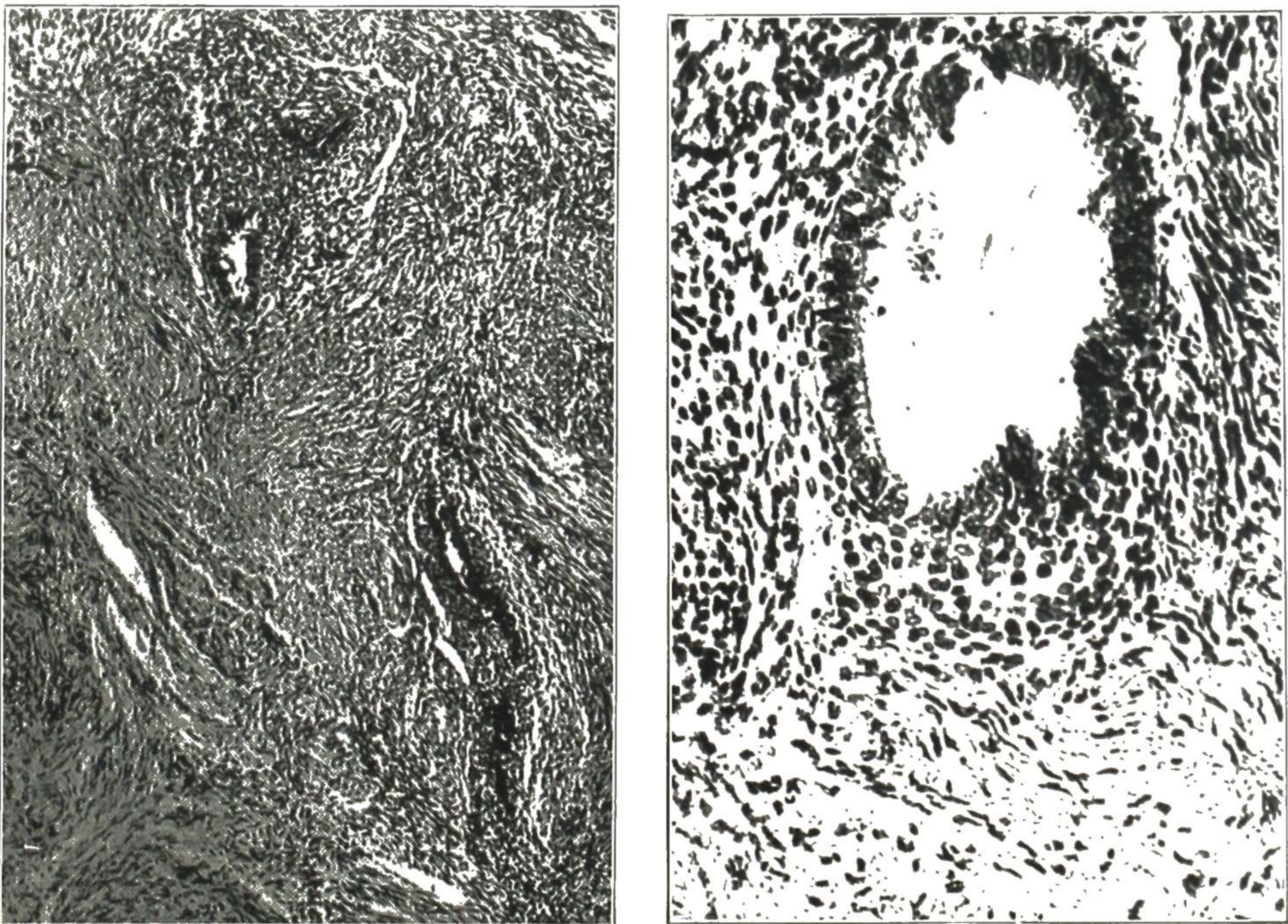
Fig. 436.—Endometriosis of the rectovaginal septum. On the right edge is seen the squamous epithelium of the vagina and on the left edge is an endometrial gland deep in the muscle. Gyn. Lab.

Solid tumors (fibroma, myoma, adenomyoma) occasionally develop in the vaginal wall. Such a tumor may be mistaken for hernia, rectocele, cyst, or a malignant tumor. Solid tumors in this situation are so rare as to require no detailed consideration, but the possibility of their existence must be kept in mind when endeavoring to determine the character of the swelling in this region.

Vaginal cysts are not especially uncommon. Since the vagina normally contains no glands, the question of the origin of the cysts is naturally of interest. Most pathologists feel that they are remnants of Gärtner's duct, carried over from embryonic life. The cysts are usually small and are rarely of importance, but occasionally they become very large. Frank has reported a case of large multiple vaginal cysts accompanied by large varicosities requiring cesarean section for delivery. Microscopically, the lining of these cysts may be low cuboidal epithelium or there may be several types of lining cells: ciliated, nonciliated, columnar, or squamous. Vaginal cysts are shown in Figs. 438 to 441. In some cases the vaginal wall is separate from the cyst and moves freely over it, while in other cases the vaginal wall is closely adherent to the cyst, apparently forming part of it.

The contents of the cyst may be like serum or may be milky or may be dark and thick, the color and consistency depending on the amount of hemorrhage into the cyst cavity.

Diagnosis.—The cyst differs from vaginal HERNIA in that it is of gradual development without apparent cause, gives, on coughing, no impulse separate from that of the adjacent vaginal wall, cannot be reduced, and is not associated with intestinal disturbance. The cyst differs from vaginal ABSCESS in that inflammatory symptoms are absent. In some cases, infection of the cyst contents takes place and the cyst becomes an abscess. In such cases it is distinguished from a simple abscess by the presence of a swelling long before the inflammatory symptoms developed. In some cases a swelling that appears to be a vaginal cyst is simply a pocket from the urethra (suburethral abscess).



A.

B.

Fig. 437.—Endometriosis of rectovaginal septum. The tumor was a small nodule about 1 cm. in diameter and was removed by vaginal incision. A, Shows smooth muscle in which are embedded glands surrounded by a definite mantle of stroma. B, High power, showing gland with surrounding stroma and muscle. Gyn. Lab. (Schwarz—*Trans. Am. Assoc. Obst. and Gynec.*)

Two other conditions that should receive attention in the differential diagnosis of vaginal cyst are: double vagina and double ureter. In a case of **double vagina**, the second vagina may be completely shut off and filled with old menstrual blood. It would usually be somewhat larger and less tense than the ordinary vaginal cyst, though the latter is frequently of considerable size. There would be double uterus and the relation of the mass to the uterus would point to one-sided hematocolpos. From **hydroureter** or a **supernumerary ureter**, the differentiation would also be rather difficult and depend principally on the shape and tension of the swelling. In a case of double ureter, if one ended blindly alongside the vagina and became distended with urine, it would form

a mass which would be more sausage-shaped and have less tension than a vaginal cyst. A puncture of the mass with an aspirator needle, of course, aids greatly in differentiating between these conditions—the presence of blood speaking for hematocolpos, and of urine for hydroureter.



Fig. 438



Fig. 439.

Fig. 438.—Cyst of vaginal wall arising from Gaertner's duct. (Ingraham—*J. A. M. A.*)
 Fig. 439.—Dermoid cyst of vagina which has ulcerated into bladder. (Quinby—*J. A. M. A.*)

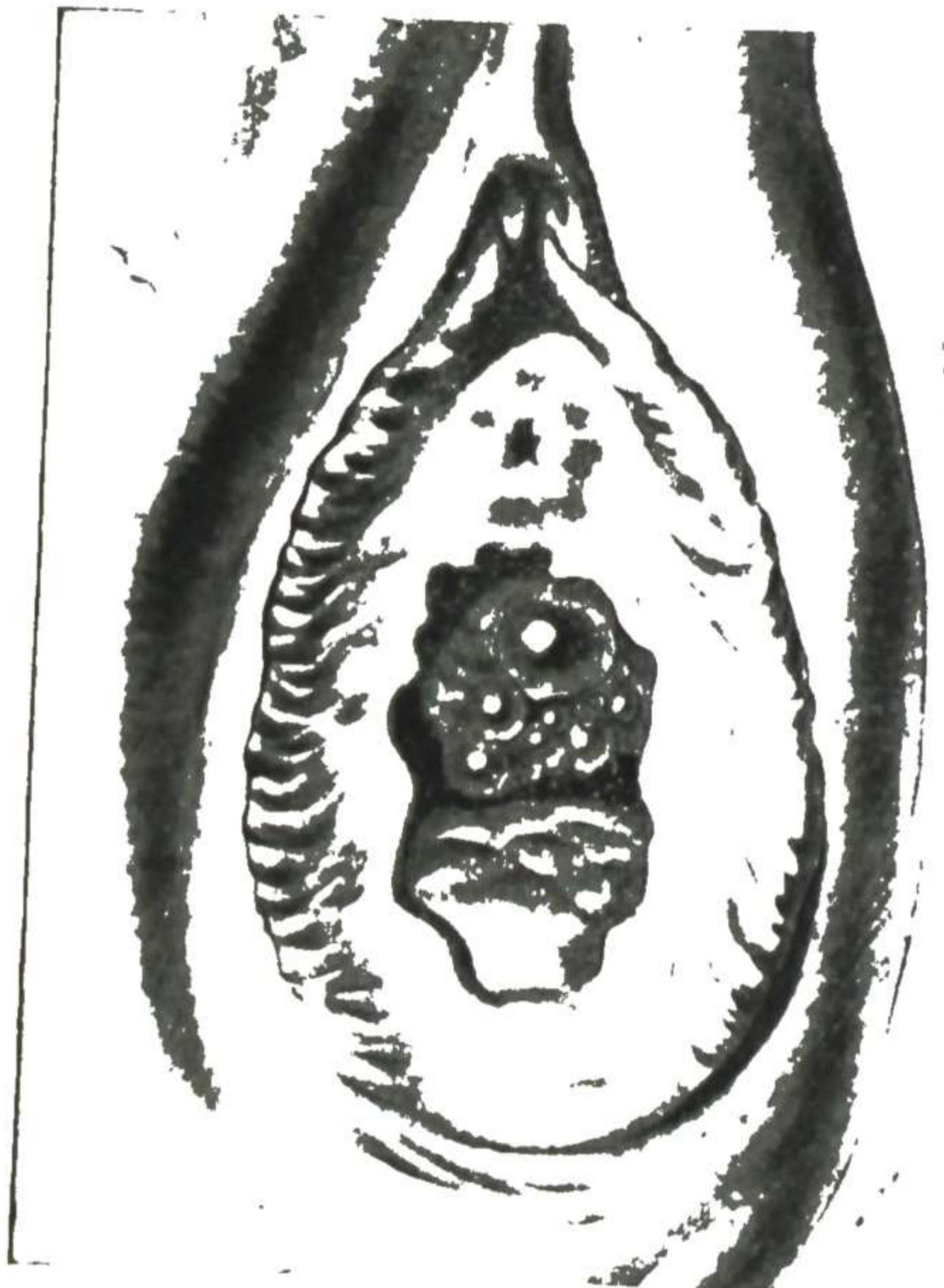


Fig. 440.



Fig. 441.

Fig. 440.—A group of small cysts of the vaginal wall. (Montgomery—*Practical Gynecology*.)
 Fig. 441.—A small cyst of the vaginal wall. (Hirst—*Diseases of Women*.)

Hernia must be carefully excluded before aspirating, or fatal peritonitis may result. If it is intended to remove the cyst by operation, only a small amount of fluid should be removed for diagnostic purposes, for the extirpation is more easily carried out when the cyst is distended than when collapsed.

Treatment.—If the cyst is large and troublesome, the most satisfactory way of dealing with it is by extirpation, provided it is situated in the lower part of the vagina where complete extirpation is practicable. A cyst due to remains of Gärtner's duct may extend up into the broad ligament, a point to be kept in mind in attempted removal. If a cyst is so situated that it cannot be completely extirpated, remove a large part of the wall, curette the remaining portion, pack with gauze, and treat as an abscess cavity. If the patient is averse to operation, the cyst may be simply emptied by aspiration. There is a possibility that it will remain collapsed for some time or even permanently. The probability, however, is that it will refill in a short time and that extirpation will be necessary.

If the cyst is first discovered during pregnancy, do not disturb it until labor begins. When labor comes on and the child's head is beginning to press into the pelvis, empty the cyst with an aspirator, to give room for the passage of the child. Do not attempt extirpation of the cyst or incision and drainage until the patient has recovered from parturition.

MALIGNANT DISEASE OF THE VULVA

Cancer of the external genitals includes carcinoma (usually of the squamous-cell type), chorioepithelioma, and sarcoma.

Carcinoma of Vulva

Carcinoma of the vulva is found in about 3 per cent of cases of cancer of the genital tract. The relative frequency of vulvar cancer to uterine cancer varies in different series from 1 to 20 to 1 to 30. The greatest incidence of cancer of the external genitals is between the ages of sixty and seventy, but

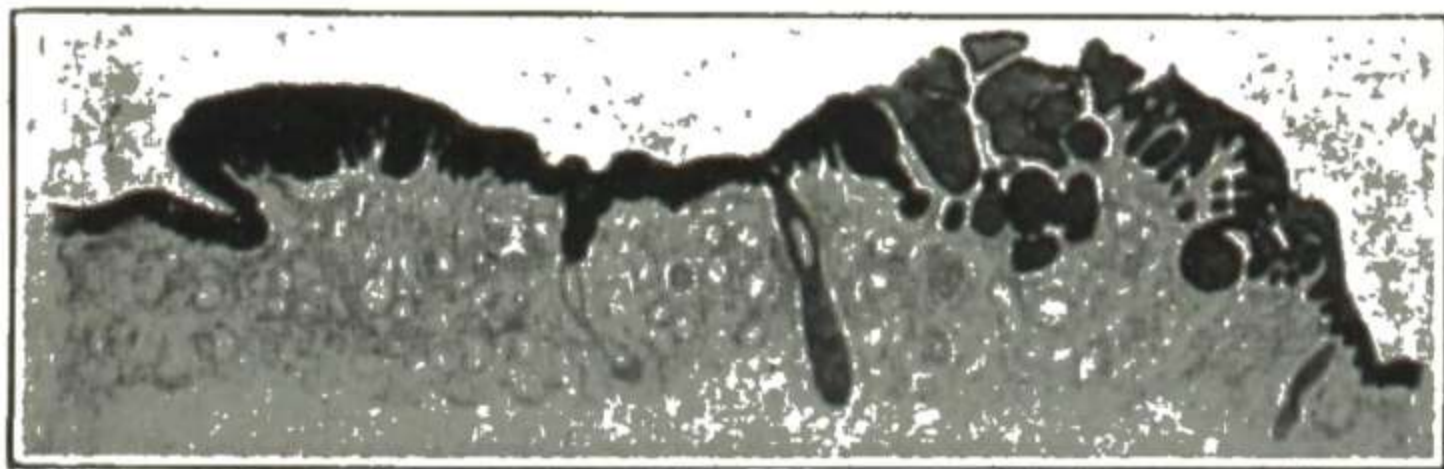


Fig. 442.

