J. C. Bloodgood

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Baltimore, Md.

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SECTION XXIII

LESIONS OF THE FEMALE BREAST

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Attention is called to the female breast by swelling, or tumor, pain, discharge from or retraction or ulceration of, the nipple; some change in an area of skin over the breast, or the palpation of some enlargement of the glands in the axilla.

When the patient seeks advice for one or more of these signs and symptoms, we may be somewhat influenced and helped in our interpretation of their significance by the following additional data: age, duration of symptoms; whether the symptoms had disappeared to reappear—especially tumor; whether the woman is married or single, whether pregnant or nursing her child, the number of children and the age of the youngest; whether there has been a history of trauma or mastitis; whether the menstruation is normal, changing, or the menopause established. The existence of pelvic irritating lesions should also be carefully investigated.

Breast Lesions.—We may have at birth, puberty and during pregnancy a diffuse enlargement of both breasts—a condition which can always be recognized clinically and should never be confused with a malignant tumor.

Mastitis as a rule is associated with lactation. It is always a diffuse lesion, never encapsulated, but may be circumscribed. We do observe mastitis in breasts which are not lactating. Then the mastitis is usually tubercular.

We do not know the etiology of chronic cystic mastitis. The affected area is never encapsulated but the large cysts which develop in a large per cent. of cases are individually encapsulated. The disease may, however, appear as a circumscribed tumor.

Cysts of the breast are galactoceles associated with lactation;

pyogenic and tuberculous abscesses; cysts in chronic cystic mastitis; papillomatous cysts, benign and malignant; and the true cancerous and sarcomatous cyst.

Encapsulated tumors are always benign. They are the cystic adenoma, the fibroadenoma and the intracanalicular myxoma. These tumors, however, may appear as circumscribed areas difficult to differentiate from adenocarcinoma.

Malignant tumors are never encapsulated, although they may be circumscribed. The types of malignant tumors are the adenocarcinoma, the scirrhous and medullary carcinoma, and the sarcoma.

We must recollect that cancer may begin in the breast during pregnancy, during lactation, and at any period of life after twenty-five.

Cancer may form in the scar residual after mastitis in which the original lump had remained quiescent for from 10 to 30 years.

Tumors may remain quiescent in the breast for many years. When growth suddenly appears, it is usually, but not always, associated with malignant change.

To increase the number of cures of cancer of the breast, we must give women the proper information which will influence them to seek an examination the moment after they feel a lump.

The most difficult problem falls upon the surgeon—to differentiate at the exploratory incision the various types of breast lesions and to decide then; whether to remove the lump, the breast, or to perform the complete operation for sarcoma or carcinoma.

Age.—Among 885 malignant tumors of the breast thirty-five or 3.9 per cent. have been under thirty years of age when the lump was first observed. In 10 cases the age of onset varied from 15 to 25 years. In six cases of cancer in which the age of onset was less than twenty-five, the tumors had been observed from 5 to 40 years, thus offering ample time for removal during the benign stage.

There remains but one positive case of cancer originating in a woman younger than twenty-five. This patient was 21 years of age and had observed the lump but a few months.

Of the four cases of sarcoma in which the patients were younger than twenty-five when the neoplasms were first discovered, in two the tumors were of 18 and 25 years' duration respectively. The remaining two cases are from outside sources, and I have been unable to confirm the data.

Therefore, when a patient with a lump in the breast is twenty-five or less, the chances of a malignant tumor are remote. After

twenty-five age does not help us, because cancer has been observed from twenty-six to seventy and over, as well as all types of benign tumors.

In the *newborn* we may observe enlargement of the breast; this is usually, if not always, bilateral, and associated with a discharge milky in character (*infantile hypertrophy*). This condition recovers spontaneously. On account of the discharge from the nipple, efforts to attain and maintain cleanliness should be great. After washing, the nipple should be protected with sterile cotton. Infections have taken place; abscesses and erysipelas have secondarily developed with mortality. My one observation recovered, and now, 17 years since, the breast has normally developed.

During *childhood* diseases of the breast are unusual and always benign. Tumors need not be removed unless they grow, or are associated with great pain.

At *puberty* benign conditions of the breast are often first observed. The attitude towards all lesions at this period should be conservative. Intense pain, rapidly growing tumor, huge enlargement of one or both breasts, are the only indications for operative interference. The object of such an operation is not to cure any hopeless disease, but to check and remove a lesion which, if left alone, would destroy the breast, or to relieve pain by the removal of a centrally situated tumor.

Unilateral Hypertrophy.—At, or shortly after, puberty the development of one breast may be more rapid than of the other. In six cases of my own observation the larger breast was not sufficiently large to excite any apprehension. The condition was really not unilateral hypertrophy, but unilateral development. In these six cases after a time the more slowly developing breast caught up with the other and symmetry was established. In one case the hypertrophy of the left breast was far out of proportion to normal, while the smaller breast was about normal for a girl two years after puberty. In this case, with the hope of checking the hypertrophy, a plastic resection of a quadrant was performed. It is now about 10 months since the operation, and there has been no further enlargement. We know from our experience with operations for benign tumors of the breast during and after puberty that there is no harm from such a plastic resection, but we have no evidence as yet that it will check unilateral hypertrophy.

Diffuse Bilateral Virginal Hypertrophy.—This condition has its onset at, or shortly after, puberty. At first there is observed the ordinary puberty hypertrophy. Later both breasts become so

much larger than normal that interest and anxiety are excited. In the literature the cases are usually observed from four to ten years after onset, and nothing has been done for this condition, except removal of one or both breasts. Apparently in this late stage nothing else offers any relief. If these cases are seen in the beginning of the trouble, menstrual disorders should be corrected, sexual disturbances controlled, and when the size of the breast has gone much beyond normal, plastic resection as noted above might be attempted.

Now and then unilateral hypertrophy may be due to the presence of a tumor in the center of the breast. In my only observation in-

FIG. 301.—Encapsulated aberrant fibroadenoma. Tumor larger than the breast. Breast to the median side.

Pathol. No. 7135.—Operation in 1906, excision of tumor; breast saved. Colored, female, aged 19, tumor seven months.

tense pain was the indication for operation. At the exploratory incision previous to the contemplated plastic resection, the central tumor was found and removed. The pain was relieved, and 10 years later this breast lactated normally.

At, or shortly after, puberty tumors in the region of the breast may develop, grow rapidly and, if left alone, become larger than the breast itself (Fig. 301). They are usually incorrectly diagnosed sarcoma, and the young patients are mutilated for life by the removal of a normal breast with a benign encapsulated tumor. *These are aberrant breast tumors*, and will be discussed again under fibroadenoma (page 598).

At what age should a single tumor of the female breast be removed?

In my own opinion, if the patient is under twenty, the tumor may be left alone, unless it exhibits growth, or is very annoying by pain. Between twenty and twenty-five there is some doubt as to what is best to do. On the whole, accumulated experience favors operation. After twenty-five there is no question—operate.

In many of the single and multiple tumors in girls under twenty-five which I have observed during the past 25 years the tumors have spontaneously disappeared. Young girls, if possible, should not be subjected during puberty to operations upon the breast. After twenty the chances of spontaneous disappearance grow less, and as the tumor certainly should be removed, if it does not disappear in a few years, why wait? There is no danger and no mutilation. The removal of these benign tumors protects the woman from growth of this tumor which may take place during a subsequent pregnancy or lactation at a time when an operation, even for a benign tumor, is more annoying than at an earlier period. There is also no doubt that it protects the woman from the possible development of a cancer in such a benign tumor.

In women after 25 years, their age can no longer be used as a factor either against operative interference, or in differential diagnosis. Although the relative proportion of benign and malignant diseases of the breast varies with the age of the patient, it is not sufficiently distinct to be helpful. If a surgeon uses age in his differential diagnosis after twenty-five, it will simply increase the number of his mistakes.

Duration of Tumor.—Theoretically, our patients should always see us at once, so that we would never be assisted in our differential diagnosis by the duration of the disease. When the woman waits, always at her own risk, the surgeon may be helped by the long duration of the disease without any definite change. But even here, there are too many exceptions to the rule, to allow one to rely much on the long duration of the disease. Our records show many cases of cancer in tumors which have been present 30 or more years. We know that when we operated the tumors were cancer. Our records may show when the clinical signs of cancer first developed, but we have no way of finding out when or why the malignant change took place. A tumor, then, of many years' duration which during this time has shown no growth and is quiescent today, may begin its malignant change tomorrow.

When the duration of the symptoms is helpful in the differential diagnosis, I will mention it later with the specific lesion under discussion.

The relative per cent. of benign and malignant lesions of the breast in our 1800 cases has changed gradually in the past 27 years, and very rapidly in the past three years. In the first 10 years of the observation the per cent. of benign lesions was 32, in the second period of 10 years it was 41, in the next seven years it was 54, but in the past three years 59 as compared with 47 in the preceding three years. This increasing proportion of the benign lesions of the breast has been associated with a shortening of the duration of the disease, and the latter has been due to the education of the profession and the public. Any clinic reporting today a larger per cent. of cancers of the breast suggests that this clinic is getting late cases.

The greatest changes which we have observed in the past few years in diseases of the breast are the duration of the disease, and its pathology.

ETIOLOGICAL FACTORS

Trauma.—Many breasts are bruised and after the contusion there may be ecchymosis and even palpable induration. All of these signs may disappear and nothing develop later. There are apparently but few records of such cases. I now have three which have been followed from the onset of the injury. In the oldest case it is three years since the trauma. This, like many other conditions of the breast, may be frequent, but we know little about it, because those who keep records are not consulted.

On the other hand, the number of breast lesions secondary to trauma is relatively small, but sufficiently large to impress one that trauma must be considered an etiological factor. All the cysts of the breast which I have seen in young women under twenty-five have followed a trauma. In sarcoma of the breast trauma is a much more frequent etiological factor than in carcinoma. Trauma may excite the growth of a pre-existing tumor, and this subsequent growth may be either benign or malignant. The history of a trauma, either positive or negative, is of no help in the differential diagnosis.

Breasts, however, which have been injured should be carefully watched. If the induration which immediately followed the contusion does not disappear in a few weeks, the area should be explored. If an area of induration or a tumor appears some days or weeks after

the trauma, in cases in which nothing was present immediately after the trauma, exploratory operation is indicated at once.

Infection.—In the absence of pregnancy and lactation, the breast is especially immune to metastatic involvement in general or local infection, yet this may occur, as will be discussed under *mastitis*. When we have a local infection on the body or on the upper extremity, the breast now and then is secondarily involved. When the patient gives a history of tuberculous glands of the neck which have healed; when scars from a recent suppuration in the axilla are seen; when sinuses are found, and there has occurred a more recent enlargement of the breast, the chances are that we are dealing with tuberculosis. Without such a history such a breast with its present induration and retracted nipple would have to be considered the seat of a malignant lesion.

The history, or demonstration, of a portal of infection near the infected breast may now and then urge the surgeon to explore rather than to perform the complete cancer operation for a breast condition which is clinically malignant. But these are unusual conditions and can only be fully considered in a monograph or case reports.

Pregnancy.—If a lump is felt in the breast of a pregnant woman and the patient is over twenty-five, it should be explored at once; during pregnancy as well as in the lactation, cancer disseminates with greater rapidity. At exploration, a benign tumor may be exposed (Fig. 307). All lesions of the breast during pregnancy are unusual. Benign and malignant tumors are about equally divided. Among the cancers in our records there is one blood-cyst and no sarcoma. Among the benign lesions tumors predominate. Mastitis is very rare and when present is usually tuberculous.

When a woman knows that she had the lump in her breast before she was pregnant, immediate operation is not so essential, but it is far better to remove the lump before the birth of the child. I have usually selected the period between the third and the fifth month. The tumor should be removed, because during lactation it is more apt to give trouble. It seems safer for the child to remove the breast tumor during pregnancy than during nursing.

Diffuse Bilateral Gravidity Hypertrophy.—The bilateral hypertrophy observed in virgins after puberty may be observed in the breasts during pregnancy. As far as I can learn from the literature, it is a rare condition. If these breasts produce milk, and the child nurses, the condition as a rule spontaneously recovers. If, however,

there is no secretion of milk, spontaneous recovery rarely, if ever, takes place.

Lactation.—The predominant lesion of the lactating breast is mastitis. The portal of entrance of the infection is through the injured nipple. The suckling child is apt to injure the nipple within the first few months. Lactation mastitis is most frequent within the first month, and very rarely observed after the fourth month.

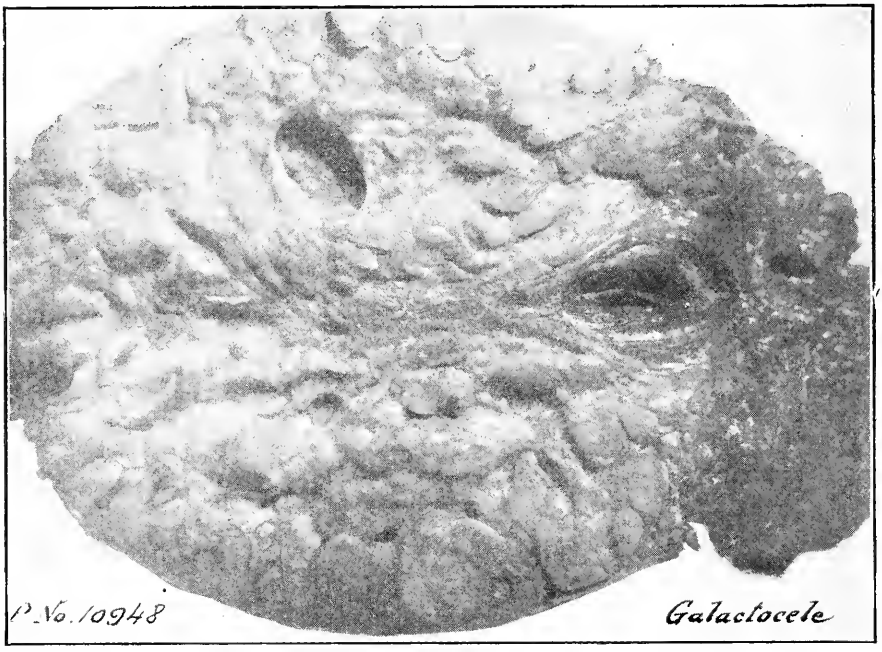

FIG. 302.—Galactocele—a single cyst containing milky fluid. The breast contains dilated ducts with milky fluid.

Pathol. No. 10948.—1910, complete operation for cancer on account of retracted nipple and red, adherent skin.

White, female, aged 40; a mastitis in this breast many years ago leaving retracted nipple; at the time of the operation patient was nursing child two years of age. Tumor observed three months. Rapid growth; painful and tender. The changes in the skin were probably due to an infection of the galactocele. The microscopic study shows chronic mastitis (see Fig. 314) and dilated ducts (see Fig. 318) and some areas of lactation hypertrophy (see Fig. 323).

A lump, or a "cake," or an induration of the breast in the first four months of lactation may at first be looked upon as mastitis. We should expect in such a palpable area resolution (spontaneous disappearance), or the formation of a definite abscess (relieved by incision). If one of these two things does not take place within two weeks, one should be suspicious of malignancy. The area should be

explored. The chronic mastitis abscess (Fig. 303)* and galactocele (Fig. 302) must be distinguished in the gross from the cancer cyst (Fig. 305). Tuberculosis (Fig. 304) may be recognized by the abscess.† The non-suppurating chronic mastitis is most difficult to differentiate from cancer. The benign tumor will be found encapsulated (Fig. 306). The dilemma here will come in the frozen section (Fig. 307).

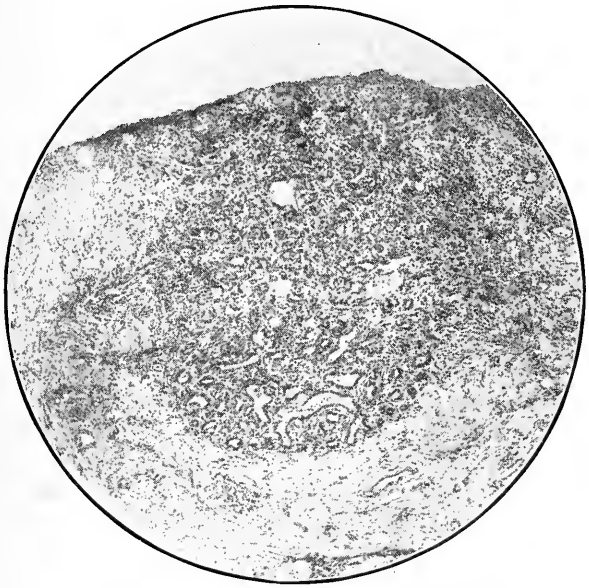

FIG. 303.—Chronic mastitis in a lactating breast, from the wall of a chronic lactation mastitis abscess.

Pathol. No. 228.—1893, excision of cyst; later complete operation for cancer, on account of the microscopic picture shown here. 1916, 23 years, well.

White, female, aged 29; nursing child four months old; tumor two months. Clinically and gross a chronic abscess; surrounding breast shows normal lactation with a zone of mastitis adjacent to abscess cavity.

In lactation the nipple should always be protected. When the cake appears massage is not sufficiently beneficial in mastitis to justify its employment while it would be distinctly dangerous if the lesion were malignant. Cleansing and protection of the infected nipple are the most important things in the treatment. Bier's hyperemia, ice, or the hot-water bag may be employed. My personal experience is too limited to speak authoritatively. I have confined my treatment to the nipple and to ice and have been surprised at the large

*All these photographs were taken by Mr. Herman Schapiro.

†Tubercular mastitis without abscess shows no caseation. It resembles lactation mastitis without abscess. Both suggest infiltrating carcinoma. Both in the gross and the frozen section.

