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## DISEASES

OF THE

## FEMALE MAMMARY GLANDS

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AND

## NEW GROWTHS OF THE UTERUS

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ONE HUNDRED AND FIVE FINE WOOD ENGRAVINGS

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## CHAPTER I.

### ANATOMY OF THE BREASTS.

UNDERNEATH the skin, on each side of the sternum, are situated two glands which in the female alone reach their fullest development, although they are similarly situated in both sexes. They form soft hemispherical projections above the surface of the body, and extend, when well-developed, vertically from the third to the seventh rib, and horizontally from the edge of the sternum to the anterior border of the axillary space; being situated for the most part on the pectoralis major muscle, and to a less degree on the serratus magnus (Luschka). It is worthy of note that these glands, at the same period of life and under similar functional conditions, differ in size, not only in different women, but also in the same individuals, and that there is no fixed relation between their size and that of the body. The circumference of the gland depends not only upon the amount of the gland-substance, but to a great degree upon the amount of the superimposed adipose tissue. Very near the middle of each gland is situated the nipple, in which the excretory ducts empty, and around which the skin is of a light rose-red or brown color for a distance of 1¼ inches. According to Hennig the mammary gland has frequently a three-cornered shape, and one can distinguish an inner and two outer (an upper and a lower) extremities; the upper external extremity not infrequently sends out a process which extends under the pectoralis major muscle nearly to the axillary glands. The nipple does not generally denote the central point of the denuded gland, but is somewhat internal to and above it. The right mammary gland is usually somewhat larger and heavier than the left.

The mammary glands belong to the class of aggregate acinose glands,

and are to be considered in their whole development and situation as sebaceous glands of the skin, whose function is to secrete a fat emulsion (milk). As is well-known, this function is by no means a constant one, but depends upon certain occurrences in the sexual organs. In this respect there are analogous processes in the other sebaceous glands, in that the fluidity, the softness and amount of the secretion of these glands stand in a certain relation to the sexual organs, and that upon this relationship depends the great softness of the female skin.

Between the mammary glands of a newly-born child and those of a pregnant woman, there exist such great qualitative and quantitative differences, that an especial consideration of these glands under these different circumstances is necessary, especially since a knowledge of these differences is of great weight in order to properly understand the pathological processes.

The arteries of the mammary glands are chiefly given off from the internal mammary and long thoracic arteries; the branches of these arteries anastomose to a considerable extent, and are much enlarged during the activity of the gland. They spread out into finer and finer twigs, until they form a capillary net-work surrounding the single lobules. From these capillary net-works arise numerous venules, which, following the course of the arteries, form dense net-works under the skin, and finally empty into the internal mammary and thoracic vein; many of the subcutaneous veins emptying into the external jugular (Luschka).

The mammary glands are very rich in lymphatic plexuses, which are partly situated deep down in the gland, partly subcutaneous. They form tolerably narrow closed plexuses, not communicating with the connective tissue interspaces (Langhans), which surround the lobules of the glands near the capillary plexuses and accompany the excretory duct. They arise from club-like processes in the papillæ of the mammary areola (as in the skin), form cutaneous and subcutaneous plexuses, and then unite to form lymphatic trunks. The superficial as well as the deep lymphatic trunks pass for the most part to the lymphatic glands of the axillary space, where they unite with the lymphatic vessels of the intercostal spaces and through these with those of the thoracic cavity. (Luschka).

The nerves of the mammary glands are mostly of spinal origin, though to some extent there is a mixture of sympathetic elements. There are, according to Eckhart, especially, branches from the 4 to 6 intercostal nerves, which accompany the larger milk-ducts and are distributed in the parenchyma of the gland. Their mode of termination is not yet known, though it is very probable that they end in terminal bulbs, as they do in other acinose glands (as in the salivary glands, W. Krause). The skin over the mammary glands is very rich in nerves, which come from the internal and middle supraclavicular nerves, and from the external branches of the 2 to 6 intercostal nerves (Luschka).

## The Mammary Glands of Infants and their Development.

Similarly to other cutaneous glands, the mammary glands proceed from a growth of the rete Malpighii, and, so far as observations show, they first appear about the third month. The separate divisions of the gland are disconnected by a process of proliferation, and have a flask or pear-shape. They appear a little larger and a little more perfectly formed in newly born children, and are of the same size in both sexes. At the time of their first formation in the fœtus, there is a slight excavation at the site of the nipple; but the nipples and the excretory ducts of the gland are developed during fœtal life. Newly-born children have indeed tolerably well-developed nipples. Th. Kölliker describes certain processes in the gland, which have been hitherto thought to be exceptional, as regular and normal. He says, of the mammary glands of newly-born children: "The most striking appearance to be seen in all glands, though to a less extent in boys, is the ectasia or dilatation of a now large, now small number of gland-ducts, so that they present a considerable lumen from their external opening to the terminal bulb. In these ducts, the lumen is filled with thrown-off epithelium and a white granular mass, while the pre-


Fig. 1.—Mammary Gland of Female Embryo. 7 inches long; enlarged 70 times. (*Langer.*)

served epithelium is disposed in layers on the basement membrane." Further on he says: "The above described ectasia of the milk-ducts begins in the first week of life, and frequently goes on to pronounced parenchymatous swelling, which may present the appearance of mastitis with great dilatation of the ducts, so that the whole gland has the appearance of a cavernous organ. In such cases, one never finds simple cylindrical epithelium, but the ducts either contain few epithelia, which seem to be pressed flat against the parietes of the cavernous space, or we find, what is more frequently the case, stratified epithelium with two or three layers of round cells. The greatly dilated ducts and lobules contain sometimes single epithelial cells, sometimes a granular, yellowish, crumbling mass, consisting of large plates, (changed epithelial cells?) and not taking

hæmatoxylin." "To sum up, we find in the beginning dilatation of the milk-ducts in different degrees as characteristic of the first year, which may reach such a degree that cavernous spaces are formed, against the parietes of which lie the flattened epithelial cells." "This occurrence is, in my opinion, physiological, when it occurs in a moderate degree, but when it occurs in a more marked degree and lasts for a longer time, it becomes pathological, and may be considered a mastitis, which, according to my observations, may lead under certain circumstances to similar wide-reaching changes in the whole gland, and must exert an influence upon the further development of the gland. Glands of this character, as shown in Fig. 2, (high-grade cystic dilated gland-ducts, Kölliker), are scarcely ever developed normally afterwards, and the faulty development of the breasts in otherwise well-developed women is very probably due to this mastitis of childhood."

## The further Development of the Female Mammary Gland and its Retrogression in Old Age.

Up to the time of puberty the growth of the gland bears a close relation to the bodily growth in both sexes; only a few gland-lobules are

Fig. 2.—Gland Lobule from the Breast of a Girl 16 years old. × 70. (After *Langer*.)

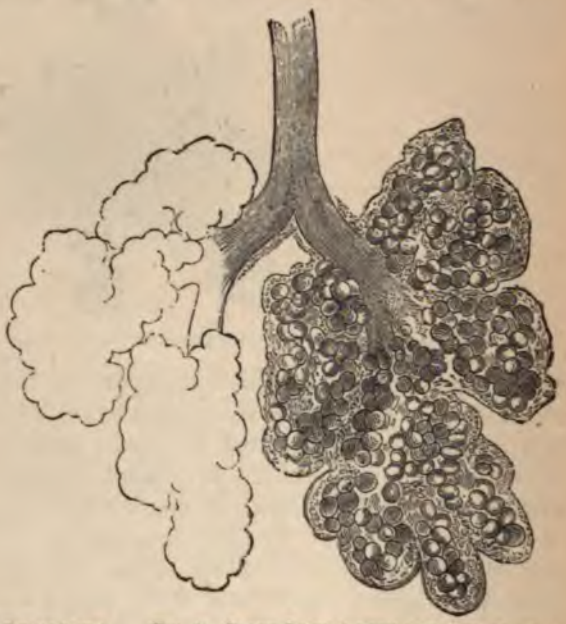

Fig. 3.—Gland Lobule from the Breast of a Girl 18 years old. × 70. (After *Langer*.)

developed by proliferation. According to Hennig the right areola is always better formed than the left.

With the onset of puberty, there is a further development of the gland in females. Up to this time the excretory ducts are but slightly formed, being for the most part blind sacs; now true terminal vesicles are formed, although of a more bulbous shape.

Soon the connective tissue which immediately surrounds these gland-ducts has a peculiar compact hyaline quality; it is especially rich in nuclei, and different from the bundles of connective tissue which lie between the lobules; this peculiar covering of connective has doubtless an important relation not only to the later richer growth of vessels, but also to the development of the so frequently present pseudo-plasma in the mammary glands.

Later the terminal vesicles develop into regular grape-like acini. These acini contain small round cells, such as epithelium; the excre-


FIG. 4.—MAMMARY GLAND OF A WOMAN DURING LACTATION. About one-third natural size. (*Luschka.*)

tory ducts have cylindrical epithelium. Coincidently the size of the gland increases, the epithelium grows by proliferation, while capillaries and firm connective tissue surround the newly developed acini. The acini and excretory ducts contain no secretion; the firm elastic consistency of the virgin breast is due to the peculiarly firm quality of its connective tissue.

During the first pregnancy, the number of acini greatly increases, especially by the development of the parietal acini; the lobules become larger, and the underlying cellular tissue becomes richer in vessels and more succulent. Whilst in a virgin breast the single lobules cannot be separated from the connective tissue, and the developed breast which does

not contain milk appears to the naked eye as thick, firm connective tissue, when the organ contains its secretion the single gland-masses are easily apparent in the surrounding connective tissue.

The appearance of lobules filled with milk is shown in Fig. 5.

More highly magnified, the acini present the appearances seen in Figs. 6, A and 6, B.

In the functionating organ not only is every acinus distended with milk, but the surrounding connective tissue is very much richer in cell elements, which appear larger and more succulent, which is not the case in the non-secreting organ. By this enlargement and rich development of capillary vessels and lymphatics, the mamma assumes an appearance similar to that of other acinous glands, as the salivary and lachrymal

FIG. 5.—ARTIFICIALLY INJECTED MAMMARY LOBULES OF A PUERPERA. × 70. (After *Langer*.)

glands. I have not been able to find a separate investing membrane of the acini, though it has been mentioned by many authors. According to Langer each acinus is sharply defined by a fine nucleated fibrous net-work. This highly developed condition is that in which the gland is most frequently described. The developed nipple is very contractile; it contains a large number of muscular fibres, which belong only to the cutis not to the excretory ducts, and the muscular fibres of the skin in this region are generally strengthened. According to Hennig, these muscular fibres extend also deep into the gland, so that they surround, in interrupted layers, not only the excretory ducts but also the single gland-lobules.

The nipple is pierced by from twelve to fifteen excretory ducts, which are here so small that the finest bristle can scarcely penetrate them. The

small, previously-mentioned nodules of the areola, which, with the areola, are of a brown or brownish-black color during pregnancy, are small acin-

FIG. 6, A.

FIG. 6, B.

FIG. 6, A.—SECTION THROUGH THE TERMINAL LOBULE OF THE MAMMARY GLAND OF A NURSE, WITH INJECTED BLOOD-VESSELS. Hartnack Syst. 1-8. (*Langer.*)

FIG. 6, B.—RETICULAR CONNECTIVE TISSUE FROM THE PARIETAL WALL OF TWO GLAND LOBULES, Hartnack Syst. 1-9. (*Langer.*)

FIG. 7.—GREATLY ENLARGED CROSS-SECTION OF A MILK-DUCT, SURROUNDED BY BUNDLES OF ORGANIZED MUSCULAR FIBRES, PIERCING THE NIPPLE. (*Luschka.*)

ous glands and are considered by most authors as sebaceous glands of the skin. Luschka believes that these so-called Montgomery's glands, as

shown by Duval, are important parts of the milk-glands (*glandulæ lactiferæ aberrantes*), which do not perforate the nipple, but end in the areola. Either view is sound if we regard all the lacteal glands as sebaceous glands. Hennig thinks that sexual intercourse, without resulting pregnancy, has more to do with the development of Montgomery's glands than with the size of the areola and the weight of the glands.

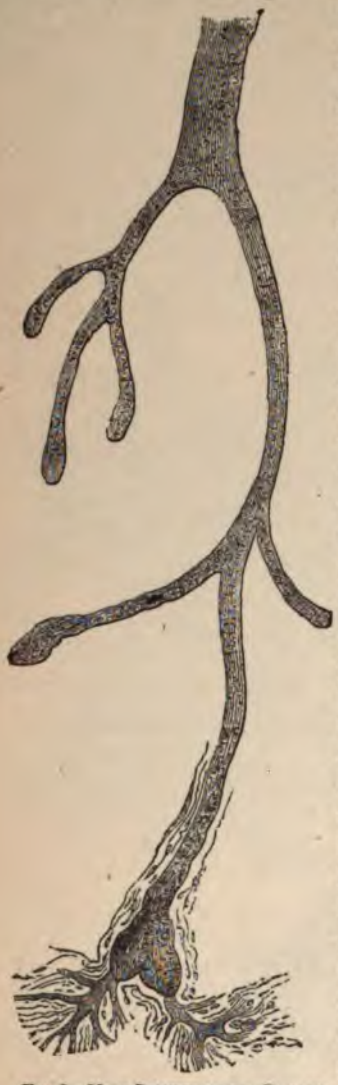

FIG. 8.—MILK-DUCT FROM THE BREAST OF AN OLD WOMAN, in which the whole glandular parenchyma was shrunken, with collapse of the ducts, which were filled with a greenish cloudy fluid and were in places varicose; only in one small branch were rudiments of wasted finer ducts to be seen. × 27. (*Langer.*)

During the lying-in period and during lactation, the mammary glands often attain considerable proportions, feeling very firm and extending to the axillary space. Before emptying into the nipple, the excretory ducts widen very considerably into the sinus lactei (Fig. 4). This dilatation occurs really first during milk-secretion, but afterwards undergoes only a slight retrogression. The milk itself is an emulsion of serum and fat, the latter originating in the epithelial cells of the glands. The appearance of the fat-globules in these cells is best observed at the beginning of the secretion of milk, and in the colostrum, the thin fluid which is poured out from the nipple during the first stage of glandular activity. The quality and quantity of the milk secretion are of the greatest interest to the obstetrician and physician, less so to the surgeon. On the cessation of lactation, the acini collapse, though they do not disappear, but persist without secreting, only to be again, during the next pregnancy, first filled with cells and later again with milk. The connective tissue of the gland remains relaxed, and is soon transformed into fatty tissue, but it does not again take on the firm hyaline condition seen in the virgin state of the gland.

With the complete cessation of menstruation about the fiftieth year, at the time of the so-called involution, atrophy of the gland-tissue begins—that is to say, a withering of the glandular epithelium and collapse of the acini. Only the excretory ducts remain, though

their epithelium withers. At the lobular ends of the excretory ducts of old women, we may often find the traces of the collapsed canals. (Fig. 8).

The breast of an old woman consists, then, of nothing more than connective tissue with fat and these gland-canals. Whatever portion of the gland-substance disappears is at times so completely compensated for by the addition of adipose tissue, that the breasts of well-nourished old women often have a round form and do not appear at all atrophied, although there may be no glandular tissue remaining. In thin old women many thick elastic fibres are found scattered through the connective tissue. The capillaries are partly obliterated, but, what is more noteworthy, a great number of the lymph capillaries have disappeared (Langhaus). Cystic dilatation of the milk-ducts, with the formation of a brownish or greenish thin or viscid secretion is very frequent in old women. Although these changes are not infrequently absent, I still regard them as regular and physiological.

# CHAPTER II.

## ABSENCE OF THE MAMMARY GLANDS (AMAZIA) AND SUPERNUMERARY MAMMARY GLANDS (POLYMAZIA).

CONGENITAL absence of a breast (Amazia, Birkett) has seldom been observed; in one case seen by Louisier, it was hereditary. Froriep and Schlözer saw congenital absence of the breast with coincident absence of the greater portion of the pectoralis major muscle and a union of the third and fourth ribs with the sternum. An infantile appearance of both mammary glands has been observed by Pears and Cooper, Caillot and Laycock, usually with coincident absence or incomplete formation of the ovaries.

More frequently there are more than two breasts (Polymazia, Meckel; Pleiomazia, Birkett). Sometimes this is only apparent, there being two or more nipples (Polythelia, θηλη nipple) in different places on one breast. According to Meckel von Hemsbach there are originally in man five mammary glands (as is the case in the bat), two at the centre of the thorax, which alone go on to development; two in the axillary spaces, and a median one above the umbilicus and immediately under the sternum. Gorré saw all these five breasts developed in a woman and Sanderson saw five nipples in these different situations in a man. Four mammæ have been observed by Cooper, Lee, Shannon, Champion and Gardner. Dreger, Bartolin, Hannæus, Borle and M. Jussieu saw three mammæ on a woman. Robert reports the case of a woman whose mother had had a double nipple, and she herself had a supernumerary milk-giving mamma on the outer surface of the left thigh. This case is scarcely to be explained by developmental history or by comparative anatomy. Those cases where in cows an udder on the back is found in connection with supernumerary extremities, are without doubt to be placed in the category of double malformations.

Leichtenstern, through his very careful investigations of such cases as have been reported, as well as by a series of cases seen by himself, has proved that the situation of these supernumerary breasts, (including the cases seen in the male sex,) is far more constant than has been thought. The reported cases of supernumerary breasts in the median line of the abdomen, on the acromion, and on the upper part of the thigh are very rare, and in part unique. Most supernumerary glands are situated

below and somewhat internal to the normal situation, and very rarely in the axillary space. It is in the highest degree probable that these anomalies are to be regarded as a reversion to other and lower types of animals, which normally have several mammæ, in fact, as a kind of atavism (Darwin), even though Meckel's opinion, that man originally had five breasts, would not be further confirmed thereby. Supernumerary breasts should only be removed when, on account of their situation or size, they become troublesome, or when the nipple is impermeable, and a lactiferous cyst is thereby developed, as in a case of Harés. There seems to be no relation between these anomalies and later diseases of the breast. I have, in all my observations, seen only one case in which a tumor (acinous carcinoma) has developed in a breast with two nipples. Precocious development of the breasts accompanies too early development of the sexual organs. Kussmaul (Wüzburger, Med. Zeits., Bd. II., p. 321) has collected these cases and critically examined them.

# CHAPTER III.

## DISEASES OF THE NIPPLE AND AREOLA.

DURING lactation the formation of fissures of the nipple is very frequent. When the child in nursing wounds the nipple, especially at its base, and the mother, despite the intense pain, continues to nurse the child without taking necessary precautions, deep, penetrating, chink-like ulcers are formed. In such cases nursing from the injured breast must cease entirely, or a nipple-shield must be used. As prophylactic against such wounds, the nipples should be washed with cold water, with astringent solutions or with alcoholic washes. For an already existing fissure, touching it with lunar caustic, although very painful, is one of the best remedies; applications of lead-water, of weak solutions of nitrate of silver, etc., may be used. Repeated washing of the fissure with a 5% solution of carbolic acid is also to be recommended. Of course any application must be carefully washed off before the child is again put to the breast.

Further practical rules regarding remedies to be used in the disturbances of lactation are to be found in works on midwifery. Especially comprehensive is the treatment of puerperal inflammations of the nipple given by Winckel.

Inflammatory softening of the nipple, with ulceration and fungus granulations, which may also be due to nursing, are to be treated by applications of lunar caustic and astringent fomentations. Aphthous disease of the oral mucous membrane of the child is not infrequently the cause of ulcerative processes on the nipple of the mother or nurse. While there are many kinds of Schizomycetes (Vibrio, Bacterium, Leptothrix, Coccus and Straptcoccus) in the child's mouth and on unclean nipples, according to Haussmann, the *Soor-pitz* (oidium albicans, probably identical with oidium lactis) which can be planted alternately from the mouth of the child to the nipple, and *vice versa*, is capable in either place of provoking inflammation. Syphilitic ulcers also occur on the nipples, primary as well as secondary, the latter in the form of broad condylomata. General as well as local antisyphilitic treatment must be instituted, and lactation must be absolutely forbidden, when such ulcers are found on a nursing woman.

The nipple and areola are sometimes attacked by chronic eczema, the cause of which may be uncleanliness, though in most cases this is un-

known. This eczema of the nipple, which is not infrequently bi-lateral, is very obstinate to treatment; the remedies used may have to be changed frequently before a cure is effected. Local measures alone seem to be effectual. Careful and repeated ablutions of cold water are often sufficient, but when the young epithelium is regenerated, it must be protected for a long time with fat (glycerine, oil, cerate), or a relapse will occur. Astringent salves, especially of zinc, lead and white precipitate, best made with starch and glycerin, are of benefit, especially when the crusts have been carefully softened and removed. At times, every kind of moisture is harmful, and good results are obtained by the careful dusting of the parts with zinc-powder (white oxide of zinc with an equal amount of starch). More severe measures, such as the use of soaps, tar, etc., which are very useful in other torpid forms of chronic eczemas, are of no avail in the treatment of eczema of the nipples.

Tumors of the nipple and areola are very rare; slowly developing epithelial carcinoma has been observed. Russel and Lebert have seen atheroma of the areola, which was probably developed from the areolar glands.

# CHAPTER IV.

## WOUNDS OF THE MAMMÆ.—SPONTANEOUS HEMORRHAGE AND CONGESTION.—ERYSIPELAS.

INCISED, penetrating, crushing and shot wounds of the breast offer nothing especially interesting. On account of the toughness and elasticity of the tissue, a blunt instrument must strike with enormous force before it can produce a wound, and even then the injury to the ribs and lungs will be of much more importance than the wound of the mamma.

Burns of the skin covering the breast and nipple are more frequent, partly from the pouring over the body of hot fluids, partly from burning of the clothing. The general treatment of burns is applicable to these cases.

The nipple may be entirely destroyed or obliterated by cicatricial changes following burns, as well as by ulcerative processes. These cases have hitherto been so seldom observed, that we have no experience as to what would occur in such a breast, the glandular tissue of which may be entirely normal, in case pregnancy should supervene. It is probable that such a gland would at first secrete milk, but as there could be no excretion, the secretion would either cease and the gland subsequently atrophy, or suppuration would occur, with the formation of numerous abscesses; at least this is the case in other acinous glands, as the parotid after ligation of Steno's duct. Operative measures would avail nothing, since, even if, by removal of the remains of the nipple, the mouths of the ducts could be again opened, they are so small that they would not remain patent.

Kicks on and bruises of the breasts occur frequently, but are usually of no immediate consequence. Sometimes they cause subcutaneous and intraglandular hemorrhages, which run the same course as in other regions of the body, being usually absorbed spontaneously. If the blow was a severe one, inflammation and subsequent abscess may result. If the extravasation has formed a cavity, it may be encapsulated and transformed into a cyst or fibrous tumor, which may be a long time in disappearing.

Extravasations of blood into the mammæ also occur without external wounds, especially in girls and young women subject to dysmenorrhœa and amenorrhœa; this has been observed by Cooper, Velpeau and Birkett,

and is doubtless a so-called vicarious menstruation, though not so frequent as in other parts of the body. Such extravasations are usually absorbed, without further consequences; they are generally entirely painless, but are, in a few cases, accompanied by a feeling of tension in the breasts. Applications of lead-water, infusion of camomile, etc., may be ordered if medicinal treatment be desired. If the hemorrhage is more severe and causes great pain, a light compress is the most rational means of affording relief.

Dentu and Verneuil describe cases of sudden swelling of the mammary glands, with induration (engorgement, *sclèréme phlegmasique temporaire*), which occur in old women, and disappear after a few weeks or months; some of these women had arthritis.

When erysipelas ambulans attacks the breast, the diagnosis is easily made. An erysipelatous rash, primarily originating on the mamma, may spread from fissures in the nipple, as to the nature of which there may be at first some doubt. Great sensitiveness to superficial touch, sharp limits of the rash, slight tension of the glandular mass with a high eruptive-fever will make the diagnosis in one or two days. Infection of wounds of the nipple, especially in lying-in houses, through unclean matters from the mouth of the child, by aphthæ, are the most frequent causes; so also fright, digestive troubles and cold. The treatment of true erysipelas of the mammæ is that of the disease generally. Nursing should be prohibited, as in so severe a disease the secretion of milk will be interrupted at all events the milk of an erysipelatous woman may be injurious to the child.

# CHAPTER V.

## PUERPERAL MASTITIS.

ON practical grounds we may consider the acute mastitis occurring during the puerperium as a separate affection, though there is no doubt that the anatomical processes in mastitis are always the same, at whatever time the disease occurs. Acute mastitis occurs so very frequently during the puerperium that the affection under other conditions is relatively rare. Of seventy-two cases observed by Nunn, fifty-eight occurred during lactation, seven during pregnancy, and seven separate from these conditions. Bryant saw seventy-nine cases during the puerperium, two during pregnancy and twenty-one outside of these conditions. I have seen in all fifty-six cases (almost all in my clinic on account of abscesses); in forty-four cases the affection had developed during lactation (usually unilateral, bilateral in a few cases), in four cases during pregnancy, and in six cases in unmarried or married, but non-pregnant or non-suckling, women.

There are not statistics to show whether mastitis is more prevalent in lying-in houses than in private houses. Winckel writes, as follows, as regards the frequency of puerperal mastitis, in the Dresden Lying-in Institute:

"Of 2300 nursing women, of whom 918 were suffering from disease of the breasts, I found 136 cases of parenchymatous mastitis; *i.e.*, 6 per cent. of all the nursing women and nearly 15 per cent. of all suffering from affections of the breast; of those affected with mastitis, there were as many blondes as brunettes." Primiparæ are more disposed to mastitis than multiparæ. Winckel found the following proportions: Primiparæ 67.6 per cent.; Multiparæ 39.9 per cent.; Multiparæ, with rapidly recurring pregnancies, 1.5 per cent. Mastitis is more frequent among suckling than among non-suckling women; thus: Ed. Martin in 150 cases, only 8 or 10, Winckel in 60 cases, only 1, in which the patient suffering from mastitis was not nursing.

Puerperal mastitis is more frequent on the right than on the left side, and is very seldom bi-lateral. By summing up the cases in the table given by Hennig of mastitis and abscess, we find 156 cases of the right gland, 131 of the left and 37 bi-lateral. Winckel noticed in 141 cases, 50 of the right, 68 of the left, and 23 of both glands. Bryant saw 55 cases

of the right, 30 of the left, and 5 of both glands. The statistics of these three give: 261 of the right, 192 of the left, and 65 of both glands. As a rule, only part of the gland is affected, and most frequently the lower and the lower external part. Of 154 cases seen by Winckel,

| | | |
|---|---|---|
| The inner part of the gland was affected, | 4 | times. |
| " outer " " " " | 20 | " |
| " upper outer " " " | 13 | " |
| " upper " " " " | 26 | " |
| " upper inner " " " | 5 | " |
| " lower " " " | 53 | " |
| " lower outer " " " | 26 | " |
| " lower inner " " " | 7 | " |
| | 154 | |

The same result is shown by the smaller statistics of Nunn. Mastitis usually begins during the first four weeks after labor, and as a rule in the second half of this period (Bryant, Nunn, Winckel). Mastitis very frequently arises from lesions of the nipples caused by nursing. According to Winckel, mastitis sometimes appears within the first twelve hours after the injury to the nipple, but more frequently within the first week, and most frequently on the third or fourth day after it.

*Etiology.*—It was formerly thought that emotional disturbances, colds, blows and pressure most frequently caused puerperal mastitis, and these causes are at all events worthy of consideration in typical cases; of more consideration is the view that the irritable breast of puerperal women may be the result of milk stasis in certain parts of the gland. I will not deny that this may occur; from some unknown cause, the milk may coagulate in certain excretory ducts, causing an obstruction by which stasis of milk and inflammation around the tensely distended lobules may result; or, in consequence of greater laxity of the muscular tissue, or of incomplete emptying of the organ by the child, a great deal of milk may remain in certain cases and the circulation in the gland be interfered with. Still, when we so often see the women, in whom, for some reason, nursing has been interrupted, have no abscesses or inflammation — cases in which there is only firm tension, and then absorption of the retained milk—it seems doubtful whether retention of milk is so often the cause of acute inflammation as has been supposed. I believe therefore that Roser is entirely right when he maintains that the retention of milk is not the cause but the result of the inflammation, since the excretory ducts of some lobules are displaced by the inflammatory swelling. Most obstetricians are now inclined to this view, and regard puerperal mastitis as being in direct relationship to disease of the nipples.

From the above statistics it is easily seen that nursing, especially by

primiparæ, is an important factor in the causation of mastitis; furthermore, that affections of the nipples, which are also especially frequent in primiparæ, very frequently precede inflammation of the gland. Modern pathology admits that simple congestion, particularly pure passive hyperæmia, is only exceptionally the direct cause of inflammation; it demands that there should be a particular irritant for the real inflammatory hyperæmia, which plays such an important part in the tissue changes during inflammation. In all probability the same irritant is transmitted through the nipple to the interior of the gland, and consists of bodies which enter the lymphatics through the excoriated spot on the nipple and thence into the tissue, or which gain access to the latter through certain changes within the milk ducts, and from these to the deeper portions of the gland. The second view is less probable, because it can hardly be shown how bodies without active movements (such movements are not to be attributed to bacterium spores) can overcome the force of the current of the secretion. The view that bacteria, which so change the milk that it acts as an irritant to the surrounding tissue, need only to enter the ducts of the nipple to act from thence as a ferment on the milk, is certainly not proven, although it cannot be dismissed. As regards the parotitis of typhus fever (and the same is true of mumps) Virchow has asserted that the inflammatory irritant enters the gland from the mouth; this is always the most plausible hypothesis in regard to the causation of these diseases. The anatomical studies of puerperal mastitis, which I here offer, seem to substantiate this view, although the appearances can be differently interpreted.

*Anatomy.*—Hitherto no one has had the opportunity of observing histologically the first onset of a puerperal mastitis; but from clinical observations of this process it is known that the gland is never affected at once *in toto* (as usually appears to be the case in parotitis), but that inflammatory foci are formed in the gland, which may remain separate, but which as a rule gradually coalesce, and suppurate together. These foci may be considered partly as non-escaping milk, surrounded by inflamed tissue, partly as suppurating inflammatory foci, situated in the connective tissue between the acini. Clear histological descriptions of this process have not, so far as I know, been given either before or since my work on this subject. Most frequently the observations of Kolb are cited. He says: "The affected parts seem hard, and usually form nodular tumors, section of which shows them to be distended with milk; the glandular tissue is hyperæmic and very succulent. In the acini, small extravasations of blood, the size of a pin's head, may be seen. As a rule, suppuration occurs early, and appears to me, indeed, to be a connective tissue suppuration; at least I could not discover anything in such cases which would indicate an epithelial suppuration. Pus appears at first in the acini, partly fluid, partly not, and as it seems to me most frequently with fibrous intercellular substance, so that we find in the grouped acini

heaps of yellowish, fibrinous plugs, analogous to those found in croupous pneumonia. Destruction soon overtakes the finer inter-acinous tissue, the small purulent foci coalesce, forming larger ones, the pus becomes fluid and the true mammary abscess is formed. The cavity of this abscess

FIG. 9.—SUPPURATING PUERPERAL MASTITIS. Hartnack Syst. 4.

never has a smooth wall, but the membrane is rough, and not infrequently nodular, and ragged particles of broken-down gland tissue are found projecting from it."

This description agrees exactly with what I have seen in such abscesses during life, and in the examination of persons who died of puerperal fever

while having mastitis. I can, however, add something more accurate as to the histological processes in such cases. It may be seen in Fig. 9 that the acini are all more or less surrounded and in part completely covered by a small-cell (inflammatory) infiltration; but the epithelium seems to take absolutely no part in the cell-formation. It is difficult to see, with greater enlargement even, what becomes of it, though finally it seems to break down with the walls of the gland lobules, and the infiltrated interstitial substance. At *a*, in the lower part of the figure, the pus, with the tissue detritus at the centre of the abscess, has disappeared from the preparation. It at first seems strange that here, in comparison with Fig. 6, the acini are very small and milkless, and that in the fresh state the soft succulent interstitial tissue is so enormously developed. I cannot say how long after confinement the woman, from whom this preparation was taken, died, or how long she had nursed her child; still it is certain that it was more than a week, or the preparation would have appeared very different. Obviously the secretion of milk had ceased for some time, as the gland is already in a state of puerperal involution. It is very noticeable that only the immediate surroundings of the gland-lobules are infiltrated and that the very abundant interstitial tissue is not infiltrated. Finally, perhaps, another section of the gland would have shown gland-lobules completely normal.

From this and many other similar representations, it is seen that the inflammatory irritant must proceed from the acini themselves, or from their immediate surroundings. The first view seems at first sight to be the most plausible, and agrees also with what has already been said. But, anatomically, it is not the only possible one, as may be seen from the following experiment. I produced suppuration by drawing through the moderately developed mamma of a non-nursing bitch, a white cotton string about .39 inches wide, and killed the animal a few days later. The inflammatory infiltration had not extended far around the string; it was not diffusely distributed in the inter-lobular connective tissue, as in a phlegmon, but surrounded the gland-lobules as in puerperal mastitis. This shows that there are channels of dissemination for inflammatory processes, which follow the ramifications of the gland; these can only be the blood and lymph-vessels, which surround the ducts and lobules. I might maintain that it is most probable that the irritative material is distributed with the lymph through the gland, and thence acts upon the capillary net-work around the lobules, that the leucocytes emigrate and produce the purulent infiltration of the tissue immediately surrounding the lobules and their acini. As to whether the pus cells are formed more from themselves or from the connective tissue cells of the interstitial tissue, I cannot say. At all events, capillary stasis, thrombosis and necrosis of the tissue result, so far as this is not already the subject of cell infiltration. As regards the "fibrinous purulent" plugs, which Klob

found in the small abscesses of purulent lobules, I would prefer to look upon these as necrotic glandular and connective tissue. One may easily observe this change in suppuration of the subcutaneous tissue. I have not been able to convince myself of the formation of fibrin in mastitis, at least in the cases I have carefully examined, and would prefer therefore

FIG. 10.—GROUPS OF MICROCOCCI IN THE VESSELS AROUND THE ACINI OF A HYPERTROPHIC MAMMA ATTACKED BY ERYSIPELAS. Hartnack Syst. 8.

not to accept too readily the comparison with the finer processes of croupous pneumonia, which I have carefully studied. Further researches are necessary to prove that the process described by me in the tissue in puerperal mastitis is constant. These researches are now of new interest, as there is such a growing inclination to attribute all such infectious suppurations to the growth of micrococci.

Ehrlick and I (*Arch. f. Kl. Chir.*, Bd. XX., p. 418) have shown the pres-

ence of enormous masses of coccus-vegetations in a hypertrophic mamma, which was attacked by erysipelas. I cite the short communication: "A third case occurred in a young girl with enormously hypertrophied breasts. A reduction of their mass was attempted by compression with elastic bandages; this had some effect, but soon the breasts became painful, and from some excoriated points there was developed a phlegmonous erysipelas, which carried off the patient in a few days. In order to investigate the hypertrophic mammæ, at first without reference to the erysipelas, pieces of the breast were removed and preserved in Müller's fluid. The large number of cocci contained in the diseased organs was an entirely accidental discovery. Many of the blood-vessels surrounding the enlarged acini were so densely filled with these balls of cocci, that it seemed as if a very large artificial gelatine-injection had been made. Here and there in the tissue cocci were found, but sparsely. The tissue surrounding the vessels containing the cocci was entirely unchanged. Unfortunately none of the skin covering the mammæ was preserved, so that nothing can be said as to whether it contained cocci or not in this case."

At the time these investigations were made, Langhaus's work on the lymphatic vessels of the mammæ was not known, or else it would have appeared probable to us then that these canals around the acini, in which the coccus-balls lay, were dilated lymphatics. It is plausible, however, from other researches, that there are occasions when a considerable time elapses before a coccus-invasion causes inflammation and suppuration. It is even maintained by many that this follows only in an indirect way, that the contact of the coccus with the tissue acts much more directly and deleteriously upon it, that it immediately causes death, necrosis, and the suppuration is the result of the necrosis. I remember very clearly that the mammary tissue of a patient, which was studded with adeno-fibromata, was remarkably red, with here and there, perhaps, a yellow spot, as if of purulent infiltration, but at no place was there an abscess. Although there was no puerperal mastitis in this case, and although, at all events, the lactiferous ducts had not determined the direction of the inflammation, yet in this case also, the immediate surroundings of the lobules were the centre of the coccus vegetations, which, as in puerperal mastitis, would have caused abscesses with necrosis of the lobules.

Besides the typical form of "parenchymatous puerperal mastitis," which has been described, there remains the "puerperal paramastitis," a phlegmon which may develop partly upon the gland, partly behind it. The phlegmonous processes on the anterior surface of the gland arise usually around Montgomery's glands in the areola, and spread over the whole areola. Such subcutaneous cellular-tissue abscesses seldom arise in the peripheral portions of the mammæ; these processes seldom spread, but rapidly form small abscesses at their point of origin. This form of para-

mastitis occasionally developes outside of the puerperal state, sometimes as a result of a deep-seated erysipelas ambulans.

As regards the inflammation of the cellular tissue posterior to the mamma, it probably occurs only during the puerperium. In my experience these cases always result in abscess of the deep-seated portions of the gland. The pus breaks through the fascia-like connective tissue of the gland into the loose cellular tissue, which separates the gland from the pectoralis major muscle, and spreads out here in all directions to such an extent as to lift it from the thorax; it seeks an exit at the periphery of the gland or is let out here by an incision. Whether a "primary retro-mastitis" ever occurs without a coincident parenchymatous mastitis, I cannot say. I have seen in men very large acute abscesses upon and under the pectoralis major muscle, for which there was no known cause, and it is possible that the same thing may occur in women.

Whether a mastitis arising during a puerperal fever is of a metastatic nature (whether it is to be placed on a parallel with abscesses, as they sometimes occur in other organs and in the cellular tissue in pyæmia,) is hard to say. There seems to be no doubt, though, that a very extensive suppurating mastitis may lead to pyæmia; it would not appear strange, reasoning from other observations, if slight cases of puerperal diseases of the genitals, which usually heal without difficulty, should, under the influence of a pyæmia caused by mastitis, go on to marked suppuration; under these circumstances it would be difficult to decide which of the purulent foci found on section was the primarily infecting and which the infected. Hennig mentions a case of metastatic mastitis occurring in the course of typhus fever after a preceding parotitis.

*Symptoms, Course and Prognosis.*—The commencement of a mastitis first manifests itself by pain in the breast; this pain is at first limited to a certain part of the breast, is increased by movement of the affected part of the gland, by dependence of the gland and by the act of nursing. Palpation of the painful part, if the inflammation be not too deep-seated, reveals a hardness and a more or less sharply defined nodule, which enlarges in the course of a few days. The affection frequently begins with a very high fever; often with a chill. With the formation of an abscess and the evacuation of the pus, the fever subsides completely if the process terminates here. As in many cases, however, the inflammation passes from one lobule to another, the fever exacerbates and indicates here, as in other cases, whether the inflammatory process in the diseased organ has ceased or not.

The different forms of puerperal mastitis may be entirely dissipated by early and judicious treatment. More frequently, however, abscesses form, either upon or in the gland, according to the seat of the inflammation. Redness and circumscribed fluctuation soon appear in simple phlegmon of the mamma; in abscess posterior to the gland, a fluctuating

tumor appears at some point in the circumference of the gland, usually below and to the outer side. In inflammation in the gland several abscesses are usually formed, one near the other, in succession, which either empty into one another in the interior of the gland, thus forming sinuous suppurating cavities, or they open through the skin at different points. As in other inflammations, large or small fragments of gland tissue may be thrown off. The spontaneous openings through the skin are usually very small, and are a long time in occurring; their course is therefore a very painful one. The prognosis as regards life is seldom of great moment; only in very weak, tuberculous women can an acute inflammatory process of a week's duration be considered dangerous, partly from the drain occasioned by the formation of pus, and partly through its exciting a fresh tuberculous outbreak in the lungs. Rupture of a retro-mammary abscess into the pleural cavity is exceedingly rare. These cases often hang on for a long time, not only because of the formation of new abscesses, but because the old ones will not close; fistulæ remain, the treatment of which will be spoken of later. Since two of the fifty-six cases of puerperal mastitis treated at my clinic died, it is proper to state that one had thrombosis of both femoral veins when she was admitted, and the other died of an erysipelas ambulans contracted at the clinic. In neither case, therefore, was the mastitis the direct cause of death.

The treatment of acute inflammation of the breasts in child-bed consists in ordering rest in bed, and antiphlogistic diet so long as the patient has any fever. The breast should be bandaged *secundum artem*, and lightly pressed against the thorax. Whether nursing should continue in such cases depends upon the situation and extent of the inflammation. In abscesses antero-posterior to the gland, the milk may be normal in quality, although smaller in quantity. If it be not too painful, nursing may be countenanced or even recommended, if the gland becomes so distended as to increase the pain. If, however, the inflammation be seated in the gland itself, nursing had best be abandoned, at least from the affected breast; should the gland become very much distended, it may be emptied with the breast-pump. If nursing be carried on with the affected breast, we can only apply almond oil, and warm cataplasms to allay the intense pain and to hasten the formation of the abscess, or else use wadding. If lactation be interrupted, we may apply gray mercurial ointment or iodine ointment. In England there is a preference for belladonna. Leeching is not to be recommended; it only mitigates the pain temporarily and often irritates the skin very much. The application of an ice-bag to the affected breasts may, under certain conditions, be tried, but it is seldom tolerated by the patient, and may give her a serious cold. In order to rapidly arrest the secretion of milk, we usually employ cathartics (ol. ricini, magnes. sulph., sod. sulph., or small doses of calomel) and seldom fail in our efforts; the internal administration of potassic iodide

is also highly recommended to quickly arrest the secretion of milk. Massage of the breast, practised by many midwives for this purpose, is very painful, may increase the inflammatory process and is feared by many women, because they believe it makes the breasts ever afterward flabby and dependent. Winckel states that in the Dresden Lying-in Institute, out of one hundred and thiry-six cases of puerperal mastitis, ninety-one (67 per cent.) recovered by absorption.

Velpeau says that the antero- and retro-mammary abscesses should be opened early, that of the gland itself never. The first recommendation is certainly right, and usually relieves the patient greatly; we may often evacuate enormous quantities of pus from the abscesses postèrior to the gland; the spontaneous openings are usually too small to allow of a proper escape of pus and rapid healing of the abscess. We may also open the abscesses in the gland, when the pus is close under the surface of the skin, but not earlier. The opening should always be made with the knife, as I can see no advantage in using any of the pastes in these cases, and the small hole made by a trocar is not sufficient. In rare cases, abscesses of the mammæ contain a foul-smelling pus mixed with gas, without any communication with the pleural cavity; the causes of this are unknown. Velpeau reports a few such cases. I have found on opening these abscesses that the pus is always odorless; later, when suppuration has lasted foı some time, the secretion has a sour smell. This decomposition of pus we can now avoid by careful antiseptic treatment. This method seems also to have a marked influence on the course, and at times on the spread of the affection, and the suffering patient is certainly spared a great deal of pain by it. Recent experiences have proven the good results of these methods, and I cannot too strongly advise that every physician make himself acquainted with them. The breast is at first carefully cleansed with soap, and then with a weak carbolic acid or thymol solution. The incision should be made in the direction of the radius of the gland, about .39 inches long, and down to the pus focus, and must be immediately followed by the insertion of a drainage tube, which is kept from slipping in by a safety-pin. Gentle pressure is then made upon the gland, so as to force the pus out through the drainage tube; the breast is again washed with some disinfecting solution, the patient being in the recumbent position; the whole breast is covered in with Lister-gauze, waterproof dressings over this, and then over all, especially below and towards the axilla, is placed a large quantity of salicyl-jute, and the whole dressing is then fastened with a bandage extending over the entire thorax from the neck to the umbilicus. The surgeon should not neglect to place wadding over the nipple of the sound breast, and to place sufficient wadding under the breast, so that it will not come in contact with the thorax. A quantity of wadding must also be placed in the axilla on the unaffected side. When the dressing has been completed by a gauze bandage, a jacket of

oil-silk is placed over it. If the abscess is very large and sinuous, it is well to renew the bandage after the lapse of twenty-four hours, and then to allow the second bandage to remain on from three to five days; but if the abscess is not very large, the first bandage may remain on for several days. The minute details of this dressing will not be regretted, when the interests of the patient are considered. The rest given to the inflamed organ, the even compression, the prevention of pus-decomposition, the complete emptying of the pus through the drainage tube, the excellent absorption of the pus by the Lister-gauze, all these contribute to a painless and easy course, and lead to a relatively early healing even in severe cases. If, after the first or second dressing, no more pus is drained away, the dressing should be again renewed as before, allowed to remain three or four days, and after its removal the abscess will be found to be almost entirely healed. A deviation from this method is only allowable when there is a renewal of the fever and pain under the dressing; the dressing must then be taken off, and, in all probability, another superficial abscess will be found, which must be opened and drained. This may occur again and again, though there can never be such destruction of the gland as under the old expectant and timid measures, by which the patients suffered unspeakably, and the process continued for months, until it was finally necessary to make large incisions and break down all partitions between the abscesses, in order to bring the matter to a favorable conclusion, by which means the gland was usually destroyed for the greater part and disfigured by cicatrices.

In cases which come under treatment early and in which the abscess has been opened, the abscess cavity should never be injected with strong irritating solutions, for, in puerperal mastitis, the pus is rarely ever decomposed ; consequently there is nothing to disinfect or deodorize. It is different, however, in those cases in which there is already a spontaneous opening, or in which insufficient incisions have been made without antiseptic precautions; in these cases, the pus has already become acid, and has acquired irritating qualities through the lactic or butyric acid which it contains. These cases can be treated more conservatively than was formerly possible, when nothing more could be done than to make large radial incisions. We operate, as described before, but dilate the opening to about 1 inch, so that the finger, and with it the nozzle of an irrigating tube can be introduced: the cavities are now washed out with a three per cent. solution of carbolic acid until the solution returns tolerably clear; then the thin walls between the abscesses are broken down so that they all communicate one with another, the pus and the carbolic acid solution are expressed, and large drainage tubes are placed in the different openings. The whole is then dressed as advised above, and in these cases we may also attain most striking and rapid results. It is scarcely necessary to say that an anæsthetic is required in such cases.

It is by no means always the fault of the physician when such cases of apparently neglected mastitis fall into the hands of the clinical surgeon. Women resent, for various reasons, the interference of the physician in cases of mastitis. In the first place most women of the poorer and middle classes wish to nurse their children as long as possible, on the one hand, so as not to have to buy food, for milk is dear at times in large cities, and difficult to obtain in good quality; on the other hand, and this is the chief reason, they do not wish to become pregnant again so soon. Many women are not willing to use any means which will interfere with the secretion of milk, and, in spite of the physician's orders, they will continue to nurse the child from the affected breast, suffering the most intense pain, with the idea that the inflammation has been caused by milk-stasis and that it will disappear if the milk is withdrawn. Among the better classes there are still other reasons for the avoidance of the knife; the women believe that the cicatrix from a spontaneously opened abscess will be less noticeable than that from a knife. Young women, especially, fear cicatrices on the upper half of the breast, since they will be visible with low-cut dresses. Finally, as in all cases of suppuration, the patients dread the pain of the incision, more so because they have become unusually sensitive on account of the pain of the inflammation. Since also there are many patients (and many physicians) who dread anæsthesia, and since in the country it is difficult for the physician to make a daily visit to assure and advise the patient, the reasons for non-surgical treatment are so numerous that we cannot wonder at its non-employment. But it is culpable in the physician to repeatedly irritate and torment these patients with small incisions, which, without drainage and antiseptic compression bandaging, are of no more use than spontaneous openings; and we cannot wonder that after six or eight such "operations," these women lose all faith in their physician.