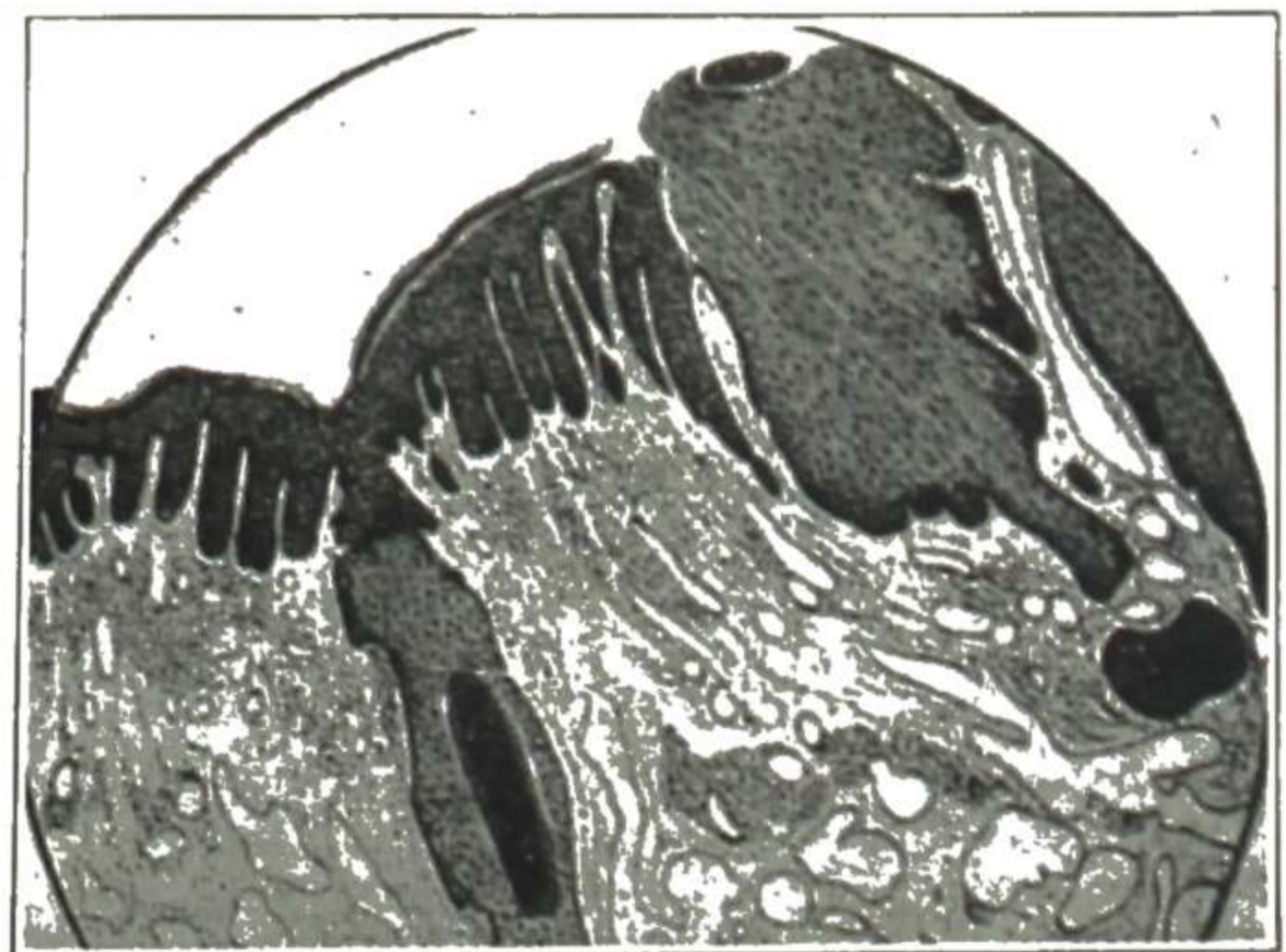


Fig. 443.

Figs. 442 and 443.—Carcinoma of vulva starting on a leucoplakic base. Fig. 442 is a microscopic section, low power, showing the leucoplakic vulvitis and the carcinoma. Fig. 443 is high power of the margin of the invading carcinoma (at the right). (Eden—*Trans. Am. Gynec. Soc.*)

it may occur at any age. Taussig found that leucoplakic vulvitis was a precursor of the cancer in 50 per cent of the cases in the large series he reported. Examples of origin from the chronic irritation of leucoplakic vulvitis and of condyloma are shown in Figs. 442 to 446.

Taussig classifies carcinomas of this region into four groups, based on the point of origin, as follows: 1. Epidermal cancer, springing from the skin. Its most frequent site is the prepuce. Microscopically it is evident that the growth is a skin cancer. The characteristics are shown in Figs. 447 and 448. 2. Carcinoma of the clitoris. This is a subdermal tumor of extreme malignancy. Histologically the cells resemble sarcoma cells.

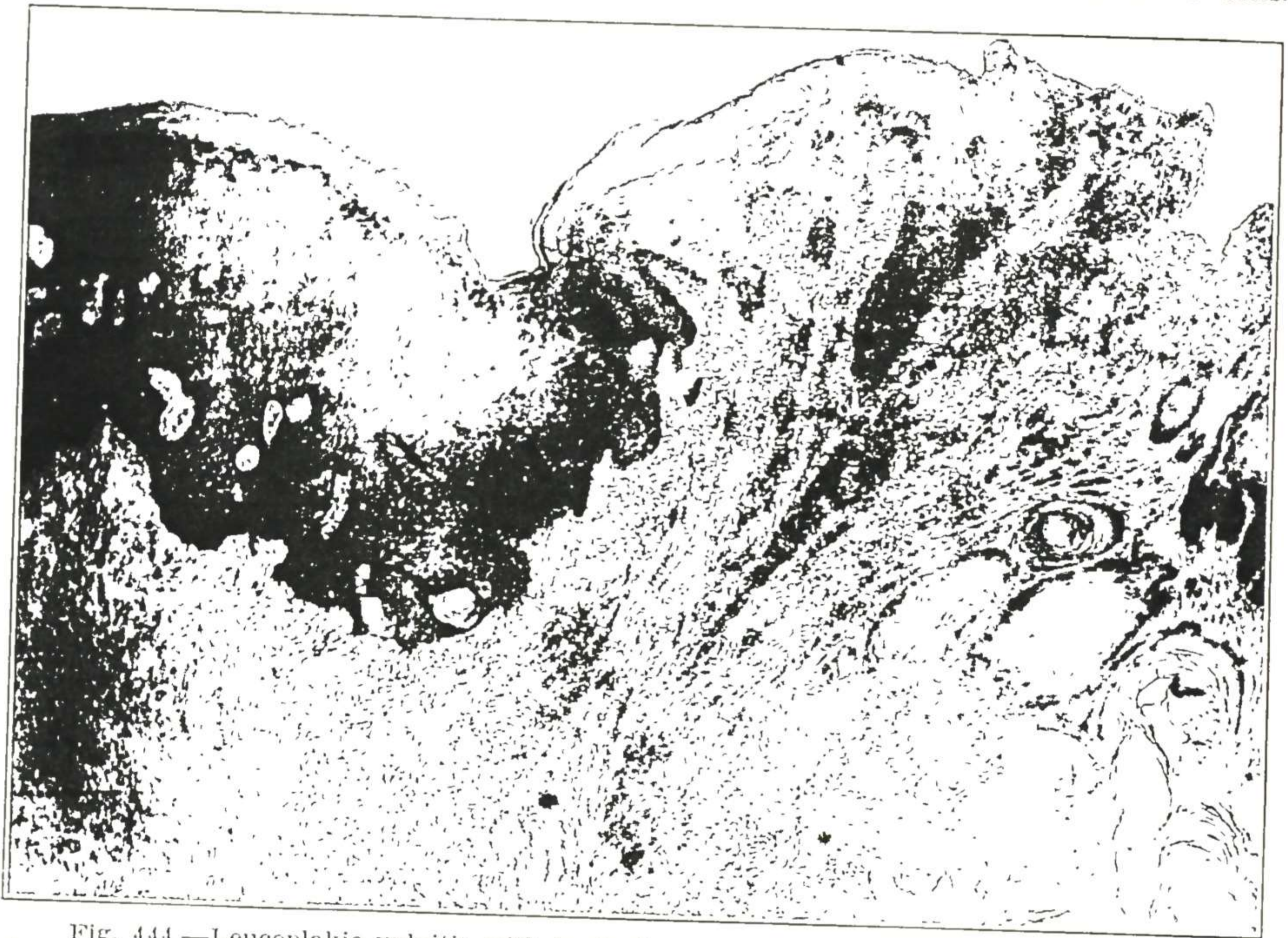


Fig. 444.—Leucoplakic vulvitis with beginning carcinoma. The leucoplakia is in the stage of epithelial hypertrophy which precedes marked atrophy. This is an excellent example of a squamous carcinoma beginning on a leucoplakic base. Gyn. Lab.



Fig. 445.



Fig. 446.

Figs. 445 and 446.—Carcinoma of clitoris starting from condyloma. Fig. 445 is a microscopic section, low power, showing condyloma and carcinomatous area. Fig. 446 is high power showing the edge of the invading carcinoma. (Taussig—*Trans. Am. Gynec. Soc.*)

3. Vestibular cancer, arising usually from the urinary meatus. Histologically it reproduces the tissue from which it springs. 4. Bartholin gland carcinoma.

Epithelioma is the most frequent form. This begins usually on the lower portion of the labium majus as a small hard nodule with a bluish tinge, especially about the edge. The nodule grows slowly and at first may produce no symptoms. In some cases, however,

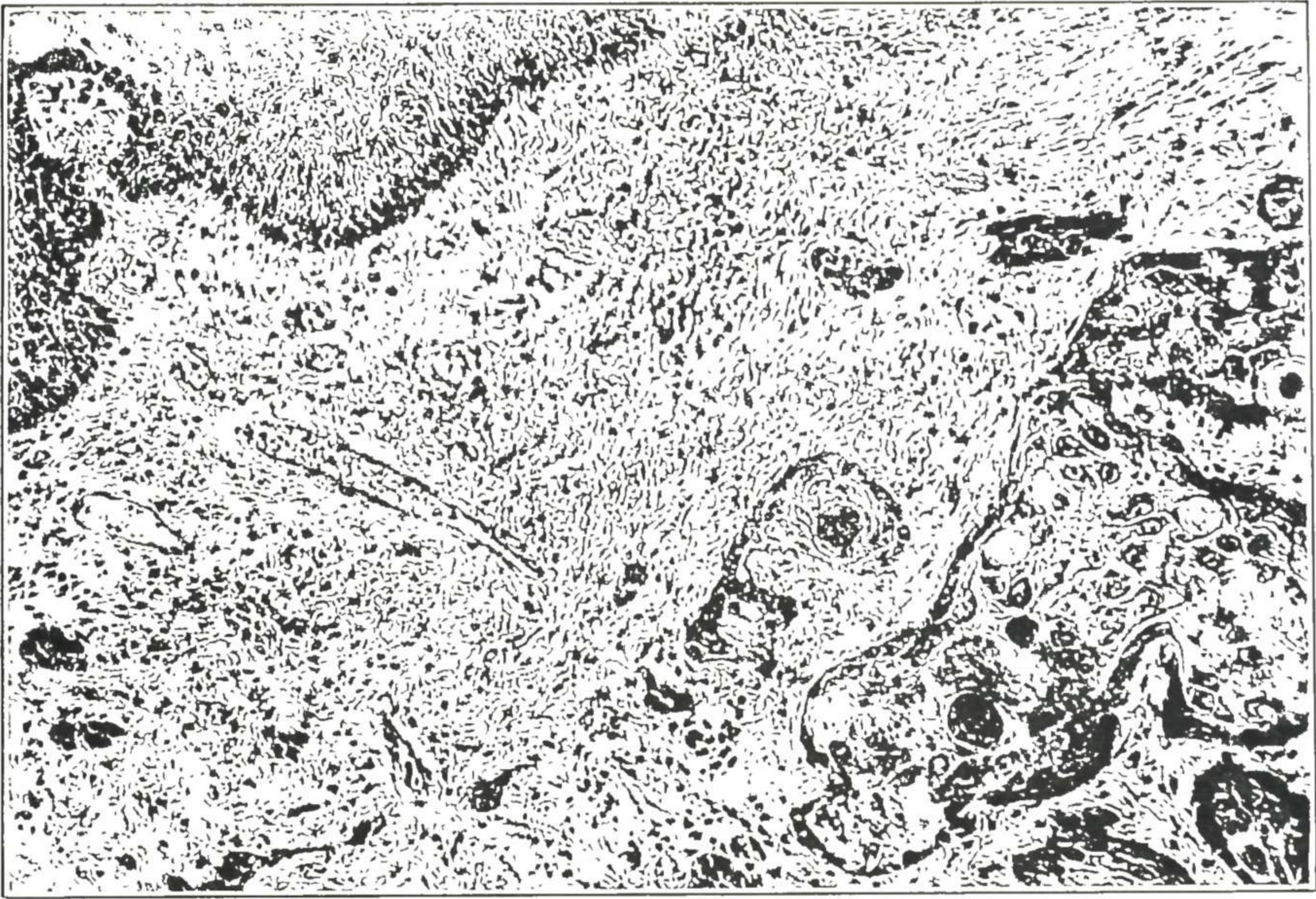


Fig. 447.—Carcinoma of the vulva. High power, showing a portion of the leucoplakic epithelium above and a nest of carcinoma cells below and to the right. Gyn. Lab.