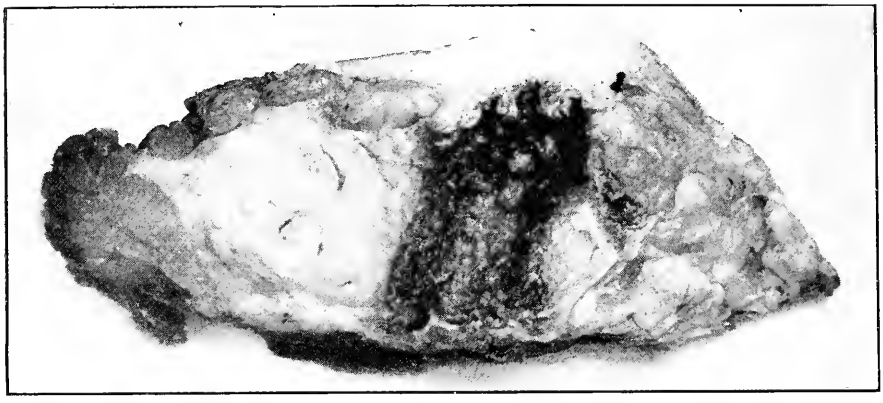

FIG. 304.—Tuberculous abscess of breast. Cavity lined by tuberculous granulation tissue.
Pathol. No. 19066.—Operation in 1916, complete excision of the breast.

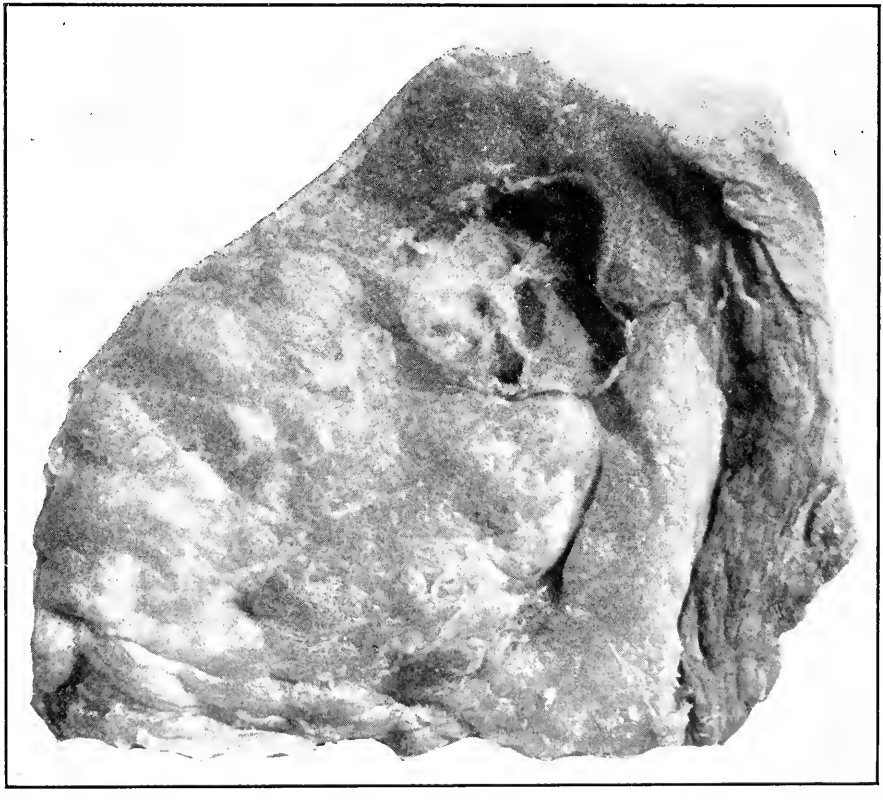

FIG. 305.—Cancer cyst in senile breast.
Pathol. No. 7665.—Complete operation for cancer.

number of cases of spontaneous disappearance. If ice should give discomfort—do nothing. On the first signs of pus—incise.

For abnormalities in lactation, especially the scanty secretion of milk, I shall take no space.

Mastitis.—*The history of "caking" of the breast* during lactation, of a definite mastitis which disappeared spontaneously, or of an abscess which was incised or ruptured spontaneously, must be considered in the differential diagnosis.

The history of a lump appearing during lactation, or remaining after lactation is suggestive of a *galactocele* (Fig. 302). At the present time our records are meager in regard to this interesting breast lesion.

Malignant tumors of the breast have apparently no relation to a mastitis which disappears spontaneously, or forms an abscess which heals. However, if the induration in the area of the mastitis, whether

FIG. 306.—Encapsulated fibroadenoma removed with a zone of breast; stroma in excess. Pathol. No. 9340.—Operation in 1908. White, female, aged 19; tumor four weeks. In 1916, eight years, well.

there has been an abscess or not, does not disappear, cancer may develop in this area (Fig. 308).

These two facts—the occurrence of galactocele and cancer in old scars after mastitis—represent additional evidence to emphasize the dictum that no lump in the breast can be considered innocent, and except in girls under twenty-five and during lactation, every lump in the breast should immediately be explored.

In the lactating breast, in view of the common occurrence of mastitis, we are justified in watching the indurated area for a short period, but in the absence of complete resolution or pus formation, the doubtful area should be explored. When there are indurated scars after a mastitis, these should be excised with a good margin of healthy breast.

Mastitis, except during lactation, is a rare disease, and one should never make a clinical diagnosis, but should explore the area.

FIG. 307.—Lactation hypertrophy in an encapsulated fibroadenoma.

Pathol. No. 15518.—Operation in 1914, excision of tumor and zone of breast. White, female, aged 20; tumor three months; patient pregnant two months. 1916, two years, well. Pregnancy and lactation not disturbed by operation.

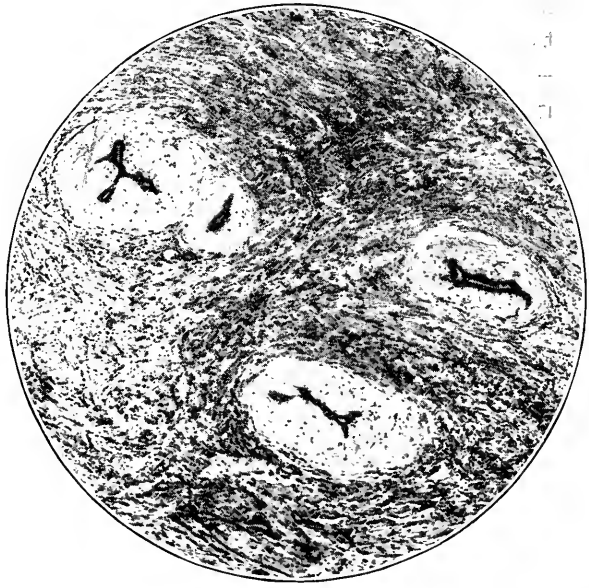

FIG. 308.—Scirrhous carcinoma developing in the scar residual from chronic mastitic. The ducts with their thickened walls preserved.

Mastitis and Lactation.—*Lactation may persist* if the child is allowed to nurse, in spite of the presence of single or multiple abscesses. Nor do the latter necessarily interfere with lactation after a subsequent pregnancy.

Menstruation.—The relation of breast lesions to diseases of the pelvic organs needs much more data before it can be defined. We know that with pregnancy the breast immediately undergoes a parenchymatous hypertrophy. The fully developed secretion of milk, to be maintained, is apparently dependent upon irritation of the nipple. Lactation ceases and the breasts return to normal when the child ceases to nurse.

There is some evidence to suggest that there may be parenchymatous changes in the breast associated with pelvic conditions other than pregnancy. The lesion of the breast called chronic cystic mastitis is most frequent during the period called the menopause.

The relation, however, between pelvic lesions, the menstrual period, and breast lesions is not sufficiently well established to be helpful in the differential diagnosis.

Menopause.—It is quite true that, except for cysts and chronic cystic mastitis, benign tumors are rare after the menopause, but the number of the former (cysts) is sufficiently large not to justify the complete operation for cancer of the breast in women after the menopause without exploratory incision.

Children.—Most careful studies have been made on the relation of the different forms of breast lesions in unmarried women, in married women who have borne no children, in married women who have borne children, and the character of the lactation in the latter. These data are rarely, if ever, helpful in the differential diagnosis, and although of interest to record, they must not be allowed to weigh much, if at all, in the differentiation between a benign and a malignant tumor. It is true that chronic cystic mastitis is much more frequent in the breast which has never lactated, whether there had been pregnancy, or not. When, therefore, you see a woman reaching the menopause, whose breasts have never lactated, who comes to you because of pain in the breast and the feeling of an indefinite lump, and you find in this and in the other breast other lumps just as indefinite as the one the patient has felt, you probably will be safe in diagnosing bilateral chronic cystic mastitis, for which operation is not indicated at this time. I will consider this point again, as many breasts now are being sacrificed for certain stages of this disease.

HISTORICAL DATA

Up to the present time an intensive study of the data thus briefly discussed has shown that with rare exceptions they cannot be depended upon for differential diagnosis. Perhaps future studies may find some diagnostic points. I am confident that in many cases precious time has been lost by allowing data of this kind to influence the diagnosis and the decision as to operative intervention. I have not mentioned the family history of cancer or tuberculosis and purposely so, because its presence or absence should have no influence on the surgeon's conclusions.

SYMPTOMS OF ONSET

I have called attention to these in the first paragraph. The most frequent symptom is the palpation of a tumor, and if we could educate women to pay immediate attention to this one message, the number of deaths from cancer of the breast would be immediately diminished. Confusion has been caused in the minds of women by other possible symptoms, especially pain. The woman usually waits for pain, and in the past, when a physician was asked to see the lump, he usually waited for the so-called clinical signs of cancer—retracted nipple, adherent skin, ulceration; and he thought much about the presence or absence of palpable glands in the axilla.

The majority of women are warned by a lump, and that warning should be enough. If the physician can feel a lump, it is fortunate for the patient if nothing else can be made out on examination.

Pain.—Pain is neither a sign of cancer, nor necessarily of any dangerous lesion in the breast. Pain in one or both breasts is not uncommon in women just before the menstrual period and disappears after the beginning of the flow. As tingling of the breasts may be the first suggestion of pregnancy, so pain in the breast may be the first warning of the coming menstrual period. Undoubtedly many women experience these discomforts and say nothing about them.

Up until 1910 I have records of but five patients who came under observation for pain only; the duration of this pain had varied from three weeks to four years. In none of these cases has any disease of the breast developed. Since 1910 there are records of 12 cases; the duration of the pain has varied from four days to two years.

The most common factor in all of these cases is that the women are usually approaching the menopause, and naturally one thinks of

chronic cystic mastitis. We know that at autopsy small cysts and dilated ducts are present in at least 25 per cent. of the breasts of all women over 40 years of age.

The next most frequent historical fact is the fear of cancer. These patients have had some near relative or friend die of cancer, and then experienced pain in the breast. In our seventeen patients there are but three under 30 years of age; the youngest was twenty-three.

The thing which should interest us most is whether pain in the breast is a forerunner of some disease and if so, of what form.

In the great majority of cases, when pain is the first symptom and tumor the second, the tumor is benign.

Nevertheless in a record of almost 1800 cases there is not a single variety of benign or malignant condition of the breast in which, in some cases, pain had not been the first symptom observed.

However, if nothing is found on palpation, pain is not an indication for operation. Of course, such patients should be carefully watched. Future intensive investigation may disclose a few instances in which pain alone may be relied upon as an indication for the removal of the breast.

Discharge of Blood from the Nipple.—There is a prevailing view that a bloody discharge from the nipple means cancer, and that the complete operation for cancer should be performed. This conclusion is apparently based on records different from my own, or on incorrect observations.

My experience shows that *if there is no other sign or symptom*, except discharge of blood from the nipple, there is no more indication for operation than in the presence of pain alone. I am hopeful, however, to be able some day to recognize the few cases in which discharge from the nipple can be properly interpreted as an indication for the removal of the breast.

In 876 cases of cancer of the breast discharge from the nipple has been the first symptom in but 16 cases (less than 2 per cent.). In the majority of these the tumor was felt at the same time or within a few days after the discharge was noted. In a few cases the interval was months, in two cases only was the interval a year.

Among 716 cases of benign tumors of the breast discharge from the nipple has been the symptom of onset in twenty-four (slightly over 3 per cent.). In the majority of these cases the tumor proved to be an intracystic papilloma. In fact, it is a question whether

such an intracystic papilloma was not present in every case subjected to operation.

In nine cases of discharge of blood from the nipple in which nothing else could be made out, no operation was performed, and no tumor developed. In this group there are four cases in which the interval is 11 years or more; the others are more recent—four years or less. The longest duration of a bloody discharge without the development of a tumor was three years.

We have, therefore, no evidence that discharge from the nipple is an indication of malignant disease, but cases of this kind should be carefully watched, and the patient should be instructed how to keep the nipple scrupulously clean.

Retraction of the Nipple.—The sudden appearance of retraction of the nipple is a sign of entirely different significance from that of discharge of blood from the nipple. It is usually the warning of malignant disease of the breast. It may be present, but very rarely, in benign conditions. If one can establish that the retraction of the nipple is really of recent appearance and is not a congenital, or old affair from some former lactation mastitis, it should be looked upon as indicating a malignant tumor in the breast and the entire breast removed, or the complete operation for cancer done.

Retraction of the nipple may be a congenital condition, but this type of depressed nipple as a rule is different from the acquired retraction. Retraction of the nipple may take place after a mastitis with or without abscess formation, and now and then, when the child is suddenly taken from the breast, one or both nipples may pull in without evidence of mastitis.

In a few instances with distinctly benign lesions retraction of the nipple has been the first symptom observed, chiefly in chronic cystic mastitis.

At the present time it is my opinion that it is safer to look upon this type of retraction of the nipple as a definite sign of cancer. If nothing else can be made out, it is my practice to completely remove the breast with the pectoral fascia to the axilla; to clamp the axilla and cut it off with the cautery; then make serial sections into the breast; if cancer is found, proceed with the axillary operation; if not, remove the axillary tissue beyond the clamp.

If cancer is not found, a condition of the breast is usually present best treated by complete removal of the breast.

I have been surprised at the attitude of many experienced clin-

icians and surgeons towards this retraction of the nipple when it has been the only sign present. Precious time has been lost waiting for the appearance of the tumor. As a rule in these cases the cancer is in the nipple zone and difficult to recognize by palpation, or the women have large, fat breasts, and the little scirrhus is too deeply situated to be recognized.

Pain and discharge from the nipple are messages, but require no answer. Retraction of the nipple is a message which should receive immediate attention.

Ulceration of the Nipple (Paget's Disease).—Years ago Paget described a number of cases of cancer of the breast associated with ulceration of the nipple. In this special group, Paget states, the ulceration of the nipple has begun one or more years before the patient had felt the lump in the breast. As far as I know, there are no recorded cures, when the operation has been performed in the Paget stage.

The sore nipples during lactation require great care and give anxiety chiefly in relation to mastitis.

There may also be a syphilitic ulceration of the nipple in the nursing mother, but other symptoms on the part of mother and child should excite suspicion, and the Wassermann test will do the rest.

Any irritation, or eczema, or ulceration about the nipple and areola should receive immediate attention. In some cases copious use of soap and water will cure the disease. In others there will be a positive Wassermann. When cleanliness fails to relieve and the blood examination is negative, I am confident that it will be safer to look upon this lesion of the nipple just as we have decided to regard retraction of the nipple—as a sign of cancer. Nothing can be gained by excising a piece for diagnosis, or completely excising the nipple zone. The breast should be removed or the complete operation for cancer performed. Not all of these cases are cancer, but I am unable, from the available data, to tell how to differentiate the benign from the malignant. I am confident that the mutilation should be considered less, than the greater risk of any conservative operation.

Subcutaneous Fat.—In the normal breast the nipple, the areola and the skin are freely movable over the deeper structures, and there is always a zone of subcutaneous fat between the skin and the breast, except beneath the nipple. When one can palpate a small tumor, the demonstration of absence of subcutaneous fat between the skin and the tumor is a sign of malignancy. In large tumors it is possible to have an atrophy of this fat from pressure in lesions distinctly benign.

Atrophy of the subcutaneous fat may also be observed in pyogenic and tuberculous mastitis.

The demonstration of atrophy of the subcutaneous fat is rather an expert procedure; it is one of the earliest signs of cancer.

In virginal and gravidity bilateral hypertrophy the parenchyma and stroma of the hyperplastic breast tissue may replace the subcutaneous fat and bring the breast tissue immediately beneath the skin. But in this disease it is not a sign of malignancy.

Skin.—Only once have I observed discreet skin metastasis in a breast tumor otherwise apparently benign, and in this case the two

FIG. 309.—Bulging of tumor. No dimpling of skin over a simple cyst in chronic cystic mastitis.

Path. No. 8579.—White, female, aged 52. Tumor one year. Operation, 1907, excision of cyst and zone of breast. 1916, nine years, well.

little nodules were present in the zone of skin directly over the breast tumor. There is no way to distinguish a single metastatic skin nodule from the common fibroma of the skin. Fortunately the latter is very rare in the breast area, but I have observed two cases of benign breast tumors in which there were also present single, shot-like skin nodules which were fibromas. This possibility should be borne in mind,

and one should not make a diagnosis of malignant tumor of the breast because of a single skin nodule.

The changes in the skin which are rarely associated with benign tumors are *dimpling* and *slight fixation*. The dimpling is brought out by pushing the breast with the palpable tumor with both hands (Figs. 309 and 310). Fixation is elicited by picking up a bit of skin over the tumor.

These two early signs of cancer have now and then been observed in benign lesions, especially simple cysts.

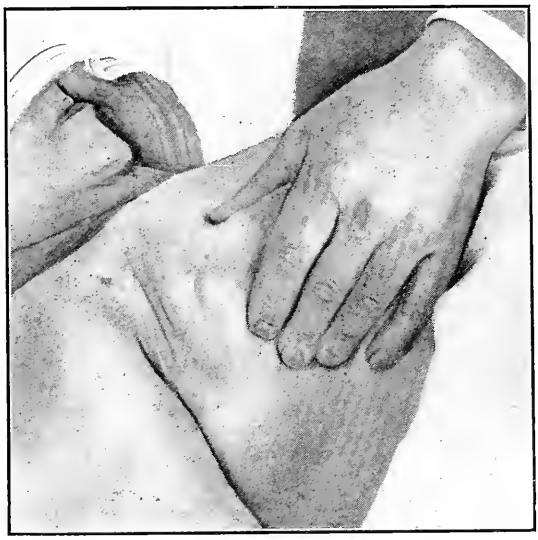

FIG. 310.—Dimpling of the skin over the bulging tumor. Small infiltrating scirrhus. Path. No. 7973.—White, female, aged 54. Tumor six weeks, pain 10 days. Complete operation, 1907. No metastasis to axilla. 1916, nine years, well.