## Sequelæ of Mastitis.

After every acute or chronic abscess of the breast, fistulæ may remain. The immediate causes of these fistulæ are faulty escape of pus on account of a too narrow opening or valvular closure of the same, fungous or unhealthy granulations in the abscess cavity; anæmia, great general weakness and general diathetic conditions are the remote causes. Fistulæ of the mammæ usually discharge thin pus, seldom milk, and, as a rule, lead to sinus-cavities in or behind the gland. When of long duration, abscesses behind the breast may lead to suppuration of the pectoralis major muscle and of the periosteum of the ribs, and even to suppuration of the intercostal muscles and the pleura; the last, however, is very rare, and in such cases there would be pleural adhesions from the purulent process and pneumothorax would result. Long duration of these fistulæ weaken

the patients very much; they become emaciated, often have a remittent fever, night-sweats, loss of appetite, become exceedingly irritable and are mentally depressed. If nothing unusual happens, the process may go on for months. If such patients are disposed to pulmonary tuberculosis, it may seize this opportunity to develop rapidly.

As regards the treatment of such fistulæ, it is usual to first cauterize with nitrate of silver and then to make injections of diluted or concentrated tincture of iodine, carbolic acid solutions, etc. Many of these fistulæ may be cured by inserting drainage tubes and using coincident compression. It seldom happens that in otherwise healthy women, all these measures fail to effect a cure; in many of the cases which have come to my clinic, the fistulæ had existed unchanged more than a year, without there being any caries of the ribs, as is so much feared in these cases. The reason that such fistulæ do not heal is, in my opinion, a purely mechanical one; the thickened abscess-wall, which is bound to the wall of the thorax, can only slowly contract and shrink. In all the cases of long-existing fistulæ of this kind observed by me, the reason for their existence was always found in abscess-cavities, which lay, for the most part, behind the mamma. The sluggish fungous granulations of all such cavities show no inclination to grow together; their secreting surfaces are covered usually with a thin layer of epithelium, which never cornifies, though its epithelial character is evident, since the cells never coalesce and there is no vascular connection between them. When such abscesses heal, it is only through shrinking of the walls; but such shrinkage is difficult on the unyielding chest-wall, on the anterior surface of the pectoralis major muscle, and the abscess remains for a long time in the condition of one or several indurated fistulæ.

Formerly in such cases I made very large incisions in the periphery of the gland, following its circumference, so that the under surface of it had sufficient play to contract. But a long time was required for healing unless the whole cavity was so intensely irritated by such remedies as liq. ferri, turpentine, etc., that the old granulations were thrown off and new ones were formed. In two cases which I treated about a year ago, I split the fistulæ so extensively that the abscess cavities could be seen to advantage; then I scraped out the granulations with a sharp spoon as completely as possible, excised the fistulous opening in the skin, washed the cavity for a long time with a three per cent. solution of carbolic acid, sutured the incision in which I had placed a drainage tube, then placed over the whole a compressing antiseptic dressing, which remained for five days. At the end of this time, the drainage tube was removed, a second dressing applied and allowed to remain five days. Healing appeared to have taken place by first intention. Unfortunately, as with other cold abscesses, this cure did not remain complete; in the course of

a few weeks other small fistulæ appeared, which did not secrete as much as the first, and disappeared only after many months.

Galactocele and cyst fistulæ will be treated of in a later section. Induration sometimes remains for a long time after mastitis, especially in those cases in which there has been no abscess formation. These indurations differ from "adeno-fibromata," which are said sometimes to develop in the breast after the puerperium, in that they are less hard and less clearly defined than the neoplasms, and in that after iodine embrocations and compression they disappear, while the new growths remain stationary.

Atrophy and disfigurement after very extensive suppurating mastitis are, unfortunately, not infrequent. In well-nourished women so much adipose tissue will usually be formed in the course of a year that the disfigurement will only be slight, and sometimes scarcely noticeable. The cicatrices caused by the incisions usually disappear entirely.

[Puerperal mastitis need, nowadays, rarely extend to suppuration. It is always possible to forestall any extensive phlegmonous process, and even in its beginning we are usually able to check it. A valuable paper published by Harris of New Jersey, in the *American Journal of Obstetrics*, for January, 1885, called the attention of the profession to the manner after which mastitis may be prevented or checked in its course. The same method was, at the time, being used in the New York Maternity hospital with the very best results, and under its uniform use we never, at this institution, have occasion to interfere surgically with the puerperal breast. The method depends simply on applying systematic and equable pressure to the mamma, and on absolutely prohibiting any manipulation whatsoever. The compression bandage used, and remarks in connection with it, will be found in Vols. I. and IV., of this cyclopædia.—ED.]

# CHAPTER VI.

## NON-PUERPERAL, ACUTE AND SUBACUTE MASTITIS.

INFLAMMATIONS of the mammary glands at other times than during the puerperium are on the whole seldom met with; even though on account of its situation the organ is very much exposed to all sorts of accidents. Outside of its periodic function it has no marked tendency toward inflammatory processes. When such processes occur, their only known causes are rubbing of the nipple against the clothes, pressure, blows and falls upon the gland; in some cases there is no particular cause to be assigned. These inflammations never equal in intensity or duration the puerperal mastitis; they sometimes result in abscesses, but these abscesses seldom develop with marked phenomena and always remain isoated; their course is usually subacute. Mastitis may develop in newly-born children, even to the age of puberty, and at times during pregnancy.

The mastitis of the newly-born is manifested by a painful swelling of one or both breasts, with reddening of the skin and secretion of thin milk; the functional and then the inflammatory irritation of the glandular tissue become more prominent. The cause of this affection, which attacks equally children of both sexes, both in private practice and in lying-in hospitals, is not known. Fomentations of lead-water will usually cause this subacute and generally non-febrile affection to disappear quickly; still there are some cases in which suppuration occurs. The abscess must be opened as soon as it is developed, and the skin over it becomes thin. Children rarely die of this form of mastitis, when taken in hand early, but when a progressive phlegmon developes, as is but rarely the case, the condition of the little patient becomes dangerous.

At the beginning of puberty a subacute mastitis sometimes occurs, consisting of considerable swelling of the glandular tissue with slight pain and at times a slight secretion of milk. The gland feels tolerably hard, like a disc under the skin. There is often a history of a blow or rubbing. The induration usually disappears rapidly under inunctions of iodine ointment; suppuration occurs but seldom.

Subacute inflammations with formation of abscess after puberty and unconnected with pregnancy are very rare. The course is more tedious and less painful than in puerperal mastitis; such inflammations are mostly circumscribed indurations of the gland, and may be dissipated by the use

of compresses, cataplasms, iodine ointment and rest in bed; sometimes however abscesses occur which slowly soften to a common focus. Such abscesses should not be opened until the surrounding induration is reduced to a minimum, or we may wait until spontaneous evacuation occurs. Of the seven cases of this kind which I have seen, two underwent resolution and five suppurated. Inflammation of the mammary glands occurs also at times during pregnancy. Nunn mentions seven cases. I have seen four cases of unilateral mastitis in women six to nine months pregnant. The course was subacute, and in all four cases an abscess was developed slowly. One of these cases was unfortunately infected with diphtheria at my clinic; abortion and diphtheritic endometritis followed and carried off the patient.

# CHAPTER VII.

## CHRONIC MASTITIS.—COLD ABSCESS.—TUBERCULOSIS.—SYPHILIS.—INDURATION THE RESULT OF CICATRICIAL RETRACTION.

CHRONIC inflammations and cold abscesses of the mammæ are exceedingly rare. When there appears near or under the gland a painless, slightly movable induration which finally, with or without early reddening of the skin, softens, it is far more probable that it is connected with some chronic inflammatory process of the ribs than with the gland. Cold abscesses in the mammary glands before puberty are never seen. After puberty they affect married as well as unmarried women, and particularly those of a scrofulous or tuberculous diathesis. An encapsulated extravasation of blood, following a blow, may also form a cold abscess. In most of the cases hitherto observed, the induration began in single lobules of the glands without any known cause, and the most varied interpretation may be given to such indurations. In many cases, the diagnosis can only be made after long observation. I have very recently seen cases of cold abscesses, which have been described by H. Klotz (*Arch. f. Kl. Chir.* Bd. XXV). In other countries these cases seem to be more frequent. Erichsen, indeed, describes two forms: chronic diffuse abscess and chronic encysted abscess. The first form is seen in persons of all ages, married and unmarried, of scrofulous diathesis, and develops in the cellular tissue behind the mammæ. (These are probably cold abscesses, which arise from some disease of the ribs). The second form is of especial importance because it is with difficulty differentiated from tumors of the breast, and since on this account many unnecessary amputations have been done. These abscesses develop almost exclusively after confinement or abortion; they are indolent, indurate slowly, and after the lapse of months gradually soften in the centre. Retraction of the nipple is a result of this, and usually there is some œdema over the swelling. The diagnosis can only be made after lengthy observation, and, at times, only by puncture. The treatment consists of puncture, drainage and compression. Samuel Gross also mentions the difficulty of diagnosis, and he has seen the affection in unmarried, scrofulous girls, but more often as a result of a subacute or chronic mastitis in women who had been confined, and especially in that breast to which the child had not been placed.

*Tuberculosis of the Breast.*—All authors agree that true miliary tuberculosis of the breast does not occur, or that up to the present time at least it has not been observed. Kolessuikow (*Arch. f. Path. Anat.*, Bd. 70) describes a form of necrosing interstitial mastitis occurring in cows, in which there is a growth of giant cells as in true tubercle. What Cooper and others, especially English authors, describe as "scrofulous tumors of the breast," is not sufficiently clear in order to draw conclusions as to the anatomical structure of these indurations. Velpeau speaks of tubercles in the skin of the mammæ (probably disseminated carcinomatous nodules) and of fibro-tuberculous nodules (not clear) in the substance of the gland. While I was assistant in B. von Langenbeck's clinic there was there for a long time a young, blonde, well-nourished girl of decidedly scrofulous habit, who had in one breast several nodules as large as a hazel-nut or walnut, which contained a yellow, cheesy pus; the affection was diagnosticated as tuberculosis of the mamma, and was cured by incision of the single foci and cauterization with nitrate of silver. I would designate this, according to the present nomenclature, as caseous, chronic lobular mastitis, without being able to say anything as to its cause (whether due to scrofula or syphilis); I have never seen a case similar to it since, and, so far as I know, no anatomical investigations of such cases have been made. Through one of my assistants, I was enabled to observe the following case: Mrs. A. H., 26 years old, came under treatment for pulmonary tuberculosis on August 23, and died three days later. The patient had never complained of the mamma; there was scarcely any noticeable swelling thereof, and therefore no mention of it was made in the patient's history. The diagnosis made after the autopsy was: chronic tuberculosis of both lungs, with phthisis of both upper lobes; tuberculous ulcer of the large intestine; tuberculosis of the right mammary gland. In the history of the patient it is stated: "Both mammæ were very much withered, small, their skin wrinkled, nowhere excoriated or ulcerated. Nipples and areolæ were darkly-pigmented. The right mamma was somewhat larger than the left, and contained a disc-like body about 4 inches wide and ⅝ inches thick, having a nodular feel externally. The left mamma was uniformly soft and spongy. Section showed the right mamma studded with foci filled with caseous, crumbling masses, containing here and there a tuberculo-purulent fluid in the centre, besides small caseous foci as large as a hemp-seed."

The microscopic sections, made from the walls of the larger foci, were not sufficiently clear to draw conclusions from; the very atrophic glandular elements were hardly perceptible, and the tissue was so clouded with a finely granular detritus strewn between the fibres, that I cannot say anything certain concerning the probable presence of giant cells in the boundary layers of the caseated foci. At any rate, the anatomical description leaves no doubt but that here was a rare case of true tuberculosis

of the breast. It is unfortunate that the other (left) apparently healthy gland was not examined, as it is possible that the first stage of this process might have been found there.

### Syphilitic Infiltration of the Mamma.—Gummous Mastitis.

That different forms of syphilides may extend over the skin of the mamma is self-evident, and in themselves they have nothing to do with disease of the mammary gland. The presence of syphilitic ulcers of the nipple has already been mentioned. That gummata occur in the mammary gland has only recently been proved. Hennig describes a case, in which an autopsy was made:

"A woman, 55 years old, was bedridden for four years on account of syphilitic ulceration of the bones of the knee. The mammary glands were of medium size and unchanged in their acinous parts. Between the lactiferous ducts, which were somewhat pushed aside, in the middle of each gland, though a little towards the anterior surface, there was a gumma, $\frac{1}{6}$ inches long, $\frac{7}{25}$ wide, and on the right side, $\frac{1}{10}$, on the left, .07 inches thick. The right was somewhat internal to and below the nipple, and was caseous in the middle, on both sides projected centrifugally flat nodules, bounded peripherally by a pale reddish-brown, somewhat jelly-like on the left, œdematous tissue-structure, by which the whole new growth appeared somewhat hilly. Superficially it occupied perhaps a third part of the extent of the gland." From this description, without microscopical examination, it cannot be said that it was necessarily a syphiloma which was seen; it might have been scirrhus, which is, at times, bilateral in old women. Among the cases reported by Ambrosoli (*Gaz. Med. Italiana Lombardia,* S.V., T. III. No. 36, 1864), one was in a young man the two others in young women, 19 and 24 years of age. Both of the latter had constitutional syphilis, had swellings in the anterior parts of the right mamma, which disappeared under the use of mercury. The cases cited by Hennig and Virchow from Sauvages, Marin, Biercher and Follin, show nothing special as to the nature of the disease. Samuel Gross mentions Maisonneuve and Verneuil as observers of syphiloma of the breast, but without quoting any of their observations. Erichsen and many other experienced surgeons and gynecologists do not mention syphilis of the mamma at all. We must at least wait for further observations before we can form a clear picture of this affection.

### Nodular Induration and Shrivelling of the Mamma from Mastitis.

The descriptions of this affection are so various, and in part so general, that we can scarcely form an exact picture of it. At one time it is the

pain, then the atrophy, then the nodular formations, then the diffuse indurations (with or without retention cysts), then the results of long-continued irritations, then the inactivity of the gland, which is made more or less of in the descriptions of this affection. The names, too, which are given to this rare affection of the breast, are various, so that it is a matter of doubt as to whether the different authors have been describing the same affection: fibroma mammæ diffusum, elephantiasis mammæ dura, induratio benigna, cirrhosis mammæ, corps fibreux, mastitis interstitialis diffusa et circumscripta.

As to the anatomical genesis of the process there is no difference of opinion. It does not consist in simple atrophy of the glandular tissue with more or less fatty degeneration of the connective tissue, since this would only show normal involution, and would only attract attention if this atrophy and its partial reparation proceeded at intervals in single portions of the gland. The process under consideration leads much more to partial or total indurations, which may eventually terminate in retraction of the tissue, and even of the nipple and skin. But the tissue of the remaining indurations is not loose, senile connective tissue, but conforms to the character of hard cicatricial tissue, and appears to retain this character, never becoming soft and tendinous, as cicatricial tissue sometimes does. Any competent judge must conclude, even though he has not observed the different stages of this process, that it begins with small-celled infiltration of the connective tissue, and must therefore be regarded, morphologically at least, as a chronic inflammatory condition. We must, then, consider how the epithelial elements of the gland behave. How difficult it is to differentiate this from carcinoma mammæ cicatricans, is well known by all who have given any attention to this subject. It is therefore no reflection, when we say that the descriptions of disputed subjects examined by the older methods—for example, the descriptions of Wernher—are, in spite of their fullness, not satisfactory. In the case pictured and described by König, there was, at all events, great dilatation of the acini and excretory ducts, with hard, fibrous, interstitial tissue; nevertheless, such involution-cysts are not so seldom found in carcinoma of the breast and also in senile breasts, without induration of the tissue. In the present state of opinion regarding carcinoma, it would be admissible to consider such cases as healed or healing carcinomata. So long as the opinion, "Because the disease has neither re-appeared locally nor elsewhere in the body, it cannot be of a cancerous nature," was held, the matter was a very simple one; but as we now no longer believe in this dogma, only an exact, anatomical, differential diagnosis can decide.

Unfortunately I cannot offer anything to aid in the diagnosis. In the anatomical examinations which I have made on this subject, sufficient analyses with modern methods have always shown it to be carcinoma. I was very much disposed to doubt the existence of a chronic mastitis ending

with cicatricial shrinking (though I did not entirely disbelieve in it), when a short time ago I had a patient in whom there was a condition of the left breast which was without doubt what I had until then sought for in vain. A. M. W., a farmer's wife; 45 years old, always healthy; always menstruated regularly; had borne nine children, the first fifteen years, the last two and one-half years ago. She had nursed all the children at both breasts, usually for sixteen months, and had never had a bad breast.

FIG. 11.—SHRIVELLING OF THE LEFT BREAST FROM CHRONIC MASTITIS, WITHOUT SUPPURATION.

(Unfortunately no mention was made in the history as to whether menstruation had ceased at the time or not.) While nursing her youngest child, which was born November 3, 1878, she noticed that a spot as large as a nut and above the nipple of the left breast was becoming hard; this induration constantly increased, particularly after the cessation of lactation. Depressions formed and gradually the gland atrophied, as shown in the illustration. The right breast, which was well-developed, remained absolutely unchanged. There had been no pain during the whole process,

and even at this time palpation was not painful. The axillary glands could not be felt. The atrophied gland was freely movable over the pectoralis major muscle: its consistence was that of a moderately firm cicatrix though not so firm as a scirrhus. There were no indurated nodules to be found in the degenerated organ.

From my observation of this case, which was not examined anatomically and which does not coincide with the descriptions of other authors, I do not think that I am entitled to give a general judgment on chronic atrophic mastitis, and so much the less as in this case two of the symptoms mentioned by all authors, pain and induration, were entirely absent. As concerns the treatise of Wernher, after re-reading it, I have the same opinion that I had when I first studied it twenty-five years ago. Should we admit that Wernher had something special in view, most modern histologists would recognize in the accurate descriptions typical forms of atrophying cancer of the mamma. What Wernher understands by atrophying sarcoma does not correspond to the modern view of sarcoma established by Virchow and myself. Whether Virchow has ever seen a case of chronic interstitial mastitis with atrophy during life, and then made an anatomical examination of it, does not appear from his statement. From all this we must understand that the process is by no means frequent, nor does it appear in various forms, with different symptoms. We know nothing as to the causes, except that it appears certain that the affection is much more frequent in women between forty and fifty years old, who have borne children and have nursed them.

With the as yet uncertain diagnosis, it is advisable not to delay operative measures too long. All observations show that the intense shooting pains, by which the patients are usually made miserable, can be removed in no other way, and that there are certainly no means of bringing the process to a stand-still. If the case be so simple and so clear as the one seen by me, and there are no pains, we should not think of operating.

The presence of chalky concretions in the mamma is extremely rare, especially so if we except bone-formation in chondromata, as is tolerably frequent in bitches but is seldom seen in man. Gross saw, in two cases, irregular, roundish bodies of hard consistence, like dried mortar, and of a whitish color; both of the cases occurred in old women. Nothing is said as to the size of these bodies, and nothing as to whether the glands were otherwise normal, or whether the concretions lay in tumors. Previously Gross says that such concretions are formed either in the substance of the gland or in the lactiferous ducts, seldom reaching the size of a pea, and are found in connection with fibrous and other tumors. Gross mentions a case, reported by Bèrar, in which the walls of a mammary cyst were completely covered in by a bony scale.

Velpeau doubts, from his literary researches, the credibility of this

very imperfectly recorded case, which perhaps he himself had not seen; yet he (Velpeau) saw and described such a case. Velpeau saw several cases in old women, in which the breast was furrowed by chalky, hard plate partition walls, needles, which lay in the otherwise healthy glands. Anatomical examinations were not made in any of these cases, though Velpeau derived the impression that the calcareous masses lay partly in the connective tissue and partly in the lactiferous ducts. Earlier observations of this kind will not bear serious criticism. It may be interesting to know that Morgagni claims to have known a widow, who had in her breast several stones, which when she walked or gently shook herself, struck against one another, sounding like a small bell.

In themselves small concretions in the breast do not demand removal. Whether they arise from small caseous foci (yellow tubercles), or from so-called "butter-cysts," by gradual absorption of the fluid elements, or from cretefaction of the connective tissue, is unknown. I have seen, in a man, an encapsulated, crumbling, chalky concretion in the mamma, such as is described by Gross; it gave the impression that the contents of the capsule were atheromatous and had become calcified; unfortunately the capsule was not thoroughly examined.

# CHAPTER VIII.

## NEURALGIA OF THE MAMMÆ.—MASTODYNIA.

WHAT we understand by neuralgia of the breasts cannot be placed on a parallel with tic doloureux, sciatica, and other suddenly arising pains, which always proceed from the same nerve trunks. By it we understand general, more or less violent pains in a breast, seldom in both, without the presence of inflammation or a tumor. Yet most authors speak of certain abnormalities of the breasts, which they have found in these cases, and which they bring into connection with these "neuralgias." Since I have had very little experience with this affection, I must make use of the contributions of other authors. At the present, it is no longer allowable to speak of "neuralgias," if we have in mind only small growths, which upon touch and movement may be not only very painful themselves, but are also radiating centres of the most intense eccentric pains. Every new growth may accidentally enter into such a connection with a sensitive nerve as to cause such results. Some of the cases described by Astley Cooper as "Irritable tumor of the breast," as well as many other observations of small painful tumors of the breast, which are here and there said to be the causes of "neuralgias," must be shut out of the territory of pure neuroses; we could just as well include painful carcinoma of the breast under neuralgia. Gross says that the affection occurs at any time after puberty, and that it is especially frequent in girls and women between the ages of fifteen and twenty. It is a very intense pain, as if caused by electricity, and shoots through the whole breast, into the shoulder, the axilla, and sometimes down into the elbow and finger. Sometimes there is a certain periodicity in the pain, it always increasing just before the menstrual period. The sensitiveness of the skin over the mamma is at times so great that even the movements of the clothing cause attacks of pain. As a rule, they are persons of nervous temperament who are, without a certain determining cause, attacked by this affection. The breasts of such persons are usually normal, but they often have an uneven, granular feel, as though there were a great many small tumors scattered around in them; these are probably slight indurations of the connective tissue around the single lobules, which come and go in different parts of the gland without any known cause.

Both Gross and Erichsen, whose descriptions are identical, consider

the affection to be always connected with some alteration of the genital organs, and that the affected women belong to the hysterical class.

Velpeau, who paid a great deal of attention to this affection, and who is entitled to the greatest consideration on account of the large number of cases which he fully describes, distinguishes *tumeurs neuromatiques et nodosités, douleurs neuralgiques et douleurs, tumeurs imaginaires.* This appears to me the most correct division. The hard nut-sized tumors accompanied by radiating pains, already stated, must at all events be separated from the category of neuralgias, though the similarity of the radiating pain of these small tumors to that of a neuralgic attack is so marked, and, indeed, is sometimes complete. Treatment in these cases is very simple; the tormenting pains are quickly allayed by the removal of these small tumors.

In a second category must be placed those cases in which the separate lobules of the gland are felt with unusual distinctness, sometimes as if indurated, accompanied by tormenting pains in the breast, which are seldom widely radiated. I have seen four such cases.

The first case was that of a woman, of the lower middle-class, forty years of age. She had had several children and was very hysterical. So long as she was busily occupied she did not complain; but towards evening and at night there was no end to her complaints. She pointed out with great precision separate spots in the breast as the points of origin of the pains, which she described, not as neuralgic attacks, but as a continual pressure, burning and stabbing, which were unbearable on account of their persistence. Both Schuh and von Pitha had several times excised painful parts of her breast, and the patient asserted that, after each operation, she was better for a long time. When she consulted me, the pains were only violent above and towards the axilla. Although I thought that she was either simulating, or was to a certain extent psychopathic, on account of her persistence and that of her family. I twice excised at the places which she indicated as the points of origin of the pain. Of the nodules previously felt or of the apparently indurated lobules, nothing could be found; moreover, there was no gland-tissue to be found, only ordinary adipose tissue, containing no more than the usual amount of connective tissue. I finally refused further operation, and do not know what became of the woman.

The other three cases were in women of the better classes, about forty years old, tolerably strong, one unmarried, the others widows. In two the pains were principally in the upper and outer part of the breast, in the other deep down; the pain was partly spontaneous, partly caused by pressure. The very largely developed breasts had a nodular feel. When one of the breasts was taken by the sides or above and below, it gave the impression of containing a large nodular tumor; but when felt from other directions there was no such tumor to be felt. All three patients believed

that they had or were going to have cancer. It was only by careful examination and earnest persuasion that they could be quieted for a short time. The pains, especially before the menstrual epoch, were often so great and tormenting as to prevent sexual intercourse, and at night they could not lie on the affected side. The three women were healthy, not only as regards their genital organs, but also in other respects; they were intelligent women and in no way hysterical. Immediately before each menstrual epoch, as already stated, the pains were most intense, and also after emotional disturbances. No locally applied anodyne, had any effect upon the pains, which sometimes disappeared completely during the day, though there seemed to be no especial cause for this. Cold compresses, elevation of the breast at night and the recumbent position were the only things that eased the pains and gradually brought about a more comfortable condition.

Finally, there is a third class of cases in which there are neuralgic pains sudden and typical, without any changes noticeable in the breasts on palpation. I have already expressed the belief that these are perhaps cases of intercostal neuralgia with radiation to the anterior part of the thorax. Eulenberg appears to share this opinion, to which Romberg and Hasse are also inclined.

From his rich experience Velpeau (the disease seems to be strikingly frequent among French women) gives the following statistical data. Within four years he saw forty cases of neuroses of the breast, twenty-one of the right, seventeen of the left and two of both breasts. Of these women 15 were 30 years of age; 7 were from 31 to 40 years; 8 were from 41 to 50 years; 7 were from 51 to 70 years; 3 were over 70 years.

In ten cases there was slight thickening of the glandular tissue (*léger empâtement, nodosités*), and in thirty, there were no recognizable changes.

As regards the treatment of neuralgia of the breast, it has been of little benefit in those cases in which there was no recognizable tumor. With increasing age, and especially with cessation of the menses, these neuralgias seem to disappear, or, at least, to be less troublesome. Exact observations as to the complete cure by time are wanting; it would be of importance to collect them. Though all authors assume a relationship between these neuralgias and the genital system, there are no definite statements as to which forms of disease of the genital organs produce the neuralgias; and in by far the greater number of cases no such relationship has been shown either therapeutically, clinically or anatomically. As to the relation of mammary neuralgia to hysteria there are few therapeutical means called for, for hysteria is not too frequently amenable to therapeutic treatment. From the impression which I have of hysterical persons, they are all to be considered more or less psychopathic. Congenital disposition, developed by education and other external circumstances, generally lies at the bottom of those conditions which we collectively denote as

hysteria. As with many other unimportant functional disturbances, the appearances on the part of the genital system may be as frequently a symptom as a cause of the general diseased condition. That, in the treatment of neuralgia of the mamma, an assurance of freedom from danger plays no inconsiderable part is especially noted by the experienced Velpeau. The more the patients are occupied with their household affairs, busy from early till late, the less will they think of their pains. Physical fatigue in otherwise healthy persons will always cause sleep. Pure functional nervous troubles are very rare among the working classes, and are never completely developed. As slight as is the power of the physician of really effecting a complete psychical cure in hysteria, except perhaps in special institutions, just so slight is his power in a series of these cases. While in two of the cases observed by me, assurance that there was no risk acted favorably, in the third case it was completely in vain.

As regards medicinal treatment, most authors do not fail to enumerate a number of external and internal remedies, though as a rule with the caution that the result is uncertain. Cataplasms and ice, leeches and iron with quinine, compression of the breasts, and complete freedom of the breasts by loosening the corsets, purgatives and opium, all have been used. Plasters and inunctions of belladonna, hyoscyamus, cicuta, stramonium, aconite, veratrin, chloroform. The same drugs have been given internally, and to them must be added arsenic, quinine, colchicum, cannabis indica, bismuth, zinc, calomel, preparations of antimony, etc., etc. There is nothing else to do in such a stubborn affection than to use some of these means in one form or another for a time. The appearance of continuous exertion on the part of the physician is a source of alleviation and comfort to the patient. As regards the subcutaneous injection of morphia, I would advise that it be omitted in these cases, as the morphine habit would probably be induced.

# CHAPTER IX.

## ANOMALIES OF SECRETION AND EXCRETION.—GALACTOCELE.

IN such a gland as the mammary, which only functionates at certain times, we can only speak of "disturbances of function" when such disturbances occur during the period of functional activity, or when a secretion is established at a time when, normally, such secretion should not occur.

It is *very* seldom that there is entire absence of milk secretion (agalactia) after delivery; it only happens when there is complete absence of the glands. It is well-known, however, that, in poorly developed glands, milk-secretion is very slight, and that for this reason, especially, many women cannot nurse their children. Excessive secretion of milk after delivery is not always the result of abnormally developed glands, or of an especially strong constitution. It is frequently the case that weak, nervous women secrete a great deal of milk and thereby emaciate markedly, although they eat well. For weeks and months there is sometimes a continual flow of milk from the breasts (galactorrhœa) of women who have either not nursed at all or who have ceased to do so early; this is especially frequent in slender, flabbily built women. According to Birkett, Montgomery saw a case in which the flow of milk continued for three years after labor, and after five years milk could be expressed from the gland, though there had been no new pregnancy.

Abnormal milk secretion has been repeatedly observed, though the number of authenticated cases has not grown very much of late, as most authors cite the same old cases over and over again. I have no observations of my own to offer, and can therefore only repeat what is already known. Beigel has collected all the known cases in literature. That milk can be expressed from the breasts of newly-born children, when the glands are swollen and tender, has already been stated. Th. Kölliker has shown that the lactiferous ducts are dilated in these cases, and are almost cavernous. The secretion ceases without the use of especial measures. A case is mentioned by Will, in which milk flowed from the breast of a girl thirty weeks old, for some time. Baudelocque mentions the case of an eight year old girl, in the village of Alenton, who often applied a child, which her mother had just borne, to her breasts, by

which means a milk secretion was established so that the girl was able to nurse the child for a long time. On October 16, 1783, the girl, from whose breasts a quantity of milk was at this time expressed, was exhibited to the Surgical Society of Paris. There were no other signs of puberty, except that, after the age of five years, she had a vicarious menstruation in the form of hemorrhage from the eyes (?) (This menstruation from the eyes is not very credible; furthermore, the nipples of an eight year old girl must have been extraordinarily developed, or the child could not have nursed; there must have been precocious development of the girl.) I will also cite from Beigel the observation of Dr. Carganico (1838). The fifty-nine year old wife of a working man nursed, without a coincident delivery, her nine months old grandchild. At the beginning the child was nursed by its mother, who was, however, compelled to wean it. The child became so restless, that the old woman, who had not menstruated for ten years, placed it to her own breasts, after she had nearly satisfied its hunger by other means, to quiet it. Suddenly she felt piercing pains in both breasts, and on examination she found some drops of a milk-like fluid. The child was then zealously put to the breasts, with the result of producing such a free flow of milk that it was exclusively fed by her. Observations of moderate milk secretion in non-pregnant unmarried, and in childless married women are frequently mentioned, as also the occurrence of "milk-like" fluid in the breasts of very old women (one of eighty-two years, for example). Here and there mention is made of the secretion of milk in connection with uterine and ovarian tumors. In the tolerably large number of such tumors which I have seen, I have never witnessed such coincidence with abnormal milk-secretion.

Cases sometimes do occur in which the excretory duct of a portion of the gland becomes stopped up or is closed by adhesions. When the woman becomes pregnant and the gland becomes active, the milk cannot escape from the closed portion of the gland, but collects gradually in the lacteal sinus behind the nipple, and distends it more and more; this distension may be very considerable without causing any pain, but simply a feeling of moderate tension. This condition is known as "Galactocele or milk-cyst." The nature and time of its origin, which, as a rule, will be definitely given by the woman, the situation of the tumor and the well-defined fluctuation, will, in most cases, leave no doubt as to the diagnosis. This manner of development of such retention milk-cysts is not frequent; I have never seen such a case, and other writers do not appear to have observed it often, since they all cite the same cases. Among these cases we find some, the descriptions of which answer more closely those of subacutely developed abscess. One of the largest cysts of the kind, without doubt a galactocele, was observed by Scarpa. A woman twenty years old, of strong constitution, with normally developed breasts, noticed a swelling of her left breast ten days after her second confinement; the

more the child was applied to the breast, the larger the swelling became. In two months the breast was thirty-four inches in circumference and reached down to the left thigh. The skin covering it was unchanged, but the glands of the left axilla were somewhat swollen. Ten quarts of pure milk were evacuated with a trocar, chemical analysis showing that it did not differ from normal human milk. Suppuration, which continued a long time, followed, but the patient finally recovered completely. Two years later she had another child, but nothing unusual happened to the breast. Erichsen states that Walpy evacuated ten pounds of milk from a cyst in a similar case (Erichsen does not say where the observation of Walpy is published; perhaps it was a private communication; or can it be the above mentioned case of Scarpa? Beigel erroneously ascribes Scarpa's case to Birkett, who only cites the case from Scarpa.)

As to the fate of the milk in these cysts, it is thought that an oily, buttery, or even cheesy material is formed. It is possible that the milk in the gland may be changed into butter and cheese by simple thickening of the milk, in consequence of the absorption of the serum, and we may speak of "butter-cysts" and "cheese-cysts;" but these observations will scarcely bear analysis. I do not doubt that some oil, butter and cheese-like substances are found in mammary cysts; I will later speak of such observations, but I doubt that such are developed from true galactoceles, as above described. In the cases cited by Bérard, Birkett, and Beigel, from Martini, Brodie, Dupuytren, Layd, and Forget, I do not find it mentioned that the tumor, most often noticed in the later stages of lactation, grew larger from putting the child to the breast, and then gradually grew smaller; this could scarcely escape notice if such an absorption of water should occur as to cause the milk to become of a buttery or cheesy consistence. There is more probability in the case described by Astley Cooper, in which he opened a cyst in the breast of a thirty-eight year old woman, one month after the birth of her last child, and evacuated "six ounces of white, coagulated milk, mixed with some yellow serum;" the woman had had the tumor one year before Cooper saw her. Certainly nothing can be said here of a change of milk into butter or cheese. The woman had had an abscess of the same breast after a previous confinement

The cases reported by Velpeau cannot convince me that the butter, cheese, and adipocere-like contents was thickened milk, in spite of the clear descriptions of the microscopical examinations made by Donné and Lebert. That cysts of the breast contain fat in drops and crystals and shrivelled cells in various forms, is not to be wondered at. Quévenne made a chemical examination of a cyst seen by Velpeau, and his language is very diplomatic: "des principes laiteux et butyreux, mais il ne pousse pas assez loin ses recherches pour les énumerer tous."

The treatment of galactocele consists in opening and draining the cyst. I must refer to Velpeau's case of a "galactocele by infiltration," cited by many authors, and represented as though a galactocele had burst subcutaneously and the milk was extravasated into the meshes of the connective tissue. The matter is not so clear as that. Velpeau writes: "In a woman, thirty-four years old, who was confined fifteen months previously, and had weaned her child six weeks before, the right mamma swelled to about double its size, was of a hemispherical form, of spongy consistency, and painful for a few days; the skin was a little more glistening than on the other side, not reddened, but the whole breast was doughy. By puncture with a bistoury a considerable quantity of milk was evacuated, which clearly came from the meshes of the cellular tissue." Whence he draws the conclusion is not stated. It is very possible that a large milk duct was opened by the puncture, and the milk evacuated from the probably dilated ducts deep in the gland. That Velpeau took this view himself is very probable from the fact that he placed the case in the category of "lacteal engorgements." The tumor disappeared in fourteen days, after the administration of purgatives, and after blood-letting and baths.

# CHAPTER X.

## TUMORS OF THE MAMMARY GLAND.

THE anatomy and developmental history of tumors of the breast have for a long time been of especial interest to the anatomist and surgeon. As it was formerly the remarkable variety of these tumors that interested the investigator, it is now the developmental history of these forms which always attracts him. But the physician who stands at the same time on a scientific and humanitarian basis, seeks a morphological solution of the question, as to whether the tumor belongs to the carcinomata, which cut off so many women while still in their full strength. He must at once cease trying to find means and ways for preventing the formation of this terrible neoplasm, as all dietetic and medicinal treatment has hitherto been vain, and he can only render assistance by the earliest possible recognition and removal of the first focus of disease, from which it may spread throughout the whole body. In the interest of the patient, therefore, it is especially important to recognize this dangerous disease early.

Since the time that Astley Cooper first sifted and arranged the material in his unfortunately incompleted work, important progress has been made, not only in this special field, but in the great field of the knowledge of tumors, so that by exact anatomical examination of extirpated neoplasms there is very seldom a difference of opinion, and the diagnosis can usually be made with sufficient exactness. With the diagnosis in these cases, the prognosis is also given.

It might be thought entirely superfluous to go thoroughly into the anatomy and developmental history of tumors of the mammary glands, since they do not differ in their nature from tumors in other places. This is true, since it is now the generally accepted opinion that neoplasms consisting of connective tissue (fibroma, lipoma, sarcoma, chondroma, osteoma) proceed from the cellular elements of the connective tissue, and adenoma and carcinoma especially from the epithelial elements of the glands. However, the structure and peculiar physiological conditions of the mammary glands admit of so many combinations in these respects that the acquiring of knowledge without guidance is not always easy. It is certainly very seldom that a tumor forms within the breast which simply pushes the gland-tissue aside. Neoplasms are almost always from

the beginning confined to the lobules of the gland; these rarely ever disappear entirely, but are changed in various ways. Most neoplasms not only spread in themselves, but attack the neighboring gland-lobules, so that sooner or later a more or less considerable part of the gland is involved. This peripheral extension (which, moreover, is not especially noticeable in the so-called benign tumors, and often enough is entirely absent) ceases, as a rule, at a certain point in fibromata and sarcomata; the diseased portion of the gland then remains separated from the unaffected part, a condensed layer of connective tissue being formed around the tumor, and it is then said to be "encapsulated." In carcinomata and in many adenomata and cyst-growths, this capsulation of the neoplasm does not take place as a rule, but the whole gland is gradually affected, or at least the greater part of it. In carcinoma the affection extends beyond the limits of the gland, forward into the skin and backward into the muscles, ribs and pleura. Then comes the infection of the lymphatic glands, followed by internal metastases. Usually there is no important difference in the anatomical or clinical relations between infiltrated carcinoma of the mammary gland and carcinoma of other organs; and as fibroma and sarcoma also always contain glandular elements, often combined with peculiar and manifold cyst-growths, so in this organ there are sometimes very carcinoma-like forms. Adenomata of the breast, also, as in other glands, have their specific peculiarities. Tumors of the breast are therefore not only interesting on account of their variety and peculiarities, but we can find the key to their peculiarities only by the study of their developmental history.

On purely practical grounds I will first speak of the most infrequent occurring lipomata and chondromata of the mammary gland, in order not to interrupt the continuity of the presentation of fibromata, sarcomata, cysto-sarcomata, etc. So far as I know angioma and true neuroma are never developed in the breast. (The cases reported by Klebs, *Pathol. Anat.*, Bd. I., Abth. I., p. 1194, permit the belief that the angiomata were originally developed in the skin or subcutaneous adipose tissue over the mamma.) What is known as to the relation of the blood and lymphatic vessels to tumors of the mammary gland will be mentioned under the consideration of carcinoma.

## Lipoma.

In the few cases which have been described as lipoma of the female breast there is a doubt whether they really originated in the connective tissue binding the lobules together, or whether they were developed behind or near the gland in the loose cellular tissue, and thence pushed the gland before them; in a few cases this seems certainly to have occurred. This was so in a case which I saw and which has been reported by Carl

Hegetschweiler: Agatha St., thirty-four years old, admitted February 14, 1865; was entirely well until six years ago. At that time, while sawing wood, she felt a pain in the right breast just above the nipple, and at the same time noticed a tumor at that spot; the pain soon passed away, but the tumor grew constantly. In March, 1863, she was confined, and the swollen breast had possibly more milk than the healthy one, though she did not nurse her child from it at first, chiefly because the nipple was flattened by the tumor, and the child could scarcely get hold of it. The growth continued to increase, becoming especially large at each men-

FIG. 12.—WOMAN, THIRTY-FOUR YEARS OLD, WITH ENORMOUS LIPOMA BEHIND THE RIGHT MAMMA.

strual period. The condition of the breast at the time of admission is shown in Fig. 12.

The tolerably dark-colored nipple with the areola lay as nearly as possible at the most dependent portion of the enormously enlarged mamma, which felt nodular, large-lobed, partly soft and partly firm and elastic. The length from the upper portion to the nipple was 17.2 inches. The skin over the tumor contained dilated veins, was thinned but did not adhere to the neoplasm. The lymphatic glands were not enlarged, and the general condition of the not very strong, though well-nourished woman, was not at all disturbed.

Since scarcely anything else than diffuse hypertrophy and cysto-sarcoma of the breast attain such enormous size, I thought it must be one of these conditions or perhaps a combination of both. After the extirpation

on February 16, which consisted in amputation of the mamma, with removal of all superfluous skin, I found that it was a giant lipoma. Examination showed that the mammary gland itself was pressed flat by the tumor and was pushed evenly forward. Unfortunately the tumor was not weighed, or, if it was, its weight was not noted. It had clearly developed behind the breast, and in front of the fascia of the pectoralis muscle. The wound healed well.

Astley Cooper saw a case very similar to this. The lipoma weighed fourteen pounds five ounces, and the mammary gland lay in front of it. The incision for the operation was thirty-two inches in circumference. The preparation is in St. Thomas's Hospital Museum in London. Velpeau mentions three cases, the third of which was similar to that above described. The tumor developed behind the right breast of a young woman (age not given) of somewhat delicate constitution, and in three and a half years grew to enormous size; it was spherical, 19.65 inches in circumference, reaching, when the patient stood erect, downward to the crest of the ilium and on account of its weight (4½ pounds) it was somewhat pediculated. The nipple lay below and to the outer side, and had no firm connection with the tumor. Though in the beginning it is said that the tumor was made up of a mixture of fatty and hypertrophic glandular tissue, no glandular tissue could be found by the microscope in that part which was supposed to be mamma and which contained inspissated milk (?). In Velpeau's first case, the tumor was as large as two fists; in the second, as large as a hen's egg. Birkett, Erichsen, and Gross do not mention lipoma of the mamma at all. Of the cases of Portalupi and Lebert (Becourt), mentioned by Hegetschweiler, it is very doubtful if they had any connection with the mamma.

Since, in the later years of life, after atrophy of the glandular tissue, the whole texture of the mamma is changed into fatty tissue, and there is no denying the possibility of the interacinous connective tissue forming fatty tissue, it is very remarkable that lipoma is so seldom formed within the mamma. There is no case known in which the glandular was included in the lipomatous tissue.

The cases which have hitherto been observed up to the end of the twentieth year, did not occur in especially fat and strong women, but rather in slender women. The growth was of moderate rapidity, still not so very slow when its size at the time of operation is considered. The diagnosis can seldom be made positively.

### Chondroma.—Osteoma.

What have been described by Velpeau and others as cartilaginous and bony tumors of the mamma are nothing else than true chondroma and osteoma, but there are chalky formations in the walls of all cysts, and

perhaps also chalky epithelial pearls, sand-like in small cysts. The only case, which seems with little doubt to be a partly bony chondroma, is the following described by Cooper: Maria F., thirty-two years old, had a tumor of the breast (right or left) for fourteen years; the tumor was very painful, and the skin covering it felt very warm compared with that of the surrounding parts, and required the constant use of evaporating lotions to moderate the warmth. The tumor was extraordinarily hard, painful to a high degree before menstruation, after which the pain moderated considerably. Various local remedies were used, such as cataplasms and irritating plasters, but they caused neither absorption nor suppuration, and as all discutient remedies had been used without result, the patient strenuously desired extirpation of the tumor.

As the axillary glands were free from diseased changes, and as the general condition of the patient, even after so long a duration of the disease, seemed good, Cooper recommended the operation.

On examining the tumor after removal, the greater part of it had the appearance of the cartilage which supplies the place of bone in young persons; the remainder was bony.

The illustration (at least in my copy of Cooper's work) is unfortunately quite imperfect. Neither the typical light blue color nor the distinct division of the cartilage by connective-tissue septa seen in sections of chondromata, is recognizable; that which should be bone, seems to be fat. Nevertheless it seems to be certain from the short anatomical description, as well as from the previous description of cartilage and bone development in the embryo, that this was really a true chondroma. The extremely slow growth of the tumor, which was about as large as a duck's egg, is strongly in favor of chondroma, as also, in a slighter degree, the painfulness and at times almost inflammatory appearances of the tumor during its course. Perhaps the case will never be cleared up. Birkett searched in vain in the London museums for the preparation. Virchow cites cases from Nélaton, Cruveilhier, Warren and E. Wagner, in which it is probable that the tumors contained some cartilaginous tissue.

Thus far I have never seen in tumors of the breast in men anything that had any resemblance to cartilage. However, I once found in a large myxo-sarcoma of the mamma a considerable mass of small, hard nodules as large as flax-seed, which consisted of true bone substance, which had developed from the connective tissue.

Cartilaginous tissue in various forms is not infrequently found in mammary tumors of bitches. These, on the one hand, may pass over to myxomatous tissue, or may go on to true bone formation, with development of medullary spaces.

## Fibroma.—Fibro-Sarcoma.

I have already spoken of a layer of hyaline firm connective tissue, rich in nuclei, which surrounds the acini and smaller excretory ducts, and in virgin breasts, especially, is usually largely developed. This connective substance, which at the same time forms the floor upon which the epithelia of the acini are fixed, and which first disappears where the firm walls of the excretory ducts begin, is the point of origin of all fibromata and sarcomata in the mammary gland. It follows from this that the gland-spaces may be easily influenced in their form and situation by the development of such tumors, and indeed under certain conditions must be so influenced. We will next consider the fibromatous tissue, which is here quite frequently formed, and is, as a rule, of a very pale yellowish-

Fig. 13.—Fibro-Sarcoma of the Mammary Gland, with Fissure-like Expanded Gland Ducts. Natural size. (After *Astley Cooper*.)

red and of a firm homogeneous texture. It is not formed in regular bundles, loosely attached to one another, as is the subcutaneous cellular tissue, but is rigid and very hard to tear apart. In hardened sections, under the microscope, we see certain turnings of the fibre, shown only by the oval nuclei of the connective tissue cells, which are not very rich in protoplasm. These cells are abundantly strewn through the tissue, generally evenly distributed, and seldom heaped in groups; in some places, these heaps of partly round and partly spindle simple-shaped cells may be so large that we may well speak of a "fibro-sarcoma." It is a peculiarity of these tumors that their tissue is always the same, whether the nodules have existed one or ten years. They are not richly supplied with blood-vessels.