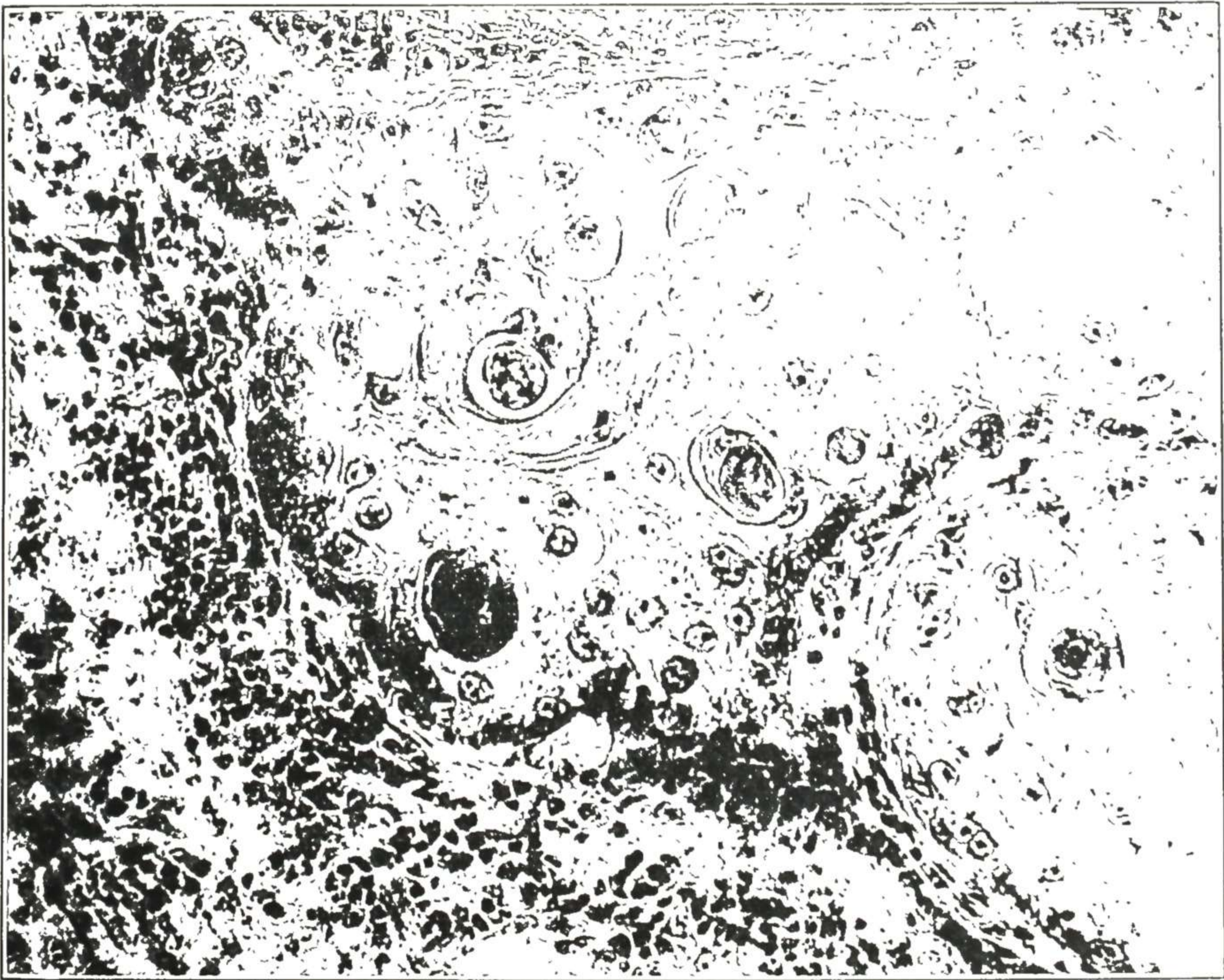


Fig. 448.—Carcinoma of the vulva. Higher power of the nest of carcinoma cells, showing the variation in size, mitoses, and pearl formation. Note the round cell infiltration at the periphery. Gyn. Lab.



Fig. 449.

Fig. 449.—An epithelioma of the right labium. (Hirst—*Diseases of Women.*)



Fig. 450.

Fig. 450.—Carcinoma of labium minus, beginning. (Hirst—*Diseases of Women.*)



Fig. 451.

Fig. 451.—An epithelioma of the clitoris. (Hirst—*Diseases of Women.*)

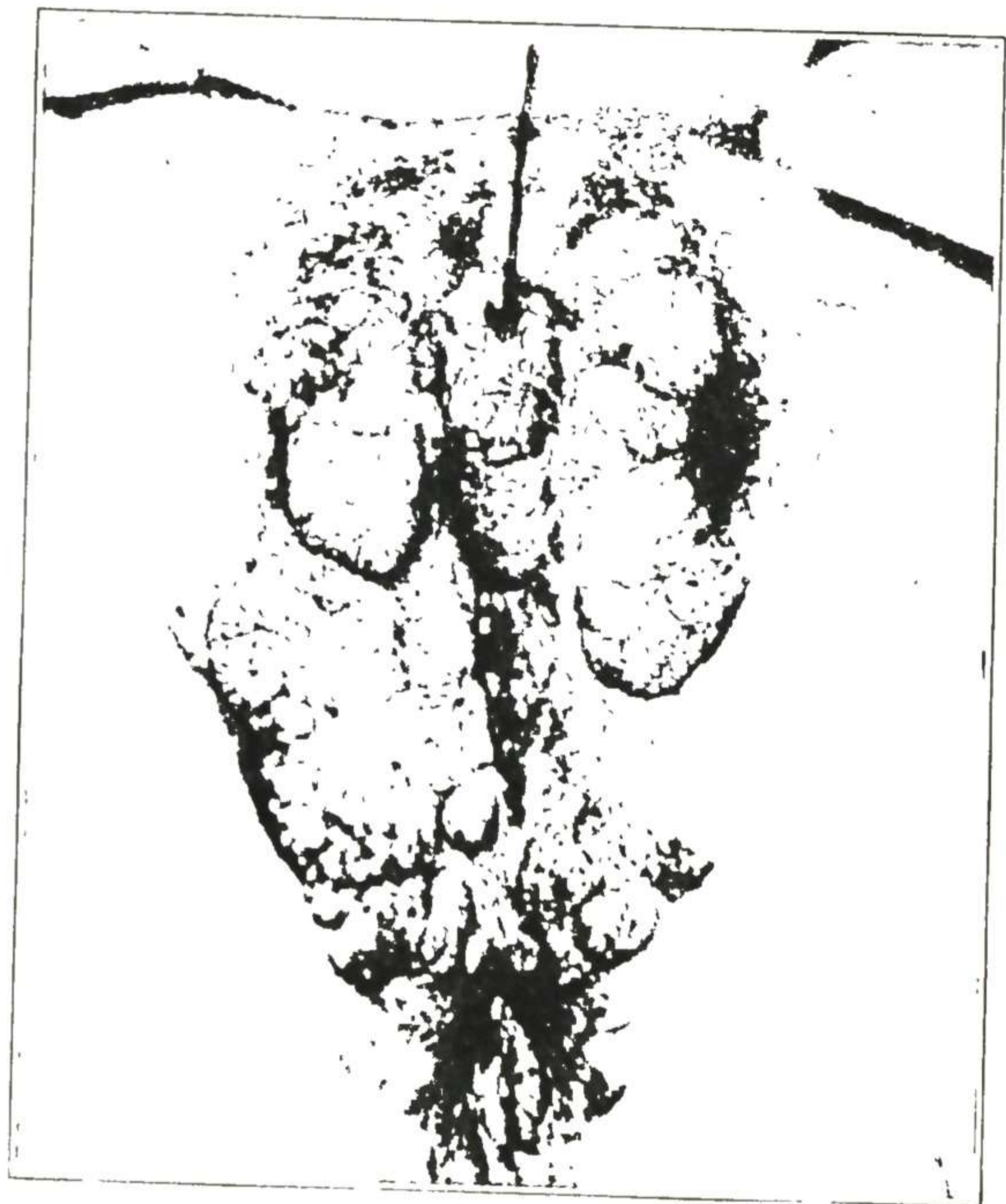


Fig. 452.

Fig. 452.—Carcinoma of clitoris, starting from condyloma. (Taussig—*Trans. Am. Gynec. Soc.*)

even from the first there is severe pruritus. After a time, part of the nodule breaks down, forming a small ulcer which is surrounded by an area of induration (Figs. 449 to 454). There is a watery discharge sometimes mixed with blood. It may begin in the labium minus (Fig. 450) or in the clitoris (Fig. 451). After the malignant induration breaks down and ulcerates, the progress is rapid. The adjacent surfaces become involved in the destructive process, and in the later stages a large fungating mass may form.

The relation of chronic vulvar irritation, particularly leucoplakic vulvitis, to the origin of cancer is indicated in the illustrations.

The inguinal glands become enlarged early, at first simply from the lymphatic enlargement that always takes place when there is inflammation or persistent irritation of the genital region. Later the glands become infiltrated with cancer cells and often are greatly enlarged. In the later stage the carcinomatous glands break down and ulcerate externally.



Fig. 453.

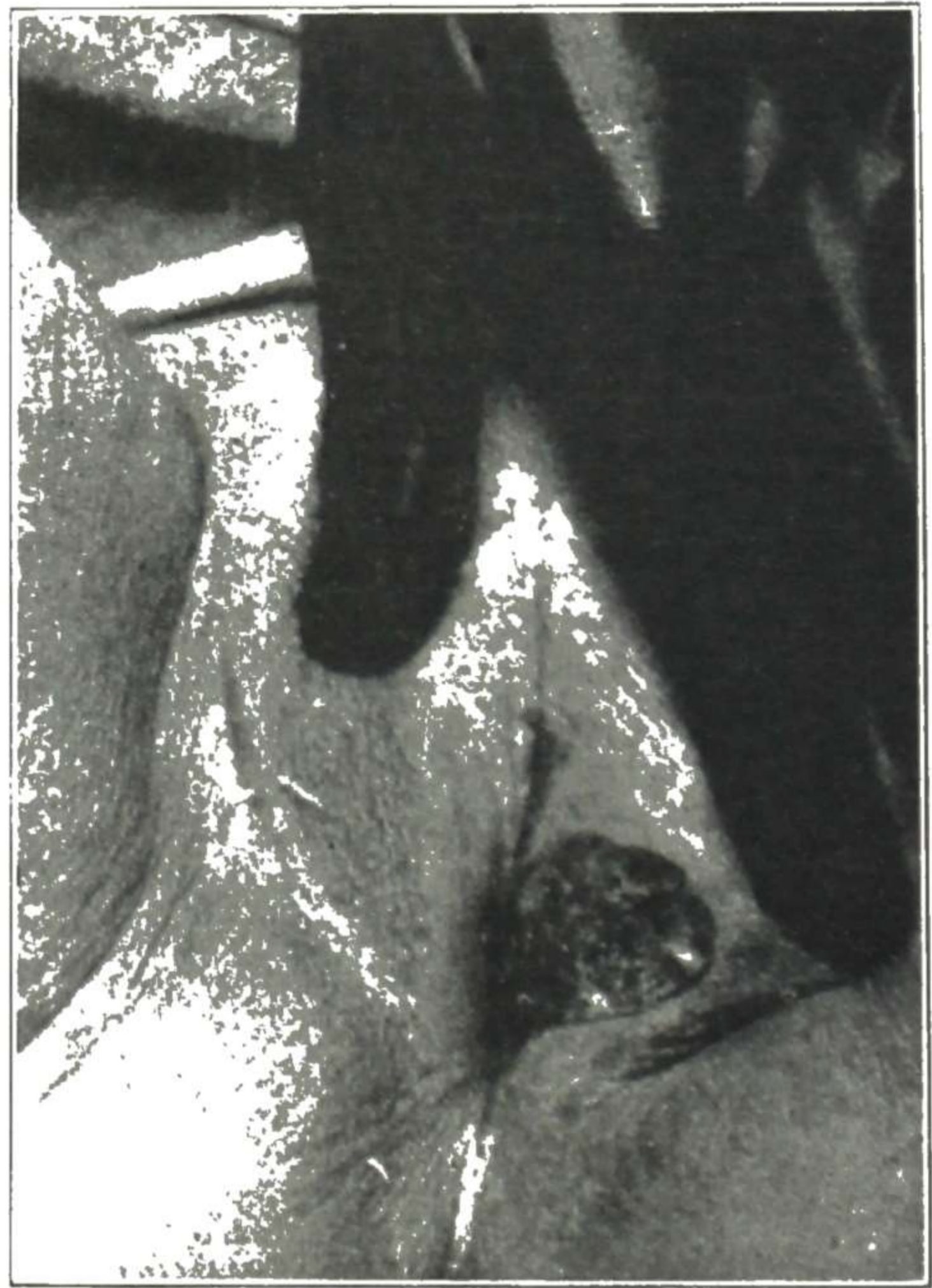


Fig. 454.

Fig. 453 and 454.—Two patients with carcinoma of the vulva starting on a base of leucoplakic vulvitis. (Taussig—*Trans. Am. Gynec. Soc.*)

Carcinoma of the vulvovaginal gland is shown in Figs. 455 to 459. It originating in the duct it is of the squamous-cell type; if in the gland, of the cylindrical-cell type. Rothchild reported an incidence of 17 cancers of this gland in 395 vulvar cancers (4 per cent), while Taussig found 4.5 per cent in his personal series of 89 cases of vulvar cancer. The vulvovaginal gland carcinoma has reached an unusual size before breaking down by ulceration. The very rapid growth in pregnancy is shown in Figs. 458 and 459.

Diagnosis.—The patient may suffer from burning and superficial pain in the early stages and later there may be severe pain from involvement of the deeper structures. Carcinoma of the clitoris has been observed, and may be melanotic. The urinary meatus is another site where cancer occasionally de-

velops after long-continued irritation; and in any persistent infiltration there, this condition should be considered. In all of these forms of growth, treatment in a very early stage gives the only probability of cure. Consequently, in the case of a suspicious ulcer or nodule in which the diagnosis remains doubtful after careful treatment for a short time, a piece of the margin of the area should be excised for microscopic examination.