Redness and definite adhesion of the skin to the tumor are observed in pyogenic and tuberculous mastitis, and in infected cysts (which are very rare). In the vast majority of cases they are signs of cancer. Very large benign tumors (intracanalicular myxoma) may by pressure produce ulceration of the skin. With this exception ulceration is an almost positive sign of cancer.

The formation of a sinus or sinuses is very unusual in a malignant tumor of the breast. It is very common in tuberculosis after the sixth month. The early formation of a sinus favors a pyogenic abscess. This latter should heal rapidly, while the sinus from a tuberculous focus rarely heals.

When a malignant breast tumor becomes infected, forms an abscess, becomes adherent to the skin, ruptures and forms a sinus, the differential diagnosis from mastitis, pyogenic or tuberculous, is practically impossible clinically. Although it is very rare in malignant disease, the evidence seems to indicate that, in cases of this kind, it is a safer procedure to operate for cancer. In most of these cases the breast must be removed in any event. In a few instances one with a large experience, having recognized the benign character of the lesion, may, with comparative safety, perform a conservative operation.

In a few instances a local infection in the skin over the breast may involve the deeper tissues and produce a clinical picture suggesting malignant disease. Here a careful history will be helpful.

The later changes in the skin associated with fully developed cancer should give rise to no difficulty, and although now and then these may be associated with mastitis, it is always the safer procedure to operate for cancer. These more definite skin changes are the so-called "pig skin," marked induration, multiple dimpling, superficial ulceration, reddening, dilatation of veins.

Œdema of the skin and subcutaneous tissue over the breast is usually a sign not only of cancer, but of hopeless cancer. I have, however, observed it twice in benign conditions of the breast. In both instances the breasts were large and pendulous, the induration of the breast and œdema of the skin and fat had followed a trauma and had persisted.

Axilla.—Too much importance has been placed upon the presence or absence of palpable nodules in the axilla, and so far the recent teaching has been unable to overcome the older. In benign lesions of the breast, glands are frequently palpable; in cancer of the breast with metastasis to the glands in the axilla, one may be unable to palpate glands.

In my entire experience I have only observed one case in which the palpation of large and adherent glands in the axilla led to a diagnosis of malignancy even in the absence of any palpable lump in the breast. After the complete operation a small schirrous cancer was found in the breast. This woman, however, had a large, fatty breast.

In a small number of cases of cancer of the breast the patient's attention to the disease has been attracted by the nodules in the axilla, and the tumor of the breast was not felt until later. But this, of course, does not exclude the presence of the breast tumor at that time.

When one feels a palpable mass or a number of enlarged glands in

the axilla and palpation fails to reveal any trouble in either breast, there should first be a blood examination to exclude leukemia or syphilis. Having excluded these, the probabilities are that one is dealing with a primary lesion within the axillary area. The number of such cases is small. We must first bear in mind aberrant breast tissue. Tumors of this kind feel like lipomas. I will discuss them later. Then there are a few examples of hypertrophy and infection of the axillary sweat glands. The most common benign tumors in the axilla are lipoma and fibromyxoma of nerve sheaths.

We must also bear in mind that the glands may be enlarged from pyogenic or tuberculous infection through a portal of entrance, situated at a distance, but which has healed, and the patient may have forgotten the incident. (Healed wounds of fingers.)

Sarcoma of glands, nerve sheaths and fascia are possible.

In the surgical attack on axillary masses without breast involvement the mistake is usually made of performing an incomplete operation on the clinical diagnosis of a benign lesion. If these cases are carefully considered, one should be able to recognize those in which a complete axillary dissection offers the patient the best opportunity of a cure, and in my experience, whenever such an axillary dissection is indicated, it is best to perform the so-called complete operation for cancer of the breast.

Supraclavicular Glands.—The involvement of these glands is a late occurrence in cancer of the breast. The decision as to when to explore the neck depends less upon palpation before operation, than upon the findings within the axilla at operation. This will be discussed under operation.

Other Breast.—Both breasts should always be carefully palpated. The finding in the other breast of single or multiple tumors is a factor in favor of benignity, which will be discussed again under tumor.

We often now see patients with a lesion of one breast, and a history of some condition in, or operation on, the other breast. For example, there may be a history of a disappearing tumor, discharge from the nipple, or pain. This is suggestive that we are dealing with a bilateral lesion which in the majority of cases is benign, usually a simple cyst or an intracystic papilloma.

When there is a history of removal of a tumor from the other breast and no evidence of recurrence, we have evidence that this tumor at least was benign. But unless we have absolute proof of the nature of this tumor, we are not helped. Should we know positively that the removed

tumor was a cyst or an intracanalicular myxoma, this evidence would favor a benign tumor in the breast under examination.

Among almost 200 cases of simple cysts of the breast we have seen cancer of the remaining breast once only. This indicates that if a patient has a cyst in one breast and then a tumor develops in the other breast, the chances are that the second tumor is also a cyst. The same is also true of intracanalicular myxoma.

With these two exceptions the knowledge of a previous tumor of the other breast is not helpful, except when we know that the first tumor removed was a cancer. This is very suggestive that the present tumor is also malignant.

Our observations show that the longer our patients live after an operation for cancer of one breast, the greater the probability of cancer of the other breast. As yet we have not sufficient evidence to prognosticate this occurrence and to justify the removal of the other breast as a protective measure.

Bilateral diseases of the breast will be discussed under multiple tumors.

Other Organs.—*I have no evidence that would be helpful* in the differential diagnosis of breast tumors by the finding of lesions elsewhere. In older literature there is much stress laid upon cases in which the symptoms of metastasis were the first signs of cancer of the breast, especially fracture of the neck of the femur and paralysis of the lower limbs. But apparently in these cases the breast lesion was overlooked by patient and physician in a way not likely to occur today. The only fact that has impressed me in a long observation is that we rarely see cancer of the breast in women with marked tuberculosis of the lungs, while in our cases of tuberculosis of the breast lung involvement, if present, is slight.

Vague pains in the chest, in bones and joints, which as a rule are the first signs suggesting metastasis after operation, cannot be interpreted before operation as an indication of metastasis. Again and again I have observed them before operation in patients who have remained well years after the complete operation for cancer.

Patients with lesions of the breast should receive a most careful general investigation, but up to the present time it has not been especially helpful in the exact diagnosis of the condition in the breast.

I am now investigating the relation of chronic cystic mastitis to pelvic lesions, but as yet have obtained no definite data.

As a rule our patients with breast tumors are good operative risks.

One should always think of the ribs below the breast as the possible focus of the breast lesion. I have seen this occur but twice. Both were instances of post-typhoid perichondritis in which the pus had infiltrated the breast. In one of these at exploration we found an abscess, in the other an encapsulated bone sequestrum.

Single Tumor.—In the vast majority of cases the patient first observes a single tumor, and if she seeks advice at once, this is all that will be found at examination.

I have learned that, when a woman comes under observation complaining of a breast lesion, it is a safer plan to at first take no history and caution the patient not to tell you which breast is involved. In the past two years this plan has been especially useful because of the greater number of women who are seeking advice early for vague pain, indefinite lumps and slight weeping from one or both nipples. If after examining both breasts most carefully you can feel no distinct lump, or if the indistinct area which you feel is not the one the patient felt, the chances are there is no definite tumor. When a patient tells even an experienced surgeon that she has a lump in the upper and outer quadrant of the right breast, there is a tendency for him to feel this lump.

The breasts of many women are lumpy. This is most marked just before and in the beginning of menstruation in all women. In unmarried girls palpation produces congestion and the suspicion of a lump, but in these cases the age under twenty-five helps to exclude cancer. Now and then, however, such breasts are explored and no tumor is found. In older women who have nursed children and in younger women who have not, lumpy breasts are a common finding, especially toward the menopause.

Now that women are seeking advice so early, we should be particularly anxious not to overlook a single tumor. But at the same time we do not wish to subject them to unnecessary operation.

We must also bear in mind that a patient may have felt a tumor, and the previous examiner may also have been correct, but when you examine the patient there is no tumor. You may also feel the tumor at your first examination and fail to find it at the next. This is the *disappearing tumor*—a simple or papillomatous cyst, and its disappearance is almost as good a cure as its removal by operation.

The demonstration of a definite single tumor is an indication for immediate operation when the patient is over 25 years of age, and with rare exceptions the operation is also indicated in women

over twenty. The function of a breast is not injured by the removal of a single tumor, and, if this tumor is benign, the patient is protected by the removal of a precancerous lesion.

The object, however, of operating upon a single tumor is not so much to remove a benign lesion as to expose and recognize a possible cancer in a period when the chances of a permanent cure are best.

Disappearing Tumors.—I have records of nine cases of tumors which have disappeared when felt after a most careful examination. The age of these patients was under thirty in three, in four it was between thirty and forty, and in one forty-five. So far in this group no other tumors have appeared in the same or the other breast. In four cases it is now from 7 to 22 years since the first observation.

Among 174 cases of simple cysts in chronic cystic mastitis 14 cases gave a history of a disappearing tumor before they came under observation. Among fifty-nine of these 174 cases, in which the cystic tumor only was removed, six have observed a disappearing tumor since operation.

Among 50 cases of chronic cystic mastitis without large cysts found at operation only two gave a history of a disappearing tumor.

Apparently the disappearing tumor is a simple cyst. When a simple cyst has been removed from the breast and a second tumor appears later in this or in the other breast, there is great probability that this is another cyst. In my experience it has been cancer in only one of the 60 cases when both breasts were saved, and one out of 100 cases when one breast remained.

Among 43 patients whose removed tumor proved to be a benign intracystic papilloma there is not a single example of a disappearing tumor in the previous history, and in only one case was it observed after operation.

Among 800 or more malignant tumors of the breast we have recorded the observation of a disappearing tumor in only three cases.

The history, therefore, of a disappearing tumor is very suggestive of chronic cystic mastitis with cyst formation. But I would not allow this to influence me against exploring the second tumor when it appears, because there is a possibility, though remote, that it may be malignant.

Multiple Tumors.—*The correct presentation of the problem here* is much more difficult than with the single tumor. The number of cases is relatively small.

The most significant fact is that among the cancers of the breast

the majority of the patients presented themselves with a single tumor in one breast.

In a few instances there were multiple tumors in one or both breasts. These observations are sufficient to show that one of multiple tumors in one or both breasts may become malignant.

The most common multiple tumors of the breast are those which have the least tendency to become malignant—the simple cyst and the intracanalicular myxoma.

If one palpates distinctly more than one tumor in a breast, or tumors in both breasts, at least one tumor in each breast should be explored. One should select the tumor of longest duration, or the largest, or the one most suspicious, on palpation, of possible malignancy. If the tumor proves to be a simple cyst, or an intracanalicular myxoma, or a lipoma, I think, we are justified in removing the tumors and saving the breast, especially in younger women. We have a number of examples of the removal of multiple intracanalicular myxomas from one or both breasts, but in the presence of multiple simple cysts, the majority of surgeons remove the entire breast. I have records of 10 cases only in which multiple simple cysts were removed from one or both breasts. These patients have been as uniformly relieved as the 108 in which one or both breasts were completely excised.

CLINICALLY BENIGN TUMORS

When the surgeon feels unable to make the diagnosis of malignancy the breast lesion for practical purposes is clinically benign (Fig. 309). There is no necessity for a border-line group of clinically doubtful tumors, because to one who knows there is always an element of uncertainty.

Some surgeons from their experience may be better able to elicit slight fixation of the nipple, atrophy of the subcutaneous fat, dimpling or slight fixation of the skin (Fig. 310), when the less experienced one might overlook these. Again, experience is helpful in the interpretation of the palpation of the tumor and the surrounding tissue.

No surgeon should, however, feel too sure of his clinical diagnosis. If there are definite clinical signs largely favoring malignancy, the operation for cancer should be performed without an exploratory incision. The number of mistakes in performing this for a benign lesion will be relatively very small. But, on the other hand, if all the signs of a malignant tumor are absent, it is not justifiable to proceed with the

complete operation for cancer without excluding a benign tumor by an exploratory incision.

The per cent. of benign tumors is steadily increasing, in my observation from 32 to 59 per cent., and if every woman sought advice the moment she felt a lump in the breast the proportion of benign lesions would be still greater.

The surgeon today, therefore, must prepare himself to recognize breast lesions by their naked-eye appearance, with or without the aid of a frozen section, and this differential diagnosis is more difficult than that which confronted the older surgeons in the clinical differentiation. Then women waited as a rule until each lesion had differentiated itself. Now women are coming when there is no known clinical differentiation, and recently the number of cases, in which there is a great dilemma at the exploratory operation and in the frozen section, is increasing.

Personally I have seen in the past two years more non-encapsulated zones of the breast tissue which at first sight felt and looked like cancer at the exploratory incision, which were very suspicious of cancer in the frozen section, but which I believe are not cancer.

Until recently we explored 10 per cent. of lumps which turned out to be cancer; now we are exploring as many as 40 and 50 per cent. According to my records the mistakes of performing the complete operation for cancer for a benign lesion were until a few years ago about 10 per cent. In the hands of the same group of surgeons today it has reached almost 15 per cent.

The mistakes are not made with scirrhus or medullary cancer, but with local areas of mastitis, chronic cystitis mastitis, papillomatous cysts, and adenomas. All of these benign lesions are on the increase, while the fully developed medullary and schirrhous carcinoma are on the decrease.

When the benign lump is explored, it is best for the patient to treat the lesion as malignant, unless one is absolutely certain that it is benign. Mutilation is nothing as compared with the fatality of an incomplete operation for cancer.

To recapitulate: When the palpable lump is associated with retraction of the nipple, dimpling or adherent skin, or a pretty definite infiltration of the surrounding breast, that is, the usual signs of cancer, it is by all means best for the patient to perform the complete operation for cancer.

When at the exploratory incision the naked-eye appearance and the

frozen section, leave you in doubt what to do, the complete operation for cancer is best for the patient.

One should not mistake medullary or scirrhous carcinoma for any benign lump.

Until a few years ago my evidence indicated that if you removed a cancer of the breast as the original lump only and then, later, after microscopic study, performed the complete operation for cancer, the chances of a cure were reduced from about 80 to 10 per cent.

However, in recent years a large number of border-line tumors have been sent to the laboratory for diagnosis—cases in which the tumor only had been removed. In this group there were no fully developed cancers. In some cases the laboratory diagnosis was benign, and no further operation was advised. In others, on account of suspicion it was advised to remove the breast. In still others the diagnosis of early adenocarcinoma was made, and the complete operation for cancer was suggested.

The remarkable fact about this group is that in spite of what diagnosis we made and what operation we advised, there is not a single death from cancer, nor a single recurrence.

This group of about sixty cases has been submitted to many pathologists throughout the country. In not a single case is there a uniform agreement as to the diagnosis, or what should have been done.

For example, some of the encapsulated tumors which we had considered benign cystic adenomas or fibroadenomas, other pathologists have diagnosed cancer. In this group of cases the tumors only were removed. On the other hand, in cases which were considered by us early adenocarcinoma and in which we advised the complete operation for cancer, the consulting pathologists have viewed the breast lesion as benign.

This introduction is absolutely essential to what follows.

The diagnoses are my own, but it is important for the reader to know that in the border-line group there are some pathologists who agree, and some who disagree, with the diagnoses made. The thing to bear in mind with great emphasis is, that no patient has suffered from this disagreement, except now and then from an unnecessary removal of the breast.

What I wish to emphasize also is, that the operation for these border-line tumors in two stages yields just as good results as in one stage, and apparently it has been the results in cases of this kind in the past that have impressed surgeons that it was not dangerous to operate for cancer of the breast in two stages. It is apparently just as dangerous today

to operate for fully developed cancer in two stages, but it is not dangerous to operate for a benign or precancerous lesion in two stages. In fact, it must be remembered that in many of these latter cases the second operation was unnecessary. I am confident, however, that the complete removal of the breast is a definite protective procedure in certain non-encapsulated lesions of the breast which may be included under the terms chronic mastitis and chronic cystic mastitis.

CYSTIC AND SOLID TUMORS OF THE BREAST

The simple cyst (Fig. 311) is characterized by a distinct blue dome, smooth wall and non-hemorrhagic contents; the papillomatous cyst (Fig. 321) by the intracystic papilloma; the galactocele (Fig. 302) by its milky contents and smooth wall. The chronic pyogenic abscess (Fig. 303) contains cloudy material and has a wall which looks like granulation tissue. The tuberculous abscess (Fig. 304) contains the usual pus and pretty characteristic granulation tissue in the wall.

In contrast to these benign cysts, the malignant cyst (Fig. 305), whether cancer or sarcoma, has hemorrhagic contents without papilloma, or a thick grumous material entirely different from the contents of a pyogenic or tuberculous abscess, and some thick area in its wall which an expert surgeon could select for frozen section.

The *solid* tumors of the breast must be divided into those encapsulated, circumscribed, and infiltrating.

In my experience distinct encapsulation is a sign of a benign tumor, usually some form of an adenoma—cystic, fibrous or intracanalicular. In these cases one is helped most by the gross appearance. The histological picture of the intracanalicular myxoma is the least confusing; that of the cystic and fibrous adenoma is frequently interpreted as doubtful or malignant, when the microscopic appearance only has been considered.

Medullary carcinoma, scirrhus, adenocarcinoma and sarcoma may be circumscribed. The gross and frozen-section appearance of all but adenocarcinoma is so distinct that no surgeon should today ever make the mistake of performing an incomplete operation for these forms of cancer of the breast. When, however, certain benign lesions resemble these more malignant forms in the gross appearance or frozen section, the mistake of the complete operation will have to be made.