When we observe the cut surface of these tumors we seldom find them entirely homogeneous; as a rule they contain more or less ramifying fissures, filled with a little sero-mucous fluid which coagulates on the addition of acetic acid.

More rarely we see a few roundish cysts, as large as a pea, near the fissured spaces.

When we make larger sections for examination with low powers, it is easily seen that these fissures are nothing more than the somewhat widened and very much lengthened branched excretory ducts of the gland, the walls of which are closely adherent to the fibromatous masses, just as the veins and lymphatic vessels in other fibromata are inseparably connected with the fibromatous tissue. With a higher power it is seen that the cylindrical epithelium often lies against the wall in many layers.

In the contents of these fissures are found a few mucous degenerated cells, and fine granules disposed in a clear homogeneous substance. The

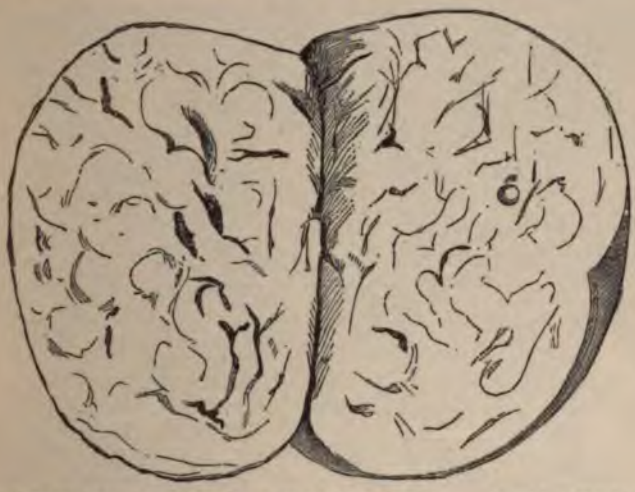

FIG. 14.—FIBROMA FROM THE BREAST OF AN 18 YEAR OLD GIRL. About two-thirds natural size.

tumors of this kind which I have examined were all in unmarried women or in women who had not borne children; the least clustered developed acini were unchanged, filled with roundish epithelial cells, and here and there were places in which the terminal vesicles were dilated.

At the same time the epithelia assumed gradually the form and situation of cylindrical epithelium; in the centre of the small cyst spaces lies a fine granular substance, in which we can differentiate a central globule and a peripheral layer; in the latter, we recognize with a higher power degenerated mucous cells, which before were completely lost in the mucus. What conditions are necessary for such a secretion will be mentioned later in the section on cyst formations. It may be said here that in the development of the already mentioned fissure spaces, and the small cysts from the terminal vesicles, there is doubtless an anatomical relation, and eventually a transition to the cysto-sarcoma, which will be spoken of later.

*Symptoms and Course.*—These fibromata usually come on unnoticed and without pain. As a rule they are first pointed out to the physician when they have attained the size of a large hazel-nut or a walnut; they are then nodular, hard, very movable inside the gland, and are painless or only very slightly painful on pressure. Occasional adherence to nerves may, in a few cases, be the cause of excessive painfulness of such small tumors. I have never known these tumors to exist before the age of puberty nor after the fortieth year; they most frequently develop between the sixteenth and twenty-fifth years. But it is not therefore to be concluded that small tumors of this kind seen in patients after the twentieth

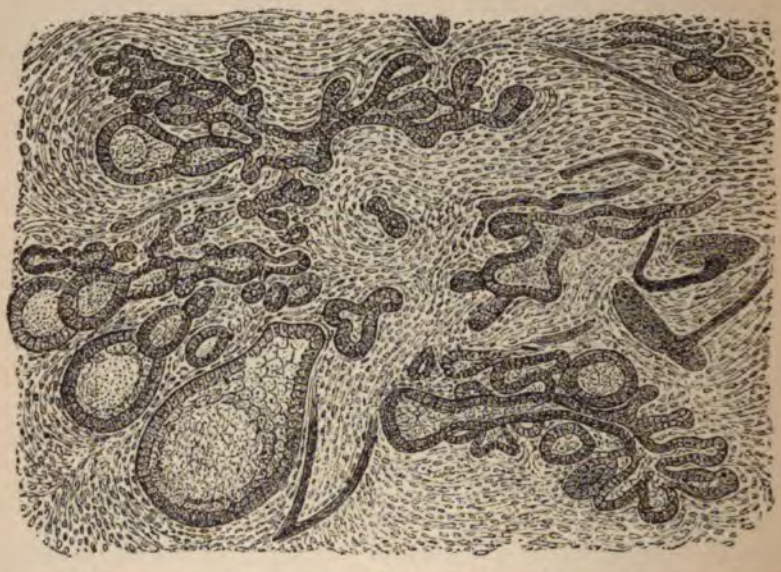

FIG. 15.—FROM A MAMMARY FIBROMA. Dilated terminal vesicles. Commencing cyst formation. Hartnack Syst., 5.

year, exist during or after the development of puberty, since the recognition of the very beginning of such unusually slow-growing neoplasms is very difficult even for the physician, especially when the smaller nodules form deep in the gland.

It is very probable that by far the largest part of the tumors which Velpeau describes as "tumeurs adénoides," tumors which are also described in literature as tumeurs fibrineuses, tumeurs squirrhoides, tumeurs fibreuses (Cruveilhier), tumeurs par hypertrophie partielle (Vidal), chronic mammary tumor (Cooper), pancreatic tumor (Abernethy), belong here, as also a few sarcomata and adenomata. According to Velpeau's statistics, these tumors are most usually found in unmarried or sterile women. From Velpeau's statistics we obtain:

| | |
|---|---|
| 15 to 30 years of age, . . . . . | 45 times. |
| 31 " 40 " " . . . . . | 38 " |
| 41 " 50 " " . . . . . | 34 " |
| 51 " 60 " " . . . . . | 12 " |
| 61 " 70 " " . . . . . | 2 " |
| | 131 |

60 on the left side, 59 on the right, 3 times in both breasts.

The growth of these fibromata is an unusually long one, and indeed there are cases in which the duration can scarcely be determined. For five years a childless woman, now in the middle of her thirtieth year, and who has had such a nodule in her right breast for ten years, has visited me annually, and I cannot say that it has undergone any change in the time mentioned. According to other authors, pregnancies cause an enlargement of such growths for some time, followed by a period of inactivity. Most of the tumors which I have seen (and the number which I see in consultation is considerable) seldom attained the size of a hen's egg, and most of them were smaller; not infrequently, however, there are several in one breast or in both breasts. Only once have I had the opportunity to see such a tumor, in an eighteen year old girl, which reached the size of a goose's egg, when it was extirpated by B. von Langenbeck, and found to be not nodular, but uniformly round. Velpeau states that of 131 cases seen by him, in only 65 was the tumor as large as a nut or hen's egg. Whether the statement that 34 were "de la grosseur de la tête," and later 2 "comme la tête d'un fœtus" is to be taken as exact, or whether they were not cases of sarcoma and cysto-sarcoma, is very difficult to determine. It has already been remarked that small, fissure-like, smooth-walled cysts, seldom spherical, with thin mucous contents and arising from the single gland-lobules, are found in these fibromata; they are never entirely filled with fluid and form no essential but only an occasional accompaniment of these tumors.

*A priori*, it certainly would not be so improbable that such a fibroma should remain stationary for years, and that the fibromatous tissue should then change in some way to the form of soft sarcoma-tissue, with coincident dilatation of the gland-ducts, acini or gland clusters, and with the formation of a large quantity of secretion in the hollow spaces. So far as I know such a change of an adeno-cysto sarcoma has not hitherto been observed; furthermore, it seems that the more malignant infectious forms always have such a beginning. It may happen, however, that fibromatous nodules, which remain painless for years, without noticeably increasing in size, may become changed into carcinoma. The statements of many women are so explicit in this respect that we can scarcely doubt it. If this is not so, we would be forced to believe that the primary tumor

was a carcinoma, which had remained unchanged for years, though this would contradict everything that we know of carcinoma. I have elsewhere (*Arch. f. Path. Anat.*, Bd. XVIII., p. 78) described a case anatomically in which I believed that I could recognize such an occurrence from examination of the preparation; still, I confess that at the time I made the examination the important part taken by the epithelial elements of the gland in carcinoma had not been rightly determined, but it would be very difficult to explain the case in any other way.

### Soft Sarcoma.—Medullary Sarcoma.

Soft sarcoma seldom occurs in the breast, though I have seen the following cases of this group of tumors.

A medullary granulation (round-celled) sarcoma, perhaps only accidentally combined with the development of striated muscular fibres, I have seen only once (*Arch. f. Path. Anat.*, Bd. XVIII., p. 69) and that in a very young girl.

D. B., 16 years old, somewhat chlorotic though otherwise strong, below medium size; has menstruated regularly for two years; came to B. von Langenbeck's clinic on March 14, 1859. Both breasts were well developed for her age. Nine months before a swelling had appeared deep down in the left breast; it was but slightly sensitive to touch, not painful otherwise, began slowly, but in the last few months had grown rapidly. Local blood-letting, iodine, iron, did not check the growth of the tumor. It soon attained the size of a child's head, was freely movable under the skin and in the gland, though the skin over it was tense, and was reddened at the summit of the tumor. The consistency of the tumor was very different at different places, partly soft and elastic, partly hard and nodular, and in other parts distinctly fluctuating. The axillary glands were not swollen. From all the symptoms a cysto-sarcoma was diagnosticated. After the tumor was extirpated, however, it was seen that it contained no large hollow spaces, but consisted partly of adenoid (externally), and partly of medullary substance, in which here and there small fissure-cysts could be recognized. The tumor, completely encapsulated, was thoroughly removed, and at the same time some of the surrounding healthy tissue and the greater part of the skin. The wound was closed with sutures, healed completely by first intention, and the patient left the hospital 14 days after the operation, cured.

On July 22 the patient returned, because three weeks before a new and very rapidly growing tumor had developed in the cicatrix. The patient had been rid of her chlorosis by the use of chalybeate waters, and looked blooming. Under the cicatrix in the left mamma, lay a more or less clearly fluctuating tumor as large as the fist, which was entirely painless; the axillary glands were not swollen. The extirpated tumor had the ex-

act appearance of brain substance, and was sharply circumscribed. Healing followed the extirpation of the tumor and remainder of the gland very quickly, and on August 7 the patient left with a small healthy granulating wound. But there is scarcely any doubt there was soon another recurrence, and that the girl finally died from the disease.

It is seen from the illustration (Fig. 16) that the original gland-ele-

FIG. 16.—MEDULLARY SARCOMA WITH STRIATED MUSCULAR FIBRES FROM THE BREAST OF A YOUNG GIRL. Enlarged 200 times.

ments are surrounded by the tumor, which contains besides small round cells, some fatty tissue also, which is not newly formed, but has not yet changed to sarcomatous tissue.

More often I have seen broad band-like fibre-filaments in sarcoma and cysto-sarcoma of the mamma, though on isolation I could not draw the conclusion that they were organized muscular fibres. That such may

occasionally develop from the layer of muscular fibres of the larger excretory ducts there is no doubt. There was no connection of the tumor to the pectoralis major muscle. Since no one will believe that striated muscular fibres are formed from the sarcoma cells originating from the connective tissue, there remains scarcely anything else, from our present histogenetic ideas, than the hypothesis that muscle-germs from the

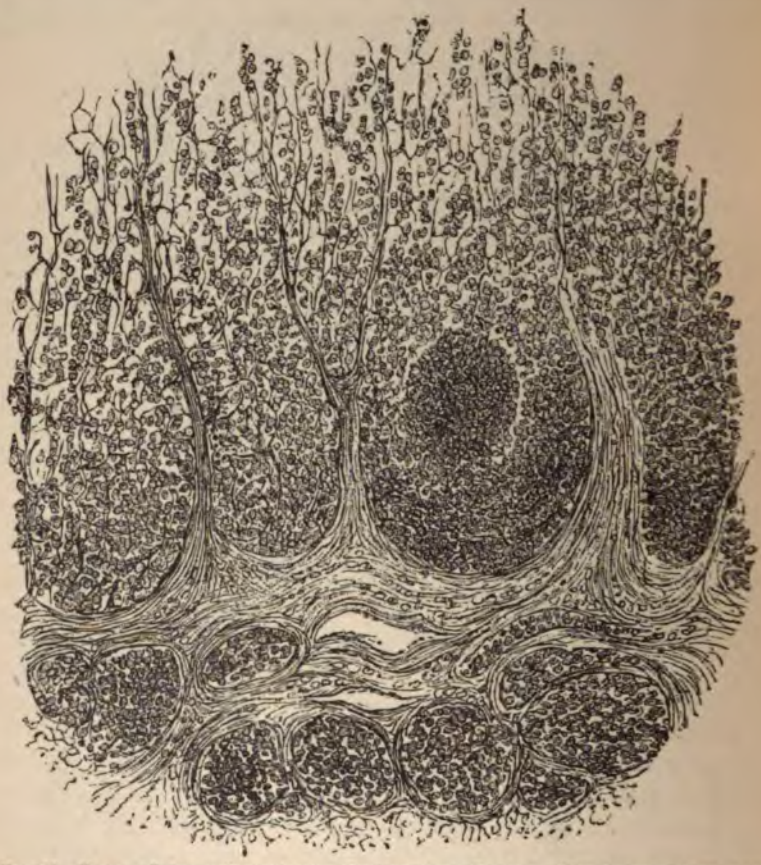

FIG. 17.—FROM A LYMPHO-SARCOMATOUS DEGENERATED BREAST. The degeneration occurred bilaterally in a pregnant woman. Hartnack, Syst. 5.

pectoralis major had wandered into the mammary substance in the first formation or during the development to puberty of this girl, and had taken on a supplementary growth by the development of the sarcoma.

## LYMPHO-SARCOMA OF THE MAMMA.

In the section on the etiology of mammary tumors, etc., I will give complete details of a case in which double and very acute sarcomatous

degeneration developed during pregnancy, and which had the character of lympho-sarcoma.

Distinct acini were not found in the peripheral parts of the tumor examined by me. Whether some of the larger alveoli corresponded to large gland-clusters, I cannot decide. In the centre of some of these alveoli were heaps of darker, punctiform, though not fatty, masses, as are sometimes found in the centre of the alveoli of lymphatic glands. Furthermore, there were seen in the larger connective-tissue trabeculæ many large fissures, partly empty, partly filled with lymph-cells, as are also found in normal glands, especially during the puerperium; I looked upon these as largely dilated lymph-spaces.

### Alveolar Melano-sarcoma.

Mrs. M. M., 68 years old, first seen July 12. 1869; noticed the begining of a tumor in the right breast three years previously; a nodule had formed externally to and below the nipple; she had borne ten children, but had nursed none of them. Menstruation was regular from her fourteenth to her fifty-third year. She had under the right eye a dark blue nodule about the size of a flax-seed, which she said she had had from her birth; her brother had a similar one in the same place. She had a similar one on the back in the region of the fossa supra-spinata, which had also existed from birth.

The woman was pale and emaciated. The right mamma was larger than a child's head, hard, nodular, with the skin adherent to the tumor; a group of axillary glands could be felt. The whole tumor, which was freely movable on the thorax, together with the mamma and the axillary glands, was removed July 15, 1869. The operation was an extended one. When the patient left the hospital October 12, with the wound healed, a bluish nodule, which infiltrated the skin, was observed on the right side of the back. This subsequently developed into a black tumor, with similar nodules near it. The region near the scar and the axilla remained free. She died June 30, 1870. No autopsy was made. Duration of the disease, 4 years

When I first reported this case in my *Klinische Berichte* (Vienna, 1869–1870, p. 177) I had some hesitation about the classification of this tumor, and I wrote as follows. "On examination of this mammary tumor, which throughout its course has acted like a carcinoma, I was for a long time in doubt in what category to place it. The brownish-black pigmentation and the arrangement of the large cell elements in somewhat small meshes, which here and there gave great security to the cell in the alveoli, made it appear for a long time probable that I had to deal with a sarcoma. Other situations of the tumor, as well as the method of spreading, the early involvement of the lymphatic glands, exquisite gland-like

forms of the large-celled cellular cylinders and bulbs, left also little doubt that it was a true, rapidly growing carcinoma of the mammary gland. I must finally conclude that it was a very intimate combination of carcinoma with sarcoma: a rapidly spreading epithelial growth and metamorphoses of the stroma into the tissue of an alveolar sarcoma very rich in pigment."

It will be seen from the above citation that I very unwillingly reached the compromise of sarcoma and carcinoma. On more recent grounds, from

FIG. 18.—FROM AN ALVEOLAR MELANO-SARCOMA OF THE MAMMA. The dark bodies in the trabeculæ correspond to the yellow, brown and brownish red pigment.

repeated examination of the subject and wider experiences with alveolar sarcoma and melanoma, I do not hesitate to call the tumor under consideration simply a "sarcoma." I am especially prompted to do this because I found the roundish alveoli in part filled with pigmented cells, and which I took for dilated gland-acini, also in the axillary glands, where they certainly could not have originated from the gland-clusters. Further, the continuous and detailed examination of rapidly growing melanoma has shown me that they are always sarcoma. Thus far there

has been no observation which furnishes proof that epithelial cells, for example, arising from the cutis, become pigmented in carcinoma; nor is there anything known as pigmented epithelial carcinoma. Now, since the epithelium of the mammary gland is derived from the epithelium of the cutis, it is in the highest degree improbable that it gives rise to true melanotic mammary carcinoma. It has been further especially proved as to large-celled alveolar sarcoma that it infects the lymphatic glands; that is, cell elements are prolonged into the lymphatic glands and there find a favorable soil for development, which is otherwise not frequent in sarcoma. So it was in the following case (see Fig. 19), which for a long time I took to be carcinoma, until repeated examinations of different portions of the tumor showed it to be a sarcoma.

### Alveolar Giant-celled Sarcoma.

Mrs. Josefa F., 42 years old; had had several children and nursed them. She consulted me first in November, 1876, on account of a tumor as large as the fist which had existed a few months in the right breast. This tumor had large nodules, was lobulated, felt tolerably firm, completely encapsulated, and was easily movable in the gland; the axillary glands were not swollen. I did not get from it the impression of a carcinoma, but rather that of a lobular hypertrophy, and for that reason I used compression with a bandage for a week. The tumor did not become smaller, but was much more turgescent and painful. I extirpated it December 9, 1876, and on account of the complete encapsulation I did not doubt that I had removed the whole diseased mass. It also appeared lobulated on section, was grayish red, and a fine granular jelly-like substance could be pressed from it; I therefore took it for carcinoma. My assistants, who made the microscopical examination, reported that the tumor contained strikingly large cells, and that it had the character of an alveolar carcinoma with some cystoid, muco-fatty foci of softening. The wound healed quickly by first intention. The operation was attended by an unusual amount of hemorrhage. In February, 1877, the patient returned with a tumor of the axillary glands, which was easily removed. In April a small recurrence near the cicatrix on the breast was removed. Soon there was a new recurrence in the axilla, which was extirpated on June 28; the patient was attacked by erysipelas after this operation and died July 9. The autopsy showed double pleurisy, fibrino-purulent peritonitis, purulent cystitis, endometritis, salpingitis and bilateral oophoritis; no emboli anywhere and no metastatic tumors.

I have again and again examined different portions of the tumor removed. Especially striking was the formation of the partially smooth-walled cystoid spots of softening in the axillary glands. If anyone could still think that these cysts, in tumors of the breast, arose perhaps by dil-

atation of the acini or excretory ducts, to which microscopic examination certainly gives no support, such ideas must surely be discarded in regard to the axillary glands. This cyst-growth, as is not unusual in giant-celled sarcoma of the bone, and also leads to the formation of hollow spaces with a perfectly smooth wall, similar to a serous membrane, certainly indicates sarcoma. Nevertheless some parts of the extirpated tumor appeared so

FIG. 19.—FROM AN ALVEOLAR GIANT-CELLED SARCOMA OF THE MAMMARY GLAND. Hartnack, Syst. 5.

markedly carcinomatous that I was constantly impressed with the idea that it was a carcinoma or a combination of sarcoma and carcinoma. Unfortunately I cannot so certainly decide the question in this case as in the former, because I myself did not make the microscopic examination in the first case, and because normal gland parenchyma, in which transition forms could have been sought, was wanting in the preparation.

The preparation, from which Fig. 19 is taken, is from the recurrent

nodule of the mammary cicatrix. The lymphatic glands have a similar appearance. In order to form an idea of the size of those cells and their nuclei, one may compare this illustration (Fig. 19) with Figs. 16 and 17, as well as with the later illustrations of carcinoma, which are of the same enlargement.

Pure spindle-celled sarcoma, myxo-sarcoma (myxoma) and plexiform sarcoma I have thus far never seen in the mammary gland. But in proliferating cysto sarcoma, which will be described later, there are not infrequently parts which consist entirely of spindle cells, and not infrequently also large portions which consist entirely of myxomatous tissue. Volkmann briefly mentions having observed an "intercanalicular spindle-celled sarcoma as large as a walnut" in a woman 22 years old.

### Symptoms and Course of Soft Sarcoma of the Breast.

The four cases reported show already how little infectious soft sarcoma of the mamma depends upon age: the cases were in the 14th, 31st, 42d and 65th years. As regards the course of these tumors, the reported cases in literature are not to be trusted. The differentiation of soft sarcoma from soft carcinoma and of the different forms of soft sarcoma from one another, is principally, and in part exclusively based on exact microscopic examination, and is the result of the progress made in the last ten years. By Velpeau, Erichsen, Paget, Gross, Birkett and other authors, these tumors are doubtless placed in the category of "encephaloid"; though to completely identify them with these is impossible, or else Velpeau could not possibly say that the encephaloids are more frequent in the mamma than in any other portion of the body. He would also probably indicate the soft medullary appearing carcinoma as encephaloid; he considers it as identical with what Burns (1800) calls spongoid inflammation, Hey (1803) and Wardrop (1809), fungus hæmatodes, Abernethy (1804) pulpy medullary sarcoma. In a more singular way, he identifies it with carcinoma fasciculatum and carcinoma villosum (Rokitansky). Later there has arisen a class of "cancers fibro-plastiques" (Lebert), under which again napiform cancers, chondroids and colloid cancer have been placed as subdivisions. It is not to our purpose to discuss what we shall understand by these notations; the first incomplete beginnings of pathological histology brought a great deal of confusion into the former classification of tumors based on outward similarity.

Since melanotic sarcoma is so clearly characterized by its color, the older surgeons of course described it when they found it in the mamma. But most of those who speak of it among the mammary tumors, say that they have not seen it. Velpeau only reports two cases, but he particularly says that the black nodules occurred in the skin near others of the same sort, and not in the substance of the gland. It therefore appears

that the above-described case is the only one that has been observed in recent times. Birkett mentions older preparations. In the museum of Guy's Hospital is a preparation of melanoma in the mamma, connected with melanoma in other parts. But it is not said of either case whether the melanoma in the mamma was the primary tumor.

To present a clinical picture of soft sarcoma of the breast and its course is impossible on account of the small number of descriptions hitherto given. We can only say that the tumor is usually movable in the glandular tissue, is encapsulated, has solitary nodules on one side, and is seldom diffused in both breasts; that no age from the beginning of puberty up to the middle of the sixth decennium, is exempt, that it feels firm at first and grows slowly, then after perhaps one year it grows rapidly, is usually painless, and then becomes larger and softer in different places. The differential diagnosis of cysto-sarcoma is not always to be made with certainty; the axillary glands are sometimes swollen, sometimes not, recurrence appears quickly after operation, and death most frequently follows from internal metastases, especially of the lungs and liver. The duration of the disease is often very short, though sometimes as long as four years.

### Proliferating Cysto-Sarcoma.

Very striking in their external configuration are the proliferating cysto-sarcomata of the mamma. They have long been known and described, though designated by many different names. The name "cysto-sarcoma" with the addition proliferum phyllodes, was introduced by Johannes Müller, and has been used by German anatomists and surgeons since that time. Virchow has proposed the term "intra-canalicular myxoma." In England the designations, sero-cystic sarcoma (Brodie), cellulose hydatids, (Cooper), glandular proliferous cysts (Paget), cysts containing solid growths, some with fluid, some without (Birkett), are used. Velpeau gives these cases many different titles, usually "tumeurs adenoides," then "cysts with thick walls," "encephaloids with cysts," etc.

The not infrequently extensive tumors have large nodules, are encapsulated and of very different consistency. When they are cut through, a great deal of serum and mucus usually escape. The cut surface is partly of a clear, pale reddish color, partly white, the tissue seeming yellow in places, œdematous (somewhat like nasal polypi), here and there studded with small extravasations, in other places tough and fibrous. The most striking thing on the cut surface is a more or less large number of irregular hollow spaces, filled with a thin mucus, and into which project leaf-like (cysto-sarcoma phyllodes, Müller), or polypus-like growths, which more or less fill the hollow spaces. These growths are seen to rise from the hollow spaces, emptied of mucus, above the cut surface, so that they

have so much more the appearance of growing from the fissure-cyst-spaces. Besides, we also find a mass of large-branched fissure-cysts such as are described in the fibromata (Figs. 13 and 14); seldom are there simple round cysts, and more seldom the presence of white globules (epithelial pearls) in the cysts. The older anatomists have unhesitatingly assumed that cysts everywhere arise from exudation, and that new growths take place from their walls and in the cyst-spaces; they could with difficulty rid themselves of the parasitic nature of new growths. If it be conceded that the growths arise from a fibrinous, usually organized and vascular exudation from the blood, we still find no relation to the surface from which the new growths have arisen; an exudation which leads to the formation of such a cysto-sarcoma may, according to former views, just as well arise in muscle, bone, brain or anywhere else. According to

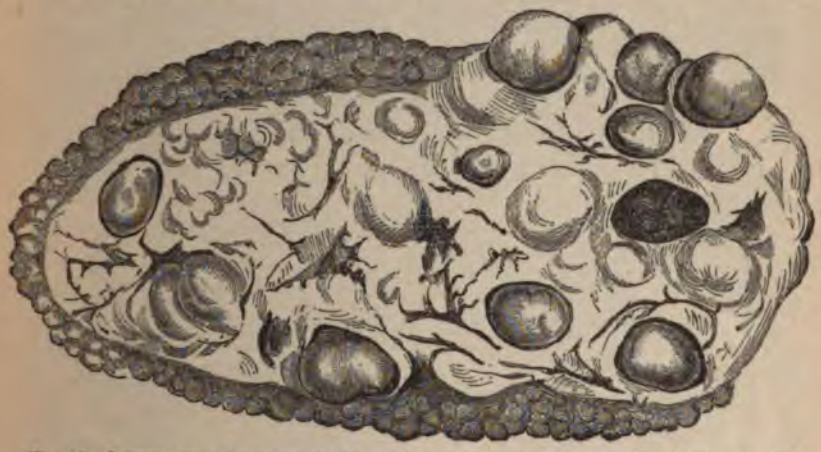

FIG. 20.—SECTION OF A PROLIFEROUS CYSTO-SARCOMA OF THE BREAST. One third natural size.

the view of our predecessors as to the soil in which they developed, they have no further relation than that they draw blood and nourishment from there. The idea that the tumors are only a form of degeneration of tissue was at first very slowly developed, and has only been fully accepted among all anatomists and surgeons during the last ten years. Since on this account we need not by any means give up a general knowledge of tumors, still, the development of tumors in each separate organ demands especial study. One of the greatest services rendered by Virchow is that he recognized and filled this need.

In the form which we have described, proliferating cysto-sarcoma can only occur in the mamma; it always includes glandular elements of the mamma. The fissure-cysts are the compressed excretory ducts of the lobules, lengthened, displaced, then again distended with fluid. The terminal vesicles are pressed together, lose their round form and also become fissure-cysts.

How the above-mentioned peculiar forms arise is very easily understood if we make a fine section of an apparent solid part of such a tumor, but which contains a number of fissure-cysts, and examine it with the magnifying glass or with very low power. At a, in Fig. 21, the termination of an acinus is clearly seen; nothing of the gland-bulbs is seen; they

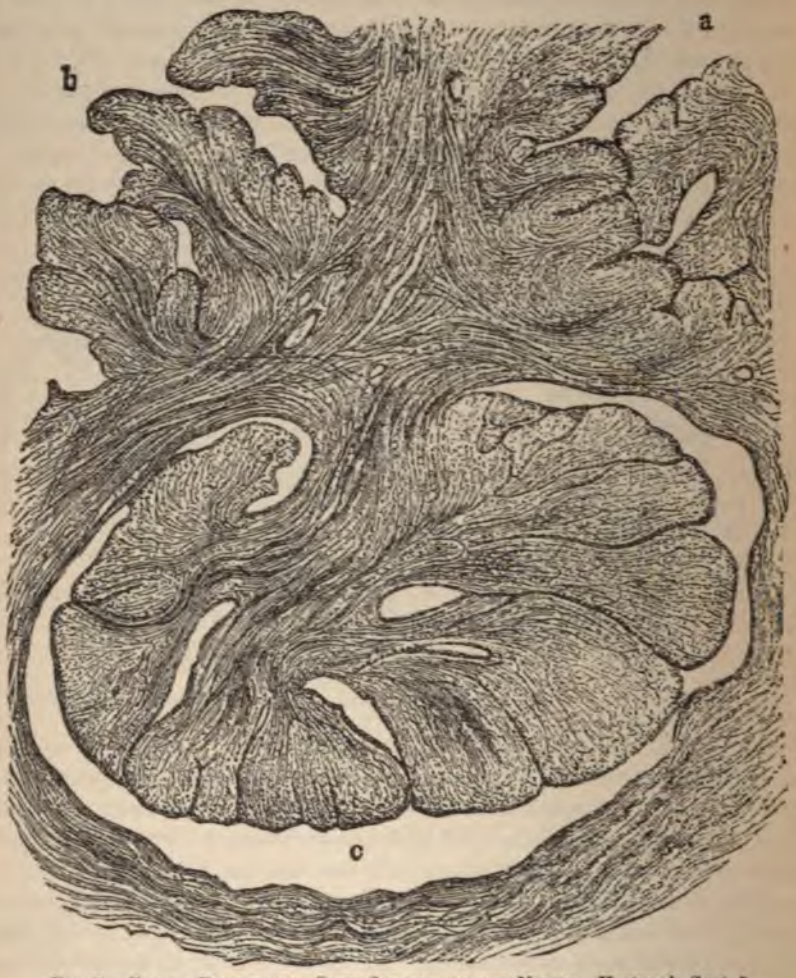


FIG. 21.—FROM A PROLIFEROUS CYSTO-SARCOMA OF THE MAMMA Hartnack, Syst. 5.

are pressed into narrow canals. In this preparation there is nothing of the virginal mammary gland, but of the mamma of a woman who has borne and nursed several children; the spaces which now appear as narrow canals, not fused together on account of their epithelial covering, were formerly round gland-bulbs (acini) filled with milk. The narrow and during lactation almost shrunken connective-tissue sheath walls between

the bulbs have now grown to a colossal size, and as they form the floor for the glandular epithelium the epithelial surface must also grow. It is perhaps very much as in enormous enlargement of the cutaneous papillæ; with their growth also grows the epithelial surface. Therein appears to me to be the proof that the acini can have no true membrana propria, which, unconnected with the connective-tissue floor, is only loosely attached to it; if this be the case, it and the epithelial surface do not need to enlarge, since the connective tissue itself enlarges. But with this conception, there is a condition that the epithelium not only be preserved, but also increase with the growth of its floor. For, should the epithelium disappear, then by the growth of the tissue the gland-canals and acini would simply be obliterated. Finally, from the occurrence described, the further development of which may be seen at *b* and *c* (Fig. 21), there is no doubt that the growth proceeds from the layer of hyaline connective substance which immediately surrounds the gland-bulbs (Fig. 3), and that gradually more groups of gland-bulbs are involved in the manner described. A fibromatous or sarcomatous nodule is then developed in the general tissue, in which the lobules are enveloped with the immediately surrounding hyaline layer, and when once formed such nodules grow entirely central in and out of themselves (in the ideas of the older anatomists); so they can only push the lobules to one side and compress them *in toto*. The above conception is also supported by the tuberous form of these tumors; the grouping in lobes is very clearly stamped on the younger parts of these tumors, as in Fig. 21; later they disappear as the connecting fibrous bundles degenerate into sarcomatous or fibromatous tissue. Reinhardt (*Deutsche Klinik*, 150, p. 121), Meckel von Hemsbach and W. Busch (*Chirurg. Beobact.*, Berlin, 1854, p. 86), were certainly the first who clearly recognized all this, and who, though incompletely, stated it. Rokitanksy, though very much attached to his theory of the outgrowth of the connective tissue, by which he not only explained the growth of cancer structure but at the same time also the extensive growths from cyst-walls, still showed that he completely appreciated these growths, as may be seen from the illustrations in the third edition of his pathological anatomy. H. von Meckel saw a carcinoma of the breast in which he was able to cut from the nipple a dilated excretory duct and so free the growth (Fig. 22). As concerns the tissue itself from which this sarcoma arises, it is partly œdematous, fasciculated connective tissue, rich in cells, and partly myxomatous, lymphoid, but seldom spindle-celled tissue. The previously described preponderating medullary-appearing form of the sarcomatous tissue I have not found in these tumors so far, or at least only strewn around in a few places. It may happen, however, that these softer forms of sarcomatous tissue may lead to the formation of proliferating cysto-sarcoma.

As already remarked, the consistence and increase of the glandular

epithelium play a very important part in the formation of these tumors. It is a tolerably regular occurrence for the epithelium in all the gland spaces and in the acini to become many-layered, and to take the character of cylindrical epithelium on the surface. Here and there it takes on active growth so that the spaces are entirely filled with epithelial cells, which finally roll together into spherical forms. I have seen no case in which


FIG. 22.—PART OF AN EXTIRPATED CYSTO-SARCOMA OF THE MAMMA. (After *Meckel von Hausbach.*) About one-half natural size. The beginning of the peculiar disease is seen at *a*.

this balling together of the epithelial cells lead to the formation of pearls; but Virchow mentions these growths in cysto-sarcomata of the mamma. Most frequently the epithelium is dissolved into homogeneous mucus, which then fills and expands the gland-sarcoma; some exudation may be added from the vessels to thin this mucus.

*Symptoms and Course.*—These proliferating cysto-sarcomata of the mamma, the prognostic signification of which depends not on the contents and mass of the cysts, but on the histological character of the interstitial

tissue, always possess sufficient peculiarities to separate them from fibro-sarcomata, soft sarcoma and adenoma, though it must be remembered that these forms of tumors are not to be sharply differentiated anatomically, and there may be many combinations of them.

They originate most frequently in the second or third decennium, more often in the married than in the unmarried, and most frequently in women who have borne children, less frequently in sterile women. Their upper surface is marked by large nodules; their consistence is different in different places; where the cysts lie near the surface, distinct fluctuation is often obtained, and in other places, the surface is firm or soft. They are always encapsulated and movable in the gland, never

FIG. 26.—FROM A CYSTO-SARCOMA, WITH MYXOMATOUS AND SARCOMATOUS TISSUE. Hartnack, Syst. 7.

adherent to the thorax, even when they grow to giant size. Their growth is very variable; there are cases in which they only attained the size of a hen's egg in two or three years, and others in which, in the same time, they have attained the size of a child's head. The growth is usually painless; they are not painful to touch or light pressure. In two cases noted by me, there was an appearance as though the cysto-sarcoma arose from fibro-sarcoma, which had remained dormant for many years (in one case 19 years).

Sometimes these tumors grow to enormous size as in the following case from Velpeau:

Mrs. A., 54 years old; tumor began 4 years ago; menopause 2 years ago; one year ago the tumor was the size of the fist, but has grown

rapidly since then. Patient refused operation. The tumor varied in consistency; the base was solid, with large fluctuating spots in other parts. The skin was thinned, and was traversed by large veins; below and externally there was slight ulceration. The greatest vertical measurement was 14.14 inches, transverse 11.8 inches, and greatest circumference 44.3 inches. The woman was very much emaciated and very weak. Over 3 quarts of fluid, with tumor detritus, were evacuated through two punctures. Weight of tumor 44 pounds. Unfortunately nothing is said of the axillary glands, or whether metastatic tumors were found in internal organs. Death from marasmus. On account of the number of small cysts, the tumor is sufficiently characterized as cysto-sarcoma, though

FIG. 24.—ENORMOUS CYSTO-SARCOMA OF THE MAMMA. (*Velpeau.*)

Velpeau calls it adenoid. The cases taken by Beigel from Pemberton and described as encephaloid tumors probably belong in this category. At all events, the cases illustrated by Cooper belong to such giant cysto-sarcomata. All these tumors were observed in old married women who had borne several children; the origin generally dated from the beginning of the sixth decennium, and coincided with involution; the growth was very rapid, these enormous tumors being formed in from two to four years, usually without involvement of the lymphatic glands, and without internal metastases. Ulceration has been observed several times, partly through spontaneous rupture of the cysts, partly from incisions into them, and by necrosis of the very thin skin, here and there adherent to the tumor.

Erichsen describes a case in which the sarcomatous masses grew, in a

cauliflower-like mass, from the opened cyst. Of the nineteen cases seen by me, fourteen were married and five were unmarried. I can prove that twelve cases remained free from recurrence for from two to ten years after operation. Here was recurrence occurring locally, for, as a rule, only the tumors were removed, not the whole of the mammary gland. I operated on one woman five times in four years; there was quick recurrence. The whole gland has now been removed and there has been no recurrence for three years. In one case metastases occurred in the pleura, ribs and pericardium without infection of the lymphatic glands. In another case there was exquisite left-sided cysto-sarcoma with local recurrence and without infection of the lymphatics, and somewhat later exquisite right-sided carcinoma with involvement of the axillary glands, and death from internal carcinomatous metastases.

In general, it can be truly said that even if cysto-sarcoma of the breast grows to such enormous size, it is still seldom infectious. Unfortunately the anatomical descriptions in the journals are not sufficiently exact to draw any conclusions as to whether the cases with infection of the lymphatic glands and with internal metastases had especial histological peculiarities by which the prognosis could be determined. Further observations are needed in order to make a more extensive study.

### Adenoma (true Hypertrophy) and Cysto-adenoma.

The differentiation of adenoma from many other tumors of the breast is unusually difficult. If the development of the gland-vesicles with formation of hollow spaces be regarded as the most important thing for the establishment of adenoma or true hypertrophy of the gland, still this cannot take place without a simultaneous growth of new connective tissue with vessels, else there would only be an interlacing cell-proliferation in the form of branched cylinders and terminal bulbs, which could not exist without formation of vessels Vessels grow, but never alone, in the epithelium, for they need surrounding supporting tissue, however slight it may be. Now since the pathology of a new growth is important, because the relation of the different tissue elements to one another is more or less of a deviation from the normal type, it happens that in adenoma at ne time the epithelial elements, at another the connective tissue with the vessels is more prominent, not only in all tumors, but also in different parts of one and the same tumor When the newly-formed onnective tissue near the epithelial glandular elements omes o complete physiological and at the same time excessive development the expression "false," "incomplete hypertrophy," or "elephantiasis" is used. If the newly-formed connective tissue remains for the most part in the earlier stage of development, we use the expression 'adeno-sarcoma." If the growth of the epithelial elements is especially great, and if they are larger,

more varied in form than they normally are, then the purely anatomical differentiation from carcinoma in certain cases becomes very difficult, because we scarcely dare set up a strict claim to an adenoma of the breast developing after an embryonal type, since immediately both hollow spaces and secretion make their appearance in the young acini, and this is not the case every where even in the development of the gland at puberty, but occurs first in the development accompanying the first pregnancy. As in many similar cases in the domain of pathology, we find in such a dilemma more support in the course and clinical appearances than in the (as Heinrich Meckel used to say "limited") anatomical analysis.

### Diffuse Hypertrophy of the Breasts.

This form of disease being so rare I think I am especially fortunate in having seen two such cases, and in having had the opportunity to examine one anatomically.

Maria S., maid servant, *virgo intacta*, 16 years old, came under my observation in the Autumn of 1868. In November, 1867 (then 15 years old), she menstruated for the first time; until April, 1868, she had very small breasts. In June they had reached their present size (in two and a half months), then became somewhat smaller until October, when they again grew to their present size. The left breast measured 23 inches in circumference at the base From the lower border of the third rib, where the breast began, up to the papilla was 10¾ inches, and from right to left 9 inches. Right breast: periphery of base 19½ inches, from the third rib to the papilla 9¾ inches, and from right to left 8½ inches. All measurements were made while the breast was dependent. The patient would not submit to an operation. I heard about one year afterwards that the girl was in service and able to do light work. The breasts had become a trifle smaller.

Anna A., servant girl, came to my clinic on June 24, 1873; she was 22 years old, of strong build, always healthy in childhood, first menstruated in her fifteenth year, and was always regular. About 3 years before (in her 19th year), she noticed a striking enlargement of both breasts; this came on slowly, without pain, and without any annoyance to her.

The menses have been absent for five months, and now the breasts have grown so enormously that the patient is bent forward and is unable to work. When she came to the clinic, the breasts were so large that they reached down over the umbilicus, and were more prominent and far harder than in the first case.

Within the soft granular parenchyma of the gland on both sides could be felt hard, movable nodules the size of a fist. The nipples and areolæ were deeply pigmented, the first spread out. (Unfortunately also in this case it was not noted if colostrum could be pressed from the nipples). The circumference of the left breast at its base was 25.54 inches, and of

the right 26.72 inches. From the upper boundary over the nipple down to the lower boundary was 28.68 inches on the left side, 29.86 inches on

FIG. 25.—HYPERTROPAY OF BOTH BREASTS. Girl 16 years old.

the right. The greatest circumference on the left side was 32.22 inches, and 33 inches on the right. The skin over the breasts was somewhat thickened but not especially adherent to the glandular tissue. Ex-

tensive venous plexuses were seen through the skin. The patient had no pains in the breasts, but the weight was so great that she was obliged to

FIG. 26.—HYPERTROPHY OF BOTH BREASTS. Woman 22 years old.

remain in bed. Examination of the abdomen and genitalia showed the existence of pregnancy, at about the fifth month.

Operation on such extensive tumors was not to be thought of during pregnancy. It seemed, however, that an attempt might be made to reduce their size by compression; compression was tried at intervals for a short time with elastic bandage, but generally with ordinary cotton bandages. After a few days the right breast appeared to be softer and smaller. But the pressure of the bandage caused some excoriations in the region of the nipple, and intense erysipelas was developed on July 5th; on July 6th the patient aborted and quickly collapsed, though there was no considerable hemorrhage, and death took place on July 7th.

Examination of the hypertrophic glands showed that true hyperplasia was present in part only, but that there were a number of large and small, soft and hard encapsulated fibromata, in which portions of the gland were inclosed, the excretory ducts of which were here and there dilated into branched fissures, as is usual in these tumors. Cross section of the mamma reminded me of a uterus studded with many fibromata, except that the tumors were softer and more succulent than is usually the case in uterine fibroma.

Microscopic examination of these fibro-sarcomatous nodules showed nothing especial. I will only add now that the enclosed gland-ducts contained a considerable amount of very milk-like colostrum; from which it is seen that the enclosed portion of the gland, though not markedly changed, had not lost their physiological function in pregnancy and labor. I had previously had an opportunity to make a similar observation. B. von Langenbeck amputated the breast of a woman which contained a tolerably large fibro-sarcoma which had become inflamed after labor. Numerous abscesses had formed, the woman sank very low, and the whole gland was removed with the fibroma in order to cut short the process. The acini and excretory ducts in the fibro-sarcomatous tumor were all filled with milk.

It has already been said that in this case the lymphatic vessels deep in the glandular substance were filled with cocci (in consequence of the erysipelatous infection). The glandular substance which was met with in excessive quantity near the tumor nodules, did not differ at the borders of the lobes from amply developed glandular tissue of a mamma preparing for lactation.

The contents of the gland vesicles was partly mixed with colostrum bodies. The acini appeared to be extraordinarily large. In other places there was no connective tissue for wide tracts, and in those places where the epithelial cells were especially large and the gland vesicles entirely filled, the latter were bent and irregularly formed, and one would easily get the impression that he had a piece from a carcinoma of the gland before him. Whether in this case, at the beginning, only the multiple fibroma-nodules existed, and hypertrophy of the portions of the gland not included in them first developed with pregnancy, is hard to say. The case shows that

growth of the connective tissue in the gland in the form of nodules, and growth of the epithelial elements, "true and false hypertrophy," (in this case in combination with the preparation for lactation), may develop at the same time.

All authors who have written of diseases of the mammary glands have

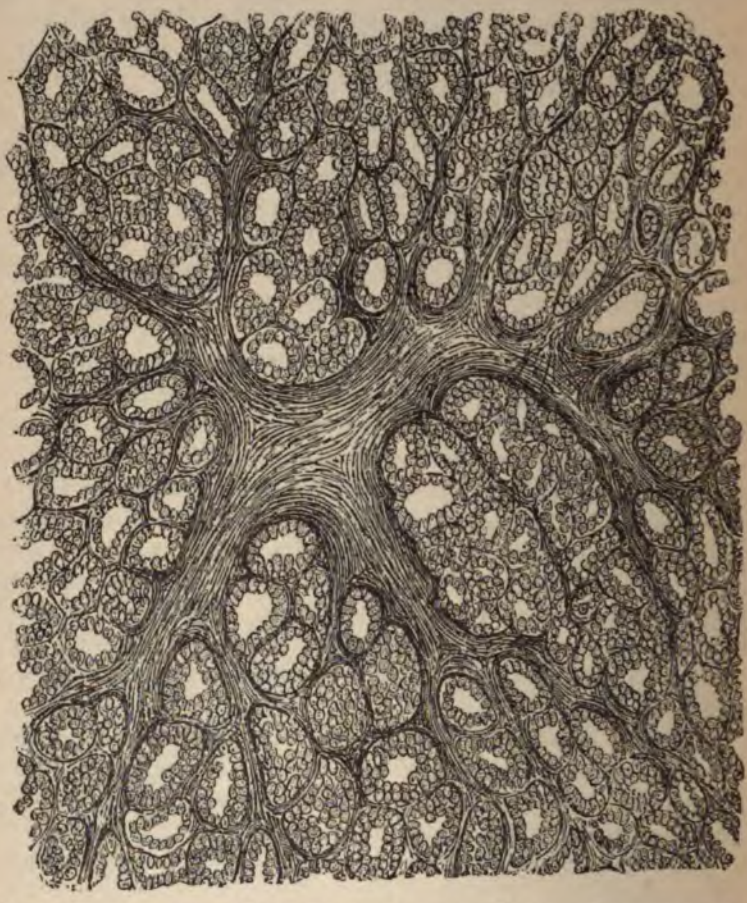

FIG. 27.—FROM THE PURELY HYPERTROPHIC PART OF THE MAMMARY GLAND OF THE PATIENT SHOWN IN FIG. 26. Hartnack, Syst. 5.

mentioned double diffuse hypertrophy, though not many appear to have made special observations, and hitherto the anatomical examinations have been very meagre. So far as I can find from obtainable literature, Paget, Birkett, Schuh, Rokitansky, Klob, Beigel, Bardeleben, and König have not even seen such cases. The case which Virchow mentions from his private practice does not appear to me to belong here, since the description does not at all correspond to the other cases. As more or less cer-

tainly belonging in this category are the cases described by Cooper, Gross and Hanley, Erichsen, Renaud, Huston, Benoit and Monteils, Le Double, Fingerhut (?), Adams, Hey, Thomson, Manec (*Gaz. des Hop.*, 1859, p. 45), Hess (*Correspondenzblatt des Vereins nassauischer Aertze*, 1859, p. 17, 49), C. G. Grähs (*Hygeia, Bd.* 23, p. 318. *Schmidt's Jahrb.*, Bd. 118, 1863, p. 44), Glück (*Amtlicher Bericht über die* 39 *Versammlung Deutscher Naturforscher und Aertze in Giessen im Sept.*, 1864. Giessen, 1865, p. 219), to which may be added both of the cases observed by me.