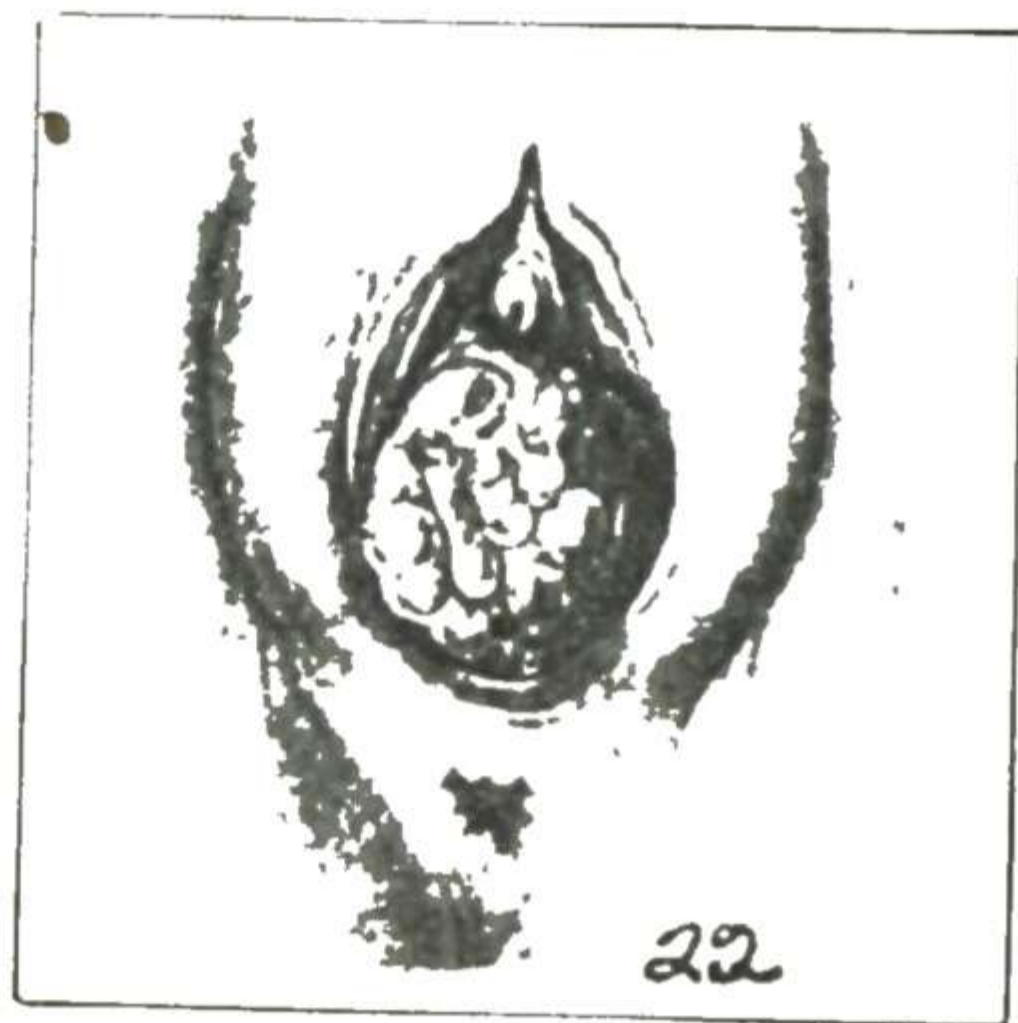


Fig. 455.



Fig. 456.

Figs. 455 and 456.—Carcinoma of vulvovaginal gland. Fig. 455, gross appearance; Fig. 456, microscopic, low power. (Davis—*Tr. Am. Assn. Obst. and Gynec.*)

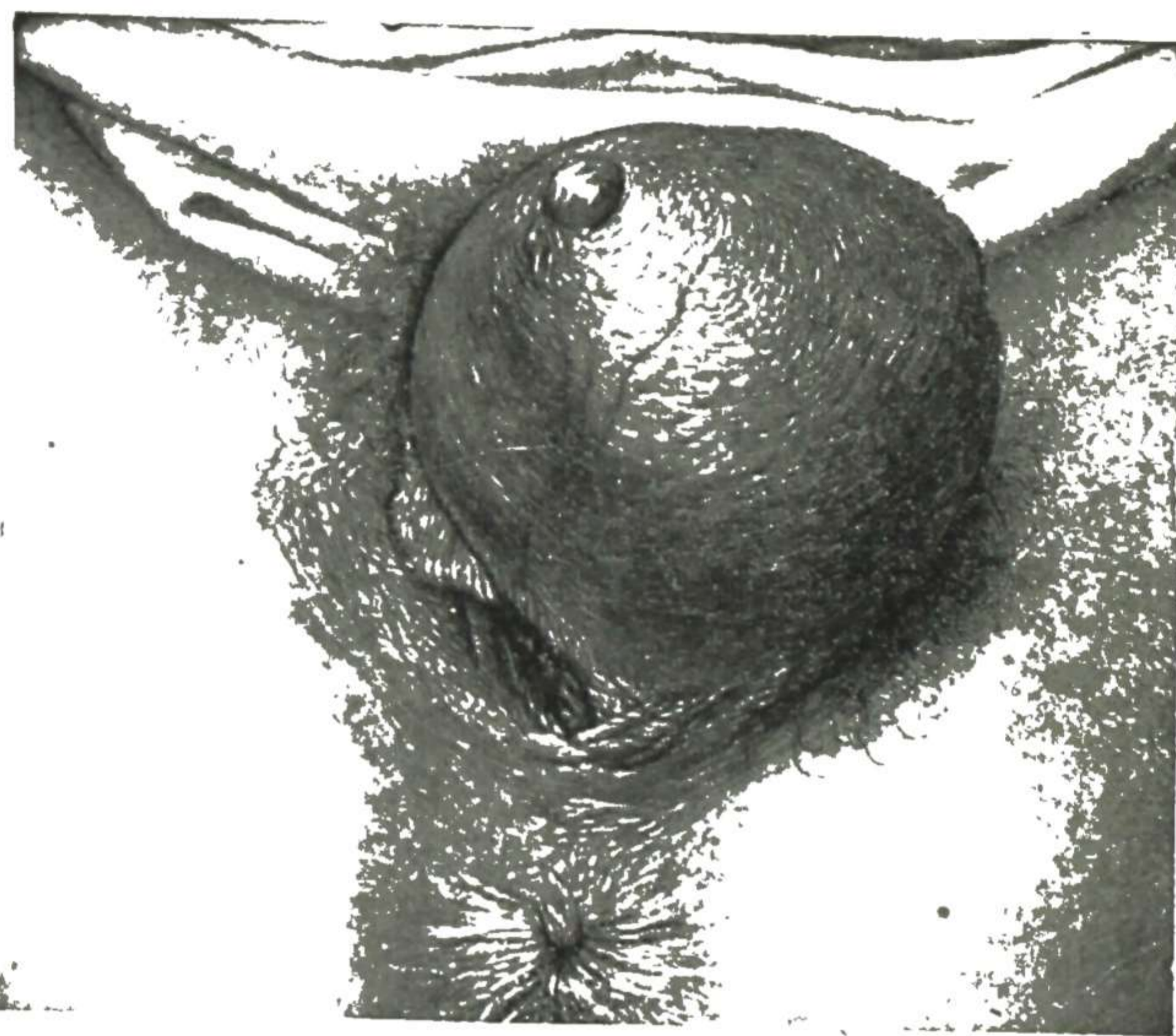


Fig. 457.—A large carcinoma of the left vulvovaginal gland. (Kelly—*Operative Gynecology.*)

Treatment.—Early and wide excision with adjacent gland removal is the treatment to employ in operable cases. Taussig from his special study and large experience with vulvar cancer gives in a recent article the following conclusions:

1. Early recognition and prompt adequate treatment are extremely rare in cancer of the vulva. In spite of this the disease, because of its relatively slow growth, offers a reasonably good prognosis.

2. Prevention of carcinoma of the vulva by early excision of the leucoplakic vulva should materially lower the incidence of the disease.

3. Radiologic treatment of the disease gives disappointing results, and is usually attended by painful burns.

4. The complete modified Basset operation gives splendid results in patients with operable lesions who are under sixty-five years of age. In older patients only those in better than average physical condition with relatively early lesions should be subjected to this procedure.

5. Approximately two-thirds of the cases of cancer of the vulva are still operable at the first examination. In those in whom a Basset operation is done we can expect a five-year survival in about three out of five, even though two out of five already show evidence of lymph gland metastasis.



Fig. 458.



Fig. 459.

Fig. 458.—Carcinoma of the vulvovaginal gland, with a seven-month pregnancy.

Fig. 459.—Two months later, showing the very rapid growth during pregnancy. (Penick—Personal Communication.)

Prevention.—As such a large proportion (50 per cent) of cases of vulvar cancer are preceded by leucoplakic vulvitis or other form of chronic irritation, the matter of possible prevention assumes much importance. On this point, Taussig concludes as follows:

I am convinced that we have been very remiss in our preventive measures in the past. The incidence of vulvar carcinoma might very possibly be cut in half, if we would adopt the following measures:

1. A complete vulvectomy in cases of well-developed leucoplakic vulvitis, and rigid supervision, at least twice a year, in milder cases where the patient refuses operative treatment.
2. Intensive antisyphilitic treatment in tertiary lesions of the vulva, especially in negroes.

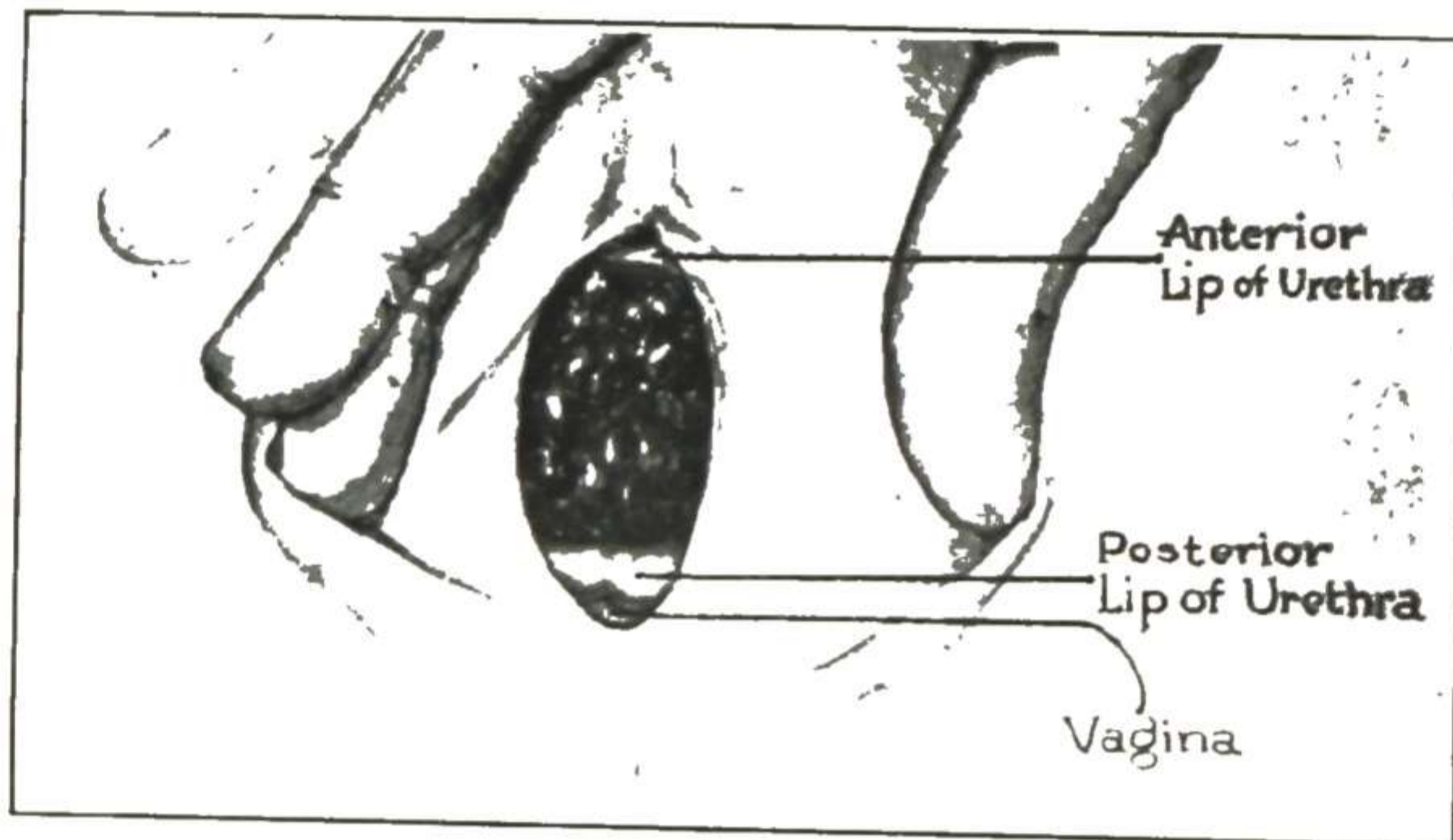


Fig. 460.—Melanosarcoma of urethral meatus. Labia spread apart exposing the tumor. (Newell and Scrivner—*Am. J. Obst. & Gynec.*)



Fig. 461.—Melanosarcoma of urethral meatus. Low power, showing the tumor beneath the squamous epithelium, taken from Fig. 460. (Newell and Scrivner—*Am. J. Obst. & Gynec.*)