Certain types of adenocarcinoma are easy to recognize: The colloid

from its intercellular substance, and the duct cancer (comedo adenocarcinoma) from the characteristic worm-like tubules which can be expressed from the cut surface.

The type of adenocarcinoma difficult to recognize is that closely associated with cystic adenoma, a more or less circumscribed tumor, and chronic cystic mastitis, a diffuse lesion.

The diffuse benign lesions of the breast are most difficult of all. We have, first, during lactation the chronic mastitis with no large areas

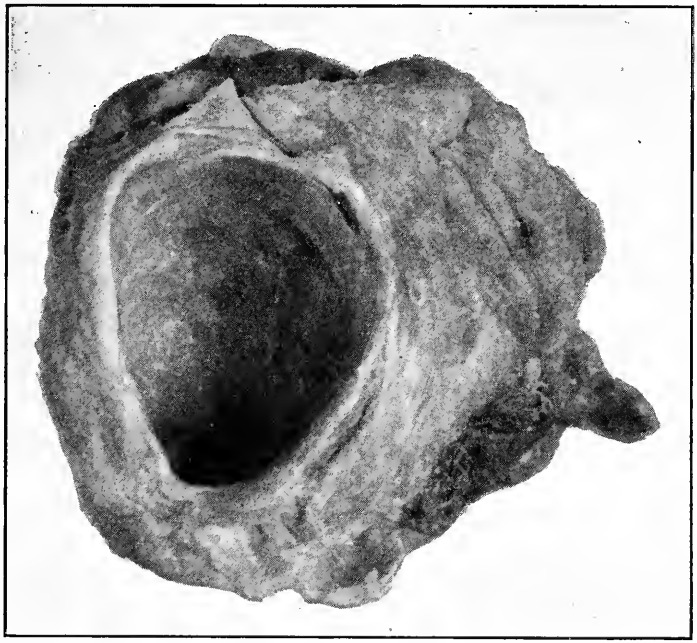

FIG. 311.—Photograph of simple cyst surrounded by a zone of breast. Note the distinct cyst wall, smooth surface, one dilated duct and many adenomatous areas of surrounding breast.

Path. No. 19040.—White, female, aged 38. Tumor and pain three weeks. Operation, 1910. Excision of cyst and zone of breast. 1916, six years, well. This photograph illustrates how a simple cyst should be excised after it is explored.

of pus formation. Then, in the non-lactating breast different forms of chronic cystic mastitis and chronic mastitis without cyst formation.

I shall attempt to present one or more illustrations of the different groups.

At this time I again wish to make the emphatic statement that in the great majority of cases a decision as to what is best for the patient can be more readily made from the gross appearance. Frozen sections

can be made. We need some differential staining method for more exact diagnosis.

CYSTIC TUMORS

Simple Cysts.—Usually on palpation the tumor is spherical and tense (Fig. 309) and suggests a cyst, but in some cases when it is buried in breast tissue one palpates the mass of breast tissue containing the cyst, and the area feels more like a cancer than a cyst.

When explored carefully, the thin cyst wall appears as a blue dome. One may pass through skin and fat only, before the cyst wall is reached,

FIG. 312.—Adenomatous areas in zone of breast removed with a simple cyst. Some areas show beginning ectasia.

Path. No. 16133.—White, female, aged 45; tumor and pain 12 days. Excision of cyst and zone of breast. 1916, well two years.

or also through a zone of breast tissue. The moment the thin wall is nicked the color disappears. The lining of the cyst is always smooth; the contents clear or cloudy; never hemorrhagic, nor grumous, thick material.

The cyst wall (Fig. 311) is usually thin; but even when slightly thicker, it is sharply demarkated from the breast tissue. When this cyst is cut out with a zone of breast, one may encounter dilated ducts filled with green, gray or yellow grumous pastille material, other cysts of different sizes, and, scattered in the white opaque breast tissue, one

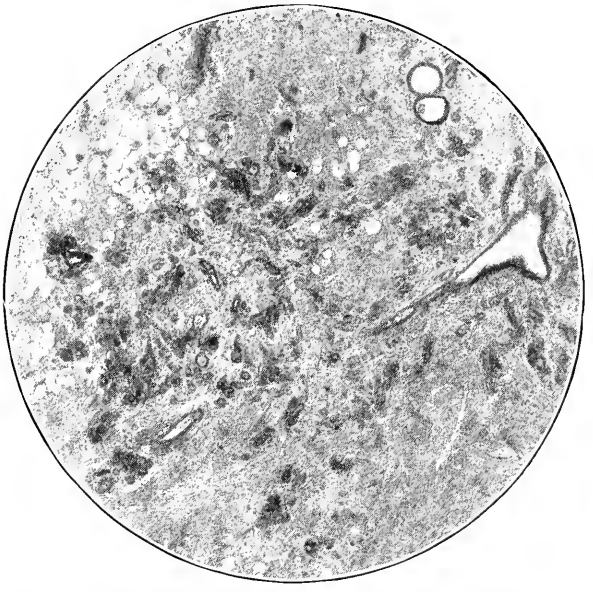

FIG. 313.—Irregular adenomatous areas and dilated duct in breast containing multiple cysts and early chronic cystic mastitis.

Pathol. No. 16786.—White, female, aged 45; pain five days, tumor four days. 1915, excision of zone of breast containing a few small cysts. 1916, one year, well.

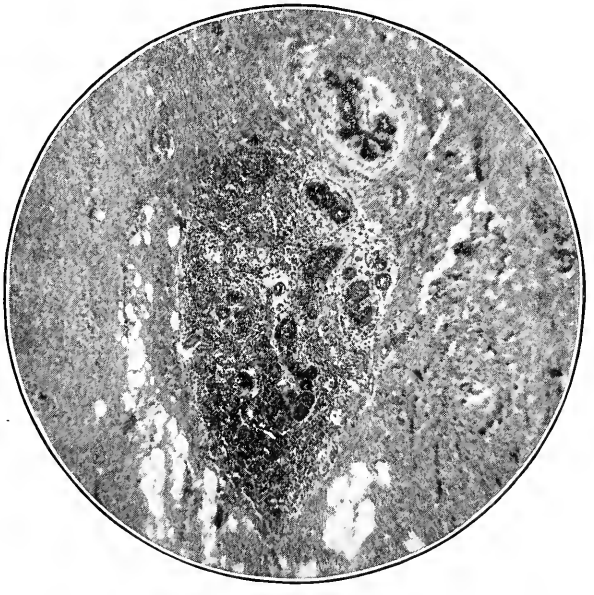

FIG. 314.—Area of chronic mastitis in breast near wall of simple cyst.

Pathol. No. 8717.—White, female, aged 45; tumor five weeks, one week after trauma. 1908, complete excision of breast because of multiple cysts. 1916, eight years, well.

FIG. 315.—Area of ectasia in breast containing multiple cysts and dilated ducts.

Pathol. No. 9394.—White, female, aged 67; tumor and pain six weeks. Nipple retracted; only one tumor palpable. 1908, complete operation for cancer based on retracted nipple. Breast contained three simple cysts. 1916, eight years, well.

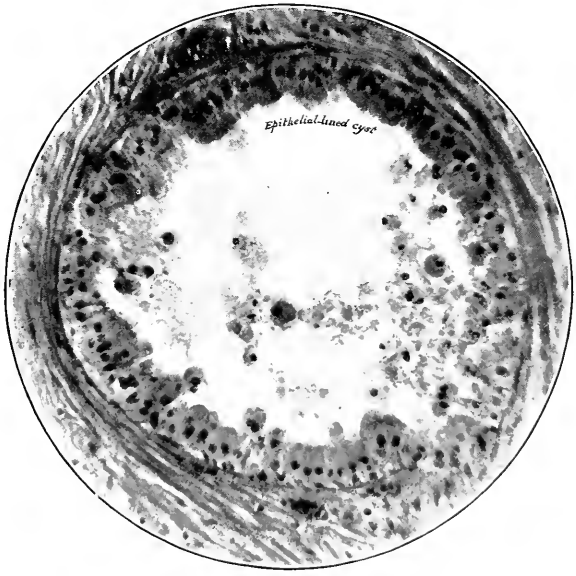

FIG. 316.—Epithelium-lined minute cyst in breast containing multiple cysts and dilated ducts.

Pathol. No. 9394.—For history see Fig. 315.

FIG. 317.—Adenocystic areas in breast containing multiple cysts and dilated ducts.
Pathol. No. 9394.—For history see Fig. 315.

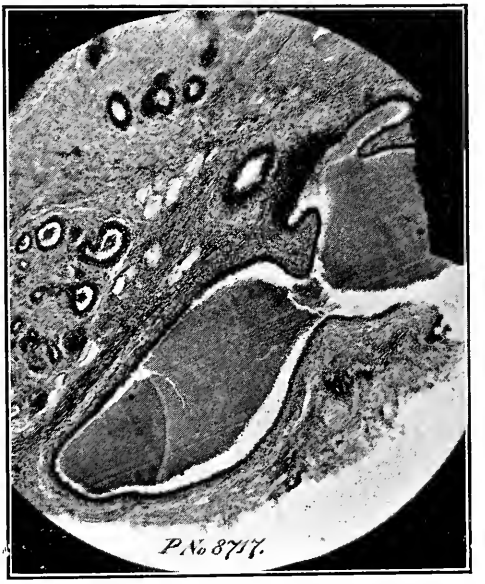

FIG. 318.—Dilated ducts, lined with basal cells, filled with grumous material. **Breast,** the seat of multiple cysts and dilated ducts.
Pathol. No. 8717.—For clinical history see Fig. 314.

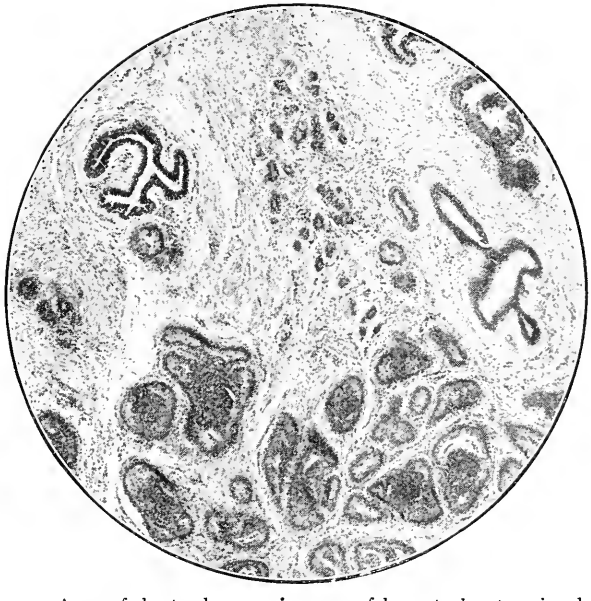

FIG. 319.—Area of duct adenoma in zone of breast about a simple cyst.

Pathol. No. 14095.—White, female, aged 37; pain three months, tumor one month. 1913, excision of cyst and zone of breast. 1916, well.

FIG. 320.—Area of duct papilloma in chronic mastitis in breast about a simple cyst.

Pathol. No. 16133.—White, female, aged 45; tumor and pain 12 days. 1914, excision of cyst in zone of breast. 1916, well.

This patient's left breast had been removed seven years before apparently for a simple cyst.

may see the pink elevated dots of the adenomatous hypertrophy which is apparently the first stage of the chronic cystic mastitis. The practical point, however, is that in an experience with 178 cases there is little or no relation between this cyst and cancer, and in the great majority of cases the breast can be saved.

However, when microscopic sections are made of the wall, we may find all stages of chronic cystic mastitis (Figs. 312 to 320) and areas which, if we did not know the gross pathology, might be considered sufficiently suspicious to justify the removal of the breast.

It is frozen sections from the breast about these blue-domed cysts which give cellular pathologists their dilemmas.

Papillomatous Cysts.—The majority of surgeons fear to do a conservative operation for a cyst with a papilloma, especially when it contains blood. However, if these papillomatous cysts are subjected to operation in the early benign stage, there is absolutely no necessity for the removal of the breast. The cyst is not blue-domed as is the simple cyst. When opened it usually contains blood-stained serum. The papillomata may be of various sizes, partially or completely filling the cyst, but the surface is always papillomatous. This is lost in the malignant papilloma. When excising the benign papillomatous cyst, study the breast tissue. If other papillomatous cysts are encountered, or if there are a number of dilated ducts and small cysts, remove the breast, a procedure which is not followed in the benign blue-domed cyst. If the breast tissue is normal, remove the cyst only. Fig. 321 pictures a papillomatous cyst with a zone of breast removed with it. After one has removed the cyst, its wall with the base of the papilloma should be studied. If beneath the papilloma there is no distinct wall, but an invasion of the breast by the papilloma, immediately perform the operation for cancer.

In some cases of papillomatous cysts thus conservatively treated many pathologists have diagnosed the microscopic section cancer. In the case represented in Fig. 322 there has been no recurrence 19 years after the excision of the papillomatous cyst only.

At the present time a large per cent. of papillomatous cysts are treated by the removal of the breast, or the complete operation for cancer. Especially now that women are coming earlier with the lump, this mutilating operation should be performed less, and without any added risk to the patient.

Galactocele, a cystic tumor due to the accumulation of milk in a dilated duct. Clinically I have never been able to make out the bottle-

shaped form mentioned in the literature. To have a true galactocele there must be, or have been, lactation. My observations show that lactation hypertrophy may persist in the breast 14 years after nursing the last child (Fig. 323). Apparently the cause of this is some local

FIG. 321.—Benign papillomatous cyst in a senile and fibrous breast; some dilated ducts and chronic cystic mastitis.

Pathol. No. 17514.—White, female, aged 66; tumor after trauma eight months; no discharge from nipple. On account of the slight infiltration of the skin (probably the result of the trauma) complete operation for cancer (1915). 1916, one year, well.

irritation, such as a galactocele, a benign tumor, or a chronic mastitis. As long as there is lactation hypertrophy in the breast and a plugged duct, galactocele is possible.

In the 20 years previous to 1910 we observed but two galactoceles, since 1910 twelve. In the past, therefore, we have either over-

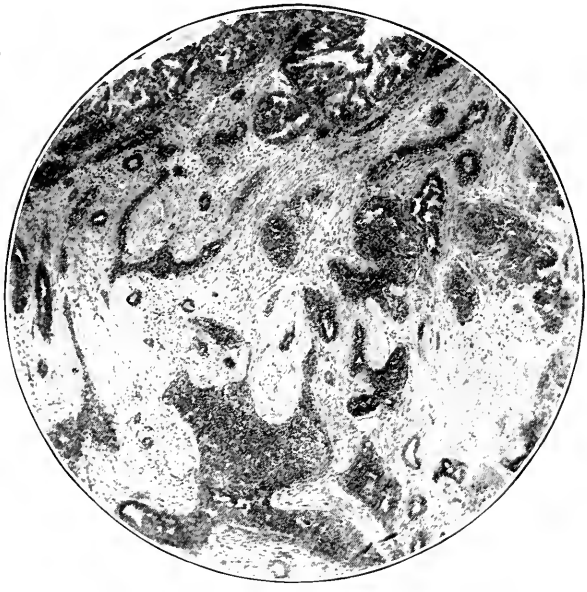

FIG. 322.—Benign papillomatous cyst. Section from papilloma.

Pathol. No. 1596.—Operation in 1896, excision of cyst and zone of breast.

White, female, aged 45; discharge of blood from nipple 15 years; tumor 10 years. 1915 19 years, well.

This section has been considered by many pathologists as carcinoma.

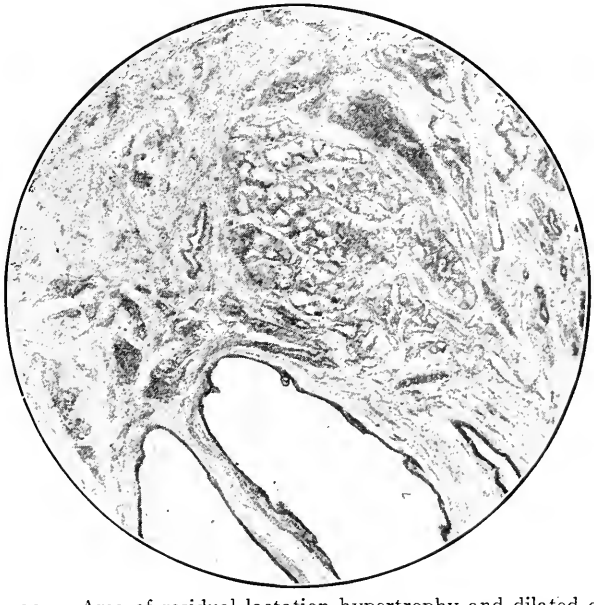

FIG. 323.—Area of residual lactation hypertrophy and dilated ducts.

Pathol. No. 5088.—This breast was also the seat of a medullary carcinoma.

looked galactoceles, or, on account of delay, the patient has come under observation with cancer. As a rule with the galactocele the breast is the seat of mastitis or areas of lactation, or there may be multiple galactoceles (Fig. 324). In the majority of cases the condition is mistaken clinically, at the exploratory incision, or even in the frozen section, and treated as malignant. There is nothing of special difficulty in recognizing the galactocele with its smooth wall and milky contents. But when the breast is the seat of mastitis, areas of lactation hypertrophy, and dilated ducts filled with creamy material, we have a con-

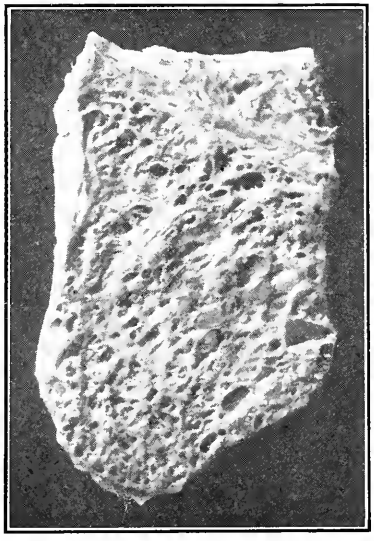

FIG. 324.—Multiple galactoceles and dilated ducts.