The following is to be said of the development and course of this condition: Diffuse hypertrophy of both breasts is always developed at the time of the first menstruation, or soon thereafter. The age most frequently noted is from 14 to 16 years; but in a few cases 2 or 3 years elapse after the first menstruation before hypertrophy exists (as in my two cases). The development of hypertrophy is always rapid in two or three months, and then as a rule remains in the condition reached, or it may attain a greater degree with the first pregnancy and then remain unchanged; there is no such thing as a continuous and indefinite growth of it. The skin grows proportionately to the development of the gland, and is often somewhat thickened and œdematous. The nipple is not developed in proportion to the enlargement of the gland, but retains its usual size and becomes flat. The subcutaneous veins sometimes appear as dilated nets, though without becoming varicose. There is no pain with this condition.

Galactorrhœa is not usually combined with this hypertrophy at the time of the development of puberty; milk is formed in the hypertrophic glands if the affected person becomes pregnant. It is not certainly shown that there is any influence on menstruation and the development of the genitalia. As a rule the menses are regular, or the general constitution is proportionately spare and not well developed. In one case an ovarian cyst developed, from the rupture of which the patient died.

As to the course, it is only shown that from the weight of the breasts, the capacity for work is seriously interfered with, and that the nutrition of the patient affected with such hypertrophy is usually bad; there does not appear to be any further constitutional influence. So far as I know, death is never directly caused by thi condition. Whether the duration of life is influenced thereby is difficult to say; but it is certain that a person has lived eighteen years after the beginning of the development of hypertrophic breasts, and perhaps there are many who have lived longer.

In Huston's case death followed from inflammation and ichorous ulceration after contusion (it is said in the report, from acute hectic fever, though it would now be described as septic fever), in one of my cases from erysipelas. In Gräh's case the patient died 18 years after the beginning of the disease, which developed in her fifteenth year, from rupture of an ovarian cyst. The formation of abscesses and fistules is noted in Gräh's

and Hess's cases, and there was also some swelling of the axillary glands.

Only in these last cases were there accurate anatomical examinations made. In the necropsical account of Huston's case it is said, (*Am. Jour. of the Med. Sciences*, No. XXVIII., August, 1834, p. 3), that no particular diseased condition was found in the breasts, no collection of fluid, no tumor, only an enlargement of all parts of the gland: "The adipose and cellular tissues as well as the whole glandular apparatus, were enormously enlarged, but no appearance of disease or exudation of fluid was perceptible. In short, a healthy structure was found, whose only anomaly was its mammoth proportions." We cannot expect any exact microscopical examination as far back as 1834. C. G. Grähs writes of the case on which he made an autopsy that the tumors were as hard as scirrhus, and consisted microscopically of compactly pressed bundles of connective tissue fibres. Hess said that in the breasts extirpated by him no trace of glandular tissue could be found. What I found, in the second case related, has been mentioned above. It is very probable that in most cases there is a similar condition; it might be concluded from the very frequent mention that hard nodules are found in these breasts that the combination with fibro-sarcoma is very frequent. How long the hypertrophic tissue exists as such, and whether it is finally supplanted by connective tissue and fat, we do not know; but I believe this to be probable.

Many therapeutic measures have been tried in these cases, chiefly compression and iodide of potassium, but without result. The introduction of a seton (Thomson) is certainly not to be advised; it might result very dangerously, and even in the most favorable cases, the consequence would be a purulent breaking down of the tissue immediately surrounding the seton, and there would be no noteworthy diminution. Mance, Hess, and Glück have performed amputation of both breasts in such cases with success; the two breasts were always removed at different times. One of these patients afterwards became pregnant, and had a normal labor; neither during pregnancy nor after labor was there any swelling or redness in the region of the cicatrix. Whether such hypertrophic breasts would retrograde if the women became pregnant and nursed their children for a long time, there are, so far as I know, no observations; in my second case the observation was unfortunately interrupted by the death of the patient from erysipelas.

As concerns the cases which, especially in older literature, are described as colossal hypertrophy of one breast in women of midde age, there is no doubt from the description that they were large cysto-sarcomata, of which we have already spoken, as this sometimes attains an enormous size. The cases in which marked galactorrhœa is connected with unilateral so-called hypertrophy, as the case of Lotzbeck, (*Wiener Med. Wochensch.*, 1854), the case from V. von Brun's clinic, and that of Ehrenhaus., (*Berlin.*

*Klin. Wochenschr.*, 1870), probably belong to the category of so-called galactoceles, of which mention has been made.

### Partial Hypertrophy of the Breast.—Adenoma and Cysto-adenoma.

So far I never seen a tumor of the mammary gland which, on histological analysis, admitted absolutely no other designation than that of a partial and glandular hypertrophy, a purely circumscribed adenoma. It was a long time before I met with a case that corresponded nearly to what other authors had described as true partial hypertrophy of the mamma. It is therefore more as a concession which I make to the systematic completeness of this work, that I describe here the following cases; they should, perhaps, be brought in at other places (under fibroma, adeno-sarcoma, etc.) There are two entirely different groups of these so-called adenomata.

#### *Fibrous Lobulated Adenoma.*

The following figure gives a good idea of the appearance of the section of such a tumor, only the lower part is compact and fibrous; the largest,

Fig. 28.—Fibrous Lobulated Adenoma of the Mamma. So-called partial hypertrophy of the mamma. Two-thirds natural size.

upper part, consists of lobes and lobules which are held together by loose connective tissue containing fatty tissue. The lobules feel in the breast of

the patient firm and finally granular. Microscopic analysis shows that the centre of each lobule contains some partly dilated acini, though its principal mass consists of a firm fibro-sarcomatous tissue, as is always found in the fibro-sarcomata occurring in young persons. If one imagines the fatty tissue, which is replaced in the more central parts of the tumor by loose bundles of connective tissue, absent, and the fibromatous tissue, which surrounds the single gland lobules, to be continuous, the tumor would in no wise differ from the ordinary fibro-sarcoma of the mamma.

FIG. 29.—FROM A FIBROUS LOBULAR ADENOMA OF THE BREAST. FIG. 28. Hartnack, Syst. 5.

I have no doubt that this tumor corresponds to what Förster saw, and of which he has made a teased preparation (Fig 30).

So lobular and gland-like seemed the tumor which I saw, that I could not prove that the acini found therein were pathologically newly-formed. A short time ago I saw a very similar tumor, in an unmarried woman, about 30 years old, with poorly developed breasts; there had formed a large number of hard, granular nodules, which varied in size from that of a pea to a bean, and part of which had in the course of the last few weeks become confluent. After the extirpation, the single hard nodules looked exactly as shown in Fig. 29; between them there was com-

pletely normal tissue. It would seem right to me to describe these cases as multiple lobular fibroma, which they are, anatomically speaking; though, if we must absolutely have a partial hypertrophy of the mamma as a form of tumor, these tumors must be classed as such.

FIG. 30.—DEVELOPMENT OF GLAND TISSUE IN A TUMOR OF THE MAMMA. Partial hypertrophy of the mamma. Enlargement 200. (*Förster*, Atlas of Pathological Histology.)

I cannot give a clinical picture of these two cases. I am convinced that almost all that has been said of the course and origin of fibro-sarcomata will also apply to these cases.

### *The Soft Cysto-adenoma.*

I have seen two cases, which, if we cannot relegate them simply to the cysto-sarcomata, must be so described. At all events I have done this with one case, when recording it, for I found in my collection a tumor designated as "cysto-sarcoma," which answered to the histological peculiarities which will shortly be mentioned, though I could not find the proper clinical history, which had unfortunately become detached from the label of the bottle containing it.

In examining the tumor, without knowing where it came from, one might imagine that it was from a mucous polypus of the rectum or uterus. It is very remarkable that the acini of the mammary gland distend to such long drawn-out hollow spaces with mucous contents; that they are all clothed with a many-layered, manifest, cylindrical epithelium is less striking, because I have seen the same thing in proliferating cysto-sarcoma. The distension is generally similar; it leads to irregular hollow spaces, into which, as may seem at first glance, papillary growths are forming. On closer analysis, it is soon found that these papillary growths are nothing else than the somewhat enlarged partitions between the acini. It is in miniature a similar developmental process to that occurring in

cysto-sarcoma, except that the interstitial tissue here is not markedly exuberant; not, or at least in only a few places, sarcomatously degenerated (the vascularisation therein had become somewhat richer, though the bundles of connective tissue remained most important), and that the dilatation was equally diffused in all the acini, while in proliferating cysto-sarcoma, the excretory ducts become disproportionately dilated. Beigel, under the description "Sarcoma Adenoides mammæ," and König, under

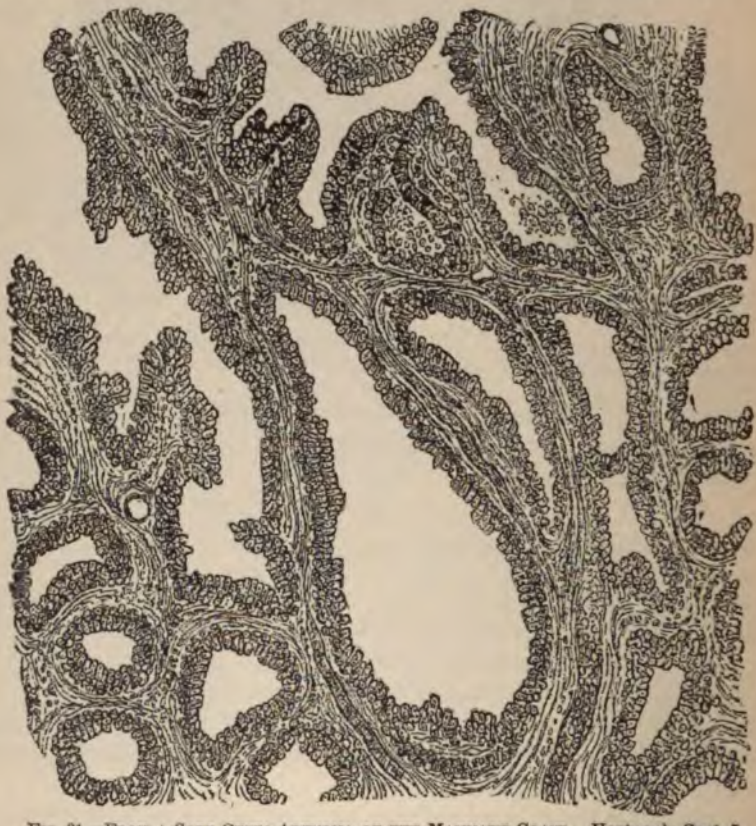

FIG. 31.—FROM A SOFT CYSTO-ADENOMA OF THE MAMMARY GLAND. Hartnack, Syst. 5.

"Cysto-sarcoma proliferum," give an illustration which corresponds tolerably well to the above. A second case belonging here I have already described under "tubular cysto-adenoma of the mamma" (*Archiv. f. Kl. Chirurgie*, Bd. I, p. 649). In this case there was as much difficulty in the clinical as in the anatomical diagnosis. I here quote from my former description:

A short time ago (July, 1865) I extirpated a tumor from the right breast of a young married woman of about 24 years of age, who had never been pregnant; the tumor was about the size of a hen's egg, was immov-

able in the gland, felt lobular and uneven, and caused moderate pains which radiated to the arm of the affected side; it had developed in the course of one year. My diagnosis was uncertain; although the local appearances were strongly in favor of carcinoma, the age of the patient was against it. It certainly was not a sarcoma. When I extirpated the tumor, I found it in intimate connection with the glandular tissue, and on the cut surface a solid mass filled with cavities from the size of a millet seed to that of a pea, from which a pulpy, granular, yellowish substance could be easily removed, and I could not yet reach a definite opinion; it might be a collection of small, caseated foci of inflammation (so-called tuberculosis of the mammary gland), or an atheromatous formation of peculiar form, or again carcinoma with spots of softening. Microscopic examination alone could differentiate." The patient now, 14 years after the operation, is perfectly well, and there has been no recurrence.

On microscopic examination I found that the cyst spaces proceeded from enlarged gland-clusters; that very soft papillary excrescences were formed in them, which underwent muco-fatty softening after some time. Between these small cysts was a very distinct net-work of branched gland canals, which had an easily recognized, open connection with the cysts: this net-work was imbedded in a firm cicatrix-like connective tissue; in many places the interstitial tissue had exactly the appearance of an atrophying cicatrizing carcinoma. My explanation was as follows: new plexiform gland tubules had formed and the gland-lobules had dilated into small cysts; I therefore chose the name "lobular cysto-adenoma." I then compared these growths with the same form of tumors in the salivary glands. But, since the latter, after Sattler's researches, are regarded as belonging to the class of "plexiform sarcoma," I was again doubtful whether the above mammary tumor did not also belong to the "plexiform-sarcoma," and I once more examined the well-preserved preparation. I arrived at exactly the same results as before, except that my explanation of the abnormal contents of the branched gland-ducts is now a different one. I am now convinced that these tubules are not newly formed, are not outgrowths of the already existing gland ducts during the development of the tumor, but that they are only pushed so unusually close together, partly narrowed, partly dilated, by the cicatricial contraction of the interstitial tissue. I formerly underestimated the signification of this cicatricial connective tissue. The radiating pains from the tumor also show the existence of a process by which the nerves are compressed or torn. Unfortunately there is nothing in the clinical history as to whether the tumor began after a certain, recognizable, immediately preceding wound; from the anatomical examination I would deem this very probable.

This explanation may now, perhaps, throw some light on the development of the cysts. I will return to this point in the next section, and

will now notice some other anatomical occurrences in the lobules of the gland.

In Fig. 32 I have gathered together, without giving to it any schematic character, several changed gland lobules, which were widely separated from each other, in order to place developmental occurrences where they may be seen together. At *b* the section of an unequally widened acinus of

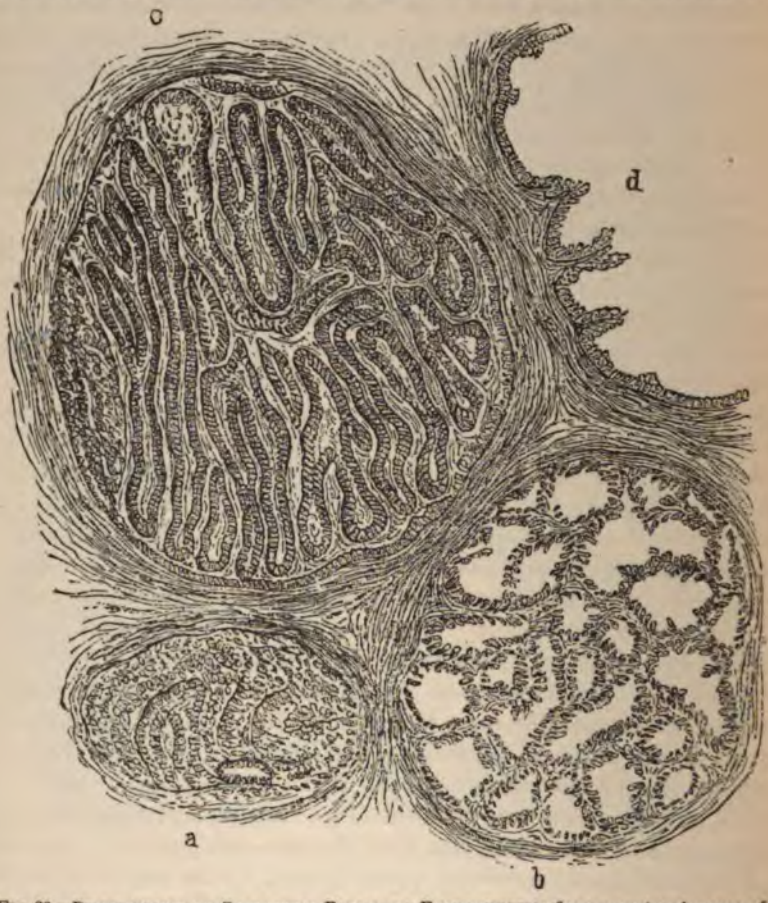


FIG. 32.—DEVELOPMENT OF CYSTS WITH PAPILLARY EXCRESCENCES; from a cysto adenoma of the mamma. Hartnack, Syst. 5.

a lobule is seen; the partitions have become very thin, and are already partly shrunken; the epithelium, already cylindrically formed, is in part still adherent; the desquamated and mucoid softened epithelial cells have fallen out.

Before there is complete atrophy of all the fine partitions in a gland lobule, and before a faulty cyst, with few excrescences (the remains of these partitions), arises, as shown at *d*, there is not infrequently a con-

siderable growth of these papillary formations, as shown at *c*. The original round form of the acini has become very much drawn out. The connection of this illustration with Fig. 31 is easily apparent. The filling up of the small acini is at times so considerable, that we can really see no hollow spaces.

Since from these descriptions it is very evident what I understand by cysto-adenoma of the mamma, and how it is anatomically developed, the classification of these few cases under "cysto-sarcoma" and "adenocystoma" should at all events be justified. It will scarcely be advantageous to be continually finding a name for every little departure from a once erected anatomical type, since we would also have to combine with it an exact clinical picture of the disease. Concerning this I can say nothing from the few cases in question. The degeneration of the gland vesicles into cysts is generally to be regarded as perhaps favorable prognostically; it usually appears where the epithelial exuberance cannot in any way break through the boundaries of the gland vesicles; it does not come from the floating of the epithelium through the lymphatic channels, nor through infection of the lymphatic glands. Should a more solid epithelial-celled growth appear, the surrounding tissue becomes softened from cell infiltration, and if the vascular network around the gland lobules is sufficiently developed to give the epithelial growths sufficient nourishment, they easily break through their physiological boundaries and go on to the development of carcinoma with infection. It is known that this occurrence first takes place, as a rule, in the fourth decennium of life. Adenomata, which are developed at this time, may therefore be much more dangerous than those originating earlier in life.

## Cysts.

Mention has already been made of the origin of cysts in sarcomata and adenomata; the cysts were the occasional additions to other neoplasms. But there are also cases in which solitary and multiple cysts originate in the mamma, without there being any other newly-formed tissue; cases in which the tumor is formed only by one or more cysts. I have clinically observed and operated on only five such cases; from this it might be concluded that the disease is infrequent, but such is not the case; it is only seldom that they attain considerable dimensions. Small ones are very frequent in elderly women, and especially at the time of involution; they are also found in entirely healthy breasts which have taken on the normal senile atrophy; and very frequently also in healthy portions of a partially carcinomatously degenerated mamma. Cooper illustrates such a mamma studded with larger and smaller cysts, which gives a very typical picture of the affection, and which, somewhat reduced, I have reproduced in Fig. 33.

These cysts seldom originate before the fortieth year; they are painless, grow very slowly, and the largest of them only reach the size of a medium-sized orange. Their walls are usually very much distended, and for that reason, fluctuation is not always distinct. As a rule they lie more peripherally, though they also approach the nipple, as may be seen in the illustration. If there is a thick layer of adipose tissue over them, it is very difficult to make a positive diagnosis; according to the movability of the tumors, which at one time feel hard, at another soft and from the age

FIG. 33.—MAMMA WITH MANY SMALL CYSTS; prepared with a portion of the skin, the nipple and areola. (*Astley Cooper.*)

of the women, one will at one time diagnosticate a sarcoma, again an adenoma or carcinoma. The escape of brownish serum from the nipple occurs with so many tumors of the mamma that no diagnosis can be based upon that; in cysts of this kind, this is relatively frequent. These cysts are neither dangerous on account of their vigorous growth nor on account of pain; in the interest of the patients, it was always an acceptable surprise to me to find such a solitary cyst, where I had expected to find a different tumor. Carcinoma or sarcoma may occur in their immediate vicinity, with their walls adherent.

The anatomical development of these cysts is easily seen in proper preparations. Mammæ, in which perfect cysts of this kind occur, always

FIG. 34.—CYSTIC DILATATION OF THE SMALLER EXCRETORY DUCTS. Hartnack, Syst. 5.

show in the apparently normal parts the development stages of such cysts. These cysts always proceed from dilatation of the small excretory ducts. (Fig. 34).

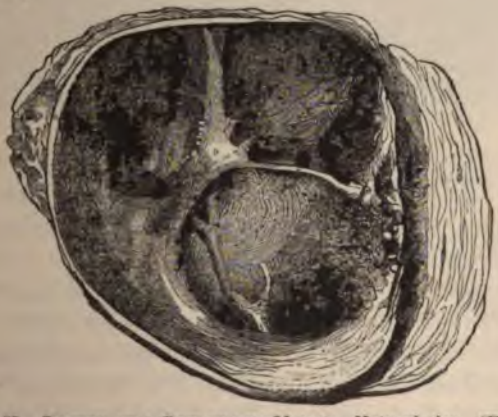

FIG. 35.—SECTION OF A CYST OF THE MAMMA. Natural size. (*Virchow.*)

Though it may possibly happen that a single gland lobule may dilate into a cyst, as seems to be the case, for example, in fibro-sarcoma (see Fig.

15), it is much more frequent that cystic dilatation attains the condition shown in Fig. 34, and so much the more as in the already partly involuted mamma, in which these cysts are developed, there is scarcely found a large number of terminal vesicles, and a much smaller number of larger gland clusters.

What appears in the foregoing cut to be dilated, are probably only the finer gland ducts, whose acinous appendages are already atrophied. Against the idea of the expansion of single terminal vesicles is the fact

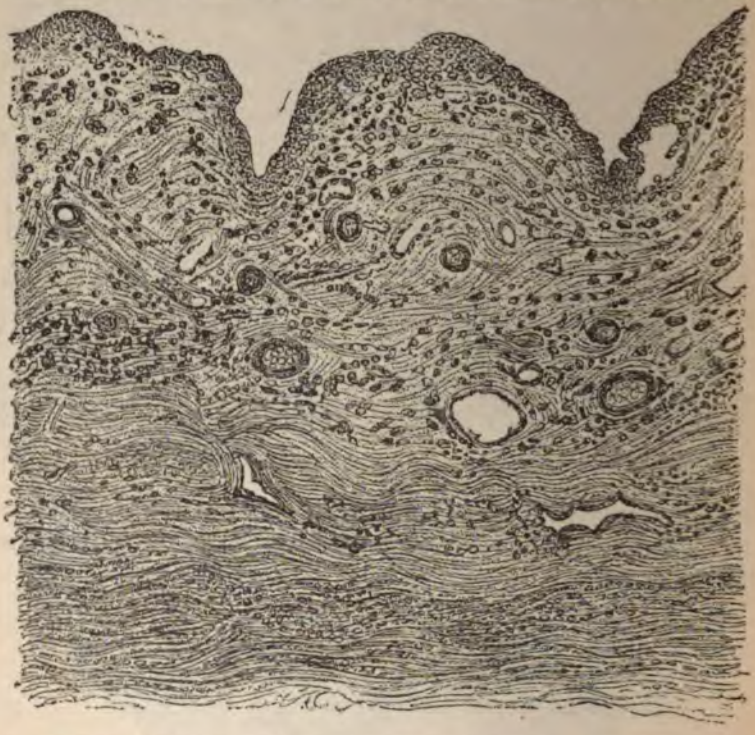

FIG. 36.—SECTION OF A CYST WALL WITH UNDULATING ELEVATIONS. Much brownish-red pigment; rich vascularisation. Hartnack, Syst. 4.

that the larger and more developed cysts usually show the remains of distinct, earlier, firm, intermediate septa.

Papillary excrescences, also, equally as well to be regarded as the remains of former septa, are sometimes present on the inner surface of these cysts. Sections of the cyst-walls arranged for microscopic examination usually show nodulating elevations (Fig. 36), which must be regarded as the last traces of former septa. There is either no epithelium in the larger cysts, or there are only traces.

A very peculiar case of multiple cysts of the mamma, both in regard to form and course, was observed by Richard and Jarjavay, and reported by

Velpeau. Gurot (*Arch. f. Klin. Chirurg.*, Bd. III., *Jahresbericht*, p, 315) has written up the clinical history of the case as reported in various French journals, in the following words:

"Richard (*Gaz. des Hôpit.*, 1861, p. 91) showed to the *Societé de Chirurgie* a woman 77 years old, with a very wonderful tumor of the breast. In 1851, Jarjavay, in Velpeau's division, removed a voluminous cysto-sarcoma of the right breast, consisting of a large number of small cysts and of hypertrophic mammary tissue. This woman was twice afterwards operated on by Richard, as the reproduction of the cysts followed rapidly. At each operation, several small tumors, formed of cysts or hypertrophic gland tissue, were removed, sometimes three or four, and at one time as

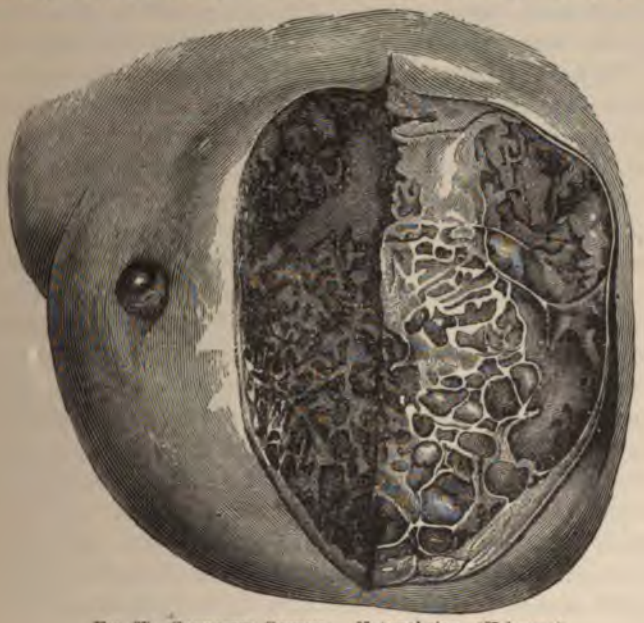

FIG. 37.—COMPOUND CYSTOMA. Natural size. (*Velpeau.*)

many as ten. Two years ago all operations were discontinued, and in the region of the nodules and throughout the whole extent of the mamma was found a large number of small tumors, partly in groups, partly isolated, of different sizes, and having no connection with the deeper structures. They were covered with partly bluish and partly normally colored skin; some of them distinctly fluctuating, others somewhat harder and more elastic. The glands were healthy and the general condition very good.

This unusually rare and peculiar case could only be judged correctly by an exhaustive histological examination; this was wanting, therefore we only express conjectures. In view of the age of the patient (the cysts developed in the middle of the seventh decennium) the most probable view is that of a multiple development of involution cysts. Notwithstanding

it is said the cysts were surrounded by "hypertrophic" glandular tissue, single small tumors only had originated from them. Hypertrophic mammary tissue in a woman 77 years old! The histological examination certainly could not have been a careful one. Consider, too, the course; with so many operations, every particle of the senile mamma should have been removed. Perhaps it was a myxoma, as such do occur in the cellular tissue of the thorax, and almost always recur locally in those of good general health; but it certainly would not have any relation to the glandular substance of the mamma.

In regard to the contents of these cysts, it is usually a thin, or somewhat slimy fluid, and, as a rule, of a greenish or brownish color. Microscopic examination shows granular detritus, granular cells, translucent globules with long granules, hæmatoidin, cholestearin and other fatty crystals. So far as I know there have been no exact chemical examinations of the contents of these cysts. Birkett states that urea has been found, but this must be accepted with caution, as it is not stated by what method this noteworthy discovery was made. The greenish or brownish color probably originated from the changed coloring matter of the blood; I certainly know of no other portion of the body in which there is such an intensely gall-green color as in these small cysts. I can only cite the sometimes opalescent, light green color of the fluid contents of hydroceles as similar. The usually dark-brown colored cyst walls contain partly hæmatoidin, and partly a very dark-brown pigment, which is never black. It seems most probable to me that the vessels in the original septa gradually become thrombotic from rarification of the tissue, so that the hæmatin of the blood passes from the thrombi into the cyst-fluid; though it is also possible that it may be due to hæmorrhages from the highly vascular principal wall of the cyst into the contents of the cysts.

As already remarked the cysts never attain a very large size; this is sometimes hindered by calcification of the walls (Bérard). When this is the case, the contents are colorless, of a lighter yellow or white, like a fat-emulsion.

In a few cases these cysts have oily (Wormald, Gross), creamy, buttery (Velpeau) or mortar-like contents. It has already been said that it is very improbable that cysts with such contents arise from galactoceles. H. Klotz (*Arch. f. Kl. Chirurg.* Bd. XXV) has accurately described two such cysts which were observed at my clinic during the last year, critically examined the literature of the subject, and made chemical analyses of the contents by exact methods in the laboratory of Prof. Ludwig, in Vienna. These showed that the contents consisted of saponified fat (lime-soap). Klotz has proved that these cysts originate by dilatation partly of the lactiferous ducts and partly of the acini. It is interesting that in his reflections on these cases he comes to the conclusion that this abnormal as well as normal secretion depends on the action of the secretory nerves. The

origin of these cysts had no connection with pregnancy, though the patients were young women.

However clear the anatomical development of these cysts may seem, the cause of their origin is very obscure. Though it is customary, and for certain reasons is correct, to place these cysts in the category of retention cysts (duct cysts), yet there are many other reasons why this should not be done. At all events the matter is not so simple and clear as is the development of atheroma, dropsy of the gall-bladder, etc.

Normally the mammary glands secrete colostrum and milk only at the close of pregnancy and after labor; properly, therefore, galactoceles can only be regarded as retention-cysts of the mammary gland. But in the cysts just described, the quality of the cyst contents is just as abnormal as is the cyst formation itself. How occlusion of the excretory ducts, even if such a thing was shown for all these cases, can be followed by the development of retention cysts in a non-secreting gland is hard to understand. We can only set up a few hypotheses of more or less probability in regard to the matter. It certainly does happen sometimes that without pregnancy the mammary glands secrete a thin mucous secretion, even in the newly-born, in young girls and in old women in the climacteric years. Though not infrequent, it is an abnormality, the cause of which we do not know. When in such cases then, for some unknown reason, the discharge is stopped, retention-cysts may be formed. We then have two unknown factors; one unknown explained by another unknown. A second explanation is the following: these cysts are produced principally at the time of mammary involution; at this time the connective tissue of the mamma contracts, the epithelium of the gland vesicles disappears, the vesicles are obliterated, and only the epithelium of the excretory ducts remains in existence for a time. Now, could not the excretory ducts be here and there unequally compressed by the unequal retraction of the connective tissue and be drawn apart in other places? Then there would be an exudation into the separated, dilated excretory ducts, and this exudation would be mixed with broken-down epithelium and some blood. I myself must object to this explanation, for we would have to suppose the connective tissue in the vicinity of the cystic dilatations in a cicatricial condition, which is not the case. Again, we might regard an exuberant growth of epithelium, with subsequent mucous softening, as the starting-point; but my preparations do not support any such explanation, though epithelial exuberance participates largely in the dilatation of the acini in adenoma and cysto-sarcoma (see Fig. 32). That the desquamation of the epithelium in involution of the gland does not always lead, without any thing further, to its destruction is shown by an observation of Ackermann, who found distinct calcified epithelial pearls and sand-like bodies in the for the most part obliterated glandular ducts, which were enclosed in a withering carcinoma of the breast.

I confess that the above explanations as to the immediate cause of the origin of the cysts do not satisfy me. Perhaps newer observations will bring us to a better understanding of these formations. I had already concluded this section when I met with a case which, although the anamnestic data are very defective, I must report and designate as cholesteatoma of the mamma. A very fat woman, 46 years old, who had had several children, came to my clinic on account of fibroma of the uterus; laparotomy was performed and the patient died on the seventeenth day after the operation. Before the operation we had found in the right mamma an encapsulated, painless, movable tumor, about the size of a duck's egg, of the beginning of which the woman could give no information, other than that the nodule had existed for a long time, had never given any trouble, and had not grown noticeably for a long time; there

FIG. 38.—SABULOUS BODIES (CALCIFIED EPITHELIAL PEARLS) IN A RETRACTING CARCINOMA OF THE MAMMA; enlargement corresponding to about Hartnack, Syst. 7. (*Ackermann.*)

was, therefore, no reason for extirpating it, as it certainly was not carcinoma. When the tumor was cut into at the autopsy, it was recognized as an exquisite specimen of a laminated cholesteatoma, a giant cholesteatoma. In the apparently well-developed, firm breast, there was not a trace of glandular tissue to be found; the whole organ consisted of fatty tissue (the heart and liver were also very fatty). The tumor lay close under the skin, but without being closely adherent to it. Whether this cholesteatoma proceeded from a lobule of the mamma or from a somewhat deeply situated sebaceous gland of the skin, I could not determine after examination of it (which on account of its rarity I did not care to dissect). It happened that about this time I saw a woman with an atheroma of the left breast as large as a pigeon's egg, which certainly would have been considered as belonging to the mammary substance had not the secretion been forced out of a small opening of the skin.

That the diagnosis of solitary cysts of the mamma is seldom to be made with certainty has already been said; but even in those cases in which it is possible, I would advise extirpation, in case the tumor, which in itself is not dangerous, is an annoyance. Velpeau recommended highly the injection of iodine (at that time frequently used by him in hydroceles and cysts with serous contents), but without showing any successful cases of cure by this method. I do not consider it impossible for a mammary cyst to be healed by this method; in the single case in which I tried first the simple puncture, then puncture with injection of iodine, the patient was not cured. After the puncture, the fluid soon collected again; after the puncture with injection of tincture of iodine (with an equal quantity of water), the now somewhat sensitive breast burst, in three weeks, through the cicatrix of the puncture, and for four years a small fistula has been running; there are no other troubles connected with it, so the patient will allow nothing more to be done.

## Carcinoma.

On account of its danger, its frightful torments, by which death is hastened, and on account of its frequency, cancer of the breast is so well known, not only to physicians, but also to the laity, that every woman who feels a hardening of the breast is at once filled with anxiety lest a cancer may develop from it. It is therefore readily understood why the study of tumors finally leads up to the question, How can we recognize cancer of the breast at its very beginning? How can we stop its development? Added to this, when we have removed a rapidly growing tumor of the breast, is the question: Can we, from its external appearance, or by microscopic or chemical analyses, recognize whether this tumor is a cancer, or how soon and where it will recur? In this the question is transferred from clinical into anatomical territory. The answer which anatomy gives cannot, from the nature of the case, correspond always to the claims of the clinician; the latter has a prepared, symptomatic, pathognomic model; the former must first develop such, but he can only build gradually, for the methods of examination formerly employed were too incomplete to obtain clear, morphological views. But these have increased, during the last twenty years, to such a degree of clearness that they offer at least as strong points of support as the developed clinical experiences of many hundred years. We may perhaps say that the clinical and anatomical picture covers the field of tumors quite definitely. It was in former time snecessary not only to separate those tumors which were not carcinoma, as has been done in previous sections, and then to make it clear that, included in those separated, there are also recurring tumors, but it was also necessary to form new, positive anatomical pictures of carcinoma. It was also particularly important to give an exact analysis of

the clinical course and further development of the different tumors at the same time with that of their anatomical structure, so as to make more and more precise the different situations of the recurrences and the manner of their appearance.

In the section on etiology more exact data were given as to the time at which carcinoma of the breast appears; it will only be said here that these tumors develop between the ages of 35 and 40 years; they seldom arise before the age of 30 or after the age of 55. As regards the rare cases in which mammary carcinoma has developed before the age of puberty, and from this time to the twenty-fifth year, they all appeared in the period when the diagnosis of tumors was very incomplete. Birkett mentions a case of "cancer developed in the mammary region" in an eight year old girl; I am inclined to believe that it was a sarcoma (he himself says that cancer of the breast is rare before the thirty-eighth year). The same applies to the cases of Carmichael and Everard Home, who are said to have observed cancer of the breast (bi-lateral) in the twelfth and fifteenth years, (cited by Gross without giving the source.)

Cancer of the breast always begins as a partial induration or hard nodule in the gland, and is *never* distinctly movable within the glandular tissue, as are fibromata. It is usually not distinctly limited from the neighboring tissue to the touch; examination is ordinarily painless; firmer pressure sometimes causes stabbing sensations. In many cases the induration is developed painlessly and is discovered by accident, when it is already as large as a walnut; but in most cases the women become aware of the commencing disease by the lancinating pains, which occur spontaneously; it sometimes happens that such sensations precede the palpable induration for months. Still I would not place too much dependence upon this (especially here in Vienna, where the women, and particularly the Jewesses, have strikingly largely developed mammæ), because such sensations in the breasts of women between thirty and forty years of age are very frequent at the time of menstruation, without there being, on that account, any prospect of carcinoma.

After these first symptoms, which are common to all cases, the course varies; many run a rapidly fatal course, partly by local spreading, partly by the infection of the lymphatic glands and internal metastases, while other cases continue for a long time. The duration varies from six months to twenty years. It has therefore been necessary to differentiate different forms and different stages of cancer of the breast. Though the signs and limits of these different forms at different times of medical observation were deduced from very different symptoms, yet the principal types are so characteristic that the descriptions in different centuries agree very nearly. For this it is only necessary to bear always in mind that it is not a question of systematizing from purely logical principles, but only a grouping of products of nature, the varieties of which are unusually nu-

merous. While such a division of carcinoma of the breast into its different forms serves an important practical purpose, the inclusion of minute details themselves, taken from the symptomatology or histology, is only of practical value when it gives some information as regards the prognosis and course; at the same time, a purely scientific interest in such details is not injurious, and may be in itself entirely right. But I cannot think

FIG. 39.—LARGE ISOLATED, SOFT CARCINOMA NODULE (*fungus medullaris*) ON AN ATROPHIED MAMMA WITH SMALL INVOLUTION CYSTS; very complete substitution of the mammary by fatty tissue. One-third natural size.

it of value to divide carcinoma into so many kinds, as, for example, Velpeau has done, though I admire the fine gift of observation which there expresses itself.

The surgeons of the middle ages differentiated three stages of malignant neoplasms.

1. *Scirrhus.*—This denoted originally only "hardening," and was ap-

FIG. 40.—TWO ISOLATED CANCEROUS NODULES IN A STILL WELL-DEVELOPED MAMMA. One-half natural size.

plied to every kind of induration, whether due to a neoplasm or a chronic inflammatory process (these two were not as distinctly separated as now). The designation "scirrhus degeneration," formerly did not include malignancy. It was in the beginning of the present century that it first became more and more the custom to use the expression schirrhus for the harder, and "fungus medullaris" for softer neoplasms, while for the chronic inflammatory indurations the designation "callous" came into

use. Later, when the expression "carcinoma" was used for malignant growths generally, and by German writers especially (in France and England, cancer and *squirrhe* are most used for the designation of malignant

FIG. 41.—INFILTRATED MAMMARY CARCINOMA, WHICH HAS GROWN THROUGH THE FAT TO THE SKIN. One-half natural size.

tumors), the term scirrhus became more limited, and a number of authors have followed my example, and call only the retracting cicatricial forms scirrhus or "fibrous cancer." Others have used the term "fibrous can-

FIG. 42.—INFILTRATED MAMMARY CARCINOMA, ALREADY ADVANCED INTO THE SKIN, WHICH IS THICKENED AS IN ELEPHANTIASIS. One-half natural size.

cer" for those forms also which figure in English literature as "infiltrated cancer."

2. *Cancer Occultus* formerly denoted that form which had been perceptible as nodules, or as a tumor, and which had gradually become softer.

3. *Cancer Apertus* was applied to the broken-down cancerous ulceration.

In order to enable the reader to understand the different customary designations still used in different places, I will now give the most usual names together with those usually employed by me, choosing as types of the different schools in different countries, Schuh (Vienna school), Birkett (England), Gross (America), and Velpeau (France).


FIG. 43.—CICATRIZING MAMMARY CANCER FROM AN EMACIATED WOMAN. Almost natural size.

1. The partly softer, partly harder carcinoma nodules; histologically appearing mostly as acinous carcinoma (Billroth). Identical with it: Fungus medullaris, fibrous cancer with large nodules (Schuh). Carcinoma medullare, encysted carcinoma, lobular carcinoma, attached to or involving only one lobe, tuberous form of cancer (Birkett). Encephaloid, tuberous form of cancer (Gross). Encéphaloide, *Squirrhe proprement dit*

FIG. 44.—CICATRIZING MAMMARY CARCINOMA WITH MARKED RETRACTION OF THE NIPPLE; considerable development of fat in place of the mamma. Almost natural size.

*ou globuleux* (Velpeau). As already remarked, many forms designated as soft cancer belong also to the category of soft sarcoma and cysto-sarcoma.

2. Carcinomatous infiltration; histologically mostly appearing as tubular carcinoma. Carcinoma simplex (Billroth). Generally soon invading the skin, partly as infiltration, partly in the form of multiple nodules. Fibrous cancer with small nodules, lenticular cancer (Schuh). Intraglandular carcinoma, infiltrating form of cancer (Birkett). Infiltrating form of cancer (Gross). *Squirrhe ligneux* (*densité et l'inextensibilité du*

*bois), squirrhe en masse, en nappe, squirrhe disséminé ou pustuleux, squirrhe lardacé, kéloides* (Velpeau)

3. The atrophying, contracting cancer of the breast. Scirrhus, (Billroth). Atrophic scirrhus (Gross). *Squirrhe rétractile ou atrophique* (Velpeau.)

4. Colloid cancer. *Squirrhe gélatinaux, alvéolaire, cancer colloide* (Velpeau). Gelatiniform carcinoma (Gross).

*Anatomy of Cancer of the Breast.*—The manifested form of all products of nature is dependent upon their finer structures, and this depends again upon the material and quality of its formation; so that different structures and different processes of development must lie at the foundation of the above-mentioned different forms of carcinoma. These will soon be mentioned. Of course the chief interest in all forms lies in the etiological factors, which unfortunately have thus far been hid from us almost entirely, but it also lies in the nature of its further development, of its course, concerning which a large number of observations has been collected, which it is difficult to collate. The anatomical structure of all carcinomas of the breast offers common points of support, though it must not be forgotten that there are so many different varieties, that many cases cannot be understood as belonging together except by the most careful study, and especially by the study of their developmental history.

The idea which is most frequently obtained in regard to the matured foci of carcinoma, which have not been changed by retrograde metamorphoses (fatty degeneration, retraction) and which have received a typical signification, is partly due to the examination of the cut surface with the naked eye, and partly to the microscopic appearance of such cut surface. The naked eye appearance of a carcinoma of the breast is that of a grayish surface interwoven with paler, net-like meshes. No distinct capsule is perceptible at the periphery; we cannot separate the new growth from the adjoining normal tissue, as in the case of fibroid and sarcoma, but the tissue extends into the new growth (with more or less sharp boundaries), so that it is dovetailed into the tissue more in the form of rounded nodules and ganglions, or which, as diffuse infiltration, has scarcely caused a projection, but may indeed have caused a contraction. In the softer forms the neoplasm is white, reticulated, yellowish towards the centre of the nodule (by fatty degeneration, carcinoma reticulare, J. Müller) or entirely yellow, and somewhat firmer and more grayish at the periphery. In the harder forms a firm, whitish, fibrous tissue is found in the centre, the periphery of the slightly uneven surface is yellowish-red (becoming darker on exposure to the air), homogeneous, fatty. If we draw the edge of a knife obliquely across the cut surface, a whitish, cloudy, and perhaps finely granular pap-like substance collects on the knife, the so-called "cancer juice." Microscopic examination of this cancer juice shows that it consists of large roundish and angular cells (cancer-cells), which are

distinguished by large nuclei, and especially glistening nucleated bodies; occasionally also we find many fatty degenerated cells and granular fat-detritus.