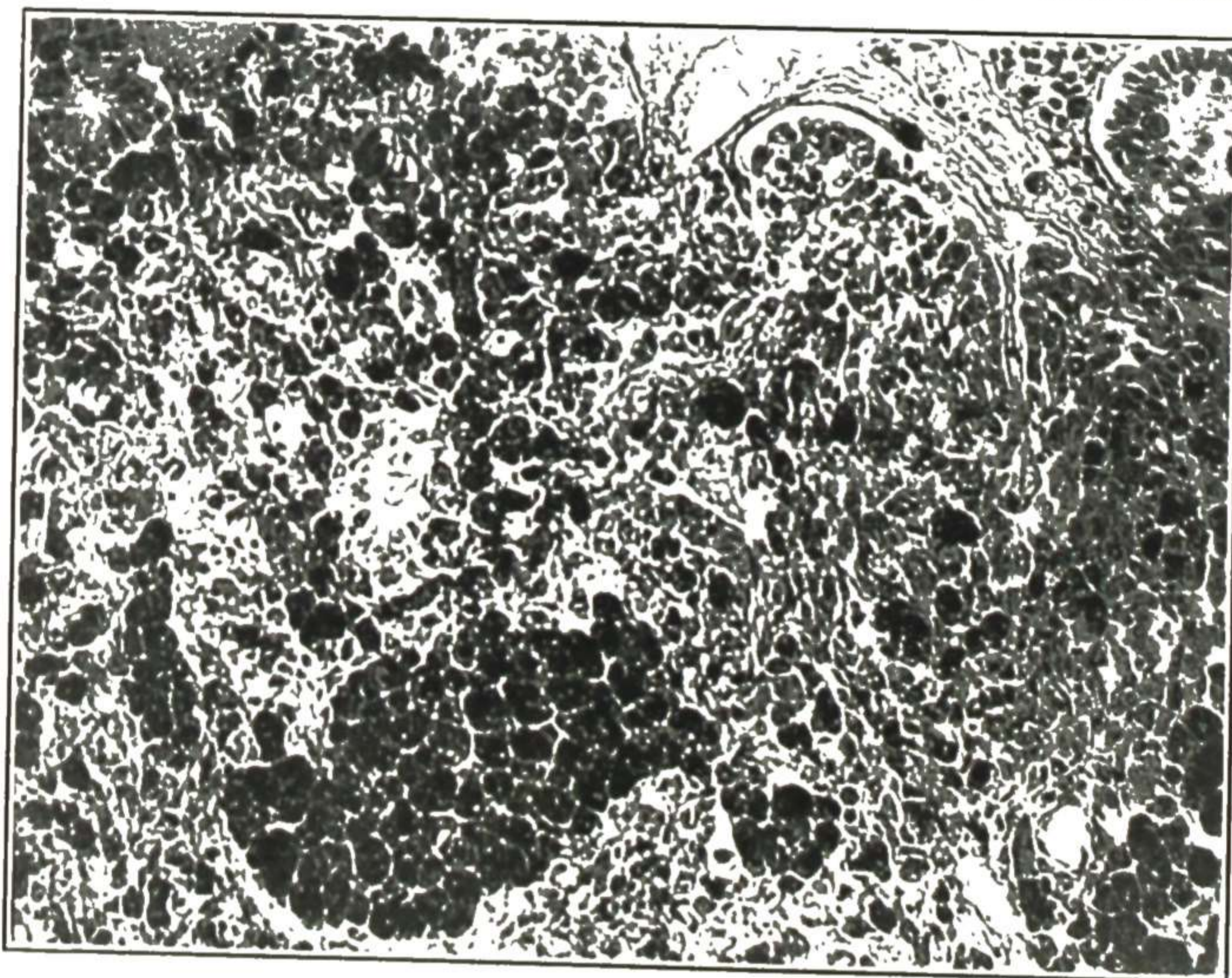


Fig. 462.—Melanosarcoma of urethral meatus. Higher power of Fig. 461, showing the malignant melanoma cells. (Newell and Scrivner—*Am. J. Obst. & Gynec.*)

3. Removal of vulvar warts in women past the menopause.

4. Close observation or excision of enlarged Bartholin glands in women over forty years of age.

5. Cautery excision or radiant treatment of urethral caruncles.

Particularly in leucoplakic vulvitis would I stress the advantages of surgery over nerve resection or treatment with ovarian hormones. The latter undeniably often decreases the pruritus, but the question whether the use of such carcinogenic substances may not at times predispose to the development of a cancer might very well be raised.

Sarcoma of Vulva

Sarcoma may arise as a tumor of the subcutaneous tissue in the vulva the same as elsewhere on the body, or it may result from malignant changes in a fibroma. The age incidence is much younger than for carcinoma. These tumors are very malignant and are rarely cured.

Melanosarcoma is an especially malignant type. One arising from the region of the meatus is shown in Figs. 460 to 462.

The treatment of sarcoma of the vulva is the same as for carcinoma.

MALIGNANT DISEASE OF THE VAGINA

This occurs in three forms: namely, ordinary carcinomas (epithelium, adenocarcinoma), chorioepithelioma which is a form of carcinoma but is derived from fetal tissue instead of from the mother's tissue, and sarcoma.

Carcinoma of Vagina

Carcinoma of the vagina is usually secondary (Fig. 463) to carcinoma of the uterus or rectum or bladder or external genitals, and the treatment depends on the location and extent of the principal lesion. Primary carcinoma of the vagina (Fig. 464) is rare.

Squamous-cell (epithelioma) is of course the usual form. It appears as a papillary or nodular condition, usually first at the vaginal vault and later spreads downward toward the opening. The usual origin at the posterior fornix fits in well with acceptance of chronic irritation as an etiological factor, for this is the site of chronic irritation from retained discharge and also from pressure of pessary when it causes irritation.

In primary cancer of the vagina, as in cancer elsewhere, a positive diagnosis in the early stages must rest upon microscopic findings in an excised piece. The treatment is complete extirpation, if seen early enough, followed by x-ray therapy. The results thus far have been unsatisfactory. There is usually recurrence. If at all advanced, radium followed by x-ray is the preferable form of treatment.

CHORIOEPITHELIOMA.—This variety of carcinoma sometimes occurs in the vagina, representing an early metastasis. This curious form of tumor will be considered in greater detail under Malignant Disease of the Uterus. It arises from chorionic villi and may develop after normal parturition or after abortion or after mole-pregnancy. It usually develops in the uterus, but occasionally one of the chorionic villi transported to the vagina (pieces of chorionic villi are normally transported to various parts of the body in probably all pregnancies) takes on the peculiar change and forms a malignant growth. As it

grows, it breaks into the veins, and particles are carried to the lungs and form metastases there. Hence the advisability of x-ray examination of the lungs in any case of suspected chorioepithelioma. Occasionally the lung symptoms are the first noticed. Since such a growth in the vagina or in the vulva is usually metastatic from a similar growth in the uterus, the condition of the uterus should be investigated.

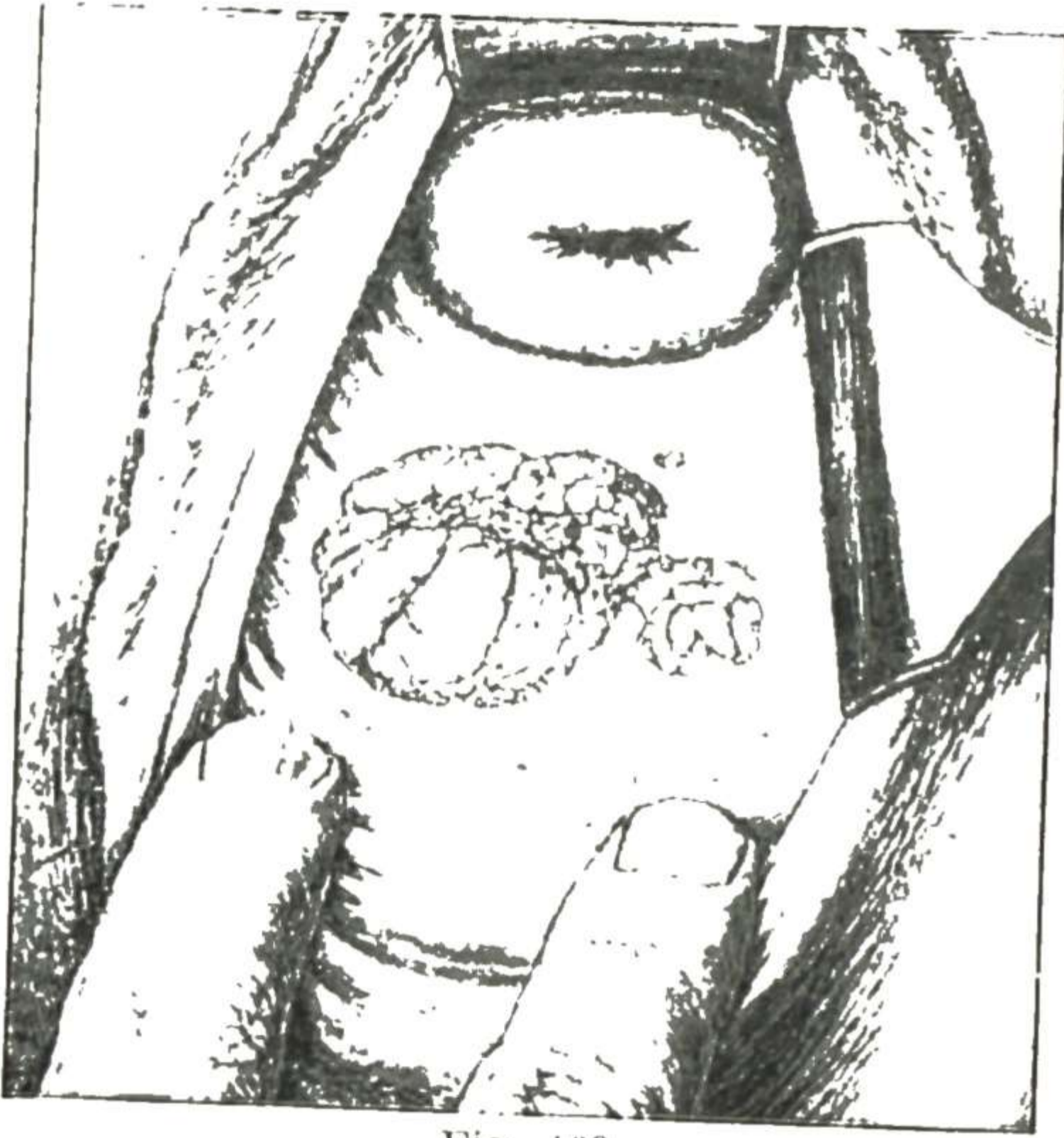


Fig. 463.

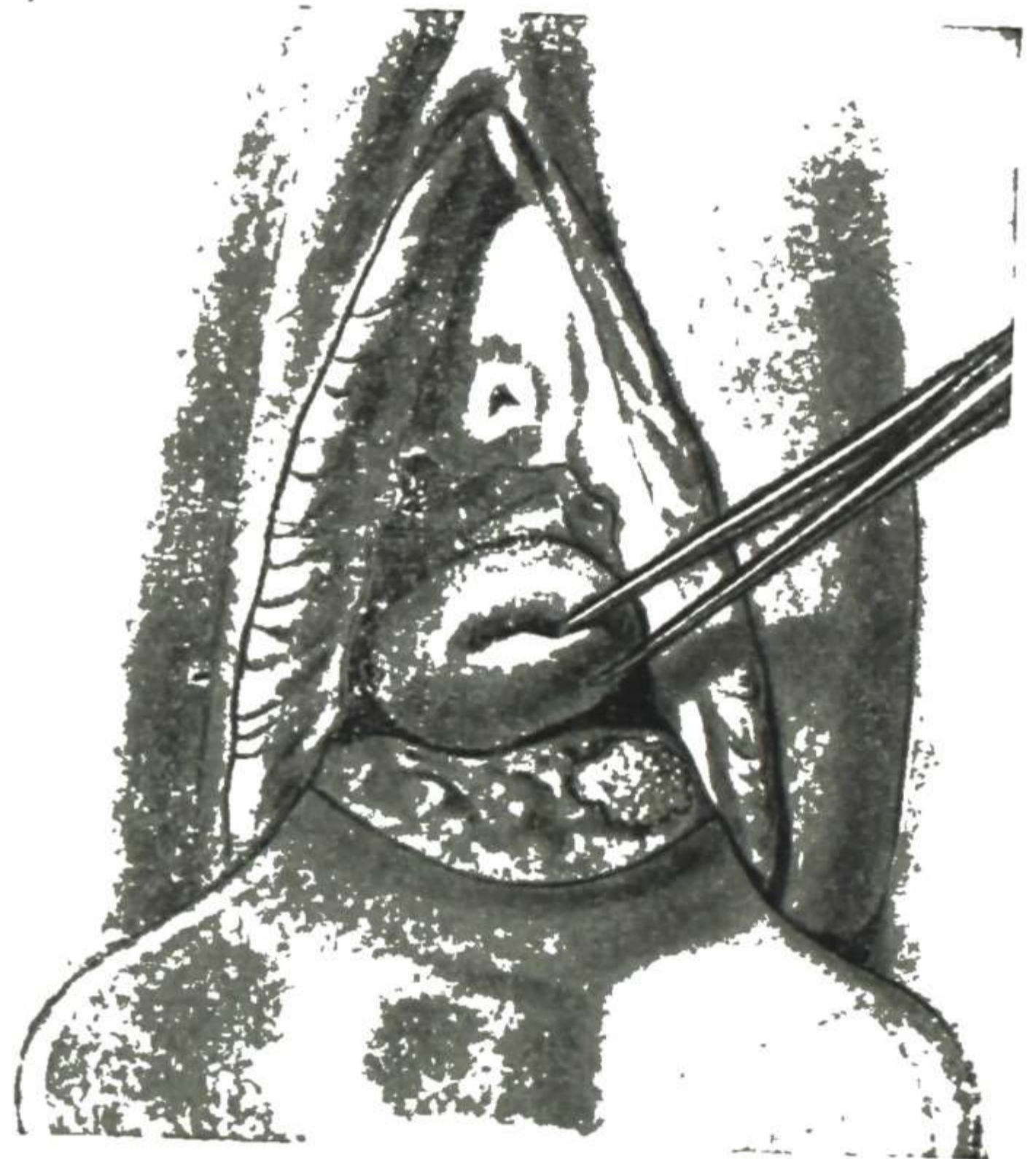


Fig. 464.

Fig. 463.—Secondary malignant ulceration of the vagina. In this case there was a carcinoma of the endometrium, and the discharge caused an implantation carcinoma where the cervix came in constant contact with the posterior vaginal wall. (Kelly—*Operative Gynecology*.)

Fig. 464.—Primary malignant ulceration of the vagina. (Montgomery—*Practical Gynecology*.)

Sarcoma of Vagina

One form in which sarcoma of the vagina occurs, is as a diffuse infiltration and degeneration of the lining membrane. This is the form sometimes found in young children. It occurs most frequently in the posterior vaginal wall. It begins as a small indurated area which slowly increases in size. After a time the epithelium covering the area is lost and an ulcer forms. The ulcer bleeds easily and is surrounded by an area of induration. A large part of, or even the entire circumference of, the vagina may become involved in the sarcomatous infiltration, which may be mistaken for carcinoma or tuberculosis. In another variety grapelike masses form in the vagina and may project outside, as in the case shown in Figs. 465 to 467. The treatment for sarcoma of the vagina is the same as for carcinoma.