Pathol. No. 8166.—1907, excision of breast. White, female, aged 34; history of abscess in this breast some years ago. The patient is nursing her child aged 20 months. Lactation in the affected breast, scanty. Lump observed, six months. In addition to tumor multiple nodules in breast. After operation, cream-like material could be expressed from the dilated ducts.

fusing picture, and the probabilities are that the majority of surgeons will do the complete operation for cancer—the safer procedure. It is quite possible that if we see the galactocele quickly as was my good fortune in the last two cases of two and five weeks' duration, there will be but a single palpable tumor, and the typical cyst will be recognized on exploration. Fig. 302 pictures a galactocele in which the condition was treated on the diagnosis of cancer. Fig. 324 shows the diffuse disease of the breast —dilatation of all the ducts often associated with galactocele.

Chronic Lactation Mastitis Abscess.—This disease may appear as a single tumor, and at exploration as a single cyst (chronic abscess) in

an apparently normal lactating breast. The contents of the chronic mastitis abscess is somewhat purulent, but never hemorrhagic or grumous, as in the cancer cyst. Nevertheless its thick wall may give rise to suspicion of cancer. The frozen section (Fig. 303) is to many pathologists even more confusing. The disease should be distinguished from cancer in the gross. When the breast is the seat of chronic mastitis with remaining areas of lactation hypertrophy, we have a clinical, gross and microscopic picture so difficult to recognize with certainty, that I would advise the complete operation for cancer. There is little

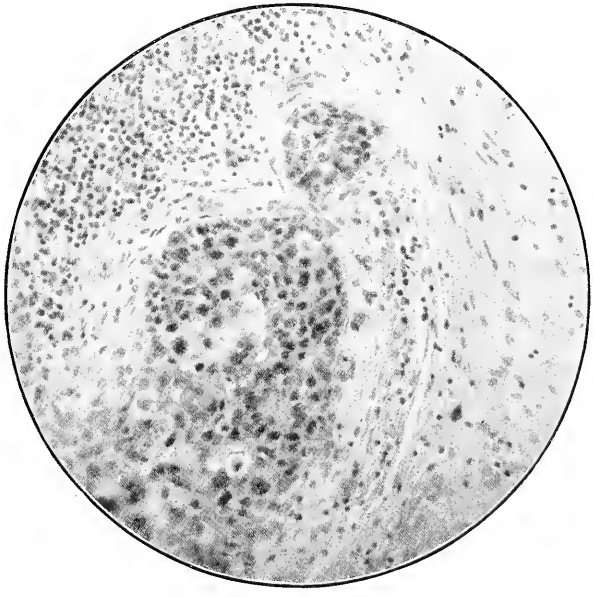

FIG. 325.—Adenocystic changes in tubercular mastitis, suggesting early carcinoma.

Pathol. No. 3170.—Complete operation for cancer in 1900. White, female, aged 35; pain three months; tumor two months; sinus one month.

Ten years later the patient was under observation with tubercular peritonitis. No evidence of cancer.

to lose, as in the majority of these cases the breast must be sacrificed in any event.

Tuberculous Abscess.—We are rarely given the opportunity to see a tuberculous abscess of the breast before it is ruptured. Tuberculosis of the breast is usually a single focus and appears first as an area of induration. Softening with abscess formation takes place, as a rule, before six months and a sinus forms. The tuberculous abscess (Fig. 304) of the breast does not differ in the gross from the same lesion anywhere else. However, microscopically, in the wall of the cavity the

mastitis secondary to the tuberculosis is frequently looked upon as adenocarcinoma (Fig. 325). I have never been able to conclusively prove the presence of cancer in any tuberculous abscess of the breast, although many of these cases had been diagnosed and treated as cancer. In none have the glands shown metastasis, nor have any of the patients died of cancer.

Cancer Cysts.—A smooth-walled cyst with bloody contents and without a papilloma should be treated as cancer. A smooth-walled cyst with thick grumous material is always malignant. In the majority

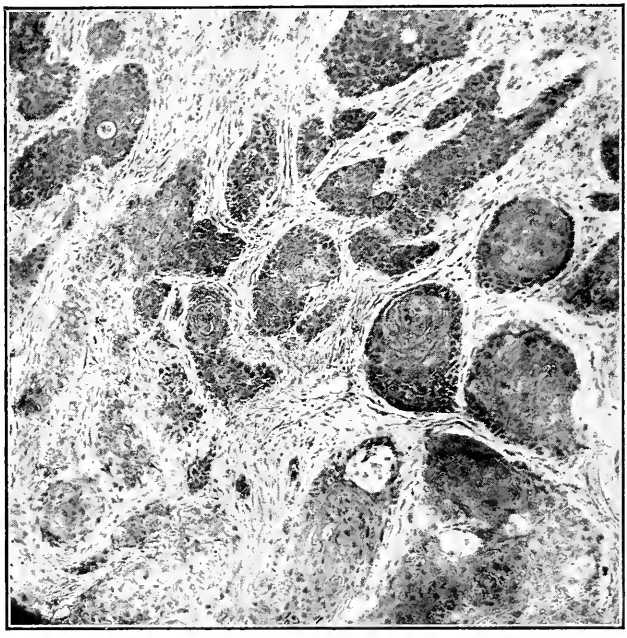

FIG. 326.—Typical fully developed cancer in wall of cancer cyst.
Pathol. No. 5252.—Operation in 1904, complete for cancer.
White, female, aged 64; pain three months; tumor two months.

of cases cancer can be recognized in the wall of these cysts at the exploratory incision.

In the past smooth-walled cysts containing blood were the cancer cysts not recognized by the surgeons, and treated as benign.

Figure 305 shows a somewhat smooth-walled cancer cyst which contained blood.

In the 20 cases of cancer cysts observed by me, fully developed carcinoma or sarcoma was readily recognized in the microscopic section (Fig. 326).

In the differential diagnosis of the different types of cysts one is helped most by the contents of the cyst, by the character of the wall, by the appearance of the papilloma, if present, and by the careful study of the base of the papilloma. There should really be little difficulty in recognizing the cancer cyst, but when the benign cyst is associated with some diffuse disease of the breast, such as lactation mastitis, chronic cystic mastitis, multiple galactoceles, the surgeon is usually confused and the complete operation for cancer performed.

SOLID ENCAPSULATED TUMORS

The benign solid encapsulated tumors are cystic adenoma, intracanalicular myxoma and fibroadenoma. The common characteristic

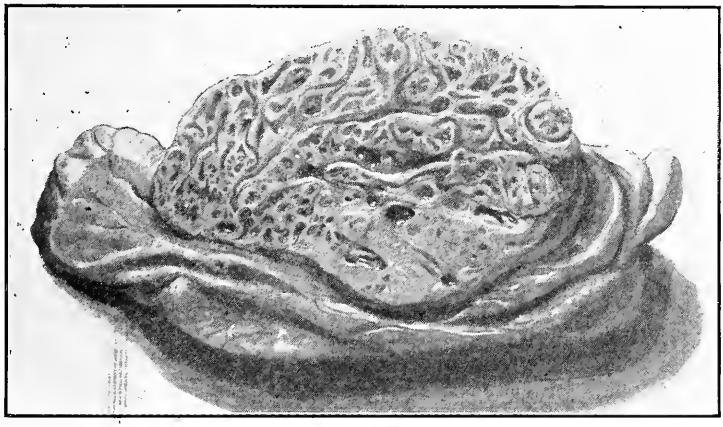

FIG. 327.—Encapsulated cystic adenoma removed with a zone of breast. Pathol. No. 2568.—Operation in 1899. White, female, aged 30; tumor 10 years.

which differentiates them from the malignant tumors is the presence of a distinct capsule. One could enucleate them from the surrounding breast. Often, however, at one point the capsule is less distinct and there is the appearance of an isthmus-like connection between the tumor and the breast. I have never observed a malignant tumor with such a capsule.

In the *cystic adenoma* (Figs. 327 and 328) one sees minute cysts throughout the tumor. Some are filled with clear or cloudy fluid, others seem to contain a granular material which, as a rule, does not express on pressure. Microscopically, on account of the large number of pictures met with, these tumors are often diagnosed early carcinoma, and breasts are unnecessarily sacrificed. About 30 per cent. of pathologists diagnosed the section (shown in Fig. 329) cancer. In this case for-

tunately only the tumor had been removed. There has been no local recurrence now four years since operation.

The *fibroadenoma* shows no minute cysts. It may be marked by little crevices or show minute dots, and in addition there are white and gray areas (Fig. 306). In some fibroadenomas there is so little stroma (Fig. 330) that they almost resemble a miniature pancreas. But here again pathologists have been found to disagree in the microscopic study (Fig. 331). Here the diagnosis of malignancy is as five to two benign.

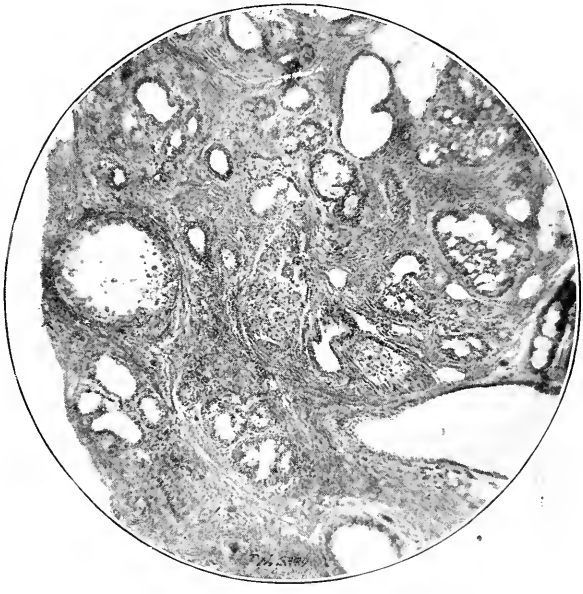

FIG. 328.—The microscopic picture of cystic adenoma and chronic cystic mastitis. Pathol. No. 9394.—For clinical history see legend of Fig. 315. The different types of areas in this zone of breast are designated in Figs. 315, 316 and 317.

When these fibroadenomas are present in the lactating breast, they undergo lactation hypertrophy (Fig. 307), and here the frozen-section diagnosis, when one is not familiar with lactation, is very confusing.

The fibroadenoma situated within the breast rarely reaches great size (a characteristic of the intracanalicular myxoma). When present for a number of years the fibroadenoma may become calcified.

Aberrant Fibroadenomas.—The most frequent tumor observed outside of the breast resembles the fibroadenoma. It may often attain a size larger than that of the breast (Fig. 301) and many of these cases are treated on the diagnosis of sarcoma. The tumor, however, is

always encapsulated. Its gross appearance is typically glandular (Fig. 332), and microscopically it differs from breast tissue at puberty only in the irregularity of the arrangement of parenchyma and stroma (Fig. 333).

FIG. 329.—Cystic adenoma.

Pathol. No. 13599.—Operation in 1912, excision of tumor and zone of breast. 1916, four years, well.

White, female, aged 22; tumor three months. Consulting pathologists differ as to diagnosis.

Intracanalicular Myxoma.—The small intracanalicular myxoma does not differ much, in the gross, from the adenofibroma (Fig. 334). In a few instances the tumor looks so succulent that it gives one the impression of a medullary carcinoma. Here a frozen section will be most helpful, because there is nothing more characteristic than its histology (Fig. 335).

I have been told about, but have never seen, a perfectly encapsulated medullary carcinoma. If there be such a thing, the frozen section will immediately differentiate it. As the intracanalicular myxoma

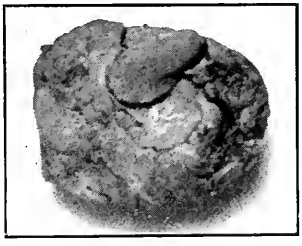

FIG. 330.—Small encapsulated fibroadenoma, excised with a zone of breast; stroma, scanty.

Pathol. No. 19063.—White, female, aged 40; tumor a few months. Operation in 1916 excision of tumor with zone of breast.

For microscopic appearance see Fig. 333.

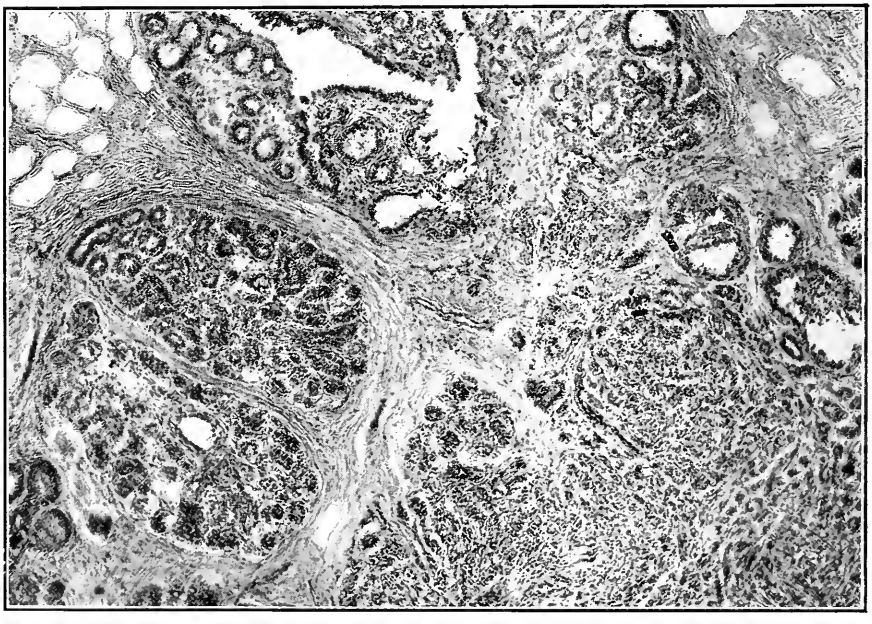

FIG. 331.—Fibroadenoma. Consulting pathologists differ as to diagnosis. The tumor was a small, distinctly encapsulated area in the breast of a young girl under twenty-five. Pathol. No. 19060.—Excision of tumor only.

grows larger, its peculiar gross appearance becomes more characteristic. In this middle stage it has neither the cysts of the cystic adenoma, nor the splits of the adenofibroma, but rather the appearance of the hypertrophied prostate.

The gross appearance of the large intracanalicular myxoma may be variegated (Fig. 336), but there is no necessity for any attempt at diagnosis before operation: These large, apparently encapsulated tumors occupying more than one-fourth of the breast should be treated as sarcoma—the tumor, breast, an area of skin and the greater pectoral muscle should be removed.

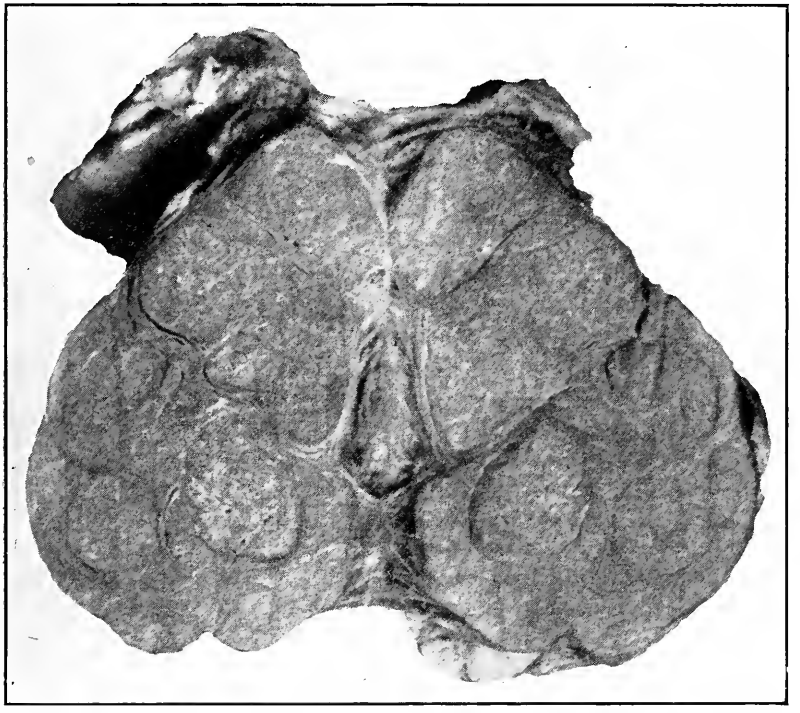

FIG. 332.—Encapsulated, large, aberrant fibroadenoma, incorrectly diagnosed sarcoma. Pathol. No. 6060.—Operation in 1904, complete for sarcoma. Colored, girl, aged 17; small tumor observed shortly after birth; rapid growth since puberty for three years. 1916, twelve years, well.

These three adenomas of the breast should offer but little diagnostic difficulty at the exploratory incision. The chief characteristic is encapsulation.

Malignant tumors may be circumscribed, but they can never be enucleated from the surrounding breast tissue, and when one explores a solid tumor which is not encapsulated, one should treat such a tumor as malignant.

Until recently all the distinct solid tumors which were not en-

capsulated and which were explored by me were malignant. Now that I am seeing cases earlier I have met with a number that are benign.

Circumscribed, but not Encapsulated Benign Tumors.—Figure 337 represents such a tumor which I explored in 1915. There was no capsule, it felt to the finger like cancer, and gave the gritty sensation

FIG. 333.—Microscopic picture of the usual aberrant fibroadenoma. For gross appearance and history see Fig. 330.

of a scirrhus under the knife. This lump had been in the breast perhaps 20 years, but in the last few weeks had seemed to grow and had become painful. The microscopic appearance is shown in Fig. 338.