When we examine this carefully expressed cancer juice with a low power and without crushing it too much, we are soon convinced that the cells are placed together in large balls and branched cylinders, the contours of which are tolerably distinct, without our being able to recognize a membrane. Sometimes structures are found, which present, with a very

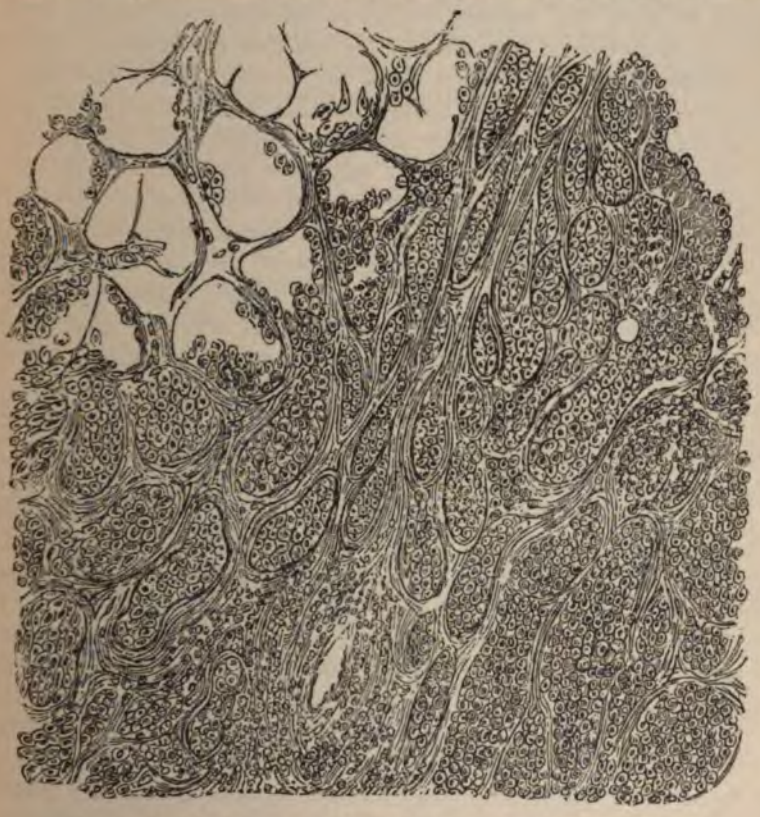

FIG. 45.—TYPICAL PICTURE OF A MAMMARY CARCINOMA. (Hartnack, Syst. 5.)

low power, very distinctly the forms of acinous and tubular glands, without our being able to find cavities in them. If we now make fine sections of the parts from which the cancer juice was expressed and treat them according to modern methods, for observation with low and high powers, we will get something similar to what is seen in Fig. 45. In a more or less firm frame-work of connective tissue are found tolerably large cells (from four to six times as large as white blood-corpuscles); these have partly fallen out; by shaking and teasing the preparation, they can be

entirely removed, so that only the connective tissue frame-work or stroma (of the older authors) remains. This tissue was called "alveolar," and is considered as well as the cells contained therein as characteristic of carcinoma. The decisive signification of this alveolar structure for carcinoma has been only very recently shaken. We have learned that many sarcomas, myxomas, and lymphomas also have a similar and sometimes precisely the same "alveolar structure." But as the alveolar and plexiform sarcomas and myxomas, as well as lympho sarcomas are of the greatest rarity in the mamma, the structure described retains without doubt its characteristic signification for mammary carcinoma. For the older anatomists and histologists there was so little doubt that the neoplasms arose from a kind, even though peculiar, of coagulating exudation, that all parts of the neoplasm appeared as pathologically newly-formed. The chief endeavor next was not only to explain the origin of the strangely formed cells, but also of the connective tissue frame-work. Rokitansky took the view that the connective tissue grew out in a knobby and dendritic manner and the cancer cells were included in it; and this process, derived chiefly from papilloma and villiform cancer, should lead to the formation of the carcinoma structure. It was soon shown, however, that such interstitial papillary growths were also present on cyst walls and in the hollow spaces of previously formed glandular spaces, but that the development of the cancer frame-work depended not on the neoplasm, but principally on the fact that the cell exuberances infiltrated the existing connective tissue of the gland, grew through it, and consequently the stroma of the carcinoma is nothing else than the old connective tissue of the organ, pressed asunder, in which and from which the carcinoma originates. This view is much advanced by the progress of developmental history, which teaches that the new cells are not separated from the amorphous blastema as crystals from a solution (Schwann), but that they only arise by budding and division of other cells. Now arises the question: from what cells are the cancer-cells developed? The more exact examinations of carcinoma, especially the examination of its boundaries, by which we hope to gain information regarding the development of the first pathological forms, show that there are almost always two kinds of cells to be found in carcinoma: 1, the larger, more epithelial-like form in the alveoli; and 2, smaller ones of the size of white blood corpuscles, more or less compressed and infiltrated between the fibres of the stroma (Fig. 45). That the first arise from one another by budding and division is easily seen by the recognized series of forms, which arise in this way. In the smaller infiltrated cells, no division forms are seen; whether they are developed by budding of the connective tissue cells, or whether they are white blood corpuscles, which have migrated from the vessels, remains uncertain; in favor of the last hypothesis is the circumstance that they are frequently seen heaped in masses around the small veins. As regards

the origin of the epithelioid cancer cells it has long been doubtful whether they also sprang from connective-tissue cells (stabile, movable connective-tissue bodies, endothelia) as do the small cells infiltrated in the stroma (Virchow), or whether they are offsprings of the glandular epithelial cells (Thiersch). Proof by direct observation will probably scarcely be furnished; we must always recur to the combination of certain stages of the development, as well as to analogous embryonal growths, and here it is conceivable that absolute certainty will not be reached. I have already accepted Virchow's opinion, and only granted the participation of the epithelial cells for those exceptional cases which I specially designated as epithelial carcinoma of the mamma. It is hard to understand why there is such an enormous difference in the size and form of the cells, which arise in the same place and from the same material; further, why at one time the cells, which have become large, collect in cylinders and bulbs, at another the cells which remain small are infiltrated in the connective tissue. Newer observations have, it is true, taught that similar processes occur in alveolar and plexiform sarcomas; still, such a great difference in the proportion of their form and size scarcely ever takes place, with the single exception of giant-cell development, which is an especial attribute of many sarcomas and also of miliary tubercle.

We would probably have advanced but little, had we confined our studies of the development of sarcoma to cancer of the breast; nevertheless, the studies of Thiersch, on cancer of the skin, illumined in a spirited manner by reference to normal histogenetic processes, soon advanced the matter further and brought it, with the exception of many doubtful points, to a certain conclusion. In this connection I may refer to the later works on pathological histology and general surgery, and would only call attention to the fact that it has been made obvious, especially by Waldeyer's work, that in cancer of the breast the cancer cells lying in the alveoli, which he calls "cancer bodies," spring from the epithelial glandular cells. As these epithelial forms in carcinoma never spread over the embryonal parts of the gland, and also deviate in their formations from the normal types of the mamma, he rightly calls carcinoma an "atypical epithelial tumor."

As already said, we must give up trying to directly observe the derivation of cancer cells from the true epithelia; so also the first stages of division are concealed by the complicated tissue in the examination. It appears that, through a few generations, the small epithelial cells of the acini or gland ducts scarcely ever (in many carcinomas perhaps never) grow out over the normal mass, but later, when they are freed from pressure by a kind of softening process of the surrounding connective tissue, they reach the size in which we find them in the formed parts of the carcinoma. Nevertheless, we sometimes meet with carcinomas which allow us to see with especial clearness the process on their boundaries; there are

pictures especially, which we obtain by very low powers, which give us accurately, as it seems to me, undoubted conclusions in this direction.

In Figure 46 we see, in a mamma, already in a state of involution, the gradual changes of the lobules in succession at a, b, c, d. The ends of the gland elements, which have again already become bulbar by the partial atrophy of the acini, are filled with cells and thus become larger and larger, though still clearly preserving the glandular forms for a time; and finally they grow over the boundaries of the connective tissue between

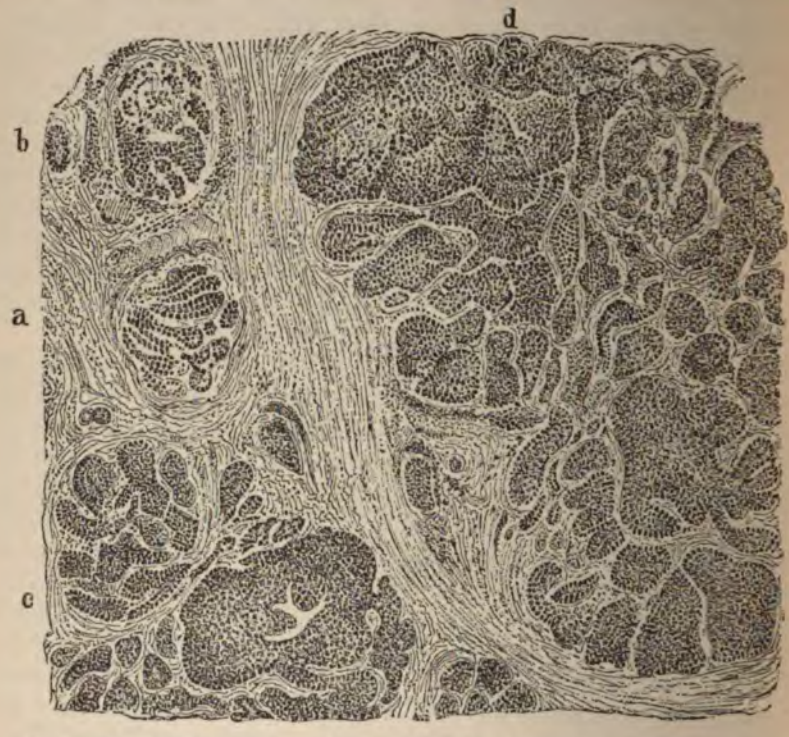


FIG. 46.—FROM THE LIMITING LAYER OF AN ACINOUS CARCINOMA OF THE MAMMA. (Hartmack, Syst. 2.)

the gland lobules; in this way there occurs a confluence of foci, as at *d*. With a higher power this acinous structure becomes very distinct in certain selected places, until it finally assumes the type of the alveolar tissue, (Fig. 45).

Most of the soft, larger noduled carcinomas have this kind of development and this structure.

Another form I have also designated as "tubular" carcinoma of the breast. It is characterized by the outgrowths of the epithelial mass in the form of elongated, ramifying cylinders or filled tubes (tubuli), which,

FIG. 47.—FROM THE PERIPHERAL LAYER OF AN ACINOUS CARCINOMA OF THE MAMMA. Formerly designated by me as "true epithelial carcinoma of the gland." Enlarged 250 times, (corresponding to about Hartnack, Syst. 7.)


FIG. 48.—FROM THE BOUNDARY LAYER OF A TUBULAR CARCINOMA OF THE MAMMA (Hartnack, Syst. 2.)

soon growing over the boundaries of the original acini, cause a confluence of these as in the previous form.

The order of development in the last illustration (Fig. 48) is a, b, c, d, e. By rapid progressive growth, what is seen in Figure 45 is finally attained. It is clear that only by the careful adjustment of sections can the elongated forms, the tubuli, be brought into view, and that these, if cut across, may give the impression of acini. But besides this, combina-

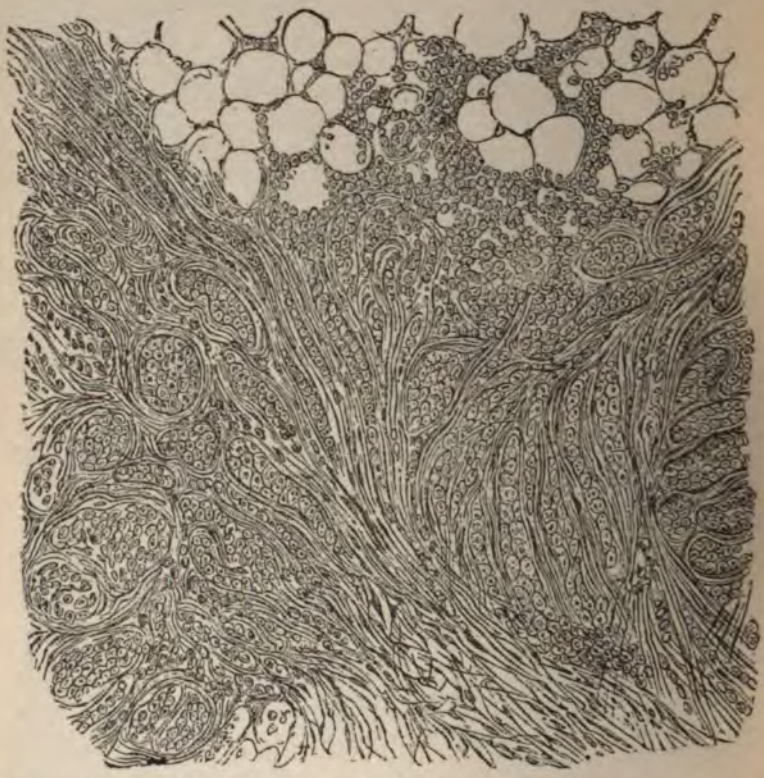

FIG. 49.—FROM THE BOUNDARY LAYER OF A TUBULAR INFILTRATED CARCINOMA, PUSHING FORWARD INTO THE SURROUNDING FATTY TISSUE (UPWARDS). (Hartnack, Syst. 5.)

tions of the acinous and tubular forms are quite frequent, and the separation not always sharply defined. But there are still other marks, which serve to indicate this more tubular form. Here the cancer cells are usually not so large as in the soft acinous forms. The character of the infiltration is here more important than the formation of nodes and nodules. But especially important in these carcinomas, which principally correspond to the carcinoma simplex, the infiltrated carcinoma of the English, is an appearance which is infrequent in the first forms, namely, a peculiar kind of atrophy and a partial cicatricial contraction.

The small-celled infiltration of the connective tissue, which is found here and there in carcinoma, has exactly the character of a chronic inflammatory infiltration. The more carefully I have studied the degenerated tissue, the more have I been convinced that a collection of the small round cells in groups is of the greatest infrequency. The illustrations which formerly I thus explained allow also another interpretation, that these groups of cells are cross and oblique sections of thinner tubules, proliferating, but still slightly enlarged outgrowths (daughter-cells) of the epithelial cells, which push themselves forward, growing into the narrow connective-tissue spaces.

As regards the fate of the infiltrated fibrous tissue, it gradually becomes,

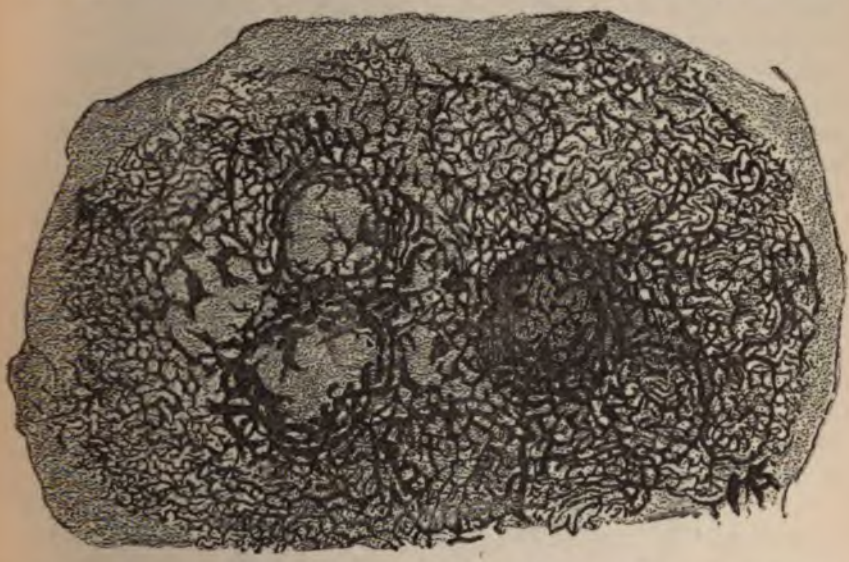

FIG. 50.—DEGENERATED VASCULAR NET-WORK OF A CENTRALLY BROKEN-DOWN CARCINOMATOUS NODULE OF THE MAMMA. (Hartnack, Syst. 2.)

by cellular infiltration, softer and more pliable, so that the epithelial cells can now expand more readily. With this small-celled infiltration is constantly connected an increase of the capillary and venous vessels, which likewise contributes to make the tissue softer, and, at the same time, brings to it more fluid nutriment; there is thus a kind of chronic hyperæmia and a chronic, partial indurated œdema. In this way the similarity to a chronic inflammatory process amounts to identity. We will best notice this, when the degenerative process attacks the skin; here the skin behaves exactly as it does before the outbreak of a chronic eczema on the leg, or before the beginning of ulceration in varicosities. The nature of the ulceration over these infiltrated cancers of the breast is exactly the same as on the leg under the circumstances mentioned. On the red, stiff

skin, vesicles, bullæ, scabs, clefts and fissures are formed, under which at first superficial, and then constantly deepening, ulcers develop by slow breaking down of the tissue.

In the interior there is also such a partial breaking down of the infiltrated tissue (both of the epithelial and connective tissue elements). The results of this are manifold. If the cell proliferation is very rapid and

FIG. 51.—CRATER-FORMED FUNGOUS CANCEROUS ULCER OF THE MAMMA.

luxuriant, there is consequently great compression of the nerves and vessels contained therein; the latter are gradually distended by the partial compression, and if the pressure increases, stasis and thrombosis occur. In this way the flow of the fluid nutriment to the vascular territory ceases, and the cancer cells first take on fatty degeneration and then break down. This breaking down finally extends to the thrombotic vessels.

The product of this breaking down is a clear yellowish substance like masses of tubercle in the large-nodular, soft (acinous) carcinomas. There

are cases in which this breaking down occurs very rapidly, and with exudation, so that the cavities eventually break externally, like a cold abscess; the contents are then evacuated, the edges of the healed nodule are turned outwards so that a crater-like ulcer is formed; then an agaric-like growth, as is so characteristic of these forms of carcinoma (Fig. 51). Though the secretion of such ulcers partly consists of true pus, yet there is seldom a formation of a really acute or chronic abscess in mammary carcinoma; it is much more frequent in infiltrated epithelial carcinomas of the lymphatic glands of the neck.

In the infiltrated (tubular) mammary cancer the process, as a rule, is different. As, in this case, much more connective tissue is reserved with the contained vessels, because the cell-collection is less largely concentrated in separate foci and nodules, the cell-degeneration is much slower. The still existing veins take off a part of the detritus with the blood, and only a small part remains behind, around which the infiltrated connective tissue contracts, and thus an interstitial cicatrix is formed. This process again corresponds to the similar processes in chronic inflammations, with the restriction that the tissue which has become infiltrated does not return exactly to its former state, but retains the character of a firm (callous, scirrhous) cicatricial tissue. The externally noticeable results of this process are very striking. The retraction acts on the skin, nipple and pectoralis major muscle; all these parts may be drawn in, *i.e.*, drawn into the retracting centre, and even the remaining parts of the mamma may thus suffer considerable dislocation. Now since such a carcinoma, undergoing partial retraction, consists in fact in part only of cicatricial fibrous tissue, this has probably led to the designation of these cases as "fibrous cancer," even though such carcinomas may still be very numerous in other parts and so remain.

There are cases, especially in elderly women, in which the carcinomatous infiltration breaks down, for reasons unknown to us (perhaps on account of deficient vascularity) so soon after their beginning, that the cicatricial retraction appears to follow immediately upon it. We find in such carcinomas, which I designate as scirrhus *κατ' ἐξοχήν*, in most places only a hard tissue, grating under the knife, which plainly consists only of connective tissue and an unusual amount of elastic fibres (Fig. 52).

These are the cases which it is often difficult to differentiate from chronic interstitial mastitis (cirrhosis mammæ, Wernher). Only by close examination of the fatty yellowish red boundary portions do we find the usually small tubular cancer bodies.

From these considerations it does not appear to be impossible for a cancer to completely cicatrize and heal spontaneously. I have never seen this, nor, so far as I know, have there been any observations of the kind by others. The most striking example of shriveling of a carcinoma which I have seen is the following: A woman, about 40 years old, came to my

clinic with an infiltrated carcinoma as large as an apple in the left breast; she refused an operation. A year afterward she came back on account of paralysis of the lower extremities, caused (as was shown later at the autopsy) by carcinoma of the vertebral column and spinal cord. Of the former tumor of the breast, indeed of the whole of the left breast, nothing remained, excepting a flat, indurated cicatrix, partially excoriated superficially, and in which no new infiltration occurred up to the time of

FIG. 52.—FROM A RETRACTED CANCER OF THE BREAST. (Hartnack, Syst. 5.)

death, which occurred shortly. Unfortunately, in my brief notes, it is not noted whether the lymphatic glands were infected. However simple these processes, after the above exposition, may seem in the typical cases, it was very difficult to find and understand them. In fact, we must have a tolerably large amount of mammary cancer material at our disposal, and must use it industriously, if we would convince ourselves of all these things, and obtain typical pictures of the separate forms, which differ so widely from one another. By far the greatest difficulty is in correctly comprehending the relation of the epithelial growths to the small-celled

nective tissue infiltration in all cases. Here there are still many points e cleared up by further researches. The relation to each other of two h powerful factors in carcinoma is not at all wholly clear for all cases.

FIG. 53.—FROM THE BOUNDARY LAYER OF A MAMMARY CARCINOMA. The gland-lobules are com- ly surrounded by small-celled infiltration. Progress of the disease from below upwards. tnack, Syst. 5.)

example, at one time we see, especially in the acinous forms, that connective-tissue infiltration at first appears to be absent, and then n, though not often, at another time the small-cell infiltration is prom-

inent at the beginning, and the epithelial growth is so far surpassed that one is scarcely inclined to consider it an important factor.

In Fig. 53 I give an illustration from the boundary layer of a mammary carcinoma, in which the single, already markedly atrophic gland-lobules are all enveloped by the small-celled infiltration, as if by a fog. With higher powers even, we cannot recognize what happens to the glandular epithelium under this cloud of cells; only later is the usual carcinoma structure shown. In regard to this Klebs has rightly remarked that the boundary places do not always give the clearest pictures of the glandular structure of mammary carcinoma, but often those places, in which a part of the small-celled infiltration has already disappeared, and in which the tissue has begun to retract. The question, whether the epithelial growth or the connective tissue infiltration is the primary in the development of carcinoma, can hardly be answered directly; perhaps it is one in the one case, and the other in another case.

An important objection to the essentially epithelial origin of cancer of the breast is, that it develops as a rule at a period of life in which the organ is either about to atrophy or has already completely atrophied, so that it is scarcely very probable that at this time the glandular elements are still in a vigorous state of growth. In the section on cysts, it is seen that the epithelia of the smaller and larger excretory ducts of the gland do not fall into decay imperceptibly, as do the epithelia of the acini, but they sometimes increase actively to the period of involution, are thrown off and by their secretory function determine the quality of the contents of the cysts. Consequently the assumption that these epithelia, under certain conditions, take on an excessive growth, would not seem to be of great importance.

We must then certainly expect that the neoplasms originating from the remaining excretory ducts lie usually near the nipple, since it is only here that finally the larger lacteal canals remain abundant But this view is shown to be erroneous, by the observation of the distribution of the small involution cysts in the atrophic glands, as these cysts frequently, indeed preponderatingly, lie in the periphery of the organ, occasionally entirely imbedded in fat, and excepting them, no remains of glandular substance are to be found in their vicinity. We may perhaps assume that individual groups of glandular vesicles often persist longer here than others, and are shut out from their connection with the nipple by early obliteration of their smaller excretory ducts. There is also the supposition, which is perhaps allowable, that there are aberrant lobules in the mamma, which, by inflammatory processes or from unknown causes, are at early periods deprived of communication with the large excretory ducts, and are then especially disposed, as are all abnormally situated parts of organs, to pathological degeneration. (Volkmann, Cohnheim). Klebs has advanced the view that the epithelial cells are also able to wander, like the so-called

connective-tissue cells, and sometimes find, in distant parts, the conditions for their abnormal further development.

It now remains to speak of colloid carcinoma, which is very seldom found in the breast. Cases have been observed by J. Müller, Robert, Albers, Bennet, Lebert, and Doutrelepont. The case of Doutrelepont is most completely and exactly described (*Arch. f. Klin. Chirurg.*, Bd. XII, p. 551). I too have observed such a case and possess the preparation, but unfortunately without reference to the corresponding clinical report.

FIG. 54.—FROM A COLLOID CARCINOMA OF THE MAMMA. (Hartnack, Syst. 5.)

How exactly my case agrees with that of Doutrelepont, Fig. 54, as to structure may be seen by comparing my illustration with his.

The epithelia play a very important part in these carcinomas; the collection groups of epithelial cells are especially distinct because they are surrounded by a homogeneous, colloid layer, as transparent as glass, the limits of which are distinctly fixed by the connective-tissue stroma. In other respects the conditions are the same as in other cancers of the breast; the very irregularly distributed small-celled infiltration, constant only at the boundaries, and the partial fatty change of the epithelial cells, are also to be found here; retraction alone appears never to take place in these

carcinomas, probably because the colloid substance is absorbed with great difficulty. The question, whence comes the colloid substance, we can only touch upon here very slightly. The regular disposition of the colloid material between the epithelial cells and the inner walls of the alveoli of the stroma permits the view, on the one hand, that the epithelial cells excrete the colloid material; on the other hand that the connective tissue is partly metamorphosed into colloid material (myxomatous tissue). That the individual epithelial cells undergo mucous metamorphosis appears to me to be without doubt from my preparations, though it is certainly not probable that, in this way, there would be such a regular disposition of the colloid substance.

In Doutrelepont's opinion, the colloid substance is a peculiar protoplasm excreted from the vessels, which at other times goes on to cell growth, but here exceptionally changes to the colloid substance. Rindfleisch has accepted this view. Klebs is more inclined to the view that the colloid substance is excreted by the epithelial cells.

## Course of Mammary Carcinoma.

1. *Anatomical Observations on the Extension of Carcinoma and on the Metastatic Tumors.*—As a rule, one glandular lobule or several adjacent lobules in a mamma are first affected. The process often remains confined to such a region for a long time, especially in the soft, tuberous form. In other cases, especially in the infiltration forms, several parts of the gland are simultaneously affected, and then gradually the whole gland. Still, the extension is in no way determined by the glandular division (of which indeed, there is often very little left), but takes place peripherally in all, or at least in several directions at the same time. As already remarked, the small-celled infiltration often precedes this, and in a certain sense prepares the way for the epithelial growth by the softening and proper vascularisation of the tissue. In this way occurs, sooner or later, infiltration of the cutis, of the retro-mammary fascia and of the pectoralis major muscle. But this extension does not take place, by any means, to an equal degree in all directions, but frequently in the form of cords which radiate from the carcinomatous focus into the adjacent tissue, and far more frequently, interruptedly, in the form of nodules, which appear around the carcinoma as a papular exanthem, constantly spreading in wider circles around the primary focus; between these parts the tissues may remain entirely healthy for a long time, until finally, if life lasts long enough, the nodules grow into a large confluent nodular tumor. When we see this on the skin, we can, as a rule, conclude that it is the same internally in cellular tissue and in the muscle. By what means the growth of these nodules is limited, is, as yet, not definitely known. The suppositions which have been made hitherto in regard to it do not bear the

test of examination. If we assume that the epithelial growth (exuberance) is the primary step in the development of carcinoma, then we must expect that some epithelial cells are always present in the centre of the small nodules, whose exuberant growth would then be followed by a small-celled infiltration of the connective tissue. The reasons for the presence of these epithelial cells here and there, are to be sought partly in the fact that, getting into the lymph-stream, they adhere to the valves of the lymphatic vessels, or that they undertake an independent migration from the carcinomatous centre, and then come to a stand-still when they cannot advance further in the lymphatic vessels on account of great numbers or too rapid growth. The most careful and lengthy examinations which I have made (a long time ago, I admit) have led to no satisfactory conclusions. If these theories be correct, however, the failures of the researches can only be explained by the supposition that the young epithelial cells which have swam away or migrated, are and remain so small on account of the compression exercised by the stiff cutaneous tissue, that they cannot be differentiated from the infiltrated cells. But this does not explain the presence of the nodules, which, for example, originate in the loose connective tissue between the muscular fibres. Though I have often examined such small nodules, I have never found undoubted epithelial elements in them. It was formerly believed that the nuclei of the muscular fibres and of the nerve sheaths likewise took part in the infiltrating growth (O. Weber); the exact observations of Volkmann and Steudener have shown that this view is a delusion. The muscular and nerve fibres become atrophied by the exuberant growth of cells and the consecutive retraction of the tissue; they pass, as I have elsewhere shown (*Arch. f. Path. Anat.*, Bd. VIII, Heft. 9), over into fibres which are not to be differentiated from connective-tissue fibres. After this abortive attempt to clear up the origin of the coronary nodules around mammary carcinomas, one feels almost inclined to go back to the older view, that a peculiar irritating juice originates in the carcinoma, which penetrates the surrounding tissue, and puts it in formative excitation; but this would not contribute to the special explanation of the formation of nodules.

I have never been able to show that the sweat glands, hair follicles and hair glands take part in the carcinomatous growth from the mamma to the cutis, though I have given special attention to this point. Doutrelepont's observation, according to which the epithelium of the sweat gland, in his case of colloid carcinoma of the breast, had an important part in the formation of cutaneous nodules, thus far, so far as I know, stands alone. By the extension of the carcinoma into the deeper parts, the periosteum of the ribs, the ribs themselves, and the pleura costalis and pulmonalis are involved, usually by the formation of nodules, which gradually lead to firm fatty infiltration and shapeless cicatricial formations, if the unhappy women live long enough. Even these parts of the carcinoma (it

occurs only in infiltrated, primarily tubular carcinoma) seldom show a distinct epithelial structure; I have been able to recognize the structure of the primary mammary carcinoma at times in the tissue of the ribs, as well as in metastatically affected vertebræ, the humerus and the femur. The same is true of metastatic carcinoma of the lungs and liver. The *a priori*, according to our present views, almost only possible theory, that these carcinomas proceed from the primary carcinomas by emboli composed of cells, I am not in a position to uphold from observations.

As a rule we find tissue, similar to that in the primary carcinoma, only in the lymphatic glands of the axilla, which have become infected from the cancer of the breast. As there are often large portions of healthy appearing tissue, so far as can be judged by palpation and by the unaided eye, lying between the primary carcinoma and the affected lymphatic glands, infection of the affected spots can only have taken place through the lymphatic vessels or the veins. There certainly is seldom any proof that the carcinoma cells have a predilection for the lymphatics (Langhaus), though they could break into the thin-walled lymphatic tracts from the tissue in so many places that anatomical proof of this is scarcely necessary. I have repeatedly seen the lymphatic trunks of the pleura and diaphragm completely filled with carcinoma cells.

I will forbear giving further details of observations on these difficult questions, and will only repeat my opinion, that I consider it certainly in the highest degree probable, in the present state of our ideas, *that the continued as well as the interrupted extension of carcinoma is brought about by misplacement of corpuscular elements, but that we are not yet in the position to prove this anatomically for all cases.* I may add that I might claim a like power of infection for the corpuscular elements of the small-celled infiltration in carcinoma, according to which, carried to other places, they have the power of setting up chronic inflammatory processes resulting in induration and ulceration, and this, too, without bearing epithelial elements with them. Finally, I would again repeat that the course mentioned is especially peculiar to mammary carcinoma; I have seen nodular coronary extensions in the form described in the same way in sarcoma of the skin, but never in carcinoma (epithelial) of the skin, in which the continuous extension, as well as the infection of the lymphatic glands, as also the few cases of metastases, appear to be absolutely dependent upon the epithelial growth, their direction of growth, and their misplacement.

2. *Clinical Course of Cancer of the Breast.*—There are cases of carcinoma of the breast which, from the beginning of the first nodule up to the time of death from internal metastases, last only six months; and other cases in which women carry carcinomatous nodules in the breast for more than twenty years without being greatly troubled by them. To make from these extremes exact types for different categories is as difficult as

it is to separate different kinds of carcinoma of the breast with anatomical exactness from one another. If, however, we try to accommodate the clinical course to the anatomical classifications given above, we can only do so by every reservation of transition and combination. The large and soft nodular (usually acinous) carcinomas have the most rapid course; in the majority of cases they occur in young women (from 35 to 40 years of age), though exceptionally there is a rapid course in older women. I will decribe the following case, which I personally observed, as an example of such exception:

In a previously healthy woman, 55 years old, several soft nodules formed in the right mamma, without known cause; she came to me at the Zurich clinic, eight months after the beginning of the trouble; one nodule had broken down and assumed a crater-like form (Fig. 51 is a picture of this woman); the whole right breast had degenerated into a large, nodular tumor; the axillary glands were swollen, though movable. *Operation.* After fourteen days, healing no longer progressed favorably; marasmus, pain in the region of the liver, dyspnœa without fever, and pleuritic exudation on both sides, recognized by percussion, set in. Death four weeks after operation. Both lungs and the liver studded with many tolerably large, soft, carcinoma nodules. Duration of the disease (which in this case was probably not changed in its course by the operation), nine months.

The infiltrated forms, by far the most frequent (carcinoma simplex, tubular form,) run an exceedingly different course. In the worst cases the course is but little different from that in those described above, except that it is more slow. It affects well-nourished women between thirty and forty years of age. It is an infiltrated, at first slow for a few months, then an ever-rapidly spreading induration, and soon the larger part of the gland is affected; after 6 to 8 months, swelling of the axillary glands, and soon swelling of the supra-clavicular glands set in. There is compression of the axillary vein, and indurated œdema preceded by neuralgic pains in the arm. There is ulceration of the skin after perhaps the lapse of 1 to 1½ years. State of nutrition is good for a long time. There are metastases in the pleura of the affected side, and also of the liver, of the bones, not infrequently of the vertebræ, and fearful pains, from which death finally frees the patient two or at most three years after the beginning of the malady. In other cases there is early adherence with the skin, and development of nodules in the skin, especially after the first operation. Radiating extension of these nodules around the cicatrix *squirrhe tegumentaire, tuberculeux, disseminè*—(Velpeau); repeated operations, without good results—such is the history. Axillary glands are hard, but not very large. The local extension constantly increases. The nodules in the skin soon ulcerate and become confluent. The skin over the whole anterior portion of the thorax is studded with nodules, and becomes immovable. A sim-

ilar process often begins on the opposite side; not infrequently hyperæmia in streaks (*squirrhe, rayonneux, ramonneux*—Velpeau) precedes the formation of nodules The whole thorax becomes surrounded by indurated, partly ulcerated skin. (*Cancer en cuirasse*—Velpeau). Emaciation, marasmus, late and not extensive internal metastases follow and death occurs from marasmus, loss of fluids (systemic drain), repeated hemorrhages. The duration is 3 to 6 to 8 years and longer.

All cases of colloid cancer take a similar course. In the case mentioned by Doutrelepont the duration was 13 years.

The mildest forms of infiltrated carcinoma pass from the form of the atrophying, cicatrizing carcinoma, to the scirrhus. How long the last may exist without causing death cannot be said. I know of cases in which old women bore such indurations for more than twenty years, and finally died of another disease. The nodules ulcerated several times; the ulcerations were checked by fomentations of lead-water; at times some necrotic tissue was thrown off, and the hole was closed again. In the axillary space superficial lymphatic glands were slightly swollen at times but were very hard; then they shrank without breaking, leaving a retracted, slightly hard scar. As I neither received these cases at the clinic, nor operated on them in private practice, only a few cases appear in my yearly reports.

Detailed statistical data as to the most important periods of the course of carcinoma may be found in Volkmann (*Beiträge zur Chirurg.* Leipzig, 1875, p. 319) and in the previously mentioned book of Al. v. Winiwarter.

The outer side of the breast is affected in by far the greatest number of cases (in 54.4 per cent. of all cases—von Winiwarter).

The axillary and infra-clavicular glands are always affected before the supra-clavicular. The infection travels by degrees from below upwards (Volkmann), though deeply-lying glands are not infrequently affected before superficial ones (von Winiwarter). The infection of the axillary glands follows in the course of 14 to 18 months after the beginning of the mammary affection. For single cases this does not answer, as the extremes of the intervals are very great. In one case the axillary glands were affected within one month, in one case not until seven years after the beginning of the tumor in the mammary gland (von Winiwarter). It is true the axillary glands are affected somewhat earlier when the carcinoma is situated on the outer upper part than when on the inner part, though the difference is not so great as one would *a priori* suppose (von Winiwarter).

Volkmann has observed cases in which, on one mamma being affected, the axillary glands on both sides were invaded; and also cases in which when the internal part of the mamma, lying nearest to the sternum, was affected, only the axillary glands of the opposite side were invaded. There is no doubt, though it is very rare, that purely inflammatory non-carci-

nomatous swelling of the axillary glands does take place in carcinoma of the mamma, which disappears after operation. Von Winiwarter cites an authentic case of this kind.

After extirpation of the mamma and of the axillary glands it not infrequently happens that the swelling of the supra-clavicular glands, which has escaped observation before the operation and become perceptible soon afterwards, ceases for a long time, and even almost entirely disappears by fatty degeneration and contraction.

Besides the cases mentioned by Winiwarter, the following case observed by me a short time ago belongs here:

Two years ago I operated on a rapidly growing carcinoma of the right mamma in an otherwise healthy woman of about thirty years of age; the moderately enlarged axillary glands were extirpated with the mamma. There was rapid healing of the wound. Six weeks after the operation, the patient returned with a supra-clavicular tumor of the lymphatic gland, as large as the yolk of a hen's egg. I gave an unfavorable prognosis. A short time ago I saw the patient; she had grown markedly in weight and had a blooming appearance. The tumor over the right clavicle existed as before, and gave her no trouble. Perhaps the following case is more remarkable.

Von Pitha operated in October, 1871, on a woman about sixty-four years old, for carcinoma of the right breast. The whole left mamma and large masses of axillary glands were also removed; healing occurred rapidly. The very well-nourished woman, who lived in the best circumstances, felt excellent. Soon, however, a new tumor appeared deep in the axillary space and under the clavicle; this, without becoming very large, became constantly harder, and caused fearful neuralgic pains in the left arm, which gradually swelled, and attained such enormous proportions as to resemble elephantiasis, and this was only slightly improved by bandaging. The patient consulted all the surgeons whom she could get at. Not one wished to incur the responsibility of a new operation, which could only consist in a disarticulation of the humerus; they were much less inclined to such an extreme operation, as the woman was fat and healthy otherwise, and would probably be entirely well if she were not tormented, especially at night, by these pains in her arm; but as she tolerated morphine and chloral well, she lived in fair comfort, until, in the summer of 1877, rhagades and ulcerations appeared in the axilla; this caused an arterial hemorrhage on November 2, 1877, to which the patient succumbed. The carcinoma of the lymphatics in this case, had remained quiescent for five years. Unfortunately no autopsy could be made.

How much a rapidly arising infiltration of the lymphatic glands may hasten the course, and how much an operation before the invasion of the lymphatic glands, will delay the fatal issue, may be learned from the following *resumé*, from A. von Winiwarter. After operations, with exist-

ing lymphatic invasions, and after extirpation of these, the average time from the last operation to death, from recurrence, is thirteen months, the total duration of the disease twenty-nine months. In cases in which the operation was performed before appreciable involvement of the lymphatic glands the patients lived, on an average, after the operation, twenty-two months, and the total duration of the disease was fifty months.

By metastatic tumors we understand those in which continuity of the disease cannot be thought of. When skin, muscles, ribs, pleura, anterior surface of the pericardium and heart, and the diaphragm are affected on the same side as that upon which the mammary carcinoma has its seat, we consider this a continuous disease. Whether it can also be considered that the affection may directly spread through the lymphatic vessels of the diaphragm to the liver, and through the posterior mediastinum to the vertebral column, remains uncertain. Of the nodules which are found after death in the substance of the lungs, liver and kidneys, we believe, according to our present views as already set forth, that they are the result of emboli, *i.e.*, carcinoma cells get into the veins, and are then carried (with or without being surrounded by blood-coagulum) into the right heart, and thence to the lungs. If the elements are small enough to pass through the capillaries of the lungs, they go to the left heart and thence into the aortic system, in which they here and there remain adherent. If, on account of their size, the carcinomatous particles cannot pass through the pulmonary capillaries, they attain further growth here, penetrate into the pulmonary veins, thence into the left heart, and so into the aortic system. If this theory be correct, the frequency and distribution, with all their contingencies, must be analogous to pyæmic metastases. This is supported by the fact that the embolic theory of carcinoma and (sarcoma) metastases is powerfully supported by it.

It may now perhaps be very possible that in the primary carcinoma some particles may grow into the veins and thence be carried away. But this never seems to be the case, for in all the cases known to me, the lymphatic glands were always affected; whether always before the internal metastases is certainly hard to prove, as the latter cannot always be diagnosticated with certainty. This objection I consider excluded in the two cases reported by Volkmann, in which, in carcinoma of the mamma, metastasis occurred once in the liver, once in the sacrum and once in the lower part of the vertebral column, without the axillary glands being affected. As regards the time elapsing from the beginning of carcinoma of the mamma to the invasion of the lymphatic glands, until metastases occur, our knowledge is very deficient. It seems that there are great variations in this respect. Those cases on which we operate under entirely favorable circumstances, but in which the patients already have internal metastases, as is shown by the autopsy when the patients die shortly after the operation, are unfortunately not very infrequent. Of thirty-four who

died after operation, five already had extensive internal metastases. The primary tumors were first noticed, five, six, seven (twice), and nine months before the operation; in three cases the metastatic nodules were situated in the liver, in one case on the pleura, in one case in the lungs. I remember several cases in which tumors of the liver could be felt a few weeks after an operation which had a favorable course. In other cases it is a very long time before internal metastases appear; but possibly these may occasionally grow very slowly, and if they are small, may give no trouble for a long time. It is well known that the lungs and liver may be completely studded with small neoplasms before their function is so interfered with as to become fatal.

As regards the frequency of the situation of these metastases, there is a deficiency on this point in the histories of the great number of reports of autopsies of persons who have died of carcinoma of the mamma. Such a collection can be productive of good results only when made from the reports of autopsies performed in very large hospitals, and especially of cancer-hospitals. What data we have are based upon too small a number. Birkett has collected thirty-seven cases in Guy's hospital. This collection was made at a time when very different views prevailed as to metastases, and such data are therefore scarcely fitted for our purpose. Still, some principal points are very distinctly brought out. Several metastatic tumors were found as follows: in the liver, 14 times; the lungs, 7; the bones, 6; the kidneys, 5; the ovaries, 4; the uterus, 4; the cerebral meninges, 2; the pericardium, 2.

This scale of frequency corresponds very well for most of the organs in my experience. But as regards the uterus and ovaries, I must be somewhat sceptical; probably some small superficially situated "fibromas" were taken for "scirrhus." According to the experience of all pathological anatomists and surgeons, whom I have consulted on this subject, metastatic carcinoma of the uterus and ovaries scarcely occurs.

In Zurich I observed metastatic nodules: in the liver, 15 times; lungs and pleura, 6; brain, 2; bones, 2.

Von Winiwarter mentions metastatic tumors in the liver, 12 times; pleura and lungs, 10; bones, 7; dura mater and brain, 2; muscles of the back, 2.

At all events this much is apparent from these statistics, that metastases are by far most frequent in the liver, and then in the lungs, bones and brain.

As regards the bones it is doubtful whether we may regard the (not any too frequent) cases of carcinoma of the humerus, occurring on the same side as carcinoma of the axillary glands, as true metastases; they belong perhaps to the carcinomas arising by contiguous development. I have frequently seen cases of carcinoma of the vertebral column, though much more frequently in private than in hospital practice (in Zurich one case,

and in Vienna four cases are noted in my clinic). I estimate the number of cases which I have seen at from twelve to fifteen. As it is not infrequent that kyphosis is thus developed, it must be assumed that the seat of the disease is principally in the bodies of the vertebræ; but the carcinomatous affection must more frequently and more rapidly invade the spinal nerves than do the suppuration and tubercle-formation in Pott's disease, for the most fearful neuralgic pains and paralyses are the rule in carcinoma of the vertebral column while they are the exception in caries of the vertebræ. I certainly know of no condition in which the severity of the pains is by any means so great, and particularly because it lasts for months, and even indeed for a year. I do not know whether it is an accident or whether it is due to some intimate connection, that the carcinomas of the vertebral column, which I saw, occurred especially in patients in whom the carcinoma of the breast belonged to the exquisite retracting form, and sometimes appeared so insignificant that it was first noticed by the physician. Even to-day I saw a case of this kind. Mrs. X., about 48 years old, very well nourished; for two years there have been nodules in the inner, lower quadrant of the left mamma, which are now scarcely as large as a hen's egg, painless, with the overlying skin markedly retracted. In the axilla, the glands are swollen to the size of a walnut, movable, not wrinkled; the patient cannot give any information as to the duration of their existence, as she was not aware of them. Pains for two months in the thoracic portion of the vertebral column; band-like sensation about the thorax; present inability to sit or to stand; continual pains—such are the symptoms. The fearful drama is just begun.

A few words regarding the infrequent metastases in the intestine (v. Winiwarter) and regarding the, by me not so infrequently observed, later invasion of the second mamma. Von Winiwarter very appropriately remarks: "We assume at present, at least tacitly, that an existing carcinoma secures the body against a second invasion of carcinoma." As we formerly acted upon the view that a cancer originates always in consequence of an already previously existing latent dyscrasia, we could not wonder if cancerous tumors appeared gradually in many of the organs of the body. Now we act upon the view that cancer is in the beginning a purely local disease, which appears solitarily, and thence infects the whole body. Von Winiwarter rightly reminds us that we must not entirely forget that the same individual may be afflicted with a second tumor, in another place, from the same (unknown) cause from which the first tumor originated. Metastatic tumors and metastatic abscesses in the mamma, for example, are such exceedingly great rarities, that we can scarcely compare invasion of the second mamma by carcinoma to them. A continuous extension from one mamma to the other is excluded in many cases of this kind. One is obliged indeed to think of a kind of sympathetic affection, such as has been proved to occur almost only in

the eyes, sometimes in the ears, and then only by inflammatory processes. Tumors of both ovaries are certainly not very infrequent; tumors in both testicles, on the other hand, do not occur frequently. There are still many problems to be solved.

### Duration of the Disease until Death.

As tumors never disappear in a definite manner spontaneously, we cannot speak here of a spontaneous course going on to cure. Further, as we possess no therapeutic means which cause a carcinoma to disappear, we cannot speak of a cure in the ordinary sense. Only by operative removal of the tumor can the patient be guarded against the troubles which the tumor itself causes locally, and against the dangers which come from it to the whole organism in one or another form.

In this section I shall only attempt to show clearly how long a woman, who is so unfortunate as to have a cancer of the breast, can expect, under certain conditions, to live. The researches made at different times on this point have, it is true, been based on a definite number of cases, yet it is again very evident, from the difference of the results, how dependent are the results of statistical researches upon the dispositions of the cases, and how the nature of the dispositions are again influenced by the views of different authors. It is now seen that no attention can be paid to the anatomical differences of the forms, because in this respect (even in my clinical journals) there are no sufficiently exact records. Further, the series of observations upon which the comparative percentage calculations rest are so unlike, that here also are sources of error. So, for example, the number of observations of "not operated" cases is much smaller, with us at least, than that of the "operated," because the surgeons are less concerned as to the fate of the former than of the latter. If, however, there is some conformity in the results of the statistical researches of this kind, it is only a proof of such an overwhelming frequency of a certain course that the type is expressed even in a few cases. Thus far calculations have been made almost only with regard to the length of time from the beginning of the formation of the tumor until death, and two categories have been made: the "operated" and "not operated" cases. From such series of cases, we have calculated the averages.

| I. Mean duration of life in "non-operated" mammary carcinoma: | | II. Mean duration of life in "operated" mammary carcinoma: |
|---|---|---|
| Paget, 1st work, (75 cases) | 48 months. | 64 cases, 52 months. |
| " 2nd | 43 " | 55 " |
| Sibley | 32 " | 53 " |
| A. v. Winiwarter (25 cases) | 32.9 " | 39.3 " |

From this it is seen that there is a great difference between the e English and our modern statistics; only Sibley's and v. Winiwa figures fix the duration of life of the "not operated" cases pretty ex in other respects the figures of the English statistics are conside higher than ours. Von Winiwarter says: "I explain these differ thus: 1, that the diagnosis in many cases is not certain (in the Er statistics); and 2, that I must leave out all the cured women (by c tion, and who still live), because I cannot now report on the durati their life. But now the existence of 21 cases, freed (permanently) o cinoma, give such an important result to judge from, that the e statistics, which only tried to show whether the operation caus especial lengthening of life, have no further importance for us. But from this, I doubt if Paget's and Sibley's calculations, which concer duration of the life of the patients operated upon, correspond to the re I consider them too great in general, if we are to understand th operated carcinomas of the mamma, without exception, are includ them. I believe that this is partly due to the fact that in England a time very different principles prevailed in regard to the operation. I example, I so arrange the cases (of operated mammary carcinoma, from recurrence), that the carcinomas with glandular infiltration l the first operation are separated from the others, I obtain for the ope cases of cancer of the breast, in which the glands were free, a mean tion of life of 50.4 months, while for the remainder there is a duration of only 29.2 months. It is evident, since the figure 50.4 sponds much closer with the statements of Paget and Sibley (52, 3 months), that at the time in England, a carcinoma with infiltrated g was never operated upon, but these cases were simply considered a *me tangere*, and were relegated to the inoperable class. But in thi also the average of life's duration for these last becomes much mor orable, since many of the cases even, with infiltrated glands, live s years."