Mixed tumors of the vagina, also called sarcoma botryoides, have been reported. They occur usually as a polyp on the anterior wall of the vagina, either present at birth or appearing shortly after birth. When removed they promptly recur and enlarge. They occur almost exclusively in children and sometimes do not exhibit their malignant qualities until after puberty. Microscopically there is a marked variation in the findings. Myxomatous tissue, striped and unstriped muscle, giant cells, round cells, and cartilage are some of the components found.

The symptoms of sarcoma of the vagina are leucorrhœa, hemorrhage, pain, and obstruction of the vagina by the infiltration. Slight hemorrhage may appear in the early stages, particularly after coitus or exertion. In the late stages, profuse hemorrhages occurs, and there is also a mucopurulent or watery

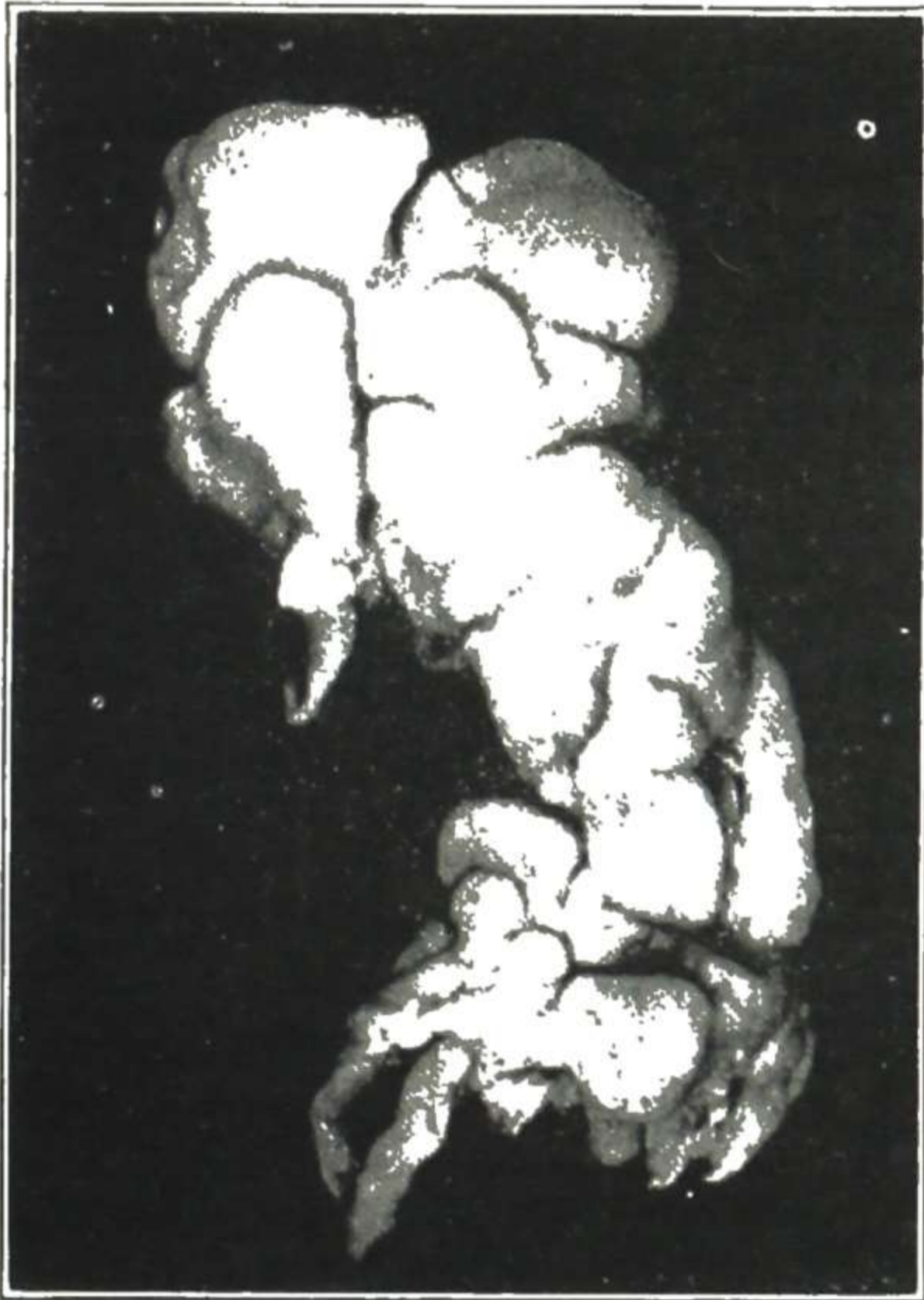


Fig. 465.



Fig. 466.

Fig. 465.—Sarcoma of vagina in child, aged five years. This specimen protruded from the vagina as a reddened cauliflower mass. Microscopic diagnosis, myosarcoma.

Fig. 466.—Microscopic section of specimen shown in Fig. 465. Low power. Gyn. Lab.

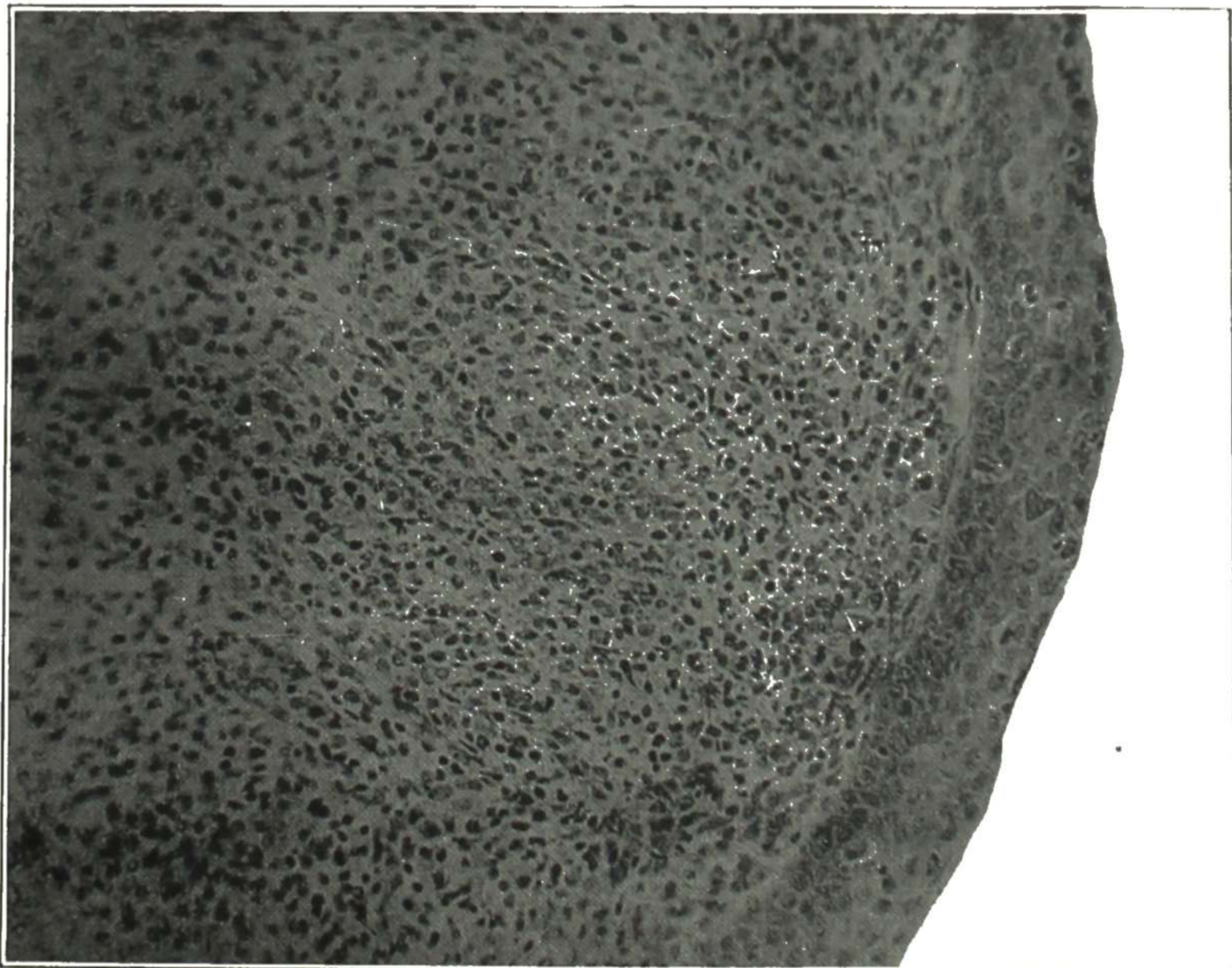


Fig. 467.—Microscopic section of specimen shown in Fig. 466. High power, showing the margin of one of the grapelike masses. Gyn. Lab.

discharge that may cause pruritus. The pain is slight at first but gradually increases in severity. It is usually worse at night. Examination reveals a nodular tumor or an area of induration or ulceration and more or less narrowing or obstruction of the vagina, and a microscopic examination shows the nature of the mass. The treatment is the same as for carcinoma.

MISCELLANEOUS DISTURBANCES

The miscellaneous disturbances of the external genitals and vagina include leucoderma (vitiligo) of the vulva and vicinity, adhesions of prepuce, adhesions of labia, hyperesthesia of vaginal entrance, and pruritus vulvae.

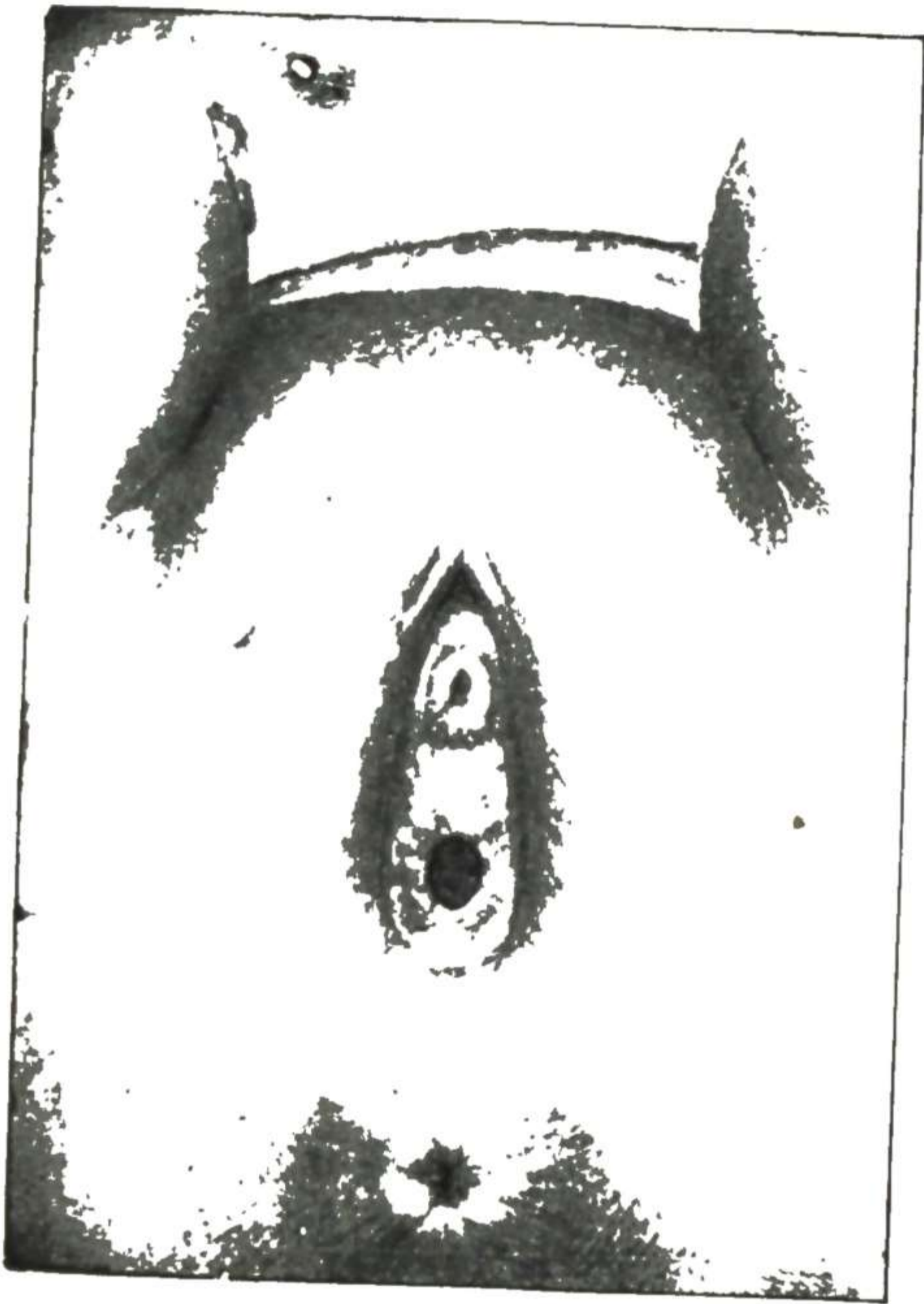


Fig. 468.