We may also observe circumscribed areas of chronic mastitis, chronic cystic mastitis, cystic adenoma and fibroadenomas which

have lost their capsule. Now that women as seeking advice earlier after the first appearance of the tumor, or more quickly after the first change in an old tumor, this new group, most difficult to diagnose,

FIG. 334.—Encapsulated intracanalicular myxoma.
Pathol. No. 18374.—Operation in 1915, excision of tumor and zone of breast.

will increase. So far all the cases recorded by me have been treated on the diagnosis of early cancer.

Chronic Cystic Mastitis.—This disease may appear as a blue-domed simple cyst (Fig. 311) such as I have described. Apparently

FIG. 335.—Microscopic appearance of intracanalicular myxoma.
Pathol. No. 2761.

this is by far the most common condition. Chronic cystic mastitis is probably present in many breasts, but not until a cyst forms is the patient aware of it. Previous to the formation of the cyst these

patients may experience pain. At the present time we are seeing many women with painful breasts, more than ever before. Again, we are seeing a number of cases of painful breasts in which on examination we find one or more nodules in one or both breasts. True,

FIG. 336.—Large encapsulated intracanalicular myxoma, which usually shows sarcomatous changes and should be treated as sarcoma.

Pathol. No. 17979.—Operation in 1915, excision of tumor only, later on advice from Pathological Laboratory, complete excision of scar and pectoralis major muscle. White, female, aged 39, tumor, two years. 1916, one year, well.

the nodules are rather indefinite to the experienced, but are often considered tumors by the patient and inexperienced physician or surgeon. When we feel a definite tumor, explore it, and find the blue-domed, smooth-walled cyst (Fig. 311) we have, as I have stated before and wish to repeat here again, clinical and gross evidence of a benign

lesion. As we cut out these simple cysts or when we examine the removed breast, we always find evidence of a diffuse disease of the breast: There are minute cysts of various sizes, dilated ducts filled

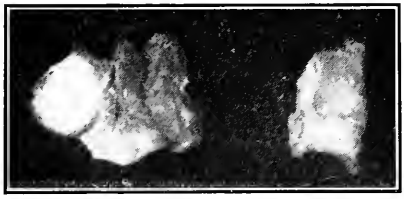

FIG. 337.—Circumscribed, but not encapsulated cystic adenoma. Gross appearance at exploratory incision suggested cancer.

Pathol. No. 17012.—Operation in 1915, exploration followed by complete operation for cancer. White, female, aged 30; little tumor 20 years; recent growth and pain two weeks For microscopic appearance see Fig. 338.

with grumous material; pink, elevated dots. These may be scattered in the breast tissue, rather diffusely mixed with the fibrous stroma. In cases of this kind they make little impression upon the ordinary

FIG. 338.—Cystic adenoma. For gross and clinical note see Fig. 317. Compare this section with Figs. 328, 329, and 319.

observer. However, we may meet the disease as a circumscribed area when it has the exact appearance of a cystic adenoma, except that it is not encapsulated. A quadrant or a hemisphere, or the entire breast

may be involved in this parenchymatous change (Fig. 339). It has received many names—*Schimmelbusch's* or *Réclus' disease, abnormal involution, senile parenchymatous hypertrophy.* I prefer to return to the old terminology of Billroth—*chronic cystic mastitis.* This pathological process impresses me as a reaction to some irritant. Microscopically and in addition to the parenchymatous changes, there is evidence of reaction in the stroma of the breast. No relation between this disease and any microörganism has yet been established.

In a smaller group of cases there are no large simple cysts (Fig. 339). In this group before operation we may palpate an indistinct tumor, a distinct circumscribed area, or a diffuse shot-like mass involving a quadrant, a hemisphere or the entire breast.

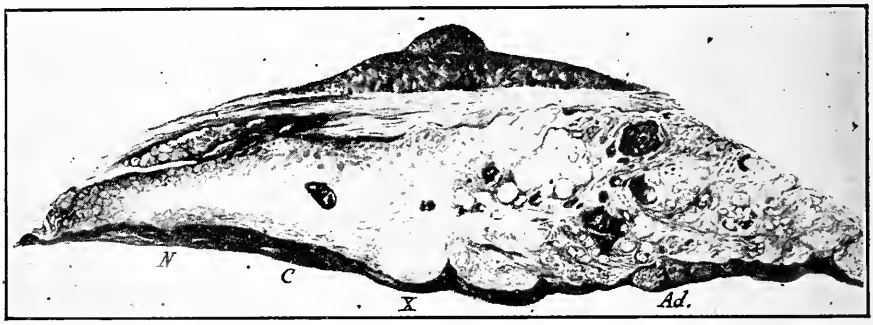

FIG. 339.—Chronic cystic mastitis; no large cysts. *N* = normal breast; *C* = minute cysts; *X* = areas suspicious of adenocarcinoma; *Ad* = adenocystic areas.

Pathol. No. 3965.—Operation in 1901, complete excision of breast. 1916, 15 years, well. White, female, aged 40; pain six months, nodular enlargement of one quadrant four months. Slight discharge from nipple. After microscopic study of this breast the complete operation was advised, but refused by patient. For microscopic appearance see Figs. 312 to 320 and Figs. 328, 329 and 331.

When we study these areas microscopically we find a great variety of histological pictures, difficult to interpret.

Until three years ago about 50 per cent. of the cases of chronic cystic mastitis without large cysts were looked upon as malignant, in the past three years only 30 per cent.

As we have no exact method of differentiating the benign from the malignant, I am convinced that it is safer in these cases to radically remove the entire breast with the pectoral fascia. If there is any evidence of cancer, operate as you would for cancer.

The time may come when we will be able to differentiate, but at the present time I am convinced that this is the safest procedure.

It seems strange that in the larger group, when we find a definite

smooth-walled cyst, experience shows that it is justifiable to perform the conservative operation of excision of the cyst with a zone of breast tissue. However, in the smaller group when we find no such cysts, but a circumscribed or diffuse area of the cystic mastitis, experience teaches us that it is safer to remove the breast.

A most thorough gross and microscopic study of almost 300 such cases shows not much difference in the breast about the simple cyst, in the chronic cystic mastitis without large cysts, and in the chronic cystic mastitis associated with definite carcinoma.

I have submitted a large number of these cases to a group of experienced pathologists and found a great divergence of opinion. It would, therefore, be a mistake to present this disease as a well-established entity in which exact diagnosis is possible.

Cancer in Chronic Cystic Mastitis.—In 18 cases of cancer cysts the presence of chronic cystic mastitis in the surrounding breast has been conspicuous by its absence. So we have no evidence that the cancer cyst begins in this disease.

When scirrhus and medullary carcinoma predominate in the picture of the tumor, one pays little attention to the surrounding breast, as an indication for operation.

In those cases in which at the exploration we do not find a zone of scirrhous or medullary carcinoma, but an area of chronic cystic mastitis as pictured in Fig. 339, the difficulties of differential diagnosis in the majority of cases are sufficient to justify the complete excision of the breast, and in some cases the complete operation for cancer.

In 50 cases we have made the diagnosis of benign, chronic cystic mastitis. As far as I know, not a single one of these patients has subsequently died of cancer. In 13 of these cases the small zone which was palpated before operation did not show the fully developed chronic cystic mastitis as illustrated in Fig. 339, but rather the character of the breast tissue pictured in Fig. 321. Microscopically, the tissue excised showed evidence of the adenomatous stage only (see Fig. 312). I am inclined to think that careful scrutiny at the exploratory incision with the aid of a frozen section will distinguish these cases and allow a conservative operation.

In 18 cases the breast was completely removed, in 6 both breasts, and in 13 the complete operation for cancer was done.

It is true that in some of these cases there was no indication for either the removal of the breast or the complete operation for cancer, because gross and microscopically the tissue removed resembled that in

the first group. But in the majority of cases the gross appearance of the palpable and explored area corresponded pretty closely to that shown in Fig. 339, and the microscopic to that in Figs. 312 to 320.

It is interesting to note, however, that the breast in these 50 cases diagnosed benign chronic cystic mastitis differed very little, except in degree, from 170 cases diagnosed simple cyst in chronic cystic mastitis. It is very difficult to explain the development of the large cyst in the larger group.

In 128 cases single simple cysts similar to that illustrated in Fig. 311 were present. In 54 of these cases only the cyst and a zone of the breast was excised. In one of these cases three years later a cancer formed in another zone of the breast. The patient presented herself

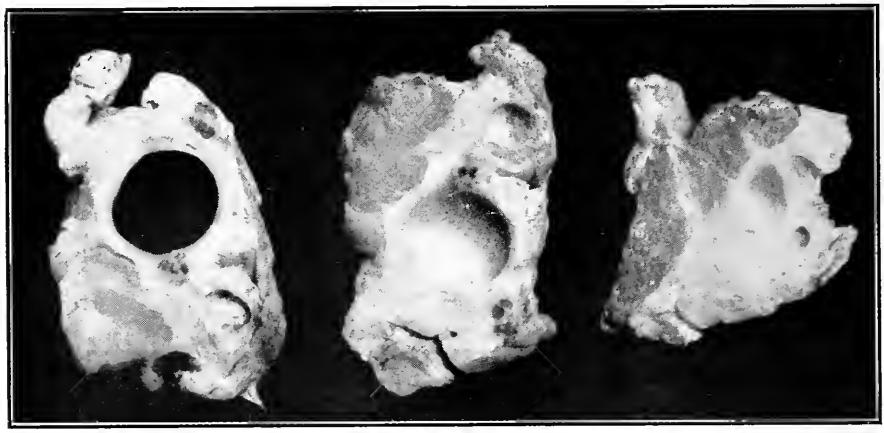

FIG. 340.—Chronic cystic mastitis with multiple cysts.
Pathol. No. 15359.—Complete operation for cancer in 1913. White, female, aged 45; pain 15 months; tumor one year (disappeared once). 1916, three years, well.

immediately, it was recognized at the exploratory incision, and the patient is well five years since the complete operation for cancer. The microscopic appearances of the breast about these cysts is shown in Figs. 312 to 320.

In forty-eight cases for various reasons the breast was excised. In twenty-six cases the operator suspicious of malignancy performed the complete operation for cancer. In a few cases because of a retracted nipple and dimpled skin. In a few others on account of the complicated gross pathology (Fig. 340) multiple minute cysts and dilated ducts. In a few cases after microscopic study.

In 42 cases, clinically, there were multiple tumors, and at operation multiple cysts were found (Fig. 340). In 10 of these cases the breast

was preserved, in 19 cases one, and in 13 both breasts were removed. The microscopic study of these breasts with multiple cysts differs from the breast containing a single cyst only in the number of simple cysts, and as a rule the chronic cystic mastitis is present to a larger extent.

During the same period of 25 years we have recorded 25 cases of cancer in chronic cystic mastitis or senile parenchymatous hypertrophy. In none of these cases was there found a fully developed area

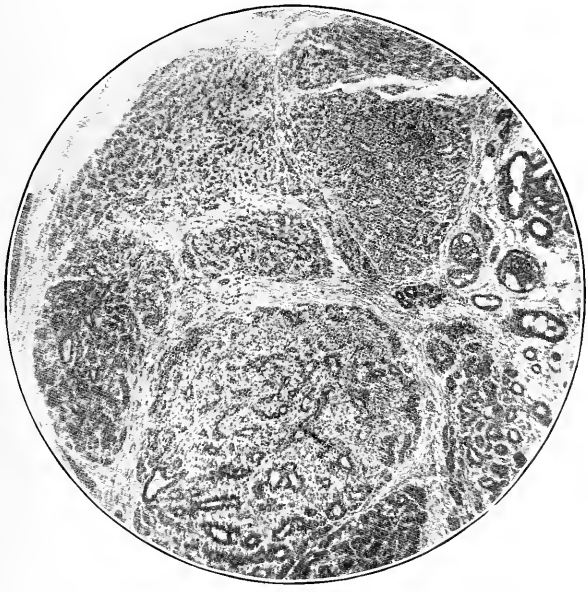

FIG. 341.—Early adenocarcinoma in adenomatous areas.

Pathol. No. 13204.—Operation in 1912, exploration followed by the complete operation for cancer. White, female, aged 49; intermittent retraction of the nipple 18 months; pain and tumor four months. Two years later excision of other breast for similar condition. 1916, four years, well.

of scirrhous or medullary carcinoma. In this group there is only one patient dead of cancer, and in this case we find after serial sections an area of fully developed cancer about which no pathologists would disagree. The other cases have all been submitted to a number of consulting pathologists, and not in a single case is there uniform agreement.

It is important to note, however, that in every one of these cases the breast was completely removed as shown in Fig. 339. In four cases the excision of the breast was the extent of the operation, in five cases the

operation consisted first of the removal of the tumor followed after an interval by the complete operation for cancer.

FIG. 342.—Adenocarcinoma in adenomatous areas.

Pathol. No. 11799.—Operation in 1911, excision of tumor; a few weeks later complete operation for cancer. 1916, five years, well.

White, femcale, aged 26, tumor two months. The tumor in the gross resembled Fig. 337.

FIG. 343.—Cancer (?) in chronic cystic mastitis. Photograph of the section of breast removed.

Pathol. No. 5221.—Operation in 1904, excision of breast only. 1916, 12 years well.

White, female, aged 46; enlargement of one quadrant of the breast four months. For microscopic appearance see Fig. 344.

It seems to me that the key to the situation is the one case in which there was a death from cancer in spite of the complete operation. In

all breasts which show the type of chronic cystic mastitis as illustrated in Fig. 339 the complete operation for cancer is the safer procedure.

Microscopic Study.—When these cases were studied under the microscope histological pictures were found never observed in the 170 cases of chronic cystic mastitis with large cysts, and 50 cases of chronic cystic mastitis without large cysts. Figs. 341 and 342 have been considered adenocarcinoma beginning in adenomatous areas and should be compared with Figs. 312, 313, 314, 331 and 333. Figs. 343 and 344 have been looked upon as adenocarcinoma in adenocystic areas and should be compared with Figs. 317, 328 and 329.

FIG. 344.—Adenocarcinoma on adenocystic area. Compare with Figs. 317, 328 and 329. For gross appearance and history see Fig. 343.

Duct Carcinoma (*Comedo Adenocarcinoma*).—At the exploratory incision this has such a distinct gross appearance that one should never fail to recognize it. It may appear as a circumscribed, but not encapsulated tumor similar to Fig. 337, or as a diffuse area involving a quadrant, hemisphere or the entire breast, as in Fig. 345. From the cut surface of the tumor, no matter what its size, one can express worm-like necrotic tissue after which there is left a little space, as shown in Fig. 345. Microscopically (Fig. 346), it is as characteristic as in the gross, and easily distinguished from the benign duct adenoma (Fig. 319). I saw

and described this tumor first in 1893, and up to the present time I have records of 23 cases, in which the tumor, in the gross and microscopic appearance resembled Figs. 345 and 346. In not one of these cases has there been metastasis to the glands in the axilla, nor have any of the patients died of cancer. The tumor is often associated with retraction of the nipple, ulceration, and even the development of a fungus.

Duct cancer resembles chronic cystic mastitis in that there may be a circumscribed area, or a diffuse change in part of, or in the entire breast. Comedones and duct adenomas are not infrequently observed in small areas in chronic cystic mastitis.

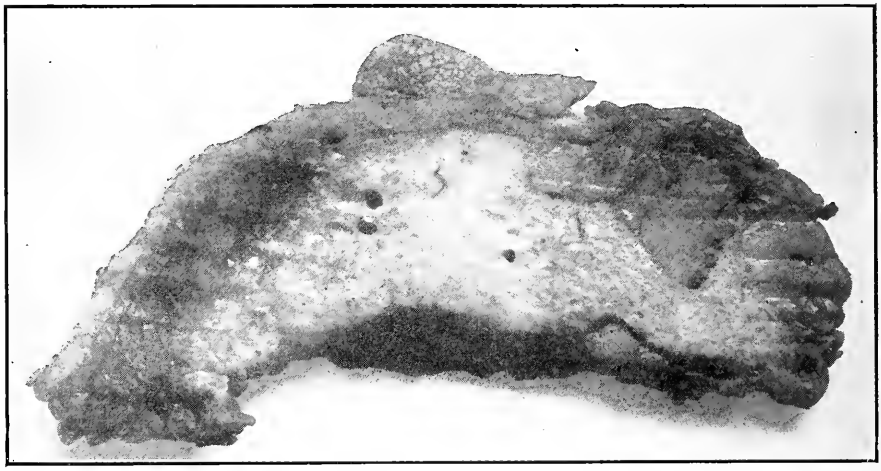

FIG. 345.—Duct cancer, involving the entire breast (comedo adenocarcinoma). Section of breast through nipple.

Pathol. No. 15427.—Operation in 1914, exploratory followed by complete for cancer. White, female, aged 38; tumor 2 years, associated with slight discharge of grumous material from nipple and pain. 1916, well.

In a larger number of cases this duct carcinoma has been present in small or large areas of a fully developed scirrhous or medullary carcinoma. In the latter group the glands often show metastasis, and the probability of a cure is identical with that in the fully developed scirrhous or medullary carcinoma.

Adenocarcinoma in Cystic Adenoma.—Cystic adenoma (Fig. 327) differs from chronic cystic mastitis (Fig. 339) only in its encapsulation. Our 12 cases diagnosed cancer in cystic adenoma were not encapsulated tumors, but circumscribed, resembling Fig. 337. In many of the cases the tumors were of long duration—5 to 25 years, with a history of

recent growth. In a few the tumor had been observed less than a year. The ages of the patients varied from twenty-nine to seventy-seven. Three cases were observed during lactation. A few of these cases undoubtedly were cancers, because the patients died of cancer. In these cases there were distinct areas of scirrhous or medullary carcinoma.