Practically it seems from this that in many cases in which the tion is done at a time when the glands are not yet infiltrated, the ope may not only be permanently curable (as will be shown later), bu also prolong life on the appearance of recurrence.

As the mean numbers thus far taken into consideration have no significance for the individual cases, and none at all for individual gr von Winiwarter has arranged his cases in still another manner: I made percentage calculations according to the time of the duration from the beginning of the carcinoma until death, and has grouped by semesters. The following is his *resumé:* "As may be seen, an e large percentage of operated and non-operated cases die in the f half-year, but hitherto about 27.5 per cent. of the former have die nearly 35 per cent. of the latter. At the end of the fourth year, 11.

cent. of the non-operated cases are alive, while 16.6 per cent. of the operated are living. The highest mortality of the operated cases falls within the second year; they are those cases in which there is early infection of the lymphatic glands, with recurrence very soon after operation, and which become inoperable early. This group includes according to the above arrangement about 47 per cent. of the whole number of all who die of mammary carcinoma: the remaining 53 per cent. is divided, because the mortality very suddenly diminishes after the second year (from 19 to 5 per cent.) and in later years in gradually decreasing numbers, the remainder show fluctuations, clearly due to the proportionately less number, and on which therefore I place no great value. If we especially consider the cases which die within the first year after operation (from recurrence) we find that they in no way concern very young women (as one might be led to think from individual impressions). The age of the patients was 44 (in two cases), 50 and 77."

## Recurrent Affections and Final Cure in Cancer of the Breast.

It is not yet half a century since we have been freed from the dogma: "all recurrent tumors are cancers." First we began to differentiate between the multiple appearance of tumors in the territory of one and the same system of tissue, and between the multiplication of a tumor by a seed spread by it throughout the body. Then followed the division of the latter group into several classes. A strict limitation of this first resulted from a careful classification of recurrent and infectious tumors, as was especially done by Thiersch. At present we are accustomed to differentiate:

1. *Continuous Recurrences at the Site of Operation.*—These always arise from portions of the tumor left behind at the time of operation, either because they could not be removed on anatomical grounds, or because they were overlooked. They are thus always the result of an incomplete operation or of one that cannot be completed. There is then always a fault with the operator, if we may designate the incompleteness of our store of knowledge as such. Operators have long hesitated to acknowledge this. These continual recurrences occur shortly after operation, sometimes even before the wound is healed, because we usually allow the wound to heal by granulation, which, in extensive operations, may require three months or longer. It is seldom that foci, left in the mamma, remain quiescent and first begin to grow after a long time has elapsed. Both the patient and surgeon are soon aware of these, by far the most frequent kind of recurrences after extirpation of the mamma and axillary glands.

2. *Regional Recurrences.*—After a longer time, sometimes even after twenty years, a recurrence will appear at the cicatrix of the operation.

This is the case almost only in sarcoma, and is certainly very rare in carcinoma. We can hardly imagine, that, in such cases, the smallest microscopic foci, which have been left at the time of operation, have remained quiet for so long a time without growing, and we therefore conclude that new tumors have arisen at the site of operation from the same (unknown) causes, which originated the first tumor. Regional recurrences are thus entirely new tumors springing up independently of the first tumor.

3. *Infection Recurrences.*—We amputate a mamma containing a carcinoma and leave the axillary glands because they absolutely cannot be felt; a few weeks or months after the healing of the wound, a carcinoma appears in the axillary glands, perhaps without the simultaneous formation of a regional recurrence, and even without such a recurrence developing at all. In regard to this, the older humoral pathologists reflected as follows: The carcinomatous juices in the body have discharged into the breast, and there concentrated; we have removed the product of its action, the cancerous tumor, which continually draws the carcinomatous material from the blood to itself and consumes it; now the peccant material settles in the lymphatic glands and here forms new products. Conclusion: cancer should be allowed to remain, as it attracts all the juices to itself, as long as possible, though it gradually undermines the strength of the organism by its ulceration. If it was removed, it was thought that at least the blood would be freed from the peccant material by the cure or else it would continually reappear here and there. This view, which is rapidly disappearing from the minds of physicians, has an uncommonly strong hold upon the public, so that the craze of carcinoma patients for "blood cures" is still very great.

Modern pathology takes a very different view of the matter. If carcinoma has been thoroughly removed, so that no continuous recurrences appear, and yet carcinoma appears in the glands, we now generally take the view that particles of the primary tumor had already entered the glands before operation, which we did not know, because we could not recognize them (again a very unwilling and very gradually conceded incompleteness of our diagnosis) and which only now have come to a further development. They would have developed (perhaps even sooner) if we had not operated. The glands were, in fact, infected before the operation. Hence the very suitable designation "infection recurrences."

4. *Metastatic Recurrences, Metastases.*—So much has already been said on this subject that we need not recur to the modern theory of their origin.

While according to the older opinions the operation looking to the cure of the evil was absolutely hopeless, since the measures which are taken to free the supposedly diseased blood from the peccant material, even though used diligently, only disappointed, while the operation seemed

even harmful, the more recent views give us the certain hope that the primarily, purely local disease can be entirely cured by the radical removal of the tumor, except in those rare cases in which carcinomata occur at the same time, or in succession, but independently of one another, in one and the same organism. If the operator can remove the carcinomatously degenerated part completely without injury to the most important functions of the organism, the patient is really cured of the "cancerous disease." From this it is self-evident that it is our duty to remove all carcinomas that can be operated on, as early as possible. But when is that moment when we dare hope that we have really cured the patient of the frightful disease? In order to know this we must learn how soon recurrence generally appears in this or that form. Regarding this there are a number of careful researches.

Weeden Cooke, by comparison of 413 operated cases of carcinoma of the mamma, found that 409 remained free from recurrence for 6½ months, and later recurrence occurred in 4 cases.

Benjamin calculated, from 80 cases, an average of 4⅛ months. Von Winiwarter has also given very detailed data on this point. I will only mention here that according to his calculation from 91 cases, recurrence took place in 27.4 per cent. before closure of the wound, in 38.4 per cent. within the first month, and in 34.1 per cent. later than the first month; in these last cases there were so many recurrences in the first three months after the operation that the total of the recurrences which appeared within the first quarter of a year after the operation amounted to 82.4 per cent. of all cases. All were doubtless continuity and infection recurrences. There remain 11 cases in which recurrence first bebecame noticeable between the eleventh and twelfth month, and five cases in which recurrence first appeared 1½ (2), 2 (2) and 3½ years after the operation. It is difficult to judge of the nature of these last cases; we may either regard them as arising from long inactive remainders or as new affections, as regional recurrences.

The results of all these researches very strongly support the following position of Volkmann: "If a whole year passes after the operation, without a local recurrence, glandular swelling or symptom of internal affection being demonstrated on most careful examination, we may begin to hope that a permanent, good result has been obtained, of which we are usually certain after two years, and, almost without exception, positive of after three years." I believe that we may be somewhat bolder and assert that if, by the examination of an experienced surgeon, it is shown that there is no recognizable recurrence one year after healing of the wound, we may be certain that neither a continuous nor an infectious recurrence will appear, and the patient may be regarded as radically cured. For the rarely occurring new affections, the so-called regional recurrences in carcinoma, we can set no time limit. I must especially emphasize the

fact that the examination, chiefly of the axillary space and of the supraclavicular region, should be made by one who, in consequence of his experience, has such a fine sense of touch, and the ability to bring the body into such positions as are most favorable for examination, and can find the smallest nodules.

If now the number of cures proved in this way has hitherto always been unfortunately relatively small, it is because the physicians who do not operate themselves always wait too long before impressing upon their patients the necessity for the operation, or both they and the patients, as I have seen, far too often, trust to the diagnosis "chronic mastitis," or refer to cases in which the development of carcinoma went on for years, or hold to the opinion that the evil is certainly incurable, so why torment the patients with operations. With the above given results, we may today predict with certainty that this will be better in a short time. The operation has lost much of its terror to patients through narcosis; the loss of blood, by modern technicalities and practice, is reduced to a very small quantity; the danger to life is minimized; the pains, on account of the modern antiseptic dressings, are insignificant, and the time required for healing has been reduced to one-fourth or less. All this, conjointly with the conviction of physicians, must show that operation and only operation can give a permanent cure, that we always attain more and more favorable and complete results as to cure. Of course there always will be individual cases of carcinoma of the mamma, in which (as in the greater number of carcinomas of the tongue and floor of the mouth) the infection of the lymphatic glands follows so very quickly that it already exists before the diagnosis can be positively made, and these will always remain incurable; but these are rare and fatal exceptions.

I have seen in my experience 15 authenticated cases of mammary carcinoma, in which 12, 6, $5\frac{9}{12}$, $4\frac{5}{12}$, $4\frac{3}{12}$, $3\frac{8}{12}$, $3\frac{7}{12}$, $3\frac{5}{12}$, $3\frac{3}{12}$, $2\frac{8}{12}$, $2\frac{4}{12}$, $2\frac{1}{12}$, 2, $1\frac{9}{12}$, and $1\frac{1}{12}$ years passed after the last operation, without there being any recurrence, and Volkmann has had a number of such cases; it will probably be allowed that we made correct diagnoses. I know from my own observations that we should not despair of a radical cure so long as there is a prospect of removing all the disease, as in only a few of the cured cases was the operation a simple one, confined to the mamma. In most cases the axillary glands had to be extirpated; in many cases radical cure resulted only after a second operation, and in one case only after a third.

# CHAPTER XI.

## ETIOLOGY AND STATISTICS OF TUMORS OF THE BREAST.

SO little has hitherto been done in the way of discovering the specific causes of most tumor formations, that we can hardly say anything positive as to why, under certain circumstances, tumors so frequently develop in the breast, and still less, why at certain times of life, benign, and at other times malignant forms of tumors develop in this organ. What we have to say in the following pages on this subject is the result of the most exact observations, which are well calculated to direct the attention here and there, but without discovering the specific causes.

That in organs which, like the mammary glands of women, stand in such close relationship with the genital apparatus, there must be very peculiar arrangements, in order, on the one hand, to be able to attain a rapid functional development, and, on the other hand, to retrograde again, is, *à priori*, very clear. The mammary glands, like the uterus and ovaries, are first completely developed at the time of puberty, and this is done within a few months, according as these organs have thus far grown in proportion to the other parts of the body. Then there is again a period of inactivity, and it depends upon impregnation (always a contingency), when the uterus as well as the mammæ reach the highest attainable development with the first pregnancy. The development of these organs thus goes on in a certain measure by starts; there is now increase, eventually new growth of glandular elements, of interstitial tissue and muscular fibres, of blood and lymphatic vessels, of nerves. The first secretion of milk is connected with the first pregnancy, and is kept up by different women for very different periods of time according as the child is nursed by the mother for a longer or shorter time, or not nursed at all. But this seldom goes on for much over a year, and then the function ceases, the gland remaining without function until the next pregnancy, and so on.

It is very evident, at first sight, that an organ which undergoes so much change in its peculiar condition of nutrition and in its functional performance, may more easily be altered in these functions and in the anatomical changes peculiar to it, than an organ which continuously and gradually attains its natural and appointed size, and then continues to perform its functions in this way throughout the whole life. It is *à priori* conceivable that by this rising and falling, not only of the nutritive

process, but also of the formative activity of the tissue of the organ, quantitative and qualitative disturbances, aberrations of formation and function, occur. It is again conceivable how any kind of occasional non-specific excitation of the perhaps hereditarily vigorous and active formative strength may cause abnormal products in the form of tumors in strong women who are hindered by social circumstances from calming their sexual inclinations naturally, or who, for some reason, remain childless in wedlock.

To the explanation of this matter, statistics give a few very certain data. Unfortunately my researches in this direction do not support the above observations very satisfactorily. I might rather show that it is just as astonishing how typically and regularly the physiological functions of the mammary glands occur. Of my exact observations of 282 cases of tumors of the breast (up to the year 1876) I can cite only two cases of adeno-fibroma whose formation was combined with the puberal development of the mamma. All the other cases were after that period, though in a few cases only two or three years later. Only once have I seen a subacutely arising abscess of the mamma at the time of the development of puberty.

Just as seldom is mastitis in pregnant women (I have seen only seven cases), and still more rare is the formation of tumors during pregnancy. When there are 2 such cases in about 282 cases, there must have been some specially favorable circumstances, since several surgeons and gynecologists whom I have asked regarding the matter, and whose observations are much more numerous than mine, had seen nothing similar.

These cases have been published in my clinical records, but on account of their rarity, I will briefly report them here:

Mrs. L., 31 years old, came to me first in May, 1869. She had had two children, and in November, 1868, felt herself pregnant for the third time. All went normally until in January, 1869, she noticed a strikingly rapid and vigorously growing tumor of the left breast. It was firm and hard, and from time to time a little serum escaped from the nipple; she had no pains. At first she paid no attention to the matter, until finally the growth of the breast became so striking, and she felt more exhausted and became emaciated; her general condition was not disturbed; there was no sign of disease of internal organs, and still emaciation increased. Finally in May, 1869, she determined to consult several Vienna surgeons. Their opinions differed; some were in favor of amputating the breast, while others were against it. When she came to me, I found the left breast as large as a large man's head, firm, elastic, the skin over it œdematous, the mamma freely movable on the thorax, the axillary glands not swollen. In the right breast also indurated nodules could be felt already. The patient was sparely built and emaciated. I advised against an operation, because I did not think it probable that she would survive amputa-

tion of both breasts, and to me the malignant nature of the tumor seemed so indubitable that internal metastases were soon to be expected, if they did not already exist. With me the patient consulted Dr. Carl v. Braün; it seemed to us that it was better that the patient should wait until she was confined; as the tumor had formed during pregnancy, possibly as an aberration of a physiological process, it might be hoped that with the establishment of the complete physiological function of the gland it might retrograde.

Professor C. v. Braün brought on premature labor. On June 12th, a seventh months old child was born, which died soon after birth, and showed nothing abnormal. The patient was continually febrile to a moderate degree, began to cough, threw off much mucous sputum, became entirely anorexial, and died of marasmus on July 12th, one month after labor Unfortunately I was not permitted to make the autopsy; I could only obtain permission to remove some pieces from the mammæ. (The right mamma had meanwhile reached the same size and condition as the left.) The tissue was light whitish-yellow in color, was soft, and tenacious; a milky juice could be expressed from it. Microscopic examination showed that on both sides there was a granulation sarcoma (Gliosarcoma, Virchow's small-celled, round-celled sarcoma.) (Fig. 17.)

I have now to add the following points. A true secretion of milk did not appear after confinement. The "milky" fluid mentioned above, contained no milk elements, but only small lymphoid cells. But what was very striking to me, and which was always confirmed on repeated examinations, was the fact that there was no trace of glandular elements in the many wedge-shaped pieces cut out even from the depths of the tumors, which, taken together, were larger than at first. At all events, we did not have to deal with an aberrative formative activity of the epithelium of the glands. Very similar was the second case observed by me.

Mrs. Fanny J., 36 years old, working woman, had had several children. She said that five weeks before she came to the clinic, on June 21, 1875, up to which time she had been perfectly healthy, and in the eighth month of her pregnancy, there suddenly appeared a feeling of tension at the circumference of both breasts (as she said the result of catching cold!) From this time on there was rapid growth and hardening of both breasts. Seven days previously she gave birth, without any material loss of blood, to a healthy child, after the induction of premature labor by C. v. Braün. On admission the patient was very much emaciated and very pale. The breasts were larger than a child's head, hemispherical, firm, covered by tense, glistening skin, colored bluish by numerous veins, and, on account of the cutaneous tension but little movable on the subjacent parts. The tumors were firm, and in only a few places elastic; no colostrum could be expressed from the nipples. Axillary glands not perceptible. Compression of both breasts by bandages. Patient became

weaker daily, vomited whatever food she took, and died on June 28. The total duration of the disease was, therefore, only six weeks. To the above report I will add that the autopsy showed metastatic white nodules in the thyroid gland, pericardium, liver, mesentery and kidneys. The breasts were surrounded by a lobulated, mostly reddish, soft mass, showing a milk-white fluid on its cut surface, and were bound fast to the fascia of the pectoralis major muscle, by means of condensed, infiltrated cellular tissue. I unfortunately neglected to make notes of the microscopic condition, but I can state the following with certainty. From the analogy with the first case I considered that this tumor was also sarcoma, especially since there were no tumors of the axillary glands. But I have since corrected this diagnosis on the hospital book, and have designated the case as carcinoma, because I found, besides the very abundant lymphoid infiltration of the connective tissue, by which the interstitial tissue assumed the character of lympho-sarcoma, here and there indisputable epithelial cell cylinders and gland-like formations, which had the character of ordinary carcinoma. It may, therefore, have been a combination of carcinoma and sarcoma. I must add that, at that time, the occurrence of large-celled, alveolar sarcoma in the mamma was not known to me, and that unfortunately I could not find the preparation recently in order to make another examination of it.

The similarity of these two cases is striking. Both women in the beginning of the thirties, both had already borne several children, and without ever having had any trouble. In both the tumors developed rapidly in the fifth and seventh month of pregnancy. In neither was there a regular secretion of milk, after the induction of premature labor. Nor can we say of the tumors, which had more the character of sarcoma than of carcinoma, that a formative aberration of the epithelial glandular elements was the most important factor. It has already been said that true hypertrophy of the mamma can in no way be considered as having a definite relation to pregnancy or lactation, without straining the facts; more probably it is connected with the development of puberty.

Luecke,[1] Volkmann[2] and Hermann Klotz,[3] from some of their observations, are especially inclined to concede to pregnancy a prominent influence in the development of carcinomas of the mamma. Al. von Winiwarter also supports this view by two cases observed in my clinic, in which a nodule developed in the breast during pregnancy (once in the cicatrix of an abscess), which subsequently became carcinoma. These cases, as almost all of those reported by Volkmann and H. Klotz, are not identical with those which I report above. True enough in two of Volkmann's cases

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[1] Monatschrift für Geburtskunde, Bd., 19, p. 261.

[2] Beiträge zur Chirurg., Leipzig, 1875, p. 320.

[3] Ueber mastitis carcinomatosa gravidarum et lactantium. Diss. Halle, 1869.

both mammæ were successively attacked, though, as in my cases, there was a considerable interval of time, and the infiltration had the character of carcinoma simplex with rapid extension to the skin; in the other cases only one breast was affected, and the course was probably more rapid, though not different from the course of the other cases which did not coincide with pregnancy or lactation. In most of the cases of this kind, the carcinoma appeared early (in the twenty-sixth to the thirtieth year), and later than this in only a few cases.

A further point, which can be cleared up by the statistical method, is the question whether the fact that the glands never came to functional development, is to be considered as favorable for the development of tumors; this, it seems to me, is far too often asserted *à priori*, without statistical proof. Statistics disprove this assumption. Out of 236 female patients observed by me with mammary carcinoma, 23 were single and 213 married. The number of single patients is thus very small (9.74 per cent.). Velpeau found in 213 cases, 25 unmarried (15.34 per cent.). With such statistics based on hospital patients, we cannot take "unmarried" as identical with "childless;" but though we wish to know how much influence, not only the absence of sexual excitation, but also the want of full physiological development of the breasts, has upon the origin of cancer of the breast, the material for these statistics is far too uncertain; whether this has any influence on the unimportant dissimilarity of Velpeau's and my statistics, I cannot say. At all events, such numbers do not prove much more than that the unmarried are not free from carcinoma. If we wish to be more exact, we must know how many unmarried and how many married lived under observation during a certain period of time, and thus fix the relative numbers; then we could say of the unmarried X years, X per cent. were affected, and of the married, X per cent., etc. As the numbers are now nearly the same, we cannot dispute the assertion that they sufficiently represent the proportion of the unmarried to the married during the period of life in question, and may thus prove as well that carcinoma is just as frequent in unmarried as in married women.

Similar objections present themselves to the explanation of the number if we compare the number of fruitful and unfruitful married women suffering from mammary cancer. Velpeau noted 138 cases, of which 28 (13.04 per cent.) were unfruitful and 110 were fruitful; I have observed 209 cases, of which 23 (11 per cent.) were unfruitful and 186 were fruitful. How much depends upon the size of the numbers here, is shown by the statistics of Al. von Winiwarter, who has used some of my cases (170) in his statistics; he calculated the number of unfruitful women with mammary carcinoma at 16.2 per cent.; it should be mentioned here that of the thirty-nine women whom I observed further only one was unfruitful. The difference varies in the third statistical calculation, in regard to the

unfruitful women between 11 and 16.2 per cent.; at all events it is not considerable. These numbers show indisputably that a greater number of fruitful than unfruitful women suffer from mammary carcinoma; but they do not show that fruitfulness is an important factor of the disease, since the number of fruitful women is enormously greater than the number of unfruitful ones. If these numbers accurately represent the relation of the two categories to each other, then each is equally disposed to carcinoma.

I will now give the figures with regard to lactation. Velpeau noted: Of 110 fruitful women with mammary carcinoma, 60, or 54.54 per cent. had nursed; 50, or 45.46 per cent. had not. Al. von Winiwarter noted: Of 102 women with mammary carcinoma 37, or 36.2 per cent. had never nursed; 65, or 63.8 per cent. had nursed their children. This, probably, can only serve to show what is already known, that the French women more seldom nurse their children, or are more seldom in a condition to nurse them, than the Austrian women. That, therefore, more suckling women in Austria must be affected, is clear; and further, since the number of nursing women in female hospital patients is always larger than that of those not nursing, the excess of the former is not astonishing; the figures do not furnish indisputable proof that lactation predisposes to mammary carcinoma. Certainly these relations are hard to express in figures; for if lactation is to enter into the question of the formation of carcinoma, it will be of interest to know whether it has been soon and suddenly interrupted, or unduly prolonged, whether many or few children were nursed, at what intervals, etc., also the number of abortions or premature labors, etc.; and thus the question, apparently so simple, is dependent upon so many individual observations, that it is not yet worth while attempting to group them for statistical purposes.

That hardenings in one or both breasts during lactation, remaining after the weaning of the child, and after the retrogression of the glandular function, grow and develop into tumors, perhaps sarcoma or carcinoma, is considered beyond doubt by many authors; but this rests almost exclusively upon the statements of the women, not upon the physician's observation, and is therefore to be accepted with caution.

It is certainly no pleasant task to analyze so critically the results of careful and arduous labors, and much less so, when one has himself taken the warmest interest in such work. I am far from undervaluing the worth of such statistical researches for clinical exposition; great progress has been made therein, compared with the former foggy statements regarding such relations. But we cannot be too cautious when we use such researches as supports for these or those hypotheses which clear up the origin of tumors of the breasts, and eventually of all tumors. If an hypothesis is to have value, its supports must be irreproachable. That this is not the case with regard to the reiterated assertion that the mam-

ma is especially predisposed, by the peculiar nature of its development and by its periodic function, to the formation of tumors is probably apparent from the above argument.

In our helplessness in regard to the causes of the origin of tumors, we have left no way untrodden by which we could possibly find a point of support. Thus we have sought to find whether tumors develop more frequently in one breast or the other, or whether there is no difference in the two organs. Velpeau noted that of 362 carcinomas, 156 were right, 191 were left, and 15 were bilateral. I found in 245 cases, 123 right, 119 left, and 3 bilateral. The sum of both series of observations (607 cases) gives 279 right, 310 left, and 18 bilateral. According to this carcinoma would be slightly more frequent on the left side; but the difference does not seem to me great enough to base hypotheses on. It is striking that of the cases of fibroma, adenoma and cysto-sarcoma (32 in all) in which I have noted the affected side, there were 9 right, 19 left and 4 bilateral, showing a preference for the left side (in my special statistics of carcinoma, however, there is a slight preference for the right side).

Completely contradictory to what has been said are the statistics of Hennig. He has brought forward a number of cases which certainly seem to prove the opposite to ours. When we consider his statistics of the forms of carcinoma alone, it is seen that of 853 cases, 560 were right, 270 left, and 23 bilateral; and by later statistics 867 right, 538 left. This enormous difference in favor of the right side leads him to build up hypotheses as to the cause of these phenomena, which, from anatomical points of view, may seem plausible. But it is not shown how his statistics were collected, whether they really contain continuous series of observations from hospitals, or whether they also contained occasionally published individual cases, so we cannot accept his statistics as scientifically applicable without further confirmation.

Of greater value would be statistics as to the time of life at which tumors of the breast, especially carcinomata, appear. I group the figures of Velpeau, Birkett and myself as follows:

| | Velpeau. | Billroth. | Birkett. |
|---|---|---|---|
| Age of 20— 30 years, . . . | 4 = 1.32% | 12 = 5.46% | 19 = 4.14% |
| " 31— 40 " . . . | 29 = 9.63% | 43 = 18.06% | 100 = 21.83% |
| " 41— 50 " . . . | 95 = 31.56% | 93 = 39.07% | 193 = 42.13% |
| " 51— 60 " . . . | 119 = 39.53% | 58 = 24.36% | 97 = 21.17% |
| " 61— 70 " . . . | 49 = 6.82% | 30 = 12.60% | 34 = 7.42% |
| " 71—100 " . . . | 5 = 1.66% | 2 = 0.84% | 15 = 3.27% |
| | 301 | 238 | 458 |

But to estimate the percentage without these series of observations for more exact comparison, it is seen that the number of patients affected is by far the greatest in the fifth and sixth decennium (41-60). Still, not

only within this time, but also before and after it there are not inconsiderable differences in the three series. But I can scarcely believe that it is the difference of the absolute size of the figures, in which the fault lies. For example, if I take my Zurich statistics alone, and then von Winiwarter's statistics alone, these casual divisions of my observations give the same result as the above series. The greatest number always falls in the time from forty-one to sixty years of age. According to von Winiwarter's estimated series of observations as to the period of life, it is especially between the ages of forty-one to forty-five that mammary carcinoma is most frequently developed. Now this does not correspond to Velpeau's observations. (The small series of statistics of Volkmann corresponds with that of Velpeau.) According to him the time of most frequent affection is from fifty-one to sixty years. Still more striking is the frequent occurrence of mammary carcinoma in the third and fourth decennium in my series, while in Velpeau's series this age is far less frequently affected; it is so much the more striking, as many soft sarcomas may have slipped in under Velpeau's "encéphaloides," which more frequently occur in younger women.

Opposed to these peculiar, and it seems to me indisputable facts, we may perhaps point to the relations of the mammary glands to the sexual organs. I would at the same time emphasize more forcibly than Al. von Winiwarter has, that the greater part of my material for observation has been from the Galician and Hungarian Jewesses, in whom sexual maturity doubtless comes on much earlier than in French women; whether it is also extinguished earlier as a rule, I unfortunately cannot state positively, and yet it would be of importance to know this if we wish to compare the development of carcinoma with the climacteric. It is not uncommon for Hungarian Jewesses to menstruate in the eleventh year. Probably the menses usually cease in the middle of the fortieth year; yet I have met with Jewish women who still menstruated regularly in the sixtieth year, and in whom the first menstruation occurred in the tenth year. One thing seems settled, that no true mammary carcinoma has been observed before the beginning of menstruation. Further, all the cases of mammary carcinoma before the thirtieth year, of which I have known, occurred in married women. And against the statement, that the largest number of mammary carcinoma appear toward the end of the period of menstruation, and at a time, therefore, when the mamma begins to retrograde, no valid objection can be made.

These observations are also somewhat affected by the fact that mammary carcinomas in men, rare as they are, appear as a rule in the fifth and sixth decennium, and there can scarcely be any question as to retrogression in these periods. The same holds good for carcinoma of the skin. Therefore the development of carcinoma of the mammary gland (which may always be regarded as a cutaneous gland) coincides generally

with the time of development of carcinomas, so that, without regard to the incontrovertible especial frequency of carcinomas in the mammary gland, we can also explain away the connection with the functions of the genital apparatus.

As concerns the rise in the scale up to the fiftieth year, the especial frequency of carcinomas of the mamma is certainly not to be disproved, and it is claimed for the series set up for comparison that they are absolutely valid as regards the disposition of age to carcinomatous affection. From the fiftieth year onward the mortality of mankind increases so rapidly that from the smaller number of cases observed, we must not conclude that the disposition to the disease in question absolutely decreases. We see fewer women with carcinomas of the breast, and in fact, fewer carcinomatous patients from fifty to seventy years old, because there are in fact fewer people of this age living than there are of thirty to fifty years old. The numbers of the second half of the above series have therefore only a relative importance.

Though my observations regarding fibroma, sarcoma and adenoma are few, still they show some striking proportions as regards the age at which they appear; these proportions may be briefly examined.

Of the prominently fibromatous tumors there originated: 6 in the second decennium, 9 in the third, 4 in the fourth.

12 of these 19 tumors originated between the seventeenth and twenty-fifth years. Of the cysto-sarcomas and adenomas there originated: 1 in the second decennium, 4 in the third, 8 in the fourth, 5 in the fifth, 1 in the sixth.

The two bilateral colossal hypertrophies, which I observed, originated in the sixteenth and nineteenth years of life, in the first case in a *virgo intacta*, and in the second, menstruation began at the fifteenth year; then the hypertrophy developed, during which the patient became pregnant; she aborted in the fifth month in consequence of erysipelas, and died. In the first case no anatomical examination was made, so that we can only make a probable diagnosis of diffuse adenoma; in the second case there was a colossal fibromatous growth combined with diffuse adenoma. Of all these tumors, not even one originated before the development of puberty. According to these observations the third decennium especially predisposes to fibromas, the fourth to cysto-sarcomas, and the fifth to carcinomas. If one will connect this with the development and function of the gland it may be said: in the second and third decennium, there is an especial tendency to an excessive growth of the fibroid layer, which encloses the short-branched terminal vesicles of the virgin breast. In the fourth decennium this layer is also very much disposed to exuberant growth, though the degeneration more easily passes over into the soft forms of sarcoma, and is partly connected with simple hyperplasia, partly with cystoid degeneration of the lacteal vesicles and lacteal ducts;

through the always more or less striking growth of the epithelium thus taking place, these neoplasms are very nearly related to the carcinomas, which somewhat later come more and more into the foreground, and finally occupy the ground almost alone.

As to the frequency of the occurrence of the different forms of tumors of the mammary glands as regards one another and the cases taken generally at a clinic, I can state the following from my own observations.

While I was assistant at the Berlin clinic, I noted within six years 150 tumors of the breast, of which 130 (86 per cent.) were carcinomatous, and 20 (14 per cent.) non-carcinomatous.

In seven and a half years, in Zurich, there occurred 51 tumors of the female mammary gland, of which 49 (96.08 per cent.) were carcinomatous, and 2 (3.92 per cent.) non-carcinomatous. In nine years in Vienna I saw 239 tumors of this kind, 196 of which (82 per cent.) were carcinomatous, 43 (18 per cent.) non-carcinomatous. From this it seems that in Zurich benign tumors of the breast were very rare, the differences for Berlin and Vienna being unimportant. A summing up of these observations shows: Of 440 tumors of the breast 375 (82 per cent.) were carcinomatous, and 65 (18 per cent.) non-carcinomatous.

As regards the frequency of the occurrence of tumors of the breast in the surgical clinics from which my observations are taken, it is seen that in Berlin 5 per cent., in Zurich 1.2 per cent., and in Vienna 4.4 per cent. of all the female patients had tumors of the breast. From these numbers I can neither conclude that these tumors are especially rare in Zurich, nor that they are especially frequent in Berlin. It should be remembered that in the Canton's hospital in Zurich, even though not exclusively, yet few other women than those from Canton Zurich are received, while in the Berlin and Vienna clinics are cases from the most remote regions of Germany and Austria.

## Old and New Theories as to Tumor Formation, in Their Application to the Mamma.

That tumors are parasites on the body and not connected with it by means of the blood and lymph streams, no one has believed for a long time; but that they originated from black gall, blood and malignant humors, which occasionally found a resting-place in the mamma, and then became connected with the circulation of the body, is an opinion that was generally disseminated until the middle of this century. As it was agreed in regard to their developmental history that all organs originated from a primarily unformed blastema, from which the cells are first formed, so, at the time when John Müller had already discovered that they originated from the same or similar tissue as the tissue of embryos, it was agreed that tumors grew from an unformed protoplasm, which was either blood

or lymph, or excreted by blood or lymph vessels; that is to say, this juice contained the vital agents, though not always their corpuscular elements. The proposition "omnis cellula ex cellulo" was first promulgated by Remak for the developmental history; he first used it in regard to the origin of carcinoma, and this idea was afterwards employed by Virchow to include all pathological neoplasms and with great consistency in all new researches. To-day no one believes in the origin of tissue from amorphous protoplasm, at least as regards the human organism. Still, as certainly and as systematically as we can now follow up the origin and further development of the most complicated tumors, there is one thing which remained obscure and is so to-day, namely, the reason of the origin and the typical further development not only for the individual forms of neoplasms in the narrow sense, but also for the so-called inflammatory neoplasms. Clinical observation leads always and again to the thousand-fold observed fact, that after the irritations known to us, which may act accidentally on the tissue or be used exclusively for the purpose of experiment, and which we designate as "inflammatory," again do the same series of phenomena arise and run their course typically. And just here there is great difficulty with regard to chronic inflammations, which we can only imitate experimentally when we apply the irritation for a long time, or when we use substances which are very finely divided and maintain the irritation, because they are not absorbed and excreted (tuberculous experiments). It is not yet possible to produce true tumors experimentally, and we therefore conclude that we do not know the specific forms of irritation which lead to tumor formation, or that we do not know the condition in which the tissues must be when tumors can be developed from ordinary known causes. Virchow, in his endeavor to explain the existence and growth of tumors, without the aid of unknown and more or less mystical factors, but only with the aid of known observations, or at least to bring them nearer explanation, clung to the opinion that one of the known must cause the origin of tumors, and for this reason used everything which could, from that point of view, throw a ray of light on this dark territory. It has now become correct to say that a blow, pressure, a fall is with great certainty the cause of the origin of tumors in many cases; that carcinomatous ulcers are proved to originate from scars and chronic sluggish ulcers; that the influence of wind and weather, and perhaps the irritation of the skin of the face by shaving, etc., especially favor the development of carcinomas of the face. As regards these predisposing factors in their application to the breasts, they have been so carefully discussed and proved by statistics by Al. von Winiwarter, that I must refer all, who are interested in this matter of etiology, to his book.

He can only adduce 12 cases out of 170 (7.06 per cent.) of mechanical injuries (blows) acting at once, in which the declarations of the patients were sufficiently definite to induce belief; he states, however, that even

these few cases give but little etiological support, since the carcinoma either made its appearance immediately after the blow, or after a long time, without the appearance of the phenomena of contusion and chronic irritation.

As permanent irritations for the breast may be considered the manifold pressure caused by wearing narrow bodices (corsets). Direct researches on this point have not been made. It is to the point, however, that of 112 cases of von Winiwarter's observations, 61 were affected more in the external, and 15 in the internal portion of the gland, while in 36 cases the affection began in other places; for we can say that the external portion of the gland lies more on the corset than does the internal portion. But the fact that, on dividing the gland by a horizontal line passing through the nipple, 52 cases were found to be affected above the line, only 20 below, and 40 cases in other parts, does not accord with this view.

Paget has observed 15 cases in which eczema and psoriasis of the nipple and areola preceded the development of carcinoma by one year. I remember only one single case in which eczema occurred on a carcinomatous breast.

It may also be thought that a permanent intertrigo, which is found under the breasts of fat women, where the skin of the mamma and thorax join, would exert a bad influence on the mamma; but Al. von Winiwarter found carcinoma in this situation only twice.

It has also been made a prominent point that carcinoma is especially developed in and from cicatrices and other stabile remains of former inflammations. This opinion is principally due to the observation that cancer of the skin (epithelial cancer, epithelioma) is sometimes formed from fixed, frequently ulcerating scars (especially on the skull and the anterior surface of the tibia). It has never been observed so far as the skin is concerned, that a mammary or epithelial cancer has arisen from a cicatrix of the mamma. As regards the observations according to which carcinomas of the mamma have developed from cicatrices in the interior of the mamma this would not be proved, simply because it is repeatedly stated in reports that an abscess had developed in former years after confinement in the same mamma in which a carcinoma was found at the time of examination, because it is difficult to establish the proof that the carcinoma was developed from the scar in the interior of the mamma. Another connection between mastitis and carcinoma is imagined from the statements of the affected women, that after the cessation of a puerperal mastitis, a nodule remained in the affected breast from which a carcinoma developed after several years. Al. von Winiwarter has sufficiently proved and shown, regarding his 9 cases, that there were 4½, 5, 7, 10, 16, 20, 21, 25, and 28 years between the mastitis and the development of carcinoma. Finally it should also be considered that probably quite often a few not dilated lacteal lobules are broken off from their connection with their excretory

ducts by suppurative mastitis, and that such lobules may be brought into functional activity by a subsequent pregnancy; the secretion then formed must be either totally or partially absorbed, and in the latter case it would probably remain inspissated. From this it should be expected that milk and butter cysts must often be developed after mastitis, but such is not the case. There is still the hypothesis that in such occluded gland lobules the epithelium is especially disposed to atypical proliferation, and that carcinomas are thus originated. It would be very difficult to prove this hypothesis; and statistics indicate otherwise. Al. von Winiwarter found that of 114 women affected with mammary carcinoma, 24 (21.0 per cent.) had had mastitis. If now mastitis is very frequent and carcinoma likewise very frequent, so that a coincidence of the two processes will not be surprising, the frequency of mastitis to all cases of confinement, according to Winckle's statistics, is still only 6 per cent. If [illegible] there be no especial contingencies in Al. von Winiwarter's statistics, we may assume provisionally that women who have had mastitis are more [illegible] to carcinoma than those who have not had it. As regards the [illegible] which commonly remain in the breast after confinement, I must [illegible] which I have had occasion to examine (I do not mean that I have [illegible] and anatomically examined such nodules) seemed very [illegible] colloid-fibroma. It is very possible that they [illegible] before confinement, though not detected in the first [illegible] perhaps enlarged during pregnancy and lactation, and [illegible] when the gland became more relaxed.

[illegible]

be, very rarely become tuberculous. Individual exceptions do not invalidate the accuracy of these observations.

On this hypothesis, all factors which were formerly regarded as irritations of different kinds may retain their complete importance as so-called exciting causes.

When I say that such a diathesis must be assumed as congenital, I do not at all mean that it is identical with hereditary, though since most of our congenital peculiarities are hereditary, and, for example, the scrofulo-tuberculous diathesis is known to be in a high degree hereditary, we may also expect that the diathesis for the formation of tumors is also hereditary. The indications of this are not very great in literature. Al. v. Winiwarter has selected from the reports of my clinic the few certain observations; five cases are there noted in which the mother died of carcinoma of the uterus, then there are other cases in which either the mother or father died of cancer of the stomach. Yet, from his observations von Winiwarter draws the conclusion that, in only ten cases of 170, did carcinoma certainly exist in the parents; according to this, the number of cases of heredity proved amounted to only 5.8 per cent. of all cases observed. It is to be considered with regard to this that, as the question has not been put methodically, nothing is said in many reports as to heredity, either because nothing was asked about it, or because the patients were unable to give the cause of their parents' death. It is to be further considered that the hereditary peculiarities are seldom known beyond one generation, and questions as to the cause of death of the grand-parents are seldom put, and could just as seldom be answered. The consideration that frequently several sisters from non-carcinomatous mothers are affected with mammary carcinoma, as is repeatedly mentioned in the reports, also well indicates the constitutional disposition and heredity of former generations.

Though it is dangerous to base far-reaching conclusions on the remembrances of former cases, I must say that, according to my recollections of consultations, it does not seem to me so rare that several consanguineous women were affected with carcinoma; for it is quite frequent that women with slight induration of the mamma come to the surgeon especially early, because the frightful course of carcinomas of the mamma has been observed in their family. It will scarcely be possible, even from the carefully prepared clinical reports, to form a correct idea of the frequency of the heredity of carcinoma, for were we confined to such reports alone, we would gain no correct conception of the much more frequent scrofulo-tuberculous diathesis. Only the old family physician could give us any valuable information on that point. I think, however, that in further statistical investigations on this point, which is more of purely scientific than practical interest, we should not restrict ourselves especially to the heredity of carcinoma in a particular organ, but we should endeavor to

find out whether the formation of tumors became more frequent in the different generations of a family. When we inquire into the heredity of the scrofulo-tuberculous diathesis we do not restrict ourselves to the question of pulmonary tuberculosis, of laryngeal, intestinal, or tuberculosis of the cord, caries of the knee, etc., but we know very well that, with the same hereditary disposition, one organ in this, another in that generation may be affected. So also may different forms of tumors of hereditary disposition altogether change in different organs and in different generations. That the investigations are thus made more difficult stands to reason.

Broca has given an especially interesting report on the descent of carcinoma through several generations, which I will quote:

1. Generation: Mrs Z. died 1788, 60 years old, of cancer of the breast.
2. Generation: 4 daughters all married.
A, died of cancer of the liver, aged 62, 1820.
B. of the same, aged 43, 1808.
C. died of cancer of the breast, aged 51, 1814.
D. of the same, aged 54, 1827.
3. Generation. Mrs. B. had 5 daughters and 2 sons.
1. Son died young.
2. Son died of cancer of the stomach, aged 64.
3. Daughter died of cancer of the breast, aged 35.
4. Daughter, of the same. } aged between 35 and 40 years.
5. Daughter, of the same. } aged between 35 and 40 years.
6. Daughter, died of cancer of the liver. } aged between 35 and 40 years.
7. Daughter, remained free of cancer.

In another form, I might say more localized, Cohnheim[1] has conceived the beginning of the tumor as an exquisitely and even exclusively congenital one. He first of all excludes a large part of the disease-processes and products, which Virchow had introduced into oncology, and places again the origin, as the older pathological anatomists and gynecologists had limited it. Further, from different critical discussions, he comes to the conclusion, to which I entirely assent, that the most important difference between a tumor formation and the inflammatory neoplasms can lie only in the territory of etiology, as all clinicians will agree without hesitation. Finally he says: "The main point is and always will be, that it is a fault, an irregularity of the embryonal foundation, which must be sought as the true cause of the later tumor." Without regarding this view as more than a plausible hypothesis, Cohnheim subsequently deduces the theory that there are probably always parts of a tissue or organ which have not come to normal physiological function on account of some disturbance of development, and from which tumors are formed during life. In so

[1] Vorlesungen über Allgemeine Pathologie, Bd. 1, p. 622, *et seq.*, Berlin, 1877.

ingenious a manner is this train of thought of Cohnheim carried out and supported, partly by known, partly by new observations, that one is certainly, at first thought, somewhat impressed by the boldness of seeing a hypothesis, hitherto employed in explaining a few rare forms of tumor, suddenly set up as the etiological factor of tumors in general. But on more mature consideration, one can scarcely deny the fact that this hypothesis has a great deal in it, notwithstanding that its fundamental principle can scarcely be established even by direct research. It would be too much of a digression were I to more closely examine everything favorable or unfavorable to Cohnheim's view. Yet I shall make a few observations on it as regards the mamma. According to Cohnheim, tumors would only originate in those mammæ in which an "irregularity of the embryonal foundation" exists somewhere. In my opinion we should not take this literally for the mamma; an organ which is developed in three stages, (fœtal formation, further development at the time of puberty, and complete growth with the first pregnancy), is exposed to irregularities of development in each of these three stages. These irregularities may probably only be shown in that, in a gland which, except as to difference in size, continually spreads like a tree, a developed branch or a developed lactea cluster(of vesicles) is cut off from its connection with its trunk, its excretory duct, by constriction. Probably this can never be proved anatomically, and as we can only examine microscopically the smallest parts of these glands by sections, the proof of the non-connection with the glandular tree can never be exact.

We may expect now any kind of abnormality from such a disconnected portion of gland, which either never or at most incompletely attains physiological function, whenever any irritation acts on the gland-cel condemned to isolation; but it is hard to understand why without such a irritation the affected portion of the gland, in these abnormal circumstances, cannot remain quiet throughout the whole life. It seems to m that even on this hypothesis the assumption is not supported that certain physiological internal or traumatic external irritations operate upo such abnormal foundations as the exciting cause for the development o the tumor, so that what has been said before will be in no way upset b Cohnheim's hypothesis.

We are in a far more difficult situation when we wish to clear up wit the aid of Cohnheim's hypothesis, the origin of those mammary fibroma sarcomas and chondromas (in bitches), in which the epithelial elemen of the gland take so small a part that there can be no doubt as to the sole origin in the connective-tissue-like interstitial and supporting tissu We would then have to assume that in the different stages of developmen through which the mamma passes, occasionally a small focus of embryonal connective-tissue elements remains here and there for years in t stage of indifferent cellular tissue, and then on the occasion of an irri

tion, which even here we cannot do without, suddenly develops to this or that pathologically formed connective tissue. I freely admit that I cannot really agree to this, especially in cases in which such a connective-tissue tumor includes probably a fourth or a third of the glandular elements of the whole mamma. Also for those giant tumors, the cystosarcomas, which affect the whole mamma of women who have formerly nursed their children in a natural way, as well as for those cases of bilateral diffuse sarcoma of the whole mamma which originate during pregnancy, though so rarely, Cohnheim's hypothesis offers great difficulties. I am always ready to acknowledge that Cohnheim's statement has impressed me so very much, that the impression contributes materially in checking my intention of criticizing it sharply.

# CHAPTER XII.

## DIFFERENTIAL DIAGNOSIS AND PROGNOSIS OF TUMORS OF THE MAMMARY GLANDS.

THE diagnosis and prognosis of tumors of the mammary gland are much more simple in practice than may appear from the many forms of tumors which have been described as occurring in this organ. As in disease of other parts of the body, so here the knowledge of the preponderatingly frequent occurrence of this or that tumor in this or that period of life, and further the age, size, movability, rapidity of growth of the tumor, with especial reference to the affected organ, guides us. What we have to say here on this subject will be only to give the beginner a few of the main points; the details are found in the section on anatomy and clinical course, in which the symptomatology is also included.

When a tumor of firm consistency develops in the breast of a woman 35 years old, and continues to grow, it is probably carcinoma. This is not to be doubted when the tumor is immovable in the gland substance, when the axillary glands swell and become hard, when the tumor is adherent to the skin and ulcerates. When the diagnosis of cancer has once been made in such a case, the prognosis is also thereby given, as a rule. Still, there may be many modifications in regard to this, especially as concerns the more rapid or slower progress of the growth of the tumor. If the tumor has grown comparatively quickly up to the time of inspection by the physician, it will usually keep on growing rapidly; if its course up to this time has been slow, it will probably continue so, though there are exceptional cases in which, after years of slow growth and occasional cessations, a rapid growth is suddenly inaugurated without known causes. If a cancerous tumor undergoes rapid softening, if it becomes partially fluctuating and then breaks, it usually goes forward rapidly with the other subsequent phenomena. If rapidly and successively the largest part of the gland, or the whole of it, becomes infiltrated, the course as regards general infection is usually more rapid, also when the supraclavicular glands, besides the axillary glands, are also rapidly affected; also those cases in which the skin is quickly affected and studded with innumerable cancerous nodules, as well as those in which both breasts are rapidly affected in succession or at the same time, are to be prognosticated very unfavorably. In all cases of already advanced carcinoma of

the breast the liver is to be examined. The most favorable cases are always those of scirrhus which come on in old age; their course is very slow, and they infect very late or never.