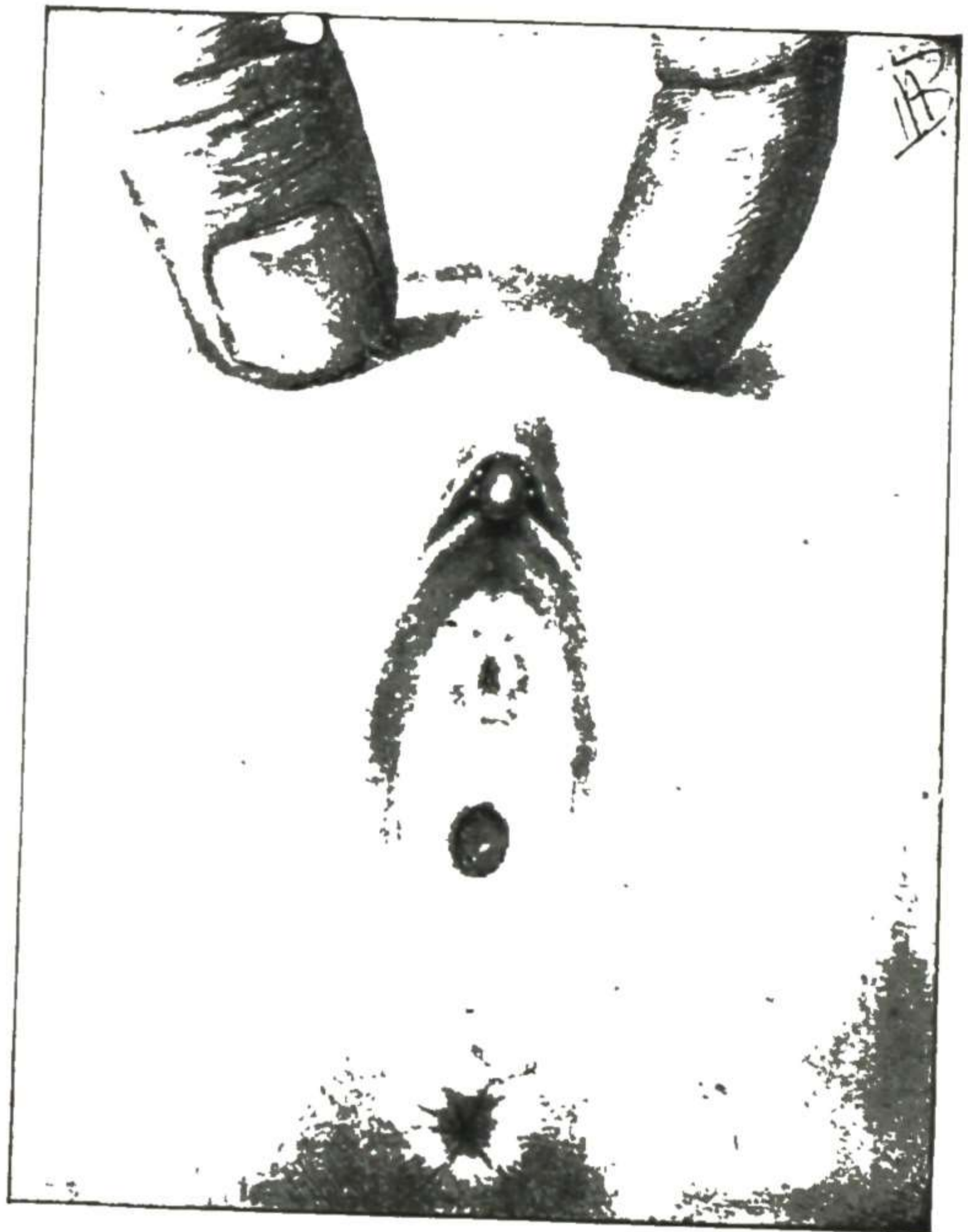


Fig. 469.

Fig. 468.—A case of adherent prepuce, the clitoris being entirely hidden. (Kelly—*Operative Gynecology*.)

Fig. 469.—The same case, with the adhesions separated and the prepuce pushed back and the clitoris exposed. Notice the smegma concretions which had formed under the adherent prepuce. (Kelly—*Operative Gynecology*.)

Leucoderma of Vulva

Leucoderma or vitiligo is a condition characterized by the loss of pigment in certain areas of the skin. As the term signifies, the skin is simply whitened. There is no infiltration nor stiffening nor hypersensitiveness. The skin of the affected areas retains its normal softness and flexibility, the only appreciable change being the loss of color. It may affect only a small area or may be extensive, with perhaps areas elsewhere on the body.

As there are no symptoms, local or general, the condition is seldom of clinical importance. It should, however, be watched to make certain that the small white area is not part of a developing leucoplakic vulvitis.

Adhesions of Prepuce

Not infrequently in infants, adhesions are found between the glands of the clitoris and the prepuce. In some cases the adhesions are extensive (Fig. 468) and much irritation is produced by retained secretion, not so rarely forming the underlying cause for the habit of masturbation acquired by a child. In such a case the adhesions should be separated. After applying a local anesthetic solution for five minutes, the adhesions are broken, the glans thoroughly exposed as in Fig. 469, and then the parts coated with some bland ointment, such as zinc oxide or vaseline.

Adhesions of Labia

The labia minora are occasionally found adherent. This condition may be congenital or acquired. In the latter case, the cause is inflammation or ulceration of various kinds, producing raw surfaces which come in contact and grow together. The adhesions are usually found in the unmarried, and especially in children and in the aged, when considerable irritation may persist without attracting notice. The adhesions between the labia are easily broken if recent, but later the adherent surfaces become firmly united by connective tissue and can be separated only with a knife. The treatment, when the adhesions are recent and weak, is to break them with a probe or other blunt instrument, separate the labia and keep them apart with pledgets of cotton. Treat the affected surfaces as indicated by the inflammation or ulceration present. When the adhesions are old and firm, the parts may be separated with the knife or scissors, or the line of union, with some of the thickened tissue on each side, may be excised. Sutures are then introduced to check the hemorrhage and close the raw surfaces.

Hyperesthesia of the Vaginal Entrance

The structures surrounding the vaginal orifice may be so hyperesthetic that coitus is very painful and in some cases impossible. Occasionally the parts are so tender and the nervous irritability so marked that attempts at sexual intercourse cause a spasm of the muscles surrounding the vaginal opening, including the levator ani. This spasmodic condition is known as "vaginismus."

There may be also a definite stenosis of the vaginal entrance due to rigidity of the hymen or adjacent tissues and making the opening so small that normal coitus is not possible and attempts cause pain.

Causes.—Hyperesthesia of the vaginal entrance occurs most frequently in nervous young women, newly married, or in women near the menopause. The cause of this marked hypersensitiveness may be as follows: (a) Urethral caruncle or inflammation about the meatus or along the urethra. (b) Painful fissures about the vaginal orifice or about the anus. (c) Inflammation of a rigid hymen or remnants of a hymen. (d) Neuromas on remnants of the hymen. (e) Neuroses. In some cases, especially in women near the menopause, the hypersensitiveness of the nerve endings is apparently due to atrophic thinning of the protective epithelial covering, which indicates treatment as for atrophic vaginitis. (f) Organic stenosis.

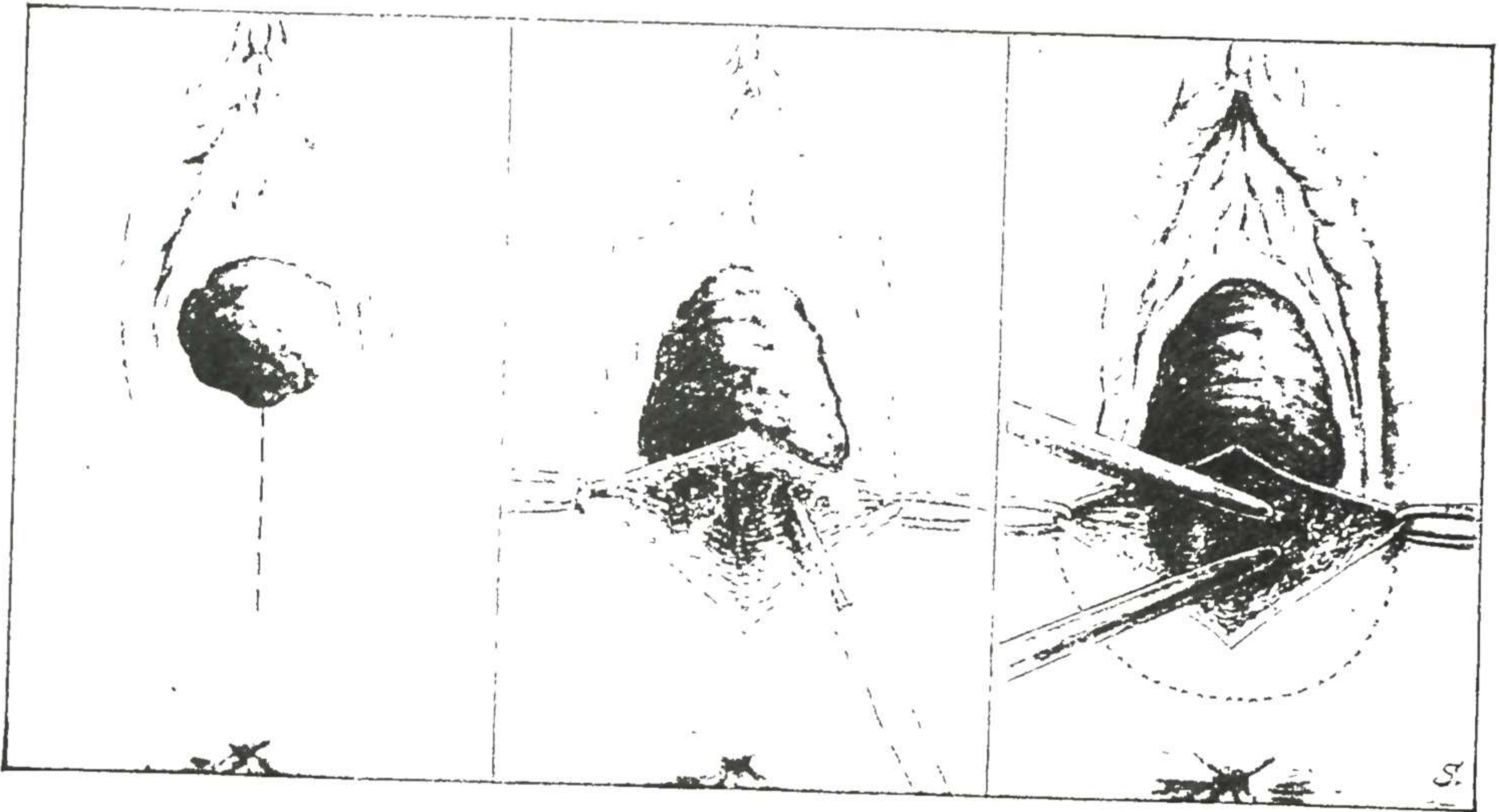


Fig. 470.

Fig. 471.

Fig. 472.

Fig. 470.—Open enlargement of the stenosed vaginal entrance. The broken line indicates the line of incision, which in severe cases should extend to the region of the sphincter ani, but of course taking care to stop short of that muscle.

Fig. 471.—The perineum has been divided, and the deep resisting levator sling is being incised. This incision of the levator muscle is to be made on each side and is to be extended deeper, step by step, as testing shows necessary to give a very wide opening. The opening must be enlarged sufficiently to allow for some subsequent spasmodic narrowing, for the tendency to spasm cannot be entirely overcome.

Fig. 472.—The skin flap is loosened by undermining, as indicated by the dotted line, and the mucous flap is likewise loosened. This loosening of the flaps should be sufficiently extensive to allow them to be brought together (Fig. 474) without much tension. In order to cover the raw surface without undue tension in severe cases it may be necessary to shift formed flaps of skin or mucosa, the incisions for forming each flap being so placed that the uncut base carries the regular blood supply.

The free bleeding from division of the deep tissues is controlled first by forceps, and then each forceps-bite is caught with a suture-ligature of chromic catgut. All approximation should be in an anteroposterior direction, as indicated in Figs. 471 and 472. Side to side narrowing must be carefully avoided. (Crossen and Crossen—*Operative Gynecology*.)

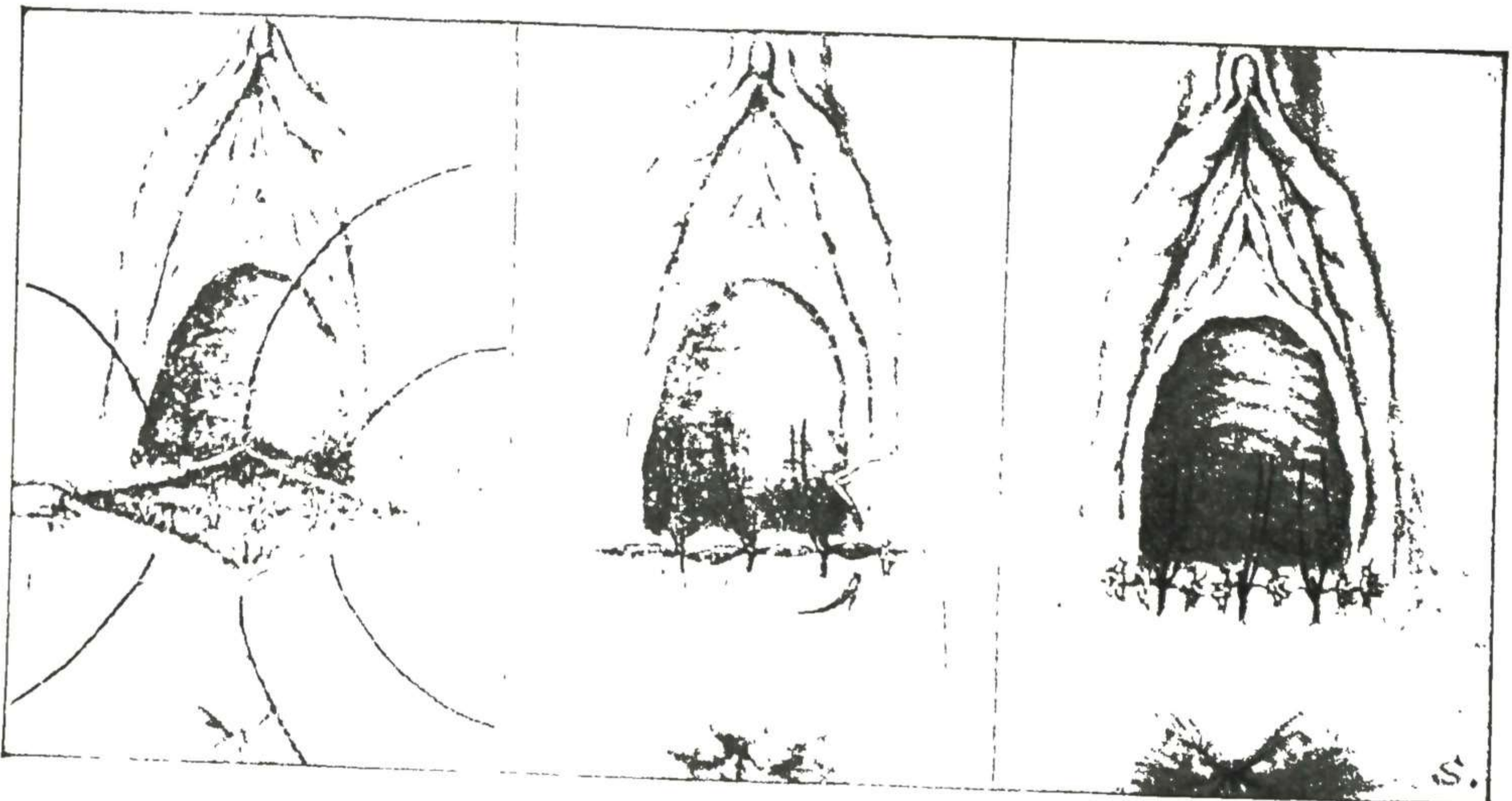


Fig. 473.