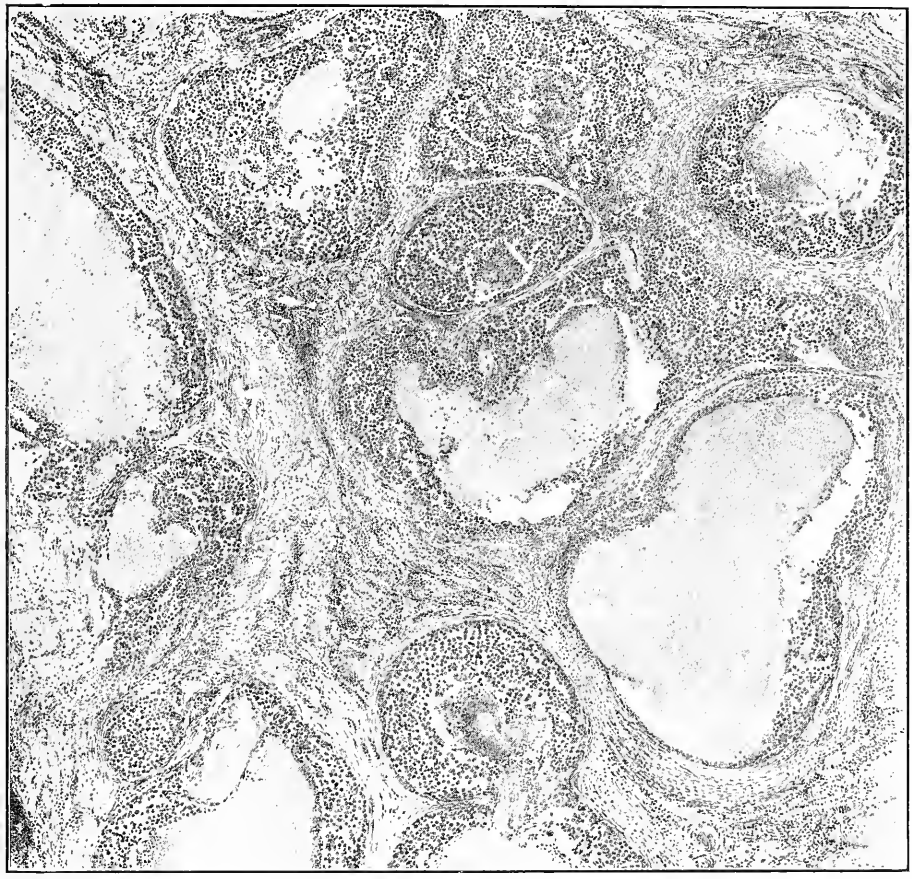

Fig. 346.—Duct cancer (comedo adenocarcinoma).

Pathol. No. 2815.—Operation in 1899, complete for cancer on both breasts. White, female, aged 52; tumor of one breast two years; recent ulceration with fungus formation, Small tumor in other breast. The patient lived 14 years and died of causes other than cancer.

Microscopically, they show the same histological picture, as already noted of cancer in chronic cystic mastitis (Figs. 341, 342 and 344).

It will always be safer when you meet a circumscribed tumor as pictured in Fig. 337 to treat it as malignant, even if it has a cystic appearance as shown in the tumor in Fig. 327.

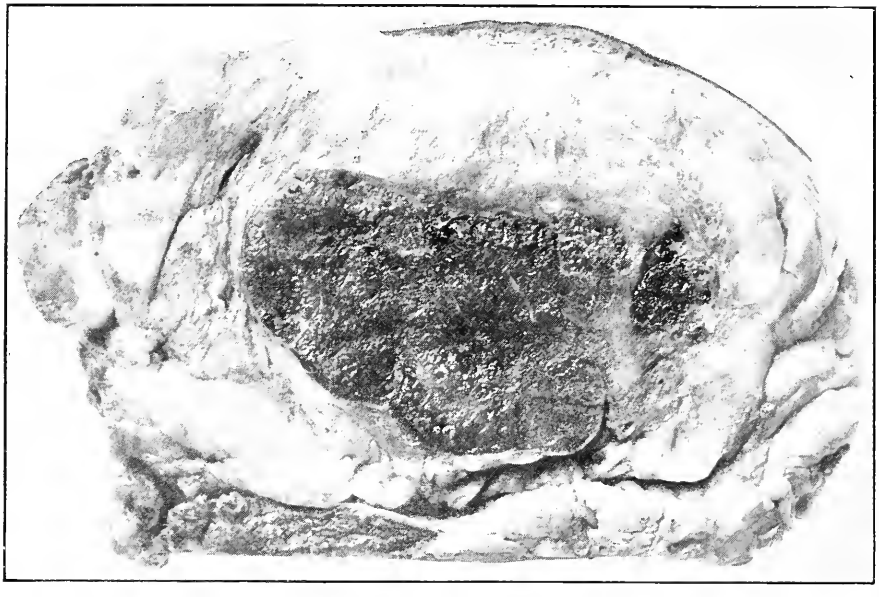

FIG. 347.—Colloid cancer. Circumscribed tumor involving a large portion of the breast beneath the nipple, showing infiltration of the breast beyond the tumor.

Pathol. No. 9733.—Complete operation for cancer in 1909. White, female, aged 31, tumor two years.

FIG. 348.—Colloid cancer.

Pathol. No. 4874.—Complete operation for cancer in 1903. White, female, aged 43, tumor nine months. 1916, 13 years, well.

Colloid Adenocarcinoma.—When explored, the gross appearance of this tumor (Fig. 347) is sufficiently characteristic to allow a positive diagnosis and indicate the immediate complete operation for cancer. I have received a number of colloid cancers in the laboratory for diagnosis the operator having unfortunately removed the tumor alone. In every instance there has either been recurrence, or death from cancer in spite of a second operation. The microscopic appearance is entirely different from any other lesion of the breast (Fig. 348).

In the past few days I have found in a young colloid cancer, areas of intracanalicular myxoma (Fig. 335) suggesting that this cancer may originate in this common benign tumor. But our evidence at the present time is too slight to reach a positive conclusion.

FIG. 349.—Scirrhous carcinoma. A somewhat circumscribed area, but showing distinct dots and lines in contrast with Fig. 337. Note also the slight retraction of the nipple. The surrounding breast is chiefly fat. There is a little stroma between the tumor and the nipple. There is no gross evidence of chronic cystic mastitis.
Pathol. No. 18840.—Recent case. For microscopic appearance see Fig. 308.

Malignant Papillomatous Cyst.—In my experience with 25 cases the malignant papillomatous cyst has shown clinical evidence of its malignancy by changes in the skin or nipple in over 85 per cent. of the cases. The probabilities are, therefore, when you explore a papillomatous cyst, that the tumor is still benign. The malignant papilloma has lost its papillomatous form and looks entirely different from the papilloma in Fig. 321. It has assumed a fungous appearance. In addition, the cyst wall at the base, and the breast beyond are infiltrated.

When one explores a breast tumor and finds a cyst partially, or completely, filled with a distinct papilloma, and at the base of the papilloma there is a distinct cyst wall separating the papilloma from the breast, and the breast beyond looks normal, excision of the cyst

with a zone of breast is a justifiable operation. In all other cases it is safer to perform the complete operation for cancer.

Scirrhous Carcinoma.—Until recently (Fig. 337) I felt that one should always recognize a scirrhous carcinoma at an exploratory incision by its hardness, by its gritty sensation to the knife, by its peculiar markings in fine dots and lines (Fig. 349).

In my past experience I had observed scirrhous cancer as a distinctly circumscribed area and as an infiltrating zone from the size of the end of the little finger up to a tumor involving the entire breast. In every instance the gross appearance was the same and the diagnosis confirmed by the microscopic section.

But now that women are seeking advice earlier we are seeing apparently for the first time a new group of tumors (see Fig. 337). Frozen sections will probably not help us in the differential diagnosis (see Fig. 338).

The circumscribed and infiltrating areas which resemble scirrhous carcinoma should at the present time be treated as malignant. I am confident that if we attempt to differentiate and be conservative in the smaller group too many mistakes will be made in performing incomplete operations for cancer. Apparently the circumscribed area is a precancerous lesion, and it will probably be safer never to be conservative in removing the lesion only, at least until we have had a much larger experience.

Cancer in Old Mastitis.—On page 607 I have referred to the possibility of a carcinoma developing in the residual scar after mastitis. In all of our cases the patients have been aware of the area of induration after mastitis from periods of 15 to 30 years. They have come under observation only after observing recent growth, with further changes in the skin and nipple. Recently I have had the opportunity to excise a chronic mastitis scar in the benign state. The cancer in all of these cases has always been of the scirrhous type, but in every instance we have been able to recognize with the microscope (Fig. 308) the remains of the old ducts surrounded by a zone of chronic inflammatory tissue.

Medullary Carcinoma.—This tumor, when small and clinically benign, is practically always a somewhat circumscribed area. I can imagine, but I have never seen, an encapsulated medullary carcinoma. It would probably then suggest an intracanalicular myxoma, and the frozen section would differentiate it. The medullary carcinoma, in contrast with scirrhus, is friable, little pieces can easily be picked out

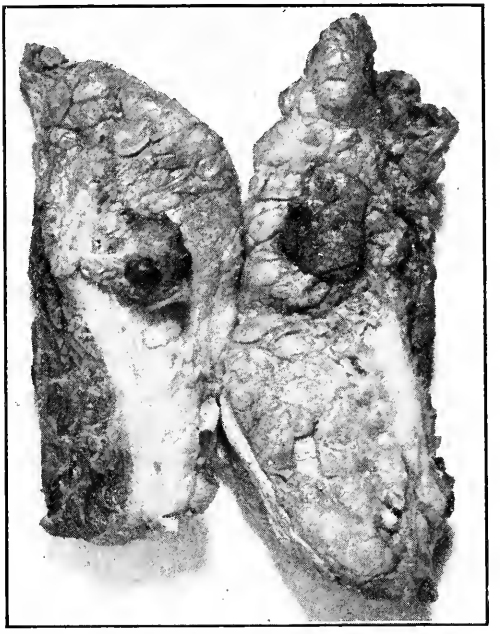

FIG. 350.—Hemorrhagic medullary carcinoma. Photograph of section through the breast, showing circumscribed, cellular, hemorrhagic tumor.

The breast is rather fatty and fibrous, with no evidence of chronic cystic mastitis.

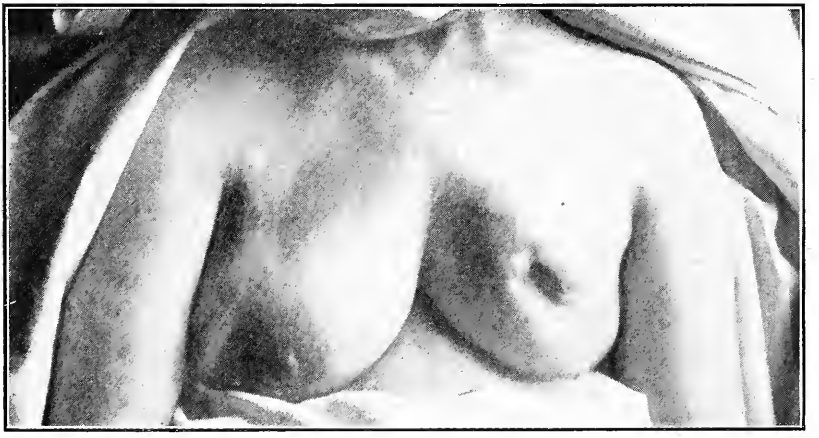

FIG. 351.—A tumor of the breast clinically malignant. The nipple is retracted, the skin dimpled. The center of the breast is occupied by an indurated mass.

Pathol. No. 2392.—Complete operation for cancer in 1898. No metastasis to axilla. 1916, 18 years well. White, female, aged 51; tumor two years and five months. Discharge from nipple 18 months.

The removed breast was the seat of an infiltrating scirrhus. No evidence of the parenchyma of the breast remaining.

with the knife. Now and then these tumors are very hemorrhagic (Fig. 350).

Sarcoma.—Metastatic sarcoma is so infrequent in the breast that it need not be considered here. I have seen one case among almost 1800 breast lesions. A correct diagnosis would not help, nor an incorrect one harm the patient. In this case the tumors were multiple, felt distinctly benign and appeared a few months after an operation for a malignant tumor of the ovary.

The most common sarcoma of the breast is a secondary development in an intracanalicular myxoma. The tumor as a rule is large, usually occupying more than half of the breast. The best rule is to treat all large intracanalicular myxomas on the diagnosis of sarcoma. The differential diagnosis from the large aberrant fibroadenoma can be made at the exploratory incision. The gross appearance of a fibroadenoma (see Fig. 336) should easily be differentiated from the intracanalicular myxoma.

The fibroadenoma as a rule is in younger women, and the larger aberrant tumor is always outside the breast. Apparently, however, differential diagnosis between these two forms has been difficult. I have mentioned this before (page 604).

The indigenous sarcoma of various types and mixed tumors containing cartilage and myxomatous tissue offer no difficulty at all at the exploratory incision; although circumscribed, their appearance will never be confused with that of any benign breast tumor.

Clinically Malignant Tumors (Fig. 351).—If we define retraction of the nipple, dimpling and other changes of the skin already described, and ulceration of the nipple as the usual signs of cancer, we have therefore the description of a clinically malignant tumor of the breast. All of these signs have been carefully described (page 576). We must also remember that these symptoms may now and then be associated with benign breast lesions. However, except in the few instances already defined, it seems safer to perform the complete operation for cancer without an exploratory incision.

Operation.—*No woman should be subjected to an operation* for a breast lesion, except for a lactation mastitis abscess, unless the surgeon is prepared to make the diagnosis at the exploratory incision and to perform the complete operation for cancer if indicated.

Now that women are seeking advice earlier I am inclined to think that a most painstaking clinical history and examination along the lines

laid down in the beginning of this article will be most helpful, and more so than in the past.

By this we must exclude a group (getting larger each day) in which operation is not indicated.

When the palpable breast lump is clinically benign the operation begins with an exploratory incision.

Exploratory Incision.—There is no objection to performing this under novocaine, with or without gas. The incision should be made from the areola out and over the tumor, pushing the breast and tumor toward the knife. Divide the skin and subcutaneous fat. Clamp the bleeding points. These clamps will do for retractors. Inspect the exposed breast tissue. Have a dry field. Often the blue dome of the simple benign cyst is exposed, and not infrequently in malignant tumors one can see and feel the infiltrated breast tissue at this point of the incision.

When the exposed breast looks and feels normal, cut through it, still pushing the tumor toward the knife; clamp the bleeding points; inspect the breast tissure carefully as it is divided. It is surprising how rapidly the benign cyst or encapsulated benign tumor is exposed to view, while in the malignant tumor one often feels that they are not being exposed as rapidly as expected.

This is explained by the fact that, in the benign cystic and solid tumors, the zone of breast is practically normal, and one palpates the tumor more easily through the breast tissue, while in the malignant tumor a very small area may feel so much larger than it really is, that when you cut into the palpable mass, you do not expose the real disease, because it is in the center of it.

In my own experience I have never missed a benign tumor at the exploratory incision, no matter how small. But on a few occasions I have had the greatest difficulty in isolating the very small scirrhous cancer, and a number of cases have come to me in which the carcinoma had been missed at the exploratory incision. Difficulty, therefore, in readily exposing the palpable tumor at the exploratory incision is suggestive of malignancy.

The moment you find signs of malignancy, disinfect the wound with pure carbolic acid followed by alcohol, and then use the cautery if you desire. I have tried the cautery for exploration of breast tumors and have so far found it unsatisfactory. Again, one can disinfect more rapidly with carbolic and alcohol than with the cautery.

Having disinfected the supposed malignant tumor, close the skin wound and proceed with the complete operation for cancer.

Some surgeons cut out a piece for frozen section, others cut out the entire tumor for inspection and frozen section. This has not been the practice nor the teaching of Dr. Halsted and I have no regrets, because I have always followed his precept and all my accumulated evidence is in favor of it.

It is surprising how rapidly one can differentiate at this exploratory incision. The benign cyst and the encapsulated tumor are recognized at once, and for these tumors a local operation is usually justifiable. In the other groups it is safer to perform the complete operation for cancer anyway. Of course, there are some exceptions. To recognize these exceptions requires great experience. If the majority follow the rule as stated, there should be no incomplete operations for cancer. There will be some complete operations for benign lesions. Up until the last few years in my observation this was done in about 10 per cent. of the benign lesions. In the last three years this has increased in experienced hands to 15 per cent.

An incomplete operation for cancer of the breast offers the patient little more probability of a cure than if there had been no operation at all. Operations in two stages do not compare in the results with one-stage operations.

Removal of Tumor.—Having exposed the benign cyst or the encapsulated benign tumor, remove it with a zone of breast through the incision made for exploration. Nothing is gained by enucleation. If one attempts to enucleate one may leave behind pieces of tumor tissue which may become foci of second growth. I have observed such recurrences after enucleation chiefly in mixed tumors of the parotid, but recently a number have come under my observation in which the tumor had been enucleated from the breast.

It is simpler to remove these tumors by cutting through the breast. It also gives one the opportunity to see the breast tissue.

Closure of the Wound.—The breast tissue should be approximated with interrupted, rapidly absorbing catgut, as a rule in three layers. The subcutaneous fat and the skin are approximated with fine silk. Buried silk and chromic catgut in breast tissue may give rise to a chronic mastitis resulting in a palpable tumor which may be very difficult to distinguish from a malignant one.

The breast wound should be closed most carefully, as hematoma usually results in a breakdown.

The dressing on the breast should be snug, fixed with adhesive straps and reinforced with a bandage.

When such details have been followed, the wounds heal, the patient and the surgeon are not worried by scar-tissue tumors or scar pain, and the subsequent function of the breast is never impaired. I have removed at one sitting three tumors from one breast and have operated twice on the same breast for a benign tumor without sacrificing the breast, or leaving any mutilation.

I have observed a few examples where after the removal of a benign breast tumor a huge defect could be seen and felt in the breast. The deformity is really more unsightly than the removal of the breast, and, of course, it is avoidable.

In my experience it is perfectly justifiable to confine the operation to the removal of the tumor only in simple cysts, papillomatous cysts, galactocele, cystic adenoma, fibroadenoma and small intracanalicular myxoma—that is the typical benign cyst and encapsulated benign tumors. It is justifiable to remove one or more of such tumors leaving the breast. I would be more inclined to remove the entire breast in multiple cystic adenomas than in any other form of multiple benign lesion.