There are a number of accessory symptoms of mammary carcinoma. Among these is retraction of the nipple; it occurs when the carcinoma originates in the neighborhood of the nipple, and the nipple region is drawn in by interstitial cicatrization. In other cases this symptom is also apparent when the skin immediately surrounding the nipple is affected and bulges forward, so that it more or less overtops the nipple. When the infiltrated nodules lie more remotely from the nipple the part of the skin which is adherent to the carcinoma becomes cicatricially retracted in case a process of shrinking occurs in the neoplasm. Pains are to be considered as accessory, but often absent, symptoms of mammary affection. They are often present at the beginning of the disease, and appear again at the time of softening and ulceration; many run their course with very great pains, and others are entirely painless. Of very little value are visible, dilated subcutaneous venous tracts over the tumor; they may be present in every tumor of the breast which compresses the deeply situated veins. So, too, I cannot hold that the escape of serous, brownish reddish fluid from the nipple is characteristic of carcinoma, though it is often present in this disease; it occurs also in other tumors of the breast and without the presence of any tumor. Of comparatively little significance, too, is the appearance of the patients; at the beginning they generally seem entirely healthy, and have none of the specific functional troubles of carcinoma; then towards the end of the disease the cachectic appearance comes on. It may depend upon different circumstances: cancer of the liver, lungs and pleura with exudation, hemorrhage, ichorous discharge and the septic fever connected with it.

A diagnostic error in regard to carcinoma of the female breast can only occur after long observation when we take a deeply situated cyst for carcinoma, or the appearance of a carcinomatous tumor is simulated by the confluence of several smaller foci in chronic mastitis (which are generally accompanied by marked pains). It is better to operate in such doubtful cases than to allow the tumor, which may be carcinoma, to continue growing.

As to the course in individual cases, we have already stated it. Even with great experience, it is very difficult to give a certain prognosis, only in months, as to the time when these carcinomatous patients will be relieved from their sufferings. The power of resistance is often very unpleasantly great, especially in those cases in which the digestive tract, the liver and respiratory organs remain unaffected. But then, rapidly arising pleuritic exudations or repeated arterial hemorrhages sometimes end life with unexpected rapidity.

Swellings and indurations of the breasts before puberty are almost

always of an inflammatory nature. Only medullary cancer (medullary sarcoma) has been certainly observed at this early age, and so seldom that these cases can scarcely be considered as curiosities for diagnosis.

From the time of puberty up to the 30th and 35th year and later, roundish, lobulated, movable, usually painless tumors, as a rule of slow growth, are developed in the mammary gland. These may be chronic inflammatory foci; suspicion is so much the greater as regards this if there has been a previous traumatism, or when such nodules remain after pregnancy and lactation. The course will soon decide. The product of a chronic inflammation is either gradually dissipated, or softens and suppurates, but never grows continuously. If such nodules remain stabile and hard for months and years, if they are roughly lobular, and later, perhaps only during the menstrual period, become slightly turgescent and moderately painful, they are benign fibromas, which often remain stabile.

If the tumors grow slowly, but continuously, they are adenomas, adenoid sarcomas, or cysto-sarcomas. These differences are not of very great significance as regards prognosis. It is between the ages of 25 and 35 that we find most frequently perfect cysto-sarcomas, not seldom of enormous size, probably also ulcerating and connected with swelling of the lymphatic glands. Though it is not very frequent, we must be prepared to find recurrence in adenoid sarcoma and cysto-sarcoma. They should always be excised early.

A very rapidly growing, soft tumor of the breast (at first to be confounded with abscess) in young girls and women, is most usually medullary sarcoma, and is of bad prognosis; in these cases the disease may prove fatal in six or eight months from internal metastases.

Cysts are easily diagnosticated if they are large enough and are superficial; otherwise not. If they contain no tumor tissue the prognosis is favorable. Deeply situated small cysts are not always to be differentiated from other tumors.

Bilateral diffuse hypertrophy occurs almost solely in young girls at the time of the development of puberty. Epithelial carcinoma of the skin is said to have been seen radiating from the nipple; from the cases which I have found in literature I do not think them beyond doubt. I have had no experience with such carcinomas.

# CHAPTER XIII.

## TREATMENT OF TUMORS OF THE MAMMARY GLAND.

A DISSIPATION (dispersion, spontaneous) of tumors of the mammary gland is scarcely to be admitted; when such a thing has occurred, according to the statements of physicians and laymen, it was probably the products of chronic inflammation. But since the diagnosis may, for a long time, be doubtful, whether we have to deal with a product of chronic inflammation or with a tumor, the indications are to use such resolvents as iodine ointment, ung. cupri oxyd. nigr., or resolvent plasters and the like. Compression with bandages (suspensorium mammæ) or compresses especially adapted to individual cases have been used, and have even been recommended in carcinoma. I cannot support this recommendation; for by them we never gain a really complete resorption and cure. The ointments, mixed with pure iodine, too often used, usually act in an irritating manner on these tumors, as does pressure also, especially when they already are adherent to the skin. I believe that by them we will sooner promote ulceration and softening than resorption.

If one does not wish to immediately advise an operative procedure, but wishes to watch the course for a time, he may use indifferent ointments or compresses with Goulard's extract (lead-water), in order that the patient may be quieted by the belief that something is being done for her; or he may use some favorite plaster, which has perhaps helped an aunt or a cousin, in case it contain no substance irritating to the skin; simple covering of the carcinomatous ulcer with wadding or with a cat's skin suffices to protect it from pressure or blows. When a definite diagnosis and prognosis has been made at the beginning, or as soon as a definite prognosis can be given, we should be so much the more positive in advice and action.

As a general rule, I might lay it down as a maxim, that every continuously growing tumor should be extirpated, of whatever nature it may be.

In stabile tumors (small fibromas) and shrinking scirrhus in old women, we need not insist on an operation, though there is seldom any ground for refusal, if it is wished. As regards specially the benign tumors (involution cysts, adenomas, adenoid sarcomas, fibroids and cysto-sarcomas) they should be removed, because by their growth they gradually become more embarrassing, and also because it is not impossible that from some irritation or other, these tumors may take on the character of malignant

medullary carcinoma, or, in later years, of carcinoma with rapid course. There are plenty of cases from older and recent times which show that tumors which for years had every appearance of being benign, later took on a malignant character. In regard to this, there is scarcely a difference of opinion, even though this idea rests more upon the statements of the patients than upon direct observation by physicians. Having a tumor has usually a depressing influence upon every woman, and on this account it is humane to free them from the tumor, for there is, on account of the great frequency of cancer of the breast, the fear that a cancer might develop from the induration. There are many women who are more relieved when the physician decides for them, whether a stabile tumor shall be retained or removed, than when it is left to their own decision.

In cancerous tumors I would advise immediate extirpation so long as we can remove the whole of the appreciable mass of tumor without presumptive danger to life. It is certainly true that many slow-growing tumors of this kind may be considered as innocuous for a long time; but then, the right moment for extirpation may easily be passed over with time. There is no doubt that infection of the lymphatic glands is hindered or at least diminished by early and thorough removal of the mammary cancer. Still, even when the lymphatic glands are affected and may still be extirpated, the operation should be done as quickly as possible; for, perhaps in this way, general infection, even if not prevented, will be deferred much longer, inasmuch as the new arrival of infectious material will be prevented. Recurrences of tumors of the breast are also to be operated upon, when this can be done with a prospect of removing all of the diseased portion. If the recurrent or primary carcinoma is adherent to the pectoralis major muscle, this must also be removed in so far as it is diseased. Co-affection of the ribs is in my experience, in those cases in which operation is still a question, rare. In such cases I would scarcely decide on resection of the ribs, as an opening into the pleura under the circumstances would possibly and probably be followed by death from pyothorax; superficial diseased portions of the ribs may be removed without any risk. Operations are usually in vain in cases in which the skin is studded with many nodes and nodules. If the axillary glands are strongly adherent to the vessels and nerves, as shown by the immovability of the tumor, and by œdema of the arm and by neuralgic pains, the supraclavicular glands being at the same time affected, no further operation is indicated. Even the most expert and experienced operator may be deceived as to whether, in a severe case, every portion of the disease is removable. There may thus be differences of opinion between consultants, and also in regard to the question whether an operation should be performed or not. So too one operator will venture further in such operations than another. It cannot be said, absolutely, therefore, that cases are not to be operated upon. Older operators are so often discouraged

by the frequent and rapid recurrences that they refrain from operating, because they no longer see any remedy in it, also no anceps remedium. The English surgeons are the most conservative in operating on far advanced cases of carcinoma, and the German surgeons, it seems to me, go the farthest in these operations. As regards the cases of compression of the vessels and nerves in the axilla, with the fearful neuralgias in and the indurated elephantiac œdema of the arm, such women have besought me, after they had suffered unspeakably, but were otherwise well and in a good state of nutrition, to give them relief or death by an operation. What can we do in such cases? We may divide the whole brachial plexus in the axilla; but as in laying this bare, we might be compelled to perform high ligation of the axillary artery and vein (which would very probably be followed by gangrene of the arm—as the collateral circulation, according to recent investigations, is established through the vasa nervorum), it would perhaps be more rational to exarticulate the arm, which is only an immovable burden, or would be at least after neurotomy. But would this relieve the pain? May not the supra-clavicular glands also exert pressure on the nerves? In this case the neuralgias would remain after the exarticulation.

With the removal by knife, many surgeons also consider the question of removing tumors of the breast by caustic pastes. The chloride of zinc, arsenic and Landolf's paste are the most popular comparatively, and are still used in various places in different forms (in France as caustic arrows, Maissoneuve). When these pastes are applied to non-ulcerated healthy skin over the tumor they cause very great pain. The application of caustic pastes to ulcerated tumors of the breast is sometimes followed by good results, if they act deeply enough; if such be not the case, they should be re-applied. The uncertainty of the procedure has mostly deterred me from using it, and I have therefore had very little experience with it. As regards the treatment of carcinoma, which cannot be extirpated, the ichorous discharge from the ulcer and the pains, as well as the marasmus, are the best indicators. Antiseptic dressings, such as a solution of chloride of lime, permanganate of potassium, creosote water, charcoal, coal tar, and carbolic acid may be tried, and caustics may be applied locally for the destruction of the cancerous mass.

Among the popular remedies against cancer, which have descended from the Middle Ages, pastes of carrots, of figs with milk, yeast, gastric juice of owls (formerly not infrequently used in Italy), played a great part. None of them have caustic or destructive properties, nor do they promote absorption. On one occasion I allowed an incurable patient, with a discharging, fearfully smelling cancerous ulcer of the breast, on which I had vainly used all disinfectants, to use dried figs cooked in milk. Contrary to my expectation, the odor, which had filled the whole house, and was mixed with that of chlorine and carbolic acid in the most disgust-

ing way, ceased; and, in place of it, there was a faint odor of lactic acid, given off from a process of lactic fermentation, which had been established. With two such dressings daily, the bad smell was entirely mastered; the deodorizing and antiseptic action was excellent. Artificial gastric juice, repeatedly applied to the ulcer, did not act as well; it probably digested the necrotic tissue, though the deodorizing effect was not as good.

After Thiersch had practised the parenchymatous injection of solution of nitrate of silver, experiments were made at my clinic with parenchymatous injection of tincture of iodine. Fowler's solution, solutions of chloride of gold, albuminate of mercury, chromic acid, carbolic acid, etc., in carcinoma of the breast. The results were so absolutely negative, that in not a single case, would a report of the methods have been worth the trouble. Nor can I report anything favorably of electro-puncture (repeatedly tried in my clinic for hours at a time). The continuous use of an ice-bag will not only check the growth of the carcinoma, but will sometimes reduce its size. In doubtful cases I have confined myself to a partial operation, in case the discharging ulcer was sufficiently localized and could be excised. At all events, a simple granulating wound is combined with fewer discomforts than an ichorous ulcer. In the periods of incurability, I pay no attention to the wishes of the patients or their friends for all sorts of cures with wonderful means. I have never seen any effects from them. But I do not mean to say that it is impossible to find remedies which may cause the disappearance and cure of tumors generally, and of carcinomas especially; and it is entirely right to seek for and use such remedies methodically. Still, until such remedies are found, we must remain true to the repeatedly expressed axioms as to operative treatment; we now know, more certainly than formerly, that radical cure, even of cancer of the breast, can be attained by early operation; it is our duty, above all things, to follow this way energetically; unfortunately there is no lack of carcinomatous patients, who seek for internal cures, of whom it may be confidently asserted that they are no longer curable by operation. For easing the fearful pains towards the end of life, we use anodynes. There is scarcely any sense in giving roborants to such patients, or in tormenting them with food. We let them sleep, sleep, sleep! For these unhappy people, subcutaneous injections of morphia are the only and best means of relief.

# CHAPTER XIV.

## THE ANIMAL PARASITES OF THE MAMMARY GLANDS.

### 1. Echinococci.

SINCE by the name "hydatid," we formerly understood every sac filled with watery fluid, it is not always possible to determine as to some of the cases described in older literature whether they really were instances of echinococcus. Accepting every possible case as belonging really to the echinococci, there are perhaps not more than 20 known in literature. I have mostly practised in regions in which echinococci were indeed of the greatest rarity, and I have never seen such a worm in the breast. But even in Iceland, where echinococci are so frequent, physicians assert that their occurrence in the breast is of the greatest rarity. I take the following from the excellent work of Haussman. The statistics hitherto compiled from the literature on the subject are not to be regarded as of great value. It is understood that rare cases are much oftener published than commoner ones. So when Bergmann reckons, that out of 102 cases of echinococci on the whole surface of the body, 15 were in the mammary glands, these numbers do not give us much information as to the true frequency of its occurrence. Boecker's[1] statistics are based on more correct grounds. Of 4770 persons treated in the Berlin Charité in 10 years, 33 were affected with echinococci; 14 of these were women, and in not one of these was the echinococcus in the mamma. According to Leuckart the echinococcus of man comes from the tænia echinococcus of the dog. The development in the mamma proceeds very slowly; according to Leuckart's researches, an echinococcus requires about 5 months to form a vesicle as large as a walnut. Of course the growth of the parasite will encounter more or less resistance according to the laxity or firmness of the mammary tissue. Blows and other irritations would tend to accelerate the growth. Where exact anamnestic data are obtained they show that the process is very different under these circumstances. In a case operated upon by Birkett, the breast containing the hydatid was doubly as large as the other, and the enlargement was discovered 8 months previously. In a case seen by Cooper the hydatid was as large as a filbert, and had existed 11 months. In Le Dentu's case, the tumor, the existence

[1] Statistics of Echinococcus, Dissert., Inaug., Berlin, 1868.

of which had been known for 2 years, was as large as an egg, and in Henry's case it had attained in 3 years the size of a walnut. In one case the echinococcus had a diameter of 3 to 4″ after 6 to 11 years growth. According to Bergmann, the echinococci thus far observed in the breast have never exceeded the size of a hen's egg or the fist.

Hitherto only one mother vesicle has been formed in the mamma, and this in daughter vesicles developed in only a few cases; most of them were sterile. We often search in vain in the fluid for hooklets. Suppuration around the vesicle, especially after traumatism, has been several times observed, giving the appearance of a cold abscess; in a few cases also the lymphatic glands of the axilla are swollen.

Echinococci give rise to the same symptoms as cysts; they cause no pain, and scarcely a temporary feeling of tension. Hydatid fremitus is never observed in them, probably because it was not particularly sought for. It is probably more of an accident, when the diagnosis of echinococcus is made before puncture. It is known to be characteristic of the transparent watery fluid, that it is free from albumin; only when the echinococcus dies is albumin sometimes transuded into the sac, or when the pus formed around the sac becomes mixed with the fluid in the vesicle.

When the diagnosis has been established by puncture, the worm may be killed by the injection of iodine, and the cyst then shrinks to a certain extent. But it is a far simpler and shorter operation to incise the connective tissue sac, allow the echinococcus vesicle to escape, drain the sac, compress it and thus cause adhesion.

## 2. Other Worms.

Haussmann has collected a number of cases from literature, in which thread worms of an indefinable nature have come out of the mamma, especially out of the nipple. Although we cannot in all cases, say what these questionable "worms" were, it seems to me that none of these cases will stand sharp criticism. There is therefore no use in entering further into the matter here; we must wait until the facts are better substantiated.

# CHAPTER XV.

## EXTIRPATION OF THE MAMMA AND OF THE AXILLARY GLANDS.

HISTORICAL REMARKS.—In the history of cancer of the breast, we can study the different views as to the nature and treatment of cancer in general. Whoever is especially interested in the subject can find the material in the history of surgery by K. Sprengel, collected with great care, but with little criticism. Only a small portion of it can be introduced here.

Hippocrates mentions the great frequency of scirrhus in the female breast, but Galen was the first to give an exact description of the nature of extirpation of the breast, and recommended that this be done with the knife. Later, hot irons were used for this purpose, alone or with the knife. The views as to the advisability of the operation varied a great deal. The capability of scirrhus for recurrence was perfectly known in ancient times. But the differentiation of swellings of the breast did not go beyond the conception of cancer occultus and apertus. It was much later in the middle ages that abscesses were differentiated as apostemata; and then was defined the difference between scirrhus, cancer and struma of the mamma, although these were very much mixed. Caustics came into more frequent use in the middle ages, partly as popular remedies; sublimate or arsenic was generally used. Nor has there been any lack of recommendations of specifics against cancer from the middle ages to the present time, and almost all active therapeutic remedies have played parts as specific cancer cures. Arsenic, mercury, iron, and then hemlock and belladonna, were especially used internally.

Most observing surgeons soon saw, however, the inactivity of internal measures, as well as the danger of insufficient caustic measures and other severe dressings. The recommendation to extirpate the concealed cancer, and to treat the open incurable cancer mildly, is very old. The best surgeons have always spoken in favor of the early operation for scirrhus; but if there have been accounts of frequent complete cures, it is very probable that they refer to the benign, hard-feeling tumors, as every tumor which felt hard was formerly called scirrhus. A more exact differentiation of tumors of the breast, based on more painstaking observation of patients, and on anatomical examination of the tumors was first begun by

Abernethy and Astley Cooper, those heroes of English surgery at the beginning of this century.

In the middle ages the whole breast was almost always amputated; later came the recommendation to incise the skin and extirpate the tumors, if they were small. The removal of the whole breast, with the greatest possible preservation of the skin, first came into vogue in the last century.

Formerly the whole breast was raised, and cut off as quickly as possible close to the thorax with a large amputating knife. In behalf of more rapid and easier removal by this elevation of the breast, almost all modifications of the method of operating are made. Joh. van Horne drew stout threads crosswise through the breast in order to make it more tense; Corn. van Solingen used a large fork for the purpose; Adrian Helvetius used a forceps with double hook attachment for this purpose (from which the now so-called Muzeux's forceps probably originated); and H. Vylhorn invented a large cutting forceps for removing the breast quickly.

Fabricius von Aquapendente and Fabry von Hilden were the first to remove the affected axillary glands, and for this purpose the finger was recommended as the best means, after the incision of the skin; a procedure which was more systematically perfected by J. L. Petit.

Extirpation of the breast is total or partial, and is scarcely ever done except for tumors. Partial extirpation is especially done for benign tumors of the breast, where the tumor is dissected out of the gland, and the rest of the latter allowed to remain. In carcinoma, it is better in most cases to remove the whole gland, though, from my experience, I cannot prove statistically that recurrence is more rapid after partial extirpation of smaller cancerous tumors with removal of a proper amount of the surrounding healthy glandular tissue, than after total extirpation of the gland.

In these operations, besides the same preparations as for all bloody operations, the following instruments are used: a scalpel of medium size, scissors, toothed forceps, Muzeux's forceps, sharp double forceps, a large number of sliding catch forceps, threaded suture needles with needle holder, sewing material; compresses and bandages must be at hand. All these operations should now be done by the antiseptic method, and everything necessary for this should be prepared.

The patient to be operated upon is best placed upon a table, with the upper part of the body somewhat elevated. If the skin over the tumor is movable and healthy, and if the size of the tumor is not larger than that of a moderate sized apple, the incision through the skin should correspond to the longest diameter of the tumor, and should be made only after the tumor has been grasped by the left hand and fixed. After the incision, the tumor will push forward, and a few superficial lateral incisions will be sufficient to almost entirely remove it; the tumor is then seized with the left hand or by an assistant, or grasped with Muzeux's forceps,

is drawn forwards, and cut away with the knife or scissors. This is easily done with encapsulated tumors, but is impracticable with carcinoma: here the skin must be dissected away, the tumor drawn forward, and sound tissue removed from the gland substance for about one inch outside of the tumor and carcinomatous induration.

If the skin is adherent to the tumor, or is very thin over it, or if ulceration has already taken place, a part of the adherent or ulcerated skin is removed by an oval incision. The long direction of this oval incision is best made from above and to the outer side, downwards to the lower and inner side, as in this way the incision may be easily carried into the axilla if extirpation of the axillary glands is shown to be necessary.

Total extirpation of the breast is done in the same way, except that the oval incision runs around the breast, and to get a better view of the field of operation, the arm on the affected side is held up. More or less skin is removed according to the size of the tumor, the extent of the adherence with the skin, or the ulceration; the gland is then raised and separated from the pectoralis major muscle, cutting from above downwards, an easy operation. If the tumor is adherent to this muscle, much of it must also be removed, whereby the ribs will often be exposed. If portions of the gland remain (especially below and outwardly, and above), they must be removed with the scissors. When there is an abundance of adipose tissue, whatever feels hard or nodular is cut away from it, as such places are always to be looked upon as beginning carcinomatous infiltrations; feeling is much better here than seeing.

These operations must be done quickly, because the blood sometimes streams from a great number of arteries. Immediately after the removal of the diseased parts, the arteries should be seized with slide forceps, and after removal of the gland, must be ligated or compressed by means of a suture. When the hemorrhage is controlled, the wound must be very carefully examined for any trace of diseased or suspicious tissue, and this immediately be removed by the scissors if found.

If the axillary glands are swollen or indurated these glands must now be extirpated. For this purpose the incision is carried from the existing wound as high up into the axilla as is necessary, in order to get at the swollen glands; in doing this the border of the pectoralis major muscle is laid bare, thus bringing us to the fascia, which is to be cut through. The finger can now be forced in and all the glands and fat be shelled out from the axilla and under the pectoral muscle. In doing this the glandular vessels are isolated with closed forceps or closed scissors, two hæmostatic forceps or slide forceps being placed on each vessel, and the vessel cut between them. Then the central (proximal) end is ligated, and the forceps removed. The long thoracic artery usually has to be tied. If the glands are all adherent to one another and to all the vessels and nerves, the operation is very difficult; it is very easy to tear the axillary vein and

artery, and care, circumspection and presence of mind are necessary to remove all the diseased portions without wounding these vessels. I may advise that the operation be not undertaken without sufficient assistance, and not unless such operations have been previously witnessed. If the operator should be so unfortunate as to tear the axillary vein, it is best to place a double ligature on it immediately, as the entrance of air, with fatal consequences, has been observed.

If one is in the habit of doing such operations often, he soon learns always to follow a certain method. After cutting through the fascia covering the axillary glands and fat, I usually immediately loosen all the fat and the glands up to the large vessels and nerves, and then proceed backwards and downwards with the operation. In this way the axillary vein is laid bare, as a rule, and usually at the point of entrance of the thoracic vein; if the latter can be ligated at about ¾ inches from its entrance into the axillary vein, this should be done; it is not advisable to tie it closer than this, because in case of suppuration the short portion easily becomes necrotic, and dangerous secondary hemorrhage may result. In the cases in which the ligation cannot be done at the length mentioned, I would advise the ligation of the trunk of the axillary vein above and below the entrance of the thoracic vein, and its division between the two ligatures. Ligation of the axillary vein causes far less disturbance of the circulatory system of the arm than would at first be thought. I have performed the operation very often, and only rarely have I seen œdema of the arm from it. In the cases in which there is considerable indurated œdema in carcinoma of the axillary and supra-clavicular glands, many more veins than the axillary must be compressed, or the compression must be much higher than the axilla. In purulent decomposition in the axilla, extensive formation of thrombi, softening of the thrombi, emboli in the lungs, and the characteristic symptoms of pyæmia may result. I cannot sufficiently advise against the use of styptics in these operations; we must search for and tie bleeding vessels, until bleeding ceases. We seldom come in conflict with the axillary artery in these operations; if it be closely adherent to the infiltrated carcinomatous tissue, we must perform a double ligation and extirpate the diseased portion. As a rule, gangrene does not follow simple ligation of an axillary artery and vein, but it might probably when the nerves are laid bare at the same time to a considerable extent. Only once, in the case of a girl, nine years old, have I extirpated the axillary artery, vein and portions from all the nerve-trunks, on account of a medullary lympho-sarcoma in the axilla; the arm did not become gangrenous, but ulcers appeared on it on the least compression, which were only cured after a long time by the most careful treatment.

That an expert operator can attempt more, and do it quicker and with less loss of blood, than one who only exceptionally does such an operation is of course understood.

*Dressing and After-Treatment.*—Formerly we were chary in uniting these wounds. As a rule, so much skin was cut away from over the mamma, that union was not to be thought of without modern therapeutic means, and the wounds in the axilla were not united on principle, so as the more certainly to avoid retention of secretion (so-called burrowing of pus), since this was the principal cause of extensive septic phlegmons, secondary hemorrhage, erysipelas and pyæmia. There is probably no doubt at all that, of all the methods hitherto employed in the treatment of wounds, the antiseptic method has earned the preference; it seems to give comparatively the most certain prophylaxis against the accidental diseases of wounds, to which formerly, and especially in operations involving the axillary space, so many patients fell a sacrifice. Therefore it cannot be recommended too strongly, that these operations should always be performed with strict antiseptic precautions, and particularly with those modifications of it in which the operator is most expert. As it is beyond the limits of the present discussion to speak generally of the antiseptic method, I will only call attention to those points which seem to me most important in the amputation of the mamma and the cleansing out of the axilla.

In order to obtain union of the wound, wholly or in the greatest part, after amputation of the mamma, when almost all the skin over the mamma is removed, I cannot sufficiently recommend the use of a few button-sutures (silver wires, with lead plates, fixed with shot). When the skin has been approximated closely in this way, the usual sutures are inserted. It is astonishing under how great tension (fixation of the thorax and arms after the operation being presupposed) primary union will take place. But we must not be betrayed into taking away too little skin in amputation of the mamma for carcinoma, in order to get more rapid healing. If it is impossible to unite the whole wound, so much as is possible is united at the sides, the wound is drawn together as much as possible by button-sutures, and the fresh wound, where it is not united, is covered with protective and Lister's dressing.

Recently, after cleaning out the axilla, I have always united the wound, after it had been carefully drained. I have found it a good plan to transfix the soft parts below and behind (the deepest part of the wound with the patient lying on the bed) and put in a thick drain; besides this, three drains are put in above, the situation and patency of which are exactly known after closure of the wound. By putting two or three button-sutures, the cavity of the wound in the axilla can be diminished to one-fourth its size; the edges of the wound are then closed by sutures as usual. Compression of the axillary cavity with the dressing, by means of curled gauze is very useful. The antiseptic dressing should be as extensive as possible, surrounding the arm, fixed to the thorax, the whole thorax to the neck, and should extend below to the twelfth rib, and be fixed by

oiled silk bandages. If, after its completion with the patient in the ting position, the dressing gapes below when the patient lies down, gaps are to be filled with salicylic jute.

The danger of the operation is extraordinarily diminished by the an septic method. I have often allowed my assistants to do these operation because they teach a great deal about the technique of operating an dressing. Until the year 1877, I operated and dressed, with a few ex ceptions, mostly abortive cases of antiseptic dressing, according to the old methods (application of charpie, etc.). Of 305 such operations (in private and hospital practice), 15.7 per cent. terminated fatally, and in fact 6.7 per cent. were cases in which the mamma alone was operated upon, against 21.3 per cent. of the cases in which the mamma and axillary gland were operated upon at the same time, or the latter alone removed (for infection recurrences). Since January 1, 1877, until the present time (August 1, 1879), I have operated exclusively according to the antiseptic method Of 68 operations (in hospital and private practice) only 4 or 5.8 per cent. have resulted fatally, 0.0 per cent. of the operations on the mamma alone, and 10.5 per cent. of extirpations of both mamma and axillary glands, or of the latter alone. In one case death was due to primary hemorrhage occurring on the evening of the operation, and in three cases it was due to sepsis.

If the objection be made that the contrast of the results of 305 operations with those of 68 can give no exact basis of comparison, I can only say that any series of 68 operations may be taken from my general statistics of earlier or later times up to 1876, and the ratio of percentage will not be different.

If we except from the four fatal cases, that of fatal hemorrhage on the first day, the mortality falls to only 4.4 per cent. I would not think it striking, however, if some operator should have 100 such cases in succession without a death, as the personal expertness of the surgeon and his assistants is a matter of great consideration.

# New Growths of the Uterus.

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# INTRODUCTION.

TUMORS develop in connection with the uterus as often, perhaps, as in connection with any other organ of the body. As regards the variety of growths that may invade its structure, the womb also occupies a front rank. It would be difficult, however, to establish by figures the proof of these statements. Indeed, we lack statistical evidence of an unimpeachable kind to guide us in our attempts to accurately establish the relative frequency of all neoplasms. According to the tables published by Gurlt,[1] embracing 15,880 cases of tumor observed in the Vienna hospitals, males furnished 29.84 per cent., and females 70.16 per cent. of all cases. This proportion of about seven females to three males is all the more noteworthy, when it is remembered that more men than women (about five to four) were admitted to the Vienna institutions.

The great preponderance of tumors in women is largely due to the frequency of neoplasms of the uterus. In 14,630 of the above cases, in which the nature of the growth was ascertained, 3,521 concerned the womb. (The other female sexual organs, including the mamma, were affected 3,009 times.)

C. O. Weber[2] has prepared a table of 740 cases of tumor, and according to his figures the uterus occupies only the tenth place as regards frequency of invasion. But Weber based his calculations on cases that came to him for operative relief in a general surgical practice. Moreover, he admits that uterine cases were rarely admitted to his wards. It will be seen, therefore, that no inference can be drawn from his figures. And indeed similar objections hold good for most clinical reports which have been published with a view to shed light on the relative frequency of tumors. While accuracy is thus out of the question, there is certainly no reason to doubt that the uterus is very often invaded by neoplasms.

[1] V. Langenbeck's Archiv., Vol. XXV.

[2] Chirurgische Erfahrungen, Berlin, 1859, p. 284.

We have as yet no knowledge regarding the causes of the frequency o uterine tumors. It is true that there is nothing surprising about th phenomenon. We have only to remember the number of different tissu that compose the organ in question, the numerous changes incident its peculiar functions, (*e.g.* menstrual congestions, and puerperal evol tion and involution), and it will appear quite natural that the uterus more prone to disease than other organs, and especially to the develc ment of tumors.

But beyond such general conceptions concerning the probable etiolo of tumors of the uterus, we have not hitherto progressed.

Congenital uterine neoplasms are of extreme rarity. Before puber and for some years after its advent, new growths of the womb are likew of very exceptional occurrence.

This again shows that the prime causative factors must be the recurre of menstrual congestion, and the more profound structural alterations cident to childbirths.

The well-known hypothetical views of Cohnheim respecting the ori of tumors, in accordance with which they all start from inclosed germ embryonal formation, will not be discussed here. It is still an open q tion whether his inferences receive corroboration or refutation fro consideration of uterine tumors. In the more detailed account of different kinds of new growths this interesting topic will receive furt attention. It may be mentioned in this connection, however, t Cohnheim, in his work on general pathology, frequently refers to uterus and to the tumors which are apt to grow in it.

A certain number of cases are on record in which uterine neopla appear to have developed at a very early age, but in no instance ha been shown that they were really congenital formations.

Uterine tumors may be classified as follows:

## I.

Neoplasms which start from the proper substance of the womb, are made up of connective tissue or muscular fibres, or both This gr includes:

1. Fibromyoma and Myxoma, which are clinically benign tumors, represent histologically mature connective tissue or unstriped muscle.

2. Sarcoma, which represents immature or embryonic connective

sue. These growths, however, may also start from the conjunctive tissue of the uterine mucous membrane.

## II.

Neopiasms which originate in the mucous membrane of the uterus, and are composed largely of epithelium. This division embraces:

3. ADENOMA and certain POLYPOID GROWTHS, the latter being clinically benign, while the former occupies an intermediate position between malignant and benign tumors.

4. PAPILLOMA, which clinically may be called semi-malignant.

5. CARCINOMA, which is always malignant.

As the descriptions which are to follow will be mainly based on clinical facts, the different sarcomata may be considered together in a single chapter, be their origin what it may.

The so-called fibrinous and placental polypi will not be discussed, since they cannot properly be regarded as new growths. Tuberculosis of the uterus will likewise receive no attention. As regards uterine cysts, if we understand thereby isolated cavities containing fluid, and furnished with walls of their own, such formations exist in the pages of certain text-books, rather than in the bodies of patients. The composite growths known as fibro-cystic tumors will be described in a separate chapter.

This translation is not a strictly literal one. A number of tables and cases, not appearing in the author's second edition have, for completeness sake, been incorporated with the present issue. For assistance in the actual work of translation, the editor is indebted to Drs. Wm. H. Flint and I. Oberndorfer of this city.

# NEW GROWTHS OF THE UTERUS.

## CHAPTER I.

### THE ANATOMY OF MYO-FIBROMATA OR FIBROID TUMORS OF THE UTERUS.

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IN the following table, reference is made, as a rule, only to the monographs and to those parts of general works which were consulted in the preparation of this chapter. References to special journal articles are made in the text. A † indicates that I myself have not read the work, and consequently cannot vouch for the correctness of the citation.

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The tumors of the uterus commonly known and described as fibroid are chiefly composed of smooth muscular fibres, or, more correctl speaking, they consist of the same histological elements as the uterin walls themselves, *viz.*, unstriped muscular fibres and connective tissue All the neoplasms belonging to this class invariably contain both kinds tissue. But the proportion of one to the other varies largely in differen cases. If the tumor represents mainly a simple hyperplasia of uterin

FIG. 1.—FIBRILLATION OF A FIBRO-MYOMA. Natural size. (From the Collection of the Patholo cal Institute at Strasburg.)

tissue, (such as is normally witnessed in pregnancy,) there is a prepon derance of muscular over connective-tissue elements. In that case th growth approaches the type of pure myoma. On the other hand, if fron the very incipience of the new formation, the connective tissue predomi nates, or if it does so secondarily by a process of fibrous induration, then the muscular tissue being held in abeyance, as it were, we get an almost pure fibroma.

Nevertheless it would not be in accordance with histological principles to divide these tumors into myomata and fibromas, since, as already stated, both varieties of tissue invariably coexist in them. A better plan, and one based on clinical symptoms, is to separate hard from soft fibromyo-

mata. A diagnosis in this sense is often possible, thus justifying the distinction recognized by English authors between white fibroids, and fleshy or red fibroids. The latter variety is always characterized by the preponderance of muscular elements. Such tumors are also more abundantly supplied with blood-vessels, and contain only sparing amounts of loose connective tissue. These soft fibromyomas are intimately connected with the true substance of the uterus, and a separation can be accomplished only with considerable difficulty. Indeed they represent but a local hyperplasia of uterine tissue.[1] With the preponderance of fibrous elements, on the other hand, we observe a lessened vascularity. The harder the fibromyoma, the less firmly is it united to the uterine walls. As the latter, *i.e.*, the hard variety, is the one most frequently met with by far, the claim of absolute non-vascularity, or at least an extreme paucity of

FIG. 2.—SPACES BETWEEN THE MUSCULAR FIBRES OF A FIBRO-MYOMA. Natural size. (From the Collection of the Pathological Institute at Strasburg.)

blood-vessels, has obtained a wide currency. It is true that attempts to inject these hard tumors from the uterine vessels, have only very rarely proved successful. (Barnes, Klob, Schroeder, van der Kolk.)

Turner,[2] however, alludes to the successful injection by Goodsir of a pediculated, subserous myoma. Large vessels were seen to enter the tumor through its pedicle, ramifying under the peritoneal investment. The loose interstitial tissue was likewise quite vascular, whereas the solid mass of the growth looked very pale. Taken as a whole the neoplasm was much less vascularized than the adjoining uterine tissue.

Klebs describes a peculiar arrangement of the muscular fibres of these tumors. For according to this author, they are connected with the vessels in such a way that bundles of smooth fibres surround the larger capillaries, thus leaving spaces between the vascular sheaths and the

[1] Comp. Spiegelberg: Archiv. f. Gynkologie, VI., p. 515.
[2] Edinburgh Med. Journal, 1861, p. 706.

muscles. Such crevices he regards as lymph-spaces. The growth of the tumors he then explains by a process of proliferation which begins in the connective tissue and muscle fibres that belong to certain vessels. In this way, he thinks a number of small growths originate, which by agglomeration at length produce a larger tumor.

Kleinwächter[1] describes the evolution of fibroids from certain round cells, which occur alongside of slowly obliterating capillaries. These round cells are transformed into spindle-shaped corpuscles, which arrange themselves in such a way as to form myomatous nodules. The arrangement of the interlacing fibres of these growths does not appear to be governed by any law.

Nerves, the presence of which had been previously assumed (Astruc, Dupuytren), were first actually found in fibroids by Bidder.

Hertz[2] describes nerve-terminations in the smooth muscle-fibres of a uterine myoma. Delicate fibres, such as Frankenhäuser and Arnold have described, could be traced as far as the nuclei of the muscle-fibres. But since the examination of Hertz was made on a piece of tumor spontaneously discharged, there is no proof that the fibrils in question were really nerves.

Lorey[3] records a case of uterine polypus, consisting of smooth muscle, in which he plainly saw medullated nerve-fibres. In one microscopical specimen, a nerve-fibre was seen to end in a "terminal body."

The soft fibromyomas are usually found near the fundus uteri. As a rule they occur singly, the multiple tumors belonging to the harder, more fibrous type. This latter variety is seen far more frequently than the former. It has been already stated that, the soft and succulent neoplasms are intimately connected with the substance of the uterus. Indeed this union is often so complete that it becomes difficult to isolate the tumor. But the hard fibroids are commonly distinct and separate from the surrounding structures, being enclosed in a sort of capsule. From the latter they can be easily enucleated. The capsule itself appears as a smooth cavity in the interior of the uterine substance. It originates from a pushing apart of fibres by the growth of the tumor, and never shows a true investing membrane. Even when the tumor has attained a very large size, uterine fibres completely surround it. But cases often occur in which at some point the uterine tissue has become so attenuated as to be barely discernible, forming only a narrow rim over the projecting mass of the tumor. Loose connective tissue is found between the substance of the growth and its capsule. And it is this circumstance which so greatly facilitates enucleation. In this layer of tissue and in the adjoining uterine substance, blood-vessels, principally of the venous kind,

[1] Zeitschrift f. Geburtsh. u. Gynäkol., IX.
[2] Virchow's Archiv., Vol. XLVI., p. 235.
[3] Deutsche Klinik, 1867, No. 21, p. 194.

and often attaining a large size, abound. The arteries are generally smaller and are more scantily supplied. In some instances the uterine tissue immediately surrounding such neoplasms shows a distinctly cavernous structure. From branches of these vessels the nourishment of the tumor is effected.

As a general thing fibromyomata are of slow growth. Moreover it continues only during the period of functional activity of the sexual organs. It takes place in most cases in the direction of the least resistance to development. This leads to important variations in the seat of the tumors, variations which materially affect the well-being of the patients. The practical issues involved in this peculiarity will presently receive attention.

FIG. 3.—HISTOLOGICAL STRUCTURE OF A FIBROID TUMOR. The dots represent cross-sections of Fibres. (Magnified 30 diameters.)

Fibroids may exist singly, or, what is more common, they occur in groups. Their size varies from growths not larger than a pea to tumors weighing sixty pounds or more, which fill almost the entire abdominal cavity. They are rarely met with in the cervix, their point of predilection being the posterior wall of the uterus. Next in point of frequency is the anterior wall, and then the fundus.[1] Thomas Lee observed only four cervical tumors among seventy-four myomas, and Courty mentions twenty-one out of a whole number amounting to 131.

Of greatest significance, as regards the symptoms and course, is the point at which the fibromyoma is developed. When the morbid process begins in the superficial, sub-peritoneal layers of the uterine tissue, the

[1] Houel, Manuel d'Anatomie Pathol., p. 596.

tumor, following the direction of least resistance, grows out into the abdominal cavity beneath the peritoneum, constituting a so-called sub-serous fibromyoma.

If, on the other hand, the tumor arises within the uterine substance, invading gradually the neighboring muscular layers, we have what is called an interstitial (intra-muscular or intra-parietal) myoma. Finally, tumors which begin in the muscular layers immediately beneath the mucous membrane, the direction of growth being chiefly into the uterine cavity, are designated sub-mucous. Strictly speaking, those tumors only should be called sub-serous which hang free in the abdominal cavity, attached by a loose pedicle, and covered only by the peritoneum; in those cases the only connection with the muscular tissue of the uterus is through the pedicle. In like manner, we should call those growths only sub-mucous which hang by a pedicle in the cavity of the womb, and which have no muscular coat. But neoplasms of this kind are also frequently designated fibrous polypi. These two forms differ from each other and from the interstitial variety, in symptoms, prognosis, and treatment. A strict anatomical division, however, cannot always be maintained, at least not during life. As soon as an interstitial fibroma has grown beyond the thickness of the uterine wall, unless its growth be exactly even on all sides, it will project more into the abdominal or uterine cavity, and thus become practically, as regards the symptoms, a sub-serous or a sub-mucous polypus. Anatomically, however, such a growth would still be classed among the interstitial tumors. Much more complicated, of course, are the symptoms in case of multiple tumors in different situations.

To whatever variety it belongs, the tumor may be at times observed to vary in size, quite independently of its natural growth. This change of volume takes place most frequently before or during menstruation. It may be due to increased fullness of the vessels, but more frequently, since these growths are but slightly vascular, is owing to increased succulence dependent upon menstrual congestion. In certain soft intra-muscular tumors, a diminution of size may occur through a contraction of the remaining muscular elements, a return to the former dimensions depending upon subsequent relaxation of the muscular tissues. (Virchow, Klebs.)

The sub-serous fibroids are attached to the external uterine wall by a pedicle of varying thickness and length. The longer and thinner the pedicle, the more movable is the tumor in the peritoneal cavity. In the case of a large tumor with short pedicle, the uterus is often pulled up for some distance and its cavity deepened very considerably, while the tumor itself may extend up as high as the epigastrium. In such cases it may be impossible to reach the os with the finger introduced into the vagina. Spencer Wells[1] observed a very large fibromyoma of this

[1] Transactions of the London Obstet. Soc., vol. XI, p. 73.

sort, extending from the posterior uterine wall, which he mistook for an ovarian tumor, and removed. This drawing up of the uterus may reach such a degree as to tear the body completely away from the cervix.[1] Times[2] relates a case in which the uterine cavity was six inches deep, and the cervix was so stretched that its canal was obliterated an inch from the os. A space of two inches between the cervical canal and the cavity of the body was occupied by a thin muscular cord, in which the obliterated canal could be traced. This case, however, cannot strictly be regarded as a separation of the neck from the body of the womb. (See also Küster's

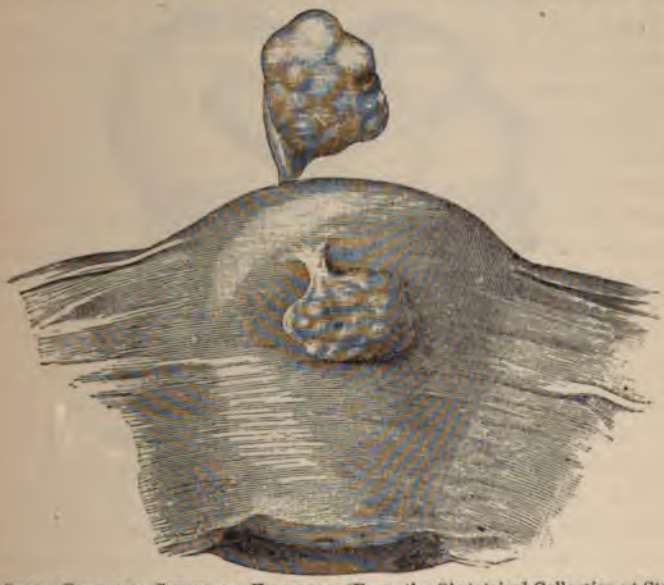

FIG. 4.—SMALL CRETIFIED SUBSEROUS FIBROIDS. (From the Obstetrical Collection at Strasburg.)

case, p. 174.) Rokitansky[3] by no means relates a case of this kind, as has been repeatedly attributed to him, but merely says that "a separation of the body from the cervix" might occur.

The shorter the pedicle is, the less distinctly can we determine an independent movement of the tumors. When, as is most frequently the case, they spring from the posterior wall of the uterus, they may sink down into Douglas's *cul-de-sac* and become immovably wedged there. Adhesions often form in these cases between the tumor and the peritoneum, so that the former is actually immovable. In other cases, in which there are no adhesions, the immobility is only apparent; and firm pressure through the vagina may force the growth out of the pelvis into the abdominal cavity

[1] Virchow Geschwülste, vol. III., p. 161.
[2] Transactions of the London Obstet. Soc., vol. II., p. 34.
[3] Pathol. Anatomie, 3d edition, vol. III., p. 482.

(provided the pedicle be long enough), thus often relieving grave symptoms of strangulation. These lodgments take place most frequently in the case of a tumor with a long pedicle, which allows the growth to obey the laws of gravity and to sink into the pelvis. So that when we find a tumor with considerable mobility in the abdominal cavity, provided it be not of great size, we may conclude that it has a rather short attachment. The greater or less mobility of these new growths often occasions a number of the most varying symptoms, which will be considered later. But it seems also as though a slight degree of local peritonitis, lead-

FIG. 5.—LARGE SUBSEROUS MYOMA OF THE UTERUS. (After *Spencer Wells*, l.c.)

ing to adhesions between the tumor and neighboring organs, were easily caused thereby. Thus adhesions of sub-serous fibroids with the anterior abdominal wall and the mass of the intestines are sometimes seen, which give rise to the most painful symptoms. The adhesions to neighboring organs may lead to an increased growth of the tumor, owing to the communications established with the vessels of the omentum, etc. (Virchow. See also the cases observed by Hofmeier at Schröder's clinic.[1]) Abscesses of considerable size even may grow into the tumor from the point of adhesion. (Chambers,[2] Vogel, Rokitansky, and Virchow, loc. cit.) The adhesions may even so surround the tumor as to cause an apparent or real separation from the uterus itself. (Rokitansky, Virchow.) The tumor may become adherent to a movable organ, as the intestine, or to one

[1] Zeitschr. f. Geburtsh. u. Gynäkol., vol. V.
[2] London Obstet. Trans., vol. XI., p. 31.

whose form is changeable, as the bladder. In such case, provided the pedicle be long and thin, the tumor will follow the movements of the organ to which it is attached, and appear to lie free in the abdominal cavity. When the tumor is attached to the wall of the pelvis, the enlargement of the uterus during pregnancy may cause a tearing loose of the new growth. This was the mode of production of the pelvic tumors described by Huguier and Nélaton.[1] Depaul[2] found a fibroid tumor lying detached from the uterus in Douglas's *cul-de-sac*. Turner[3] found a calcified fibroma, the size of a hazel-nut in Douglas's pouch, which was attached to none of the neighboring parts. In the same case a second smaller tumor was found separated from the uterus, but attached to the pelvic wall behind this organ. A third tumor, the size of a walnut and calcified, was discovered firmly united to the bladder and wall of the pelvis, while it was still connected with the uterus by a thin pedicle.