Fig. 474.

Fig. 475.

Fig. 473.—All bleeding should be controlled and the deep tissues fully approximated, as here shown, before the superficial flaps are sutured together. Secure approximation of the deep tissues in their new relations tends to lessen the tension on the superficial flaps.

Figs. 474 and 475.—If tension-sutures are used as here indicated, they may be of black silk, heavy catgut, or kangaroo tendon. (Crossen and Crossen—*Operative Gynecology*.)

Treatment.—The treatment may be presented in the following steps:

1. Reduce the general nervous irritability by sedatives and relieve the pelvic congestion by laxatives if needed, and attention to other possible causes of undue pelvic congestion.

2. Remove all local lesions that cause irritation. Abrasions, fissures, and areas of inflammation must be made to heal. The various therapeutic measures for these conditions have been described.

3. Employ local sedative applications and stretching. Hot douches usually diminish the sensitiveness of the parts, and also the various soothing measures mentioned under Vulvitis and Pruritus may be employed. In some cases of small opening or spasm, considerable relief may be given by moderate stretching treatments. When the trouble occurs in a young married woman, if temporary relief can be given, pregnancy may ensue with permanent cure of the stenosis and spasm after delivery.

4. Operative treatment. A rigid hymen that gives persistent disturbance despite stretching treatments requires to be incised or excised. Neuromas sometimes develop in remnants of the hymen, requiring excision. When there is stenosis or persistent spasm or a combination of the two seriously interfering with coitus, regular plastic operation for enlargement of the opening is indicated.

In the severe cases, especially if the spasmodic element is decided, particular care must be taken to divide the anterior portion of the levator sling sufficiently to give a good wide opening—wide enough to permit some spasm and yet not interfere seriously with coitus. The division of the deep spasmodic levator sling may be made by incision in the median line and the cut spread so as to get at the levator sling in each side, as shown in Figs. 470 and 471, or a cut may be made in each sulcus. Whether median or lateral cuts are used, they are made large enough so that the division of the constricting levator sling may be made under direct vision, as shown in Fig. 471. After the opening has been widened to the extent previously mentioned, the bleeding is controlled by suture ligatures (Fig. 472) and the wound or wounds are closed (Figs. 473 and 474). Particular care must be exercised in placing the suture-ligatures for hemostasis and approximation, to avoid narrowing of the enlarged opening. All tension and approximation should be in the longitudinal axis of the vagina and none transversely. To secure this approximation as shown in Figs. 473 and 474, flaps should be raised on both the mucous and the skin surfaces (see Fig. 475). As a rule, there will be some separation of the flap during healing because of the tension, which cannot be entirely eliminated. For suturing, chromic catgut, forty-day, No. 2, seems to do as well as any other material. It lasts for a fairly long time even on the mucous surface. Nonabsorbable sutures, such as silk or silkworm-gut would seem preferable, but experience shows that, with the unavoidable tension, they cut through so rapidly that the approximated flaps are released sooner than with the large-sized chromic catgut.

Pruritus Vulvae

Pruritus vulvae signifies simply itching about the external genitals, but by common usage the term has come to be restricted to those cases in which the itching and burning are marked and persistent.

Etiology.—The general nervous disturbances and the local atrophic changes that accompany and follow the menopause predispose to pruritus vulvae, hence the vast majority of cases are found in that period of life.

The following are the exciting causes:

1. **AN IRRITATING VAGINAL DISCHARGE.**—The discharge may originate in the vagina or in the uterus. Atrophic vaginitis, which occurs principally in the aged, is a frequent cause of pruritus vulvae. Sometimes a discharge which is so slight as not to be noticed by the patient will keep up a troublesome pruritus, the pruritus disappearing temporarily when the discharge is eliminated by douches.
2. **IRRITATING URINE**, for example, diabetic urine or highly acid urine, or pus-bearing urine due to inflammation of the bladder or kidney.
3. **PARASITIC AFFECTIONS**, which may be monilia or trichophytosis or pediculosis pubis. In children threadworms from the rectum may cause persistent itching.
4. **SKIN DISEASES**, such as eczema, follicular inflammation, and prurigo.
5. **ENDOCRINE OR VITAMIN DEFICIENCY.**
6. **GROWTH OF SHORT BRISTLY HAIRS** on the inner surface of the labia. These scratch and irritate the adjacent surface and sometimes cause very troublesome pruritus. Occasionally such irritation is caused by the short hairs present for some weeks after shaving the parts for an operation.
7. **FRICTION** from exercise, especially in very stout persons.
8. **LEUCOPLAKIC VULVITIS.**
9. **CHRONIC CONGESTION**, from diseases of the uterus or tubes or ovaries or other pelvic structures.
10. **FUNCTIONAL NERVOUS DISTURBANCES.**—In some cases, no cause for the disturbance can be found and apparently no local changes are present, aside from abrasions and irritation caused by scratching. Under such circumstances, careful search must be made for endocrine disturbances, and for allergic disturbances from articles of food or from contact substances.

Symptoms.—The patient complains of an intense itching about the genitals. It may be confined to the clitoris, labia or vestibule, or it may involve all these structures and also adjacent regions, for example, the vagina, anus, and inner sides of the thighs. The itching and burning may be practically continuous, but more often it is intermittent in character. It may disappear spontaneously for several hours or days or even longer, only to return as suddenly as it disappeared. Congestion at the menstrual period or during pregnancy may increase the pruritus. Irritating articles of food and also alcoholics often have the same effect. The warmth of the bed usually makes the itching worse, consequently the patient may lose much sleep.

Frequently the distressing symptoms persist in spite of local and general sedatives and in some cases they become intolerable, making the patient's life a burden to her. On account of the irresistible tendency to scratch or rub the parts, the skin becomes irritated and abraded and inflamed. Deep fissures may form and in some cases a discharging or weeping surface develops. The constant suffering makes the patient irritable and nervous and in some cases leads eventually to nervous prostration.

Treatment.—The treatment for pruritus vulvae may be presented in the following steps:

1. REMOVE ALL LOCAL CAUSES OF IRRITATION.—These have been enumerated under Etiology. If an irritating vaginal discharge is present, it must be stopped by appropriate treatment of the disease causing it. If that is not possible, the discharge may be kept from irritating the genitals by washing it away with antiseptic douches. Other causes of local irritation, such as diabetes, local skin diseases, and uterine or ovarian disease causing pelvic congestion, must receive appropriate treatment.



Fig. 476.—Pruritus and chronic dermatitis of the vulva and contiguous structures of two years' duration in a woman aged seventy years. For photographic purposes the site of each alcohol injection on the right was marked with indelible ink. Because of impaired circulation a minimum amount of alcohol (2 minims) was injected at wider intervals than usual. The multiple injections, thus depicted, relieved the pruritus promptly and caused the dermatitis to disappear within a week. Although there has been an occasional mild recurrence during the past three years, reinjection has not been necessary. (Wilson—*J. A. M.* 4.)

2. EMPLOY LOCAL SEDATIVE APPLICATIONS.—The various sedative applications used for dermatitis and eczema may give considerable relief. Generally, the more free from discharge and moisture the parts are kept, the less irritation and discomfort. Hence, the frequent and liberal use of dusting powders. Some patients, however, obtain more relief from the use of a bland ointment and dusting the powder over that. Analgesic ointments give temporary relief. Carbolic acid of 1 per cent strength in ointment usually gives much relief, and with it may be incorporated other drugs for the particular skin conditions present; e.g., for trichophytosis or for various forms of eczema.

3. ATTEND TO THE GENERAL HEALTH.—Regulate the bowels so that any pelvic congestion from constipation is overcome. The patient must be put in

the best of general health, that the condition of the nervous system may be improved accordingly. This means complete investigation for lesions, and also for endocrine and vitamin deficiencies and allergic factors. Bacterin treatment is sometimes helpful, particularly that of the colon bacillus type.

4. X-RAY TREATMENT.—If the pruritus persists despite the measures mentioned, x-ray treatment may be employed for temporary effect. However, its use carries the danger of postponing curative treatment based on searched-out etiology, and also the danger of starting an x-ray dermatitis.

5. OPERATIONS.—If marked leucoplakic vulvitis is present, excision is required. In cases of persistent itching without apparent tissue change, and without endocrine or allergic cause, local injection treatment may be tried.

W. M. Wilson gives a most instructive report on the treatment of pruritus vulvae by means of subcutaneous injections of two to four minims of 95 per cent alcohol at many points over the involved area. Fig. 476 shows the points of injection on the right side in one case. Forty-nine cases of pruritus vulvae, most of them persistent in spite of other measures, were treated. The results attained were remarkable, and they indicate trial of this measure in persistent cases without removable cause. Full details of handling the patients are given in the article.

A. Jacoby reports a series of patients treated with local alcohol injections. Turell reports the successful treatment of recurrent pruritus, in adjacent areas after vulvectomy for leucoplakic vulvitis, by tattooing (puncturation) with mercury sulphide. Fantus and Cornbleet take up in a very thorough way the various features of pruritus treatment as it is carried out in the Cook County Hospital.

Resection of the nerves may be tried. The local nerve supply to the pruritic areas may be attacked by subcutaneous division immediately under the affected skin, or by division of the internal pudic nerve as it leaves the protecting tuberosity of the ischium. Care must be taken that the innervation of the rectum be not damaged, with resulting incontinence of feces.

CHAPTER V

RELAXATION AND FISTULAE

of the Pelvic Floor, Perineum, External Genitals, and Vagina

Points in Anatomy

The term "pelvic floor" is applied to that group of structures which closes in the pelvic outlet and supports the organs above it. The principal supporting structures are the levator ani muscles and associated fasciae. They are indicated diagrammatically in Fig. 477. The levator ani muscles, arising from each side of the pelvis and joining in the median line, form a sling which holds up the vagina and rectum and at the same time holds their lower ends forward under the pubic arch.

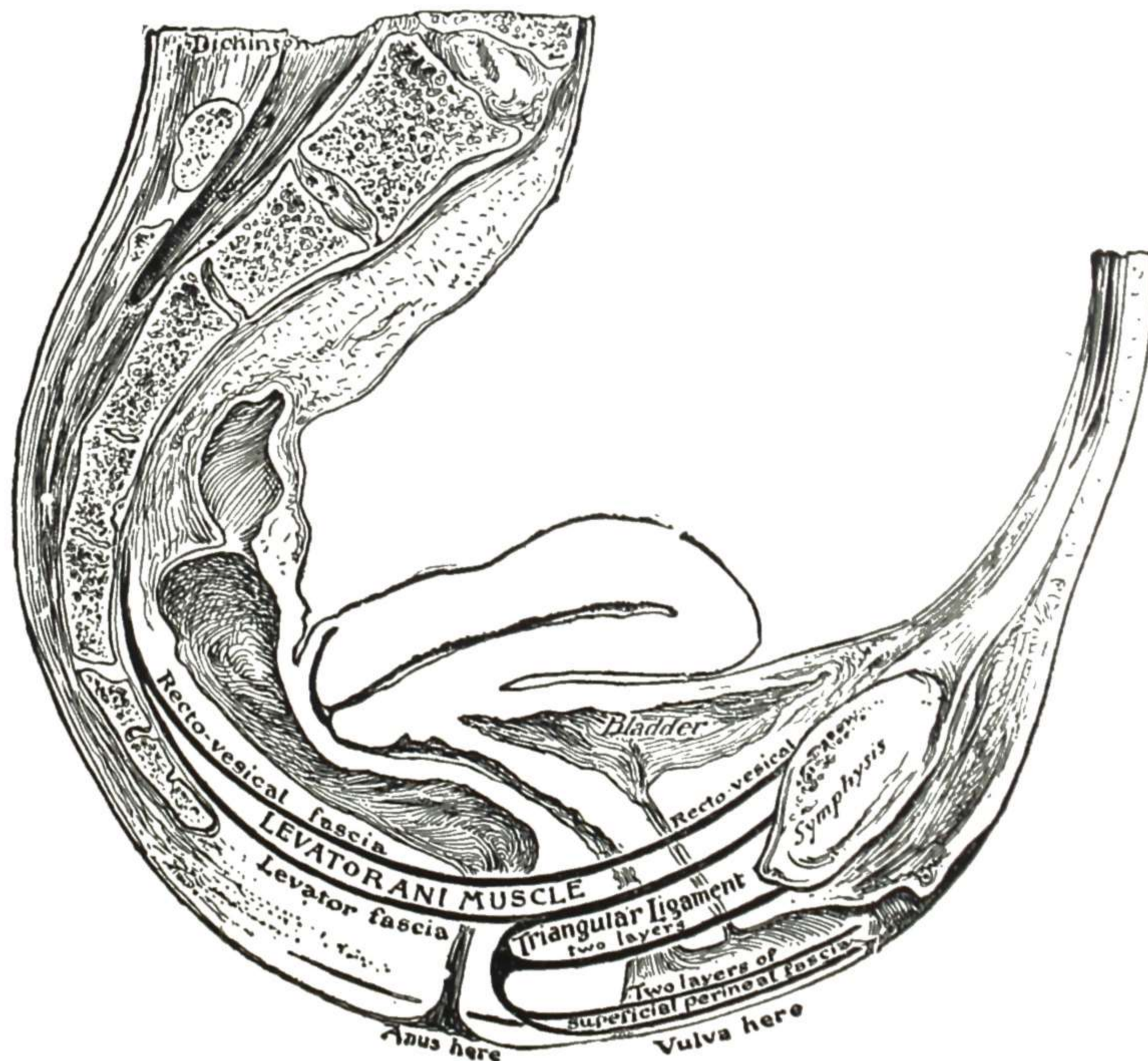


Fig. 477.—A diagrammatic representation of an anteroposterior section of the pelvis, showing the various fascial layers of the pelvic floor. (Dickinson—*American Textbook of Obstetrics.*)

Each levator ani muscles arises in front from the posterior surface of the pubic bone, behind from the spine of the ischium, and between these points from the "white line" that marks the division of the pelvic fascia. The anterior portion of the muscle passes downward and toward the median line and unites with a corresponding portion of the muscle of the opposite side. Some of the fibers unite with the lower part of the vagina, some with the lower part