In young girls one may palpate what seems to be a distinct tumor as a rule in the axillary quadrant. Yet, when one cuts down upon such an area there is no cyst, no encapsulated tumor, simply a zone of breast tissue to be distinguished from the surrounding white breast tissue by numerous pink, elevated dots. The youth of the patient helps in the differentiation. Microscopically, we find adenomatous hypertrophy (Fig. 312). Especially in young girls this peculiar lesion should be recognized, because excision of this zone is sufficient. The probabilities are that operation is not indicated at all, but when one feels a distinct tumor, we know it is safer to operate. But we must also recollect that we may not find a distinct tumor, but just an area of such hypertrophied breast.

The same condition may be present in older women at the cancer age; we feel an area of induration or even a distinct tumor, which as a rule is painful and tender. However, when we cut down upon this zone we are disappointed—there is neither a cyst, nor an encapsulated tumor, nor really any distinct disease. My records show a number of such cases in which the surgeon has been able to recognize the benignity of this lesion and has had the courage of his conviction. None of these patients lost the breast, nor have any of them suffered from

this wise conservatism. Unfortunately, however, in a larger group the operators have either been unable to make the diagnosis, or have lacked conviction. The operation has either been complete removal of the breast or that for cancer. Not one of these patients has died of cancer.

To the less experienced perhaps a frozen section would be very helpful in differentiating this non-encapsulated zone of adenomatous hypertrophy. Next to intracanalicular myxoma it is the easiest to recognize from its microscopic appearance (Fig. 312).

If one can recognize the chronic lactation mastitis with abscess, excision of the zone, if the lesion is single, is sufficient. My figures show that in at least 30 per cent. of the cases the chronic lactation mastitis has been treated on a diagnosis of malignancy.

It appears to be the uniform rule in tuberculosis of the breast to remove the entire breast, but in the beginning the tuberculosis may be a single focus, and I am confident that the time is coming when these younger women will not be unnecessarily mutilated for a small focus of tuberculosis in one breast.

Excision of Breast.—In some cases we can proceed with excision of the breast without an exploratory incision on account of the ability to make a pretty definite diagnosis of a benign lesion involving the entire breast.

In diffuse virginal and gravidity hypertrophy in which the enlargement has reached a certain stage one can proceed at once with the removal of one or both breasts. In mastitis with multiple sinuses and abscesses this operation is possible without an exploratory incision. In multiple tumors in women over 30 years of age when the breast is riddled with shot-like areas, the majority of surgeons excise the breast. This is also true when the sinus, induration and the history suggest tuberculosis.

In my experience the deliberate excision of one breast on the positive clinical diagnosis of a benign lesion is, with rare exceptions, a procedure fraught with danger; of mutilation for a benign lesion on one hand, or of an incomplete operation for cancer on the other. For all single palpable areas, and even for cases in which the breast shows multiple areas, it is on the whole safer to explore. The excision of the breast rests upon the character of the local lesion, the pathology of the surrounding breast, the age of the patient, and, to some extent, the wishes of the patient.

I have already described the local lesion in which it seems safe to confine our operation to the excision of the tumor only.

A number of patients, especially those who have nursed children, prefer to have the breast removed rather than run the risk of second operations. In all benign single lesions there is always the possibility of multiple foci which later grow.

Older women with huge, fatty breasts are probably protected by the complete removal of the breast, because in breasts of this kind it is difficult to exclude other lesions, and when cancer begins it spreads rapidly.

When the chronic cystic mastitis exposed in removing the single tumor is very extensive in the breast, patients will probably be saved second operations by the primary removal of the breast. This is such an easy condition to recognize that mistakes are rarely made, but many breasts are unnecessarily removed for this condition in its earlier stages.

In chronic cystic mastitis without large cysts, except in the early adenomatous stage, it is my opinion that it is safer to remove the entire breast. If one can recognize the chronic lactation mastitis and the multiple galactoceles, excision of the breast is sufficient, but in my experience the majority of surgeons have performed the complete operation for cancer when this disease was exposed at the exploration.

In every instance the breast after removal should be cut up in serial sections with a large amputating knife and studied for a possible area of cancer. Frozen sections can be made and in some instances may be helpful. In the presence of cancer the complete operation should follow at once.

When for any reason I have decided to excise the breast I always, by a most painstaking dissection, attempt to protect the individual by the complete removal of all breast tissue, because theoretically, any bit of breast tissue left behind might act as a focus for a subsequent benign or malignant tumor.

The complete excision of the breast is, on the whole, rather more difficult that the complete operation for cancer, because more skin is saved, and the dissection of this skin from the breast, to be properly done, is a delicate procedure, and very bloody, unless numerous bleeding points are clamped.

The nipple and areola are always removed. The area of skin beyond this varies with the size of the breast: the larger the breast the larger the area of skin; the larger the mass removed, the smaller the area of skin necessary to cover the defect.

The incision should begin over the rib near the rectus muscle in about the parasternal line and curve upward and outward to a point where the breast and pectoralis major muscle meet in the axilla; a second curved incision below encircles the nipple, the areola, an area of skin outlined for removal. These skin flaps should be dissected practically clean of subcutaneous fat over the breast tissue. It is simpler to dissect the upper flap first until the pectoralis major, and sometimes the rectus muscle, is exposed. It facilitates the dissection to remove the pectoral fascia with the breast. The dissection proceeds until the axillary fat is exposed. Now the skin fat on the outer side is dissected until the latissimus dorsi and serratus magnus muscles are exposed. This mass is then lifted up, and the connection with the chest wall divided from the lower point up toward the axilla. In this way the fat and fascia of the space below the axilla on the chest wall are removed with the breast, and the dissection is thus clean and complete as for cancer up to the base of the axilla.

Up to this point the dissection is just as complete as in the operation for cancer, except that the area of skin is a little smaller and the pectoralis major muscle is not removed.

In the opinion of the majority the removal of the pectoral muscle is made to allow a better exposure of the axilla, and, therefore, a more thorough dissection.

If the operation for the removal of the breast proceeds along this line up to this point, we really have nothing more to do, if early cancer is demonstrated, than to remove the pectoral muscle and complete the axillary dissection.

It is my rule, in the majority of cases to clamp the axillary attachments with the broad ligament clamp and make serial sections of the breast, searching for cancer. In two instances cancer was demonstrated, and the operation for cancer immediately followed. In one of these cases it is more than six years since this was done, and there has been no recurrence; the other case is recent.

If the operator decides that the breast condition is benign, the vascular attachments to the axillary area are ligated and the wound is closed.

It is my habit to close the wound with interrupted fine black silk. The wound after the excision of the breast usually fills with serum. I am inclined to think that this is due to torn lymph vessels, because this accumulation is very much less frequent after the complete operation for cancer when the skin wound is primarily closed.

When the technique has been good, I have been unable to tell whether it is better to drain these wounds or not. If you do not drain, the serum can be expressed after the fourth or fifth day. No drainage will absolutely prevent accumulation, and some of the serum will have to be expressed in any event. These wounds require the most careful after-dressing to prevent infection, and with each dressing the bandage must be snug.

There is another—and very important—reason for the complete removal of the breast along these lines. My figures show that some cases diagnosed adenocarcinoma have remained well and free from recurrence of the diseases from 5 to 16 years after the operation. The number of cases of this early type of disease will increase when women seek advice early after the first appearance of the tumor. At the present time we are not in a position to do such a restricted operation, if it is our opinion that the lesion is cancer. However, if one has decided to remove the breast, let it be done in this more radical way for the benefit of the patient. There is no more mutilation, or danger, nor is the period of convalescence longer or more uncomfortable; nor are the chances of a painful scar any greater.

Excision of Both Breasts.—I had hoped that our long and intensive study of the pathology of breast lesions in relation to the results after the different operations would throw some light on cases in which the pathology of one breast would indicate the removal of the other. But at the present time I do not feel justified in giving any rule. It seems safer to apply to the other breast the rules already stated.

The palpable lesion, single or multiple, in each breast is subjected to the same diagnostic scrutiny.

If a patient has a tumor in one breast, no definite tumor in the other, but multiple shot-like nodules or areas of induration, it is probably safer to remove both breasts, if the first breast removed is the seat of chronic diffuse mastitis without large cysts, or of multiple cystic adenoma.

When both breasts are removed at one or two operations, the technique as described should be employed for each breast.

Operation for Sarcoma.—When there is a tumor involving almost half or more of the breast and the skin over it is not involved, the chances are that it is not carcinoma, but that it is either a benign intracanalicular myxoma or some form of sarcoma. In these cases the breast will have to be sacrificed, and as most of these tumors are sarcoma, it is better to treat all as sarcoma.

The technique of the operation is very similar to that already described for the excision of the breast. The area of skin should be larger and should include all of the skin covering the palpable tumor. In addition, the pectoral muscle beneath the breast and tumor should be removed. Theoretically, there is no objection to performing the complete operation for cancer, but it seems unnecessary. In our early cases of sarcoma in intracanalicular myxoma in which the tumor and breast only were removed, recurrence in the pectoral muscle took place in every instance. Since we have removed the muscle there have been no recurrences. In a few of these cases we have also removed the axillary glands. These did not show metastasis.

T the present time we have never saved a sarcoma of the breast other than sarcoma in intracanalicular myxoma. The patients died of metastasis to the lungs.

Complete Operation for Cancer.—In this operation there is removed an area of skin, a wider area of subcutaneous fat, the major pectoral muscle, except its clavicular bundle; the minor pectoral muscle is either removed or divided, and there is a complete dissection of the axillary tissue without injury to the main vessels and nerves.

The most striking part of Halsted's first report was not the per cent. of ultimate cures, because the time of observation was too short, but the low per cent. of local recurrences in the scar, and even of regionary recurrences on the chest wall. The description of the technique of the operation in Halsted's first and subsequent reports may not have been entirely clear, but the operation as first performed by him was ideal, and all of his students who have followed his teaching will agree that his method was the first truly complete operation for cancer of the breast.

From a most painstaking study of the local growth of cancer in the breast and from the position of local and regionary recurrences I am convinced that the chest-wall dissection is the most essential feature of the operation. Now that patients are seeking advice earlier, the complete axillary dissection is becoming relatively less important.

Even in small malignant tumors of the breast there may be widespread dissemination of cancer cells through the channel of the gland ducts. I am inclined to think that this occurs before extensive lymphatic dissemination in the breast. For this reason, as described under excision of the breast, every particle of breast tissue must be removed.

Connective-tissue rich in lymphatics radiates between the skin and the breast beneath, and when cancer reaches the skin, it may disseminate rapidly within a considerable zone of skin. For the reason in all cancers of the breast with the slightest involvement of the skin the skin area removed should be larger, and with the extent of involvement of the skin the larger and larger should be the area of skin excised.

One should never see breast tissue during the operation, only fat, fascia and muscle.

In planning the area of skin to be removed the tumor, not the nipple, should be its center. In this zone of skin the nipple and areola should always be included. In thin patients with little subcutaneous fat always take a larger zone of skin, because in such instances it is more difficult to dissect the skin from the breast than when there is more fat. It is far better for the inexperienced to begin with the excision of a huge area of skin and restrict this as experience is gained, rather than the reverse.

Freedom from recurrence in the region of the scar does not depend upon the closure or the healing of the wound, but upon the extent of the surgeon's dissection in relation to the local extent of the disease.

I have had a large opportunity to compare the results of different methods of operation and different surgeons, and I am confident that the large number of the local recurrences is not due to the extensive local growth of the cancer at the time of the operation, but to the restricted zone of skin and subcutaneous tissue removed by the surgeon.

Skin-grafting can be done a week later with little or no anæsthesia at all.

In planning the operation always make it a little more extensive than the local conditions seem to indicate. The surgeon must watch himself all the time not to "cut corners," to remember that the object of this operation is to make the best attempt possible to get rid of the malignant disease.

It does not make much difference where one begins or where one ends in this operation or in what sequence the various steps follow each other, providing each step is well executed. In the majority of cases it seems simpler to dissect the upper skin flaps first, exposing the pectoralis major muscle. Except when the tumor is situated in the axillary zone, it is unnecessary to prolong the incision down the arm.

After exposing this muscle I prefer to make all of the skin dissection, except in the base of the axilla, until muscle is exposed. It facilitates most of the operation to prolong the incision down over the rectus. This helps in enlarging the exposure of the subcutaneous fat and later allows one to bring the skin flaps closer together.

Muscle.—The pectoralis major muscle is so divided that the clavicular bundle is left undisturbed. As the division extends upward toward the rib, push down the lymphatic tissue and vessels which lie between the two muscles. Then continue the division of the muscle along the sternum, clamping the intercostals. Extend the division down along the sternum to the rectus and clean the rectus and serratus magnus of all fat and fascia to be removed with the tumor mass.

Now inspect the axilla. If no glands can be felt, you know it is a favorable case. If glands are felt above the acromio-thoracic vessels and in the apex of the axilla, one must resect a V-shaped piece of the clavicular bundle of the pectoral up to the clavicle and make *en bloc* dissection of this muscle, the vessels, and all the tissue in the space between the clavicle and vessels in this area. In favorable cases this is unnecessary, and the acromio-thoracic vessels can be left undisturbed just as we leave the supraclavicular fossa out of the zone of dissection.

In proceeding with the axillary dissection I prefer, after inspection, to isolate the vessels and fat which pass from the apex of the axilla down over the minor into the major, clamp them and burn through with the cautery. This exposes the minor. The minor may be divided in favorable cases, and each half used as a retractor. In unfavorable cases it should be completely removed. In unfavorable cases the dissection of the acromio-thoracic area begins before the removal of the minor, as this gives more room for attacking the muscle. But in favorable cases when you divide the minor this is done first, and the dissection is begun at the apex of the axilla, first isolating the subclavian muscle over the vein.

I have always followed the example of Halsted and isolated the vessels separately, ligating with fine silk.

One cleans everything from the vein from the apex to the arm; then there is exposed the cavity between the subscapular muscle and the chest wall. In making this dissection one must use a combination of blunt sweeping with a piece of gauze as well as the knife. The process of cleaning everything, leaving only bare muscle, major

vessels and nerves, passes down over the teres major and latissimus dorsi until it strikes the subcutaneous fat at the base of the axilla. Having reached this point one can push the mass over into the wound and proceed with the dissection of the skin-flap over that area not included in the first and second step.

Closure of the Wound.—It is better to skin-graft than to use tension and have sloughing skin-flaps. I agree with Halsted that swelling and œdema of the arm are dependent chiefly upon wound infection, ever so slight. For this reason cover the vessels and make a good axillary fornix, then close the remainder of the wound, if you can, without tension; if not, skin-graft then or later, according to experience.

In a few cases where there is no axillary flap on account of the dissection necessary to remove a malignant tumor in the axillary quadrant, one can easily make a flap from the posterior skin area.

The direction of the skin incision in length is that described for the removal of the breast. The area of skin removed within this line varies according to the position of the tumor, the position of the breast, the size of the breast, and the thickness of the subcutaneous fat. It is impossible, and therefore would be futile to make one type of incision fit all cases.

Neck.—When the highest axillary glands are involved and one has made the V-shaped division of the clavicular bundle of the major, and the microscope shows these glands to be involved, the complete dissection of the supraclavicular glands should be done at a second operation.

It is quite true that the chances of a permanent cure in such cases are not more than about 6 per cent. However, when this operation is properly done there is rarely local recurrence, and many patients whose lives are not saved are made more comfortable, if this dissection is done at the proper time.

Supraclavicular Dissection.—From about the middle of the sterno-mastoid muscle make an incision down to the junction of the inner and middle thirds of the clavicle to join another incision which runs along the clavicle. Reflect the two flaps outlined by the above cuts. Expose and clean the sterno-mastoid down to the clavicle. Isolate and ligate the external jugular vein. Beginning high up, dissect all fatty tissue from the internal jugular vein downward to within 1 or 2 cm. of the apex of the triangular exposed area. From without inward clear the clavicle and subclavian vessels; by pulling on the mobilized mass of tissue the important dissection between the internal jugular

and the subclavian veins is completed. Lift the mobilized triangular mass so as to isolate and clamp its vascular attachments to the posterior muscles of the neck. On the left side lookout for the thoracic duct. At the base of the triangle the large number of vessels emerging from between the posterior muscles cause much bleeding unless they are isolated and separately clamped.

Excision of Vein.—Now and then in the axillary dissection the cancer is adherent to the axillary vein. There is no objection whatever to isolate and ligate a segment of this vein if necessary.

Hemorrhage.—When the tumor is on the sternal periphery of the breast and for this reason you are forced to a dissection close to ribs, intercostal muscles and sternum, you will experience difficulty in clamping and ligating the perforating intercostal vessels.

Should a clamp miss the vessel, do not attempt to re-clamp by pushing the instrument into the intercostal muscle, you may perforate the pleura. The hemorrhage can be checked by holding a bit of gauze there.

Recently in cases of this kind I have hastened and simplified matters by using the electric cautery knife. We now know this is a safer procedure when near cancer, and if one uses it slowly the vessels divided rarely require clamping.

Shock.—After a considerable comparative experience with nitrous-oxide gas anæsthesia and ether-drop, I prefer ether in the majority of cases of complete operation for cancer. Here there is no necessity for deep narcosis. Shock is rarely observed, and if one checks hemorrhage, it should never be fatal.

Mortality.—When the complete operation for cancer was extended to the complete supraclavicular dissection and skin-grafting at one sitting, the mortality increased from about ½ per cent. to 3. Now that this neck operation has been given up as a routine procedure and when done is always performed at a second operation, the mortality has fallen to less than ½ per cent.

Late Results.—In a short article of this kind there is no space to consider this phase of the subject. All our patients should be carefully watched, because even after complete operation for cancer there is the remaining breast to be looked after. Every one of these patients should be given the proper information for her own protection: "If you feel a lump return at once for inspection. No matter how well you feel, return for an examination at certain given intervals."

Function of the Arm.—In the first place good function is dependent upon healing without infection; second, upon early and continuous use.