Simpson[4] states that he has met with several such cases. He relates[5] especially the case of a lady, the subject of extra-uterine pregnancy, after whose death, consequent upon puerperal peritonitis, a fibroma was found attached firmly to the anterior abdominal wall, the pedicle of which, leading to the uterus, had been torn by the growth of the latter organ. West[6] and Porter[7] have also seen cases of this kind.

The pedicle of such a tumor is usually very thin and contains a scanty supply of blood-vessels, so that the fibroma often atrophies or becomes calcified, and is seen as a little shrivelled-up mass. In other cases, where the tumors are bulky, the pedicle may contain very large vessels. Chambers (l. c., p. 33) saw several vessels the size of a quill in such a pedicle, and Graily Hewitt[8] mentions some one-third of an inch in diameter. Martin le Jeune[9] found a tumor weighing six pounds attached to the uterus by a pedicle two inches in length and one inch in thickness. Cruveilhier[10] describes the pedicle of a twelve-pound myoma with the thickness of a quill pen. James Cappie[11] found in a woman suffering from a fibroid tumor of the uterus, who died from peritonitis consequent upon a fall, that the tumor, measuring twenty-four inches in circumference, was partially gangrenous. This had been caused by a twisting of the pedicle one and a half times around its axis, thus stopping the blood supply to the tumor.

The most common seat of these sub-serous fibromata is the posterior

[1] Gaz. des Hôp,, 1860, p 411, and 1862, p. 77.
[2] Bull. de la Soc. Anatom., XIX., 13.
[3] Ed. Med. Jour., 1861, p. 698.
[4] Selected Works, Edinb., 1871, vol. I., p. 716.
[5] Obstetr. Works, 1st ed. p. 834.
[6] Lehrb. der Frauenkrankheiten, 2d ed. p. 313.
[7] Dub. Med. Jour., 1875, p. 247.
[8] London Obstet. Soc., vol. II., p. 241.
[9] Mém. de Médecine, Lyons, 1835.
[10] Anat. Pathologique, III.
[11] Obstet. Jour., vol. II., p. 303.

wall of the uterus; they are found but seldom at the side in the broad ligaments. Usually the tumors are multiple, though some may be intramuscular or sub-mucous.

The influence of these tumors upon the shape of the uterus has been spoken of above. The change of form, when it occurs, consists in an atrophy and a lengthening of the organ. Atrophy, without at the same time a considerable lengthening of the organ, has nothing to do with the existence of a tumor, but is commonly due to senile changes. E. Küster[1] has observed a very peculiar case of this nature. By reason of the

FIG. 6.—LARGE SUBSEROUS MYOMA OF THE UTERUS, starting from its posterior surface and wedged in the Pelvis without adhesions. (From the Collection of the Pathological Institute at Strasburg.)

growth of a myoma, the size of a man's head, at the fundus, the uterus was greatly lengthened, the cervix especially being four inches long and with very thin walls. This elongated neck had become a cord the size of a finger, through a twisting of the womb two and a half times around its axis; the round ligaments were wound spirally around this cord, looking like two strings of the thickness of a goose-quill. The twisting had probably been caused by intestinal movements, as the anterior wall of the uterus was attached by ligamentous masses to the descending colon.

As sub-mucous fibroids only those tumors are to be designated which

[1] Beiträge für Geburtshülfe, etc., of the Berlin Obstetrical Society, I., 1873, p. 7.

g by a pedicle within the uterine cavity. They are entirely covered h uterine mucous membrane, as is also the pedicle. The latter is etimes formed of mucous membrane alone. These so-called fibrous ypi differ greatly from the tumors with broad base which pro- into the cavity of the uterus. The difference lies in the fact that y have a pedicle (varying in size, but usually rather short and thick), well as in the symptoms and therapeutical indications.

Every fibroma of the uterus which is not pediculated must be classed ong the intra-parietal tumors. These sub-mucous tumors resemble the

.7.—Large Submucous Fibroid of the Uterus. (From the Obstetrical Collection at Strasburg.)

b-serous, except that they are apt to approach more nearly the myomata, soft fibroids (Virchow, Rokitansky). There is but a scanty growth of tra-muscular connective tissue, so that it is easy to separate the bundles muscular fibres from each other. Sometimes there are considerable ces between them filled with a loose connective tissue. These in- stices often become actual cavities, which may perhaps be regarded as mph spaces. The tumors are covered with uterine mucous membrane, neath which there is usually a thin layer of muscular tissue. This ooth "capsule" is often ½ cm. or less in thickness.[1] Although this is usual formation of sub-mucous fibroids, yet some are met with which without a muscular coat or even without a covering of mucous mem-

[1] Hildebrandt, Fibrous Polypi of the Uterus. Volkmann's Klinische Vort- e.

brane. In those cases the pedicle consists entirely of connective tissue. Such tumors are really nothing but spontaneously enucleated myomata, whose coats (mucous membrane and muscular tissue) have disappeared (Männel, Matthews Duncan).[1] Usually the mucous covering is greatly swollen, more or less in a condition of chronic catarrh, leading to bloody and muco-purulent discharges. When the tumor, however, has attained considerable size, the mucous membrane covering it is often greatly stretched and atrophied. By reason of this stretching of the mucous coat and the circulatory disturbances thereby induced, there is often vicarious congestion and swelling of the remaining portion of the uterine mucous membrane.

Klob has observed in the membrane thus stretched, spaces which he says are produced by the falling out of the utricular glands. According to him, therefore, there is a complete disappearance of the investing mucous coat, the remains constituting merely a large-meshed net-work. It must remain undetermined how deeply the utricular glands grow into the tumor, or whether the dropping out of such glands can give rise to the formation of cavities. Probably tumors of this kind do not belong at all to the class under consideration, but find their proper place under diseases of the mucous membrane. Rokitansky (Klob) regards such new growths as adenoid sarcomata of the uterus, but even simple muscular tumors of the uterus he includes in general under sarcomata. Klebs found the mucous covering of fibroids lying in the vagina or external to it (the latter is a very rare condition) to be thick and rugous, and covered with flat epithelium, thus presenting the appearance of the vaginal mucous membrane. He stated that the portio vaginalis had on this account been mistaken for a fibroid.

Scanzoni,[2] on the other hand, mistook such a tumor for the portio vaginalis, a fold in the soft mucous membrane seeming to the finger to be the os. A. Martin[3] saw a very similar case in which a polypus was supposed to be the prolapsed uterus, on account of a similar depression existing on its under surface. The pedicle uniting these tumors to the uterine wall is composed of the same elements as the fibroid itself; its thickness and length, however, are very variable. The larger the tumor and the greater its circumference, the shorter and thicker usually is the pedicle. If the latter be long, the tumor hangs down low in the cavity of the uterus, or may even come outside of it. The large sub-mucous myomata of the uterus are, however, usually of such broad base that it is difficult to distinguish them from the intra-parietal variety. Clinically we may say that all tumors that can be cut off, *i.e.*, whose base may be cut through, belong to the pediculated, the sub-mucous variety; while those

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[1] Edin. Med. Jour., 139, Jan. 1867, p. 640.

[2] Beiträge, II., p. 99.

[3] Bost. Med. & Surg. Journ., June 11, 1867.

whose enucleation can be accomplished only through division of the capsule belong to the intra-parietal class. Cullingworth[1] describes a fibrous tumor five and a quarter inches long by three and three-quarter inches in diameter, which had descended through the external genitals, and was attached to the uterus by two pedicles. Between the two was a space an inch and a half wide. The anterior pedicle was one-half inch long and three-quarter inches wide, and was attached to the left side of the uterus; the other, situated posteriorly and to the right, measuring one-quarter inch in length by one and a half inches in thickness, contained two good-sized vessels. Unfortunately no exact anatomical examination was made of this very peculiar case, the explanation of which anatomically seems so difficult. It is probably to be explained either by the formation of adhesions, or by suppuration causing a loss of substance in the tumor, for the report mentions the occurrence of suppuration.

While the tumors are often quite vascular, especially containing large venous branches, the pedicle seldom contains large vessels, and very rarely large arteries. In a tumor of this kind the size of a small apple, attached to the portio vaginalis, I once found an artery the size of a crow's quill in the pedicle, but that was an exceptional case. In the wall of the uterus, in the neighborhood of the pedicle, there are often very large veins. Indeed Klebs speaks of varices in this situation.

The more these tumors grow out into the cavity of the uterus, the more readily do they excite contractions of the muscular tissue, and are thereby forced down through the internal os, and not seldom even through the external os into the vagina. This process, which gives rise to a number of the most constant symptoms of sub-mucous fibroids, we shall consider more fully later on. We will only remark here that the descent of the tumor is most evident during the menstrual enlargement of the uterus, and it occurs most frequently in the case of the softer variety, the fleshy myoma. The rapidity with which this extrusion, which has been aptly called the birth of the polypus, takes place, depends in general upon the rapidity of growth of the tumor, then upon the thickness of the pedicle, the condition of the uterine walls, the rigidity of the os, and other conditions which will be spoken of later. This process usually ceases when the tumor has passed through the os, although here and there cases occur in which the uterine contractions continue, and, especially in relaxed conditions of the womb, cause inversion. Such an occurrence takes place the more readily, the nearer the point of origin of the new growth is to the fundus.

The form of a pediculated uterine myoma is usually roundish, though a more oval shape is often caused by the shape of the cavity of the womb. In rare cases the tumor has an hour-glass shape, occasioned usually by

[1] Obstet. Journal, June, 1876, p. 155.

constriction by the internal or external os, the part below the constriction becoming swollen from impeded circulation. Very rarely is the growth flat or doubled upon itself, as in a case described by L. Mayer.[1]

The changes in the uterus itself occasioned by the sub-mucous pediculated fibroids are tolerably constant. There is hypertrophy of the same form as in pregnancy. In the case of a large growth, the walls of the uterus are thick, and the mucous membrane is hypertrophied and contains large dilated vessels; so that one really might speak of a "*grossesse fibreuse.*"[2]

The mucous coat of the tumor itself can take part in these changes only when the growth is small; but it may become ulcerated through movements of the tumor. These ulcers, which however are caused most frequently by injuries from without (from the examining finger, etc.), exert a very great influence upon the nutrition of the tumor, an influence which we shall study more carefully further on. They may also lead to the formation of adhesions with the neighboring mucous membrane of the uterus or even of the vagina. Such adhesions to the opposing surfaces of the uterine mucous membrane, with partial occlusion of the uterine cavity, have been mentioned by Klob. Barnes also describes a similar specimen in the St. George's Hospital Museum. Demarquay[3] observed a case in which close connective-tissue adhesions of a polypus to the vaginal wall some difficulty. matter of rendered the diagnosis, as well as the removal of the tumor, a

The intra-parietal (intra-mural, interstitial) fibroids of the uterus are those which have arisen deep within the muscular wall of the womb, and then by their growth stretched out the surrounding muscular layers equally on all sides. Very small growths of this kind may not be discovered except by a section through the wall of the uterus. But the larger ones push the peritoneum outwards and the mucous membrane inwards, so that in a certain sense they may be regarded as at the same time sub-serous and sub-mucous tumors. In this way it may often be difficult, anatomically as well as clinically, to recognize this variety. It has been already pointed out above that in such cases the distinction must rest upon the presence of the so-called "capsule." Every intra-parietal myoma is surrounded on all sides by a muscular layer of nearly equal thickness, from which it is separated by loose connective tissue. Upon section of this muscular layer, the tumor can ordinarily be shelled out with the greatest ease.

The structure of these growths is the same as that of the other fibromyomata, except that most of them seem to be more purely myomata, presenting a localized hypertrophy of the uterine substance. The cells of which

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[1] Berliner Beiträge, III., p. 80.
[2] Guyon: Des Tumeurs Fibreuses de l'Utérus, Paris, 1860.
[3] Bailly: Mouvement Méd., 1867, No. 4.

they are composed are frequently larger, and provided with larger nuclei, than those of the normal muscular tissue of the uterus. They resemble more the muscular tissue of the gravid uterus (Klebs). These tumors may attain a very considerable size, and are not infrequently multiple or mixed with other varieties of fibromata. (Schulze[1] counted over fifty tumors of this kind in one uterus.) Commonly if there is a single tumor, (though often also when there are several together), its point of origin lies in the posterior wall near the fundus; more rarely is it in the anterior wall, and exceptionally only is it found on the side.

The influence which they exert upon the uterus is manifested first by a considerable hypertrophy of the entire organ which undergoes changes

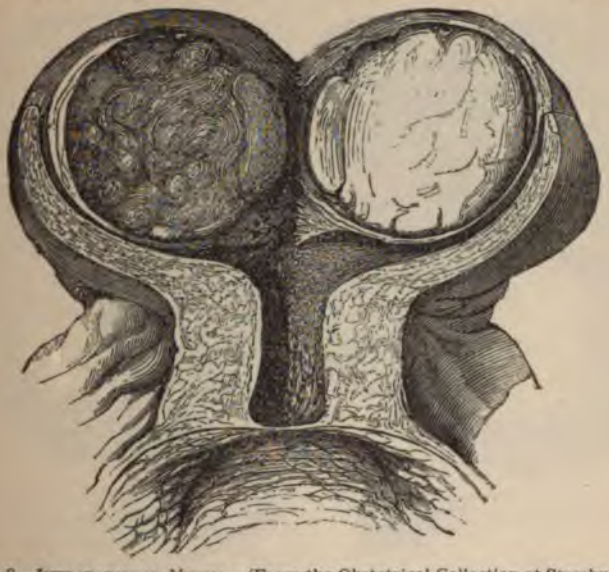


FIG. 8.—INTRAPARIETAL MYOMA.—(From the Obstetrical Collection at Strasburg.)

very like those occurring in pregnancy. Tillaux[2] found in one case *post-mortem* that a few small fibroids, situated in the lower segment of the uterus, had caused an hypertrophy of the entire organ, so that it was of the size of a large child's head. The tissues surrounding these tumors are very vascular, while the tumors themselves often have but a scanty blood supply; not infrequently one sees large vessels, usually veins, passing into the growth.

While hypertrophy of the uterine wall is the rule in this variety, we nevertheless not infrequently find atrophy to such a degree that the muscular tissue seems to have almost entirely disappeared and the tumor appears to be covered only by the peritoneum. This condition of the

[1] Jenaische Zeitschrift, 1870, Vol. V., p. 350.
[2] Gaz. des Hôpitaux, 1867, No. 144.

uterus is not by any means always dependent upon the size of the tumor, but rather upon the age and general condition of the patient. The cavity of the uterus is almost without exception markedly increased in depth, but has usually lost its normal straightness, and seems to be flexed or even bent at a sharp angle.

The shape of the uterus, except where there are multiple tumors, is usually rounded. But it may be so changed and the adnexa may be in so many ways displaced, as to give great trouble, on an anatomical examination, in making out clearly the exact condition.

The position of the uterus varies according to the situation of the tumor. There is seldom much elevation of the organ, nor is pro-

FIG. 9.—INTRAPARIETAL MYOMA. The Capsule has been destroyed, thus exposing the tumor. (From the Obstetrical Collection at Strasburg.)

lapse or even a very low position of the uterus frequently met with. A much more common condition is the complete dislocation of the womb toward the anterior or posterior wall of the pelvis; or there may be flexions of the organ. When the tumors have developed on the side, and especially when they extend between the layers of the broad ligament, the lateral deviation of the womb is marked. The most constant displacements are those which occur when the tumors are wedged into the pelvis, growing backwards and downwards from the uterus, and when they can in no way be dislodged. This is what often happens in the case of subserous tumors which have sunk down into Douglas's *cul-de-sac*. In such a case an intra-parietal myoma may seem to be situated not only behind the uterus but even posterior to the vagina. The tumors

may also develop downwards into the uterine cavity, and passing through the internal os, may reach into the vagina, the cervical canal having disappeared. In these cases one finds upon examination the same condition of things as in the birth or expulsion of a pediculated submucous fibroma, although the tumor is situated entirely within the wall of the uterus.

There is a specimen of a very peculiar development of an intra-parietal myoma in the pathological collection of Strasburg (for permission to describe which I am indebted to the kindness of Dr. von Recklinghausen). It consists of a myoma of nearly the size of a child's head, originating within the anterior wall of the uterus, which has grown downwards


FIG. 10.

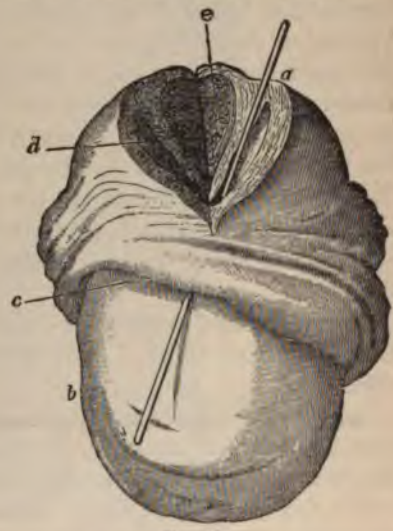



FIG. 11.

FIG. 10.—LARGE MYOMA GROWING INTO THE ANTERIOR LIP OF THE OS UTERI. The capsule of the tumor has been destroyed at the anterior lip.

FIG. 11.—THE SAME SPECIMEN FROM BEHIND. *a*, Fundus Uteri. *b*, Anterior lip of Os Uteri. *c*, Remnant of obliterated posterior lip. *d*, Cavity of the Uterus. *e*, Upper end of the tumor, which arose in anterior wall and has grown downwards to *b*.

into the anterior lip. The posterior lip has entirely disappeared, while the anterior one, the size of a man's fist, reaches down into the vagina. At the lowest point there is a perforation of the capsule, as also of the muscular layer of the portio vaginalis, and the tumor projects through a laceration of the anterior lip into the vagina. The case is described in the thesis of v. Duchémin.[1] The patient was an unmarried woman, thirty years of age. The upper border of the tumor could be felt at the navel, while the lower part entirely filled the vagina. The tumor was dragged outwards and a ligature passed around it in order to strangulate

[1] Quelques Considérationes sur les Tumeurs fibroides de l'Utérus, Strasbourg, 1863.

it. Gangrene of the tumor set in and the patient died of tetanus. This case shows how a fibroma of the body may become one of the cervix.

Although fibroids of the cervix in all three forms are developed exactly like those of the body, yet, not only on account of their rarity, but also because they occupy a peculiar position as regards diagnosis, symptoms and treatment, it seems proper to devote a separate paragraph to them. Those which have the greatest practical interest, and whose removal seems impossible, are the subserous fibroids of the neck of the womb. These usually grow outwards and posteriorly from the cervix, seldom laterally; they are developed either toward the abdominal cavity between the layers of the broad ligament, or pressing up the pelvic peritoneum, or else they grow downwards, behind the uterus or at its side, into the connective tissue of the pelvis alongside of the vagina. In the latter case they may be taken for tumors of the vagina. In every case, when they have attained a certain size, they must fill the pelvis more or less, and occasion thereby grave symptoms, especially, as we shall see later on, during child-birth. Since the attachment to the uterus is close, the mobility of these tumors is greatly restricted, especially as they cannot be pushed into the abdominal cavity on account of their extra-peritoneal situation.

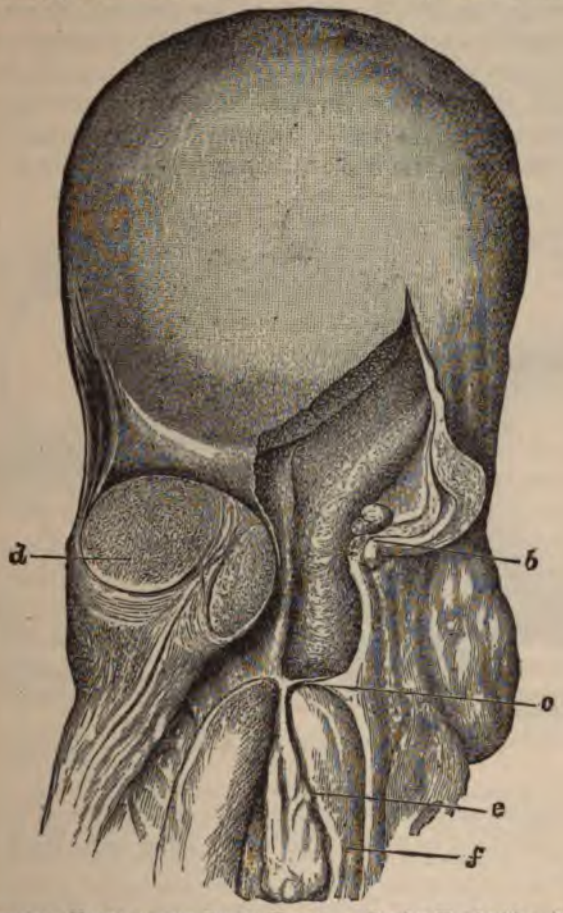
A tolerably large myoma of this kind is in the collection of the Strasburg Obstetrical Clinic, but no history of the case accompanies the specimen.

Spiegelberg[1] relates a typical case of a subserous fibroma of this sort growing from the posterior wall of the cervix. He rightly emphasizes the fact that tumors of this sort may almost completely fill the pelvis, and be irreducibly wedged in there without having contracted any adhesions whatever with the neighboring parts. When we come to speak of parturition in connection with uterine fibroids, we shall have occasion to relate more cases of this kind, which are, however, very rare. Small tumors may of course exist without any great inconvenience. Samson Gommel, of Glasgow, found accidentally at an autopsy a myoma the size of a child's head, which stretched out to the right of the uterus, growing between the folds of the broad ligament, and attached to the neck of the womb by a slender pedicle containing very large vessels. The whole lay freely movable without adhesions in the true pelvis.[2] Mattei[3] has described a similar case.

The submucous myomata of the cervix seem to be somewhat more common than the subserous, though but few cases of the kind are found in the literature of the subject. They arise with a tolerably broad pedicle from the inner side of the cervical canal, and may, through their growth and

[1]Archiv. für Gynaekologie, vol. V., p. 100.
[2]Archives de Tocologie, vol. I., p. 700.
[3]Annales de Gynéc., vol. VI.

ght, drag the uterus or the cervix far down, even outside of the genitals. In this way a very peculiar condition of the parts may ced, the recognition of which during life is often difficult; and the tumor, the greater the difficulty of diagnosis. The lips have y disappeared and the os is so far displaced upwards, that in




SUBSEROUS MYOMA OF THE CERVIX UTERI. *a*, Fundus Uteri with a large Myoma. *b*, *c*, External os. *d*, Subserous Myoma. *e*, Polypus. *f*, Vagina. (From the Obstetrical Strasburg.)

s the observers for a long time thought they had to do with an of the womb. Since the pediculated submucous fibromata of ty very readily sink downwards they are often mistaken for pro- eri; they may indeed produce this condition, which often dis- gain upon the removal of the tumor. Characteristic cases of are described by Peter Müller.[1] He found a smooth doughy

[1] Scanzoni's Beiträge, vol. VI., p. 65.

feeling tumor, the size of a child's head, lying outside of the vagina; from this a slender pedicle passed into the vagina where it widened out into a thicker, conical, fleshy mass which seemed to go directly into the vaginal wall at the fundus. More careful examination revealed to the left of this conical body a fold 4 mm. wide, through which the sound passed for two inches into the cavity of the uterus. There was in this case a polypus of the anterior lip of the os, which had stretched it out very considerably. An artery was found in the pedicle. A similar case is recorded by Hall Davis,[1] in which the tumor arose from the posterior lip with a pedicle one inch thick, and had caused a prolapse of the womb. B. Schultze[2] removed two pediculated myomata, one of which measured 24

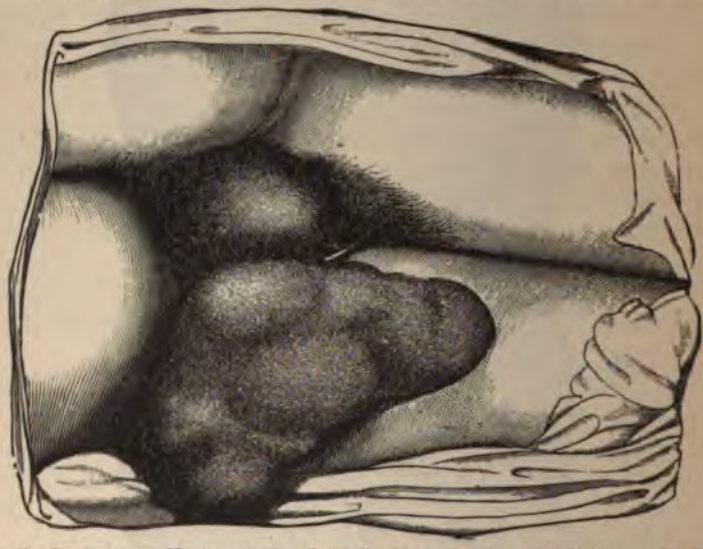


FIG. 13.—PEDICULATED MYOMA, starting from the posterior Lip with Prolapsus Uteri. (After *Barnes.*)

cm. in circumference and sprang from the posterior wall of the cervical canal with a pedicle 4 to 4½ cm. thick; the other arose from the anterior cervical wall.

Finally, a case related by Barnes[3] is instructive: A patient, thirty-seven years of age, had a tumor composed of prolapsed vagina and uterus outside of the external genitals. There was, however, no os discoverable, and while the tumor above was evidently composed of uterine tissue, the lower part, which was pediculated, was harder. As in the other cases, the whole mass was taken for a prolapse of the inverted uterus, until an opening was found anteriorly, which was seen to be the os. After the

[1] Obstet. Transact., vol. IX., p. 152.
[2] Schultze: Zur Casuistik der Uterusfibroide, Diss. Jena, 1875.
[3] Obstetr. Transact., vol. III., p. 211.

polypoid tumor attached to the posterior lip had been removed by the snare, although the fundus could be felt in the inverted vagina, the prolapse was reduced spontaneously.

Submucous myomata of the cervix are in general easily removed when they are pediculated. This also applies to the interstitial variety, when they are developed in one lip and grow downwards. The latter grow less readily outside of the vagina, and also draw the uterus less frequently downwards and outwards, but are more often than the submucous myomata of the cervix mistaken for inversion of the uterus. When a large tumor of this kind grows downwards from one lip, the examining finger naturally finds the orifice of the cervix above; and through the even growth of the two lips in width the os becomes strongly stretched laterally, the free lips being stretched closely against the tumor; in this way a narrow slit is formed, which may be easily overlooked or may be mistaken for the edge of the os of an inverted uterus. P. Müller describes such a tumor, larger than a goose egg, growing from the posterior lip, which seemed to have grown completely into the posterior wall of the vagina so that it could be palpated easily only through the rectum. The anterior lip could not be felt at all, and only after considerable trouble was the os discovered, in the anterior surface of the tumor, feeling like a little dimple; into it a curved sound could be passed backwards for two inches. The tumor was readily removed. It measured 10 cm. in length, 7 cm. in width, and 6 cm. in depth, and was enveloped in a layer of muscular tissue (the capsule) from 2 to 3 mm. in thickness.[1]

Murray[2] saw a similar large interstitial myoma in the posterior wall of the cervix. (See Fig. 14.)

Chiari[3] describes a fibroma growing in the anterior lip, which had caused a prolapse of the entire uterus, and had drawn out the anterior lip into a pedicle the thickness of a finger. After removal of the tumor the prolapse was spontaneously reduced.

Spiegelberg (loc. cit., see Fig. 15) saw a fibroma arising in the posterior wall of the cervix, which had become wedged into the vagina and had formed adhesions with its anterior wall. In attempting to excise the tumor an opening was made into Douglas's *cul-de-sac*, and the patient died from pyæmia.

A very interesting case, belonging to this category, is described by Freund.[4] There was a tumor the size of two fists outside of the vulva, the lower third of which was divided from the rest by a shallow depression. This under part was whitish in color and not sensitive to a pin prick; the upper two-thirds was bluish red, gangrenous and very sensi-

[1] Scanzoni's Beiträge, vol. VI., p. 65.
[2] Obstet. Transact., vol. VI., p. 184.
[3] Klinik der Geburtshülfe, etc., 1855, p. 411.
[4] Betschler: Klin. Beiträge, part III., p. 165.

tive. The tumor seemed to pass directly into the fundus of the vagina. A small opening was at length discovered on the posterior surface, through

FIG. 14.—LARGE INTERSTITIAL MYOMA OF THE POSTERIOR WALL OF THE NECK OF THE U (After *Murray*.)

which a sound passed to the left for 5 cm. into the atrophied ut There was in this case an interstitial fibroma, whose lower third had

FIG. 15.—INTERSTITIAL WEDGED-IN MYOMA OF THE POSTERIOR WALL OF THE CERVIX. (A *Spiegelberg*.)

uncovered by the bursting of the capsule, the upper two-thirds still bei covered by it as by a cup.

We find in the literature of the subject other cases of cervical myomata related by Virchow, Schroeder, Bayle, Dupuytren and others. I myself once removed with ease a myoma the size of a man's fist, which occupied the anterior lip, and which gave at first the impression of an inversion of the uterus. Cystic myomata have also been observed in this situation by Lee and Consat. They will be described when we come to treat of cystic fibromata.

Virchow is of the opinion that fibromata of the cervix have more the nature of connective tissue, and therefore grow more slowly. A consideration of the cases related above, that certainly constitute the most important ones mentioned in the literature of the subject, does not throw much light upon the point in question.

# CHAPTER II.

## THE GROWTH AND MORBID CHANGES OF UTERINE FIBROIDS.

As a rule, fibromyomata of the uterus grow very slowly, their development being inversely proportional to the contained amount of connective tissue, or, in other words, the more they approximate to the character of pure fibromata. Tumors rich in muscular elements, pure myomata, grow more rapidly. They may, indeed, at times, undergo an exceedingly rapid increase in size, especially when, as has been often noted, they are complicated with pregnancy. This condition being excluded, a sudden augmentation of volume of the tumors under consideration is due not, as many assert, to sudden growth, that is to proliferation and hypertrophy of their histological elements, but rather to circulatory changes taking place in them, such as œdema, inflammation or other pathological processes. Thus, very vascular fibromata undergo changes in volume before and after menstruation; in fact, the subsidence in size after the cessation of the menstrual flow has been so marked as to have been mistaken for actual atrophy of the tumor. This phenomenon will be further described later on, when we reach the consideration of the different forms of so-called cystofibromata. Similar changes may often be observed in cases of pediculated fibromata, when these are extruded beyond the external os, and the latter encircles the pedicle so tightly as to partially strangulate it, giving rise thereby to passive congestion and consequent œdema of the parts beyond the seat of constriction. When this occurs it should also not be mistaken for a sudden growth. On the other hand, a transient diminution of volume has been observed during the course of various debilitating diseases, followed, after convalescence, by comparatively rapid increase in size. Braun, Chiari and Späth[1] state that this is particularly liable to happen in cases of Asiatic cholera. These changes also occur chiefly in the various kinds of cystofibromata, and can scarcely be regarded as examples of growth. The numerous instances of uterine myomata met with in the practice of every physician, and which, during periods of close observation lasting many years, are found to manifest no perceptible increase in size, all prove how gradual the growth of most of these tumors

[1] Klinik, p. 404.

really is. Their development is, however, entirely arrested only after they have undergone calcification.

In order to obtain a better idea of the growth of these tumors, I have endeavored, in the last fourteen of these cases which have been under my care, to determine how long they had already existed. This method is, it is true, quite unreliable, for in most instances we can designate the commencement of the new formation only by the date when it first gave rise to any symptoms. How uncertain such designation is does not require demonstration. In each concrete case it is uncertain what disturbances are to be regarded as the initial symptoms; moreover the statements of patients are usually unreliable; and finally, the first subjective phenomena of disease depend very closely upon the size of the tumor. A submucous myoma will at an early stage of its existence engender symptoms, while a subserous myoma may attain a large size before it manifests its presence by any morbid phenomena whatsoever. The following data will yield, therefore, only approximative figures in estimating the rapidity of growth of myomata. Counting from the date of the manifestation of the first symptoms, in one case the tumor attained the size of a fist in six months, in another it grew to the size of an apple in a year; in still another it became as large as a fist in the same space of time. After a duration of one and a half years, *post-mortem* examination revealed in one case the presence of two fibromata, one of them 55 millimetres, the other 40 millimetres in diameter. In three cases the tumors had existed about two years: in the first the growth was as large as a fist, in the second the abdomen was distended by the tumor to a circumference of 76 centimetres, in the third the swelling was as large as a child's head, but had apparently not grown for the last two years. After having been noticed for three years, in one case, the circumference of the abdomen had reached 88 centimetres, the distance from the ensiform process to the pubic symphysis being 38 centimetres; in a second case the tumor was about the size of the palm of the hand, in a third case the patient had noticed the swelling three years before, when it was as large as a hen's egg, while, when examined by me, it extended from the true pelvis up to the umbilicus. In two cases the tumor had existed five years, in one it was as large as a fist, in the other it projected three fingers' breadth above the symphysis. One tumor had existed for eight years, and was only as large as a fist, although it had not undergone calcification; and, finally, one had been noticed for at least nine and a half years, and had attained the size of a man's head. Judging from the above list, small though it be, it must be acknowledged that uterine myomata do not exhibit a particularly rapid rate of growth.

G. Richter[1] observed the evolution of a tumor of this kind in a girl 23

[1] Progrès Méd., No. 31, 1871.

years old. The growth was so rapid that in two and a half years the circumference of the abdomen reached 1.62 metre. Schorler[1] records the following observations, based on eighteen cases occurring at the clinic of Schröder. The first signs permitting a positive diagnosis were observed in three months. After a year there was still no very marked enlargement. In five years the tumors were about as large as a fist, and in thirteen had reached the size of a man's head. Eight months to one year appeared to elapse before the abdominal circumference had increased 10 ctm., 2½ years for 18 ctm. Twice the circumference increased 20 ctm. in about three years, and once in a year and a half.

That fibroids cease to grow after the menopause, or even diminish in volume has been repeatedly observed. But according to Schorler (l. c.) women having fibroids reach the climacteric period later than others. The average age at the menopause may be placed at 47.13 years and at 50 the menopause is sure to have occurred. But Schorler found the change of life to occur on the average at 49.14 years in 29 cases observed in private practice, and in 23 dispensary patients at the age of 48. At 50 years of age (and over) 5.4 per cent. of all his private cases and 7.7 per cent. of all his dispensary cases of uterine fibroids still had regularly recurring menstrual periods.

It appears probable that in all those cases where fibroids grow considerably after the menopause, the tumors have vascular connections outside of the genital apparatus.[2]

The pathological alterations to which fibromyomata are liable are of great interest in this respect, that they may each and every one lead to spontaneous cure, that is, either to an arrest of development, or to the extrusion, or finally, to the complete disappearance of the tumors by absorption.

Quite often one reads of inflammations affecting a fibroid tumor, without being able to gain a clear idea of the change from a perusal of the reports. Inflammatory processes are no doubt met with in fibromata when necrotic disintegration of the growth happens to take place, as we shall take occasion to describe later on. In such cases we often find on the boundary line of the necrosed tissue a zone of reactive inflammation, which frequently exhibits marked purulent infiltration, giving the adjoining tissue a streaked appearance. I have never been able to discover any other form of inflammation, provided the uterine tumors were intact. That which has been described as such in literature, usually from a clinical point of view, is either an active hyperæmia or an œdematous swelling, occurring as a rule at the time of menstruation, and giving rise to pain without fever. There can be no question but that inflammatory pains, now and

[1] Zeitschrift f. Geburtsh. u. Gynäk., vol. XI., p. 153.
[2] See Hofmeier, Zeitschr. f. Geburtsh. u. Gynäk., vol. V.

then associated with fever, do sometimes occur in cases of subserous fibromata, but in these instances we undoubtedly have to do with a localized affection of the peritoneum, and not with inflammation of the growth itself.

G. Braun[1] describes an instance of "suppuration" of a fibroma, whereby the uterus was distended to a length of seventeen centimetres. The pus escaped partly through the os uteri, partly through an opening in the right inguinal region.

Hecker[2] passed a trocar into a supposed ovarian cyst and let out many pints of pure pus. *Post-mortem* examination, a short time afterwards, showed not a cyst, but a large subperitoneal uterine fibroid.

Ch. Carter[3] demonstrated in the Obstetrical Society of London a specimen of fibroma of the uterus, eight inches long and six inches wide, attached to the anterior wall of the uterus of a woman of sixty-nine years. The patient had first become aware of the existence of the tumor forty years before. The anterior wall of the tumor presented an opening as large as a sixpence, through which three pints of pus were evacuated. The internal surface of the cavity was rough and ragged, the enveloping shell being calcified, and varying in thickness from three quarters of an inch to two inches. Routh very properly inquired whether, taking into consideration the extreme rarity of suppuration in these cases, the supposed pus had been examined microscopically, and further, whether any history of traumatism could be elicited. No answer, it seems, was given.

A similar, but very imperfectly reported case is that of Chambers.[4] He states that he found, on making an autopsy, a large, pediculated subserous fibroid, which yielded on incision from ten to twelve pints of pus.

There can be no doubt that inflammatory processes, eventuating in suppuration, and which have occurred around fibroids, in the connective tissue of their capsule, have been confounded with inflammation of the tumors themselves. Leaving out of consideration the cases that occur during the puerperal state, the former, although not by any means frequent are nevertheless more often met with than suppuration of the tumors themselves. Suppuration of this character in the capsule of a tumor either leads to gangrene of the latter with ichorous disintegration, or the tumor is thereby so thoroughly loosened from its connection with the uterus, that it is often expelled whole and uninjured. It is an open question whether such inflammations develop spontaneously or depend upon traumatic influences.

It is claimed by some writers that suppuration is sometimes preceded

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[1] Zur Behandlung der Uterus-fibroide, Wiener Med. Zeitschrift, 1867, Nos. 100 and 101.

[2] Klinik der Geburtskunde, II., p. 133.

[3] Obstetrical Transactions, London, 1872, vol. XIII., p. 167.

[4] London Obstetrical Transactions, XI., p. 31.

by œdema of the loose cellular tissue of the capsule. Fenerly and Empis[1] have each reported a case of these "*bourses séreuses.*" Fenerly's[2] case, however, is the only one having any value in this connection. That of Empis[3] relates to a woman who died of puerperal peritonitis, in which disease œdema of the pelvic connective tissue and uterus is quite prevalent. However that may be, the above described "dissecting" suppuration and relaxation of the connective tissue of the capsule are most commonly observed in cases of calcified fibromata, which are thus placed in a condition favorable for expulsion. In this category belong cases such as that of Tysow,[4] who describes a fibroid, which, originating from the posterior wall of the uterus, and situated entirely within the true pelvis, underwent suppuration on its posterior aspect, thence pus made its way into the abdominal cavity, and gave rise to fatal peritonitis.

Maisonneuve[5] reports an instance of purulent infiltration of the capsule of a myoma growing from the posterior wall of the uterus; here the pus penetrated through an opening in the wall of the uterus into the subperitoneal pelvic cellular tissue. Similar cases have been observed by Huguier and others.

Now, while inflammation of fibroid tumors of the uterus is seldom encountered alone, it is frequently the cause of, and participate in, the breaking down and sloughing of these tumors. Many assume a condition of softening as a sort of transition stage from inflammation to mortification, but there are no grounds for regarding this condition as one peculiar to uterine fibromata. The softening is either simple œdema, such as occurs quite often in disturbances of circulation within these tumors, in which event it is frequently enough a forerunner of gangrene, or it is a true breaking down of the tumor, in which, for some reason or other, the ordinary signs of decomposition, such as fœtor, discharge and so forth, are not well marked. The particular varieties of softening, such as the mxyomatous form and that which occurs in the puerperal state will be discussed later on. (Compare Hecker, Klinik II. 130 )

Necrosis of fibromata may be occasioned by insufficient supply of nutrient material. It is observed most frequently in cases of interstitial and submucous growths, when the overlying mucous membrane or the capsule is in any way affected. I am inclined to doubt whether simple catarrhal inflammation of the mucous membrane is capable of producing such an effect. When, however, a tumor of this variety is pressed into the os, the blood-supply of that portion of the enveloping mucous membrane

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[1] Compare Demarquay and Saint Vel : Maladies de l'utérus, Paris, 1876, p. 158.

[2] Bulletin de la Société Anatomique, XXIX., p. 336.

[3] *Ibid.*, 1868, p. 228.

[4] A case of fibroid tumor of the uterus. Philadelphia Med. Times, March, 1874. Canstatt's Jahresber., 1874, II., p. 761.

[5] Comp. Demarquay, etc., p. 158.

which lies in the latter situation is often interfered with and leads to ulceration at that point. For a time this may be of no particular consequence, but, finally, perhaps by infection from without, the ulceration presents a putrid aspect and then decomposition, starting from this point as a focus, attacks the entire substance of the tumor.

More frequently gangrene starts from an injury to the enveloping mucous membrane, inflicted, either intentionally or accidentally, by the introduction of sponge tents or a uterine sound, from the employment of intra-uterine injections, or from attempts at instrumental removal of the tumor. Every gynecologist knows of one or more cases of this description. Putrefaction will also occur whenever the capsule, which is the carrier of the nutrient vessels, is loosened from its attachments to the surrounding tissues by dissecting suppuration, and the tumor is thereby more or less cut off from its sources of nutrition. For the same reason decomposition so often affects calcified uterine fibromata, inasmuch as either large portions of the tumor are directly starved, or because the greater extent of the capsule participates in the calcareous change.

Pediculated submucous tumors also most frequently undergo decomposition as a result of injuries inflicted on their enclosing mucous membrane —not infrequently, however, also, as a result of obstructed circulation. When a tumor of this class protrudes from the mouth of the womb, that aperture commonly contracts so firmly around the pedicle as to prevent the return flow of blood from the tumor, giving rise first to œdema, then to extravasations of blood, and finally to necrosis of the prolapsed portion. Subserous tumors undergo putrefaction much more rarely, and in these cases, the process when not dependent upon an immediately preceding childbirth, is usually associated with partial calcareous degeneration. Of course, in this class of tumors hemorrhages may be occasioned by falls, blows and axial torsion[1] of the pedicle, and then decomposition of the extravasted fluid leads to putrefaction in the entire mass.

I could quote numerous examples of all of the above-mentioned contingencies from my own experience and from the literature of the subject. I have personally investigated the cases reported by Pinault,[2] Barth,[3] Willaume[4] and Seyfert-Säxinger.[5] Neugebauer[6] reports the following remarkable case. The putrefying contents of a calcified, subserous fibroma broke externally through the anterior abdominal wall, the calcified shell remaining behind for a long period of time, presenting as a large

[1] J. Cappie : Obstetrical Journal, II., p. 303.
[2] Bullet. de la Société Anatomique, 1828, p. 5.
[3] *Ibid.*, 1850, p. 365.
[4] Archives Générales, XXIV., p. 449.
[5] Prager Vierteljahrsschrift, 1868, I., p. 89.
[6] Monatsschrift für Geburtskunde, 28, p. 401.

cavity with rough, rigid and encrusted walls. Dumesnil[1] describes an analogous instance of the spontaneous putrefaction of a subserous myoma. The case of Ziemssen[2] and Braxton Hicks[3] are remarkable as regards the size of the putrescent tumors. In the first case the summit of the swelling rose one inch above the umbilicus, while in that reported by Hicks the tumor dilated the uterus to the size attained in the seventh month of pregnancy.

Instances of gangrene attacking pediculated tumors after partial or complete extrusion through the os uteri have been reported by Braun, Chiari and Spaeth (p. 402), McClintock,[4] Freund,[5] Männel,[6] and many others. Baker-Brown,[7] Retzius,[8] and Jäger[9] have intentionally lacerated the surface of such a tumor and induced decomposition as a curative measure. In another chapter we shall return to the consideration of these cases, as well as of those accidents of the same nature which occur during the puerperal state.

The microscopical examination of such necrosed tumors does not disclose any peculiar features. We find all of the cellular elements in a state of fatty or finely-granular cloudy degeneration. The connective tissue fibrils have become liquified into cloudy granular masses, containing fatty corpuscles. The coloring matter of the contained blood is converted into crystalline and granular particles. Fat crystals are also present (Virchow), as well as spherules of leucin (Waldeyer).

While uterine myomata, when affected by sloughing, almost always at the same time undergo fatty degeneration, that process occurring alone and independent of other changes is certainly an exceedingly rare event. One is accustomed to speak of the fatty metamorphosis of these tumors as a very likely occurrence, particularly after childbirth, being led to this assumption by the recollection of the process of involution which the muscular tissues of the uterus usually undergo after confinement. As a matter of fact, this occurrence has never been demonstrated. Virchow, Spiegelberg and others very properly call attention to the fact that the process of fatty metamorphosis attacks essentially only the muscular elements of the tumor, so that, at all events, the connective tissue stroma remains behind. Now since some tumors, the pure myomata, consist solely of muscular tissue, it is conceivable that these may undergo fatty metamorphosis

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[1] Gazette des Hôp., 1868, p. 6.
[2] Virchow's Archiv., XVII., p. 340.
[3] Obstetrical Transact., VII., p. 110.
[4] Dublin Quarterly Journal, Feb. 1868, p. 24.
[5] Beiträge, III.
[6] Prager Vierteljahrs., 1874, II., p. 29.
[7] Obstet. Transactions, I., p. 330.
[8] Neue Zeitschrift f. Geburtskunde, 31, p. 425.
[9] Gazette Méd. de Strasbourg, VII., p. 185.

throughout their whole extent, and there are cases in which the complete disappearance of such tumors can be explained on this assumption alone. But it would clearly be reasoning in a circle to attempt to demonstrate the frequency of such fatty degenerative changes, or even indeed their mere occurrence, simply from the fact of the disappearance, often more apparent than real, of uterine myomata. The literature of the subject abounds in instances of the so-called fatty metamorphosis of fibromyomata, but the only cases that are based on microscopical examination are those of Freund,[1] who clearly demonstrated the presence of fatty degeneration, although the tumors themselves had not undergone any diminution in volume, and A. Martin,[2] who records the case of a lying-in woman who had a broken-down fibroid filled with fatty detritus. Whether the observations of Hecker (Klinik. II. p. 130) concerning the occurrence of pulpy softening in the interior of fibromata during the puerperal state have any bearing on this point, will be investigated later.

There is another kind of regressive metamorphosis to which fibromata seem to be quite often subject. At any rate it cannot infrequently be demonstrated anatomically, namely induration or atrophy. The most pregnant examples of this change are met with in uterine tumors of a firm consistence, and rich in connective tissue, especially after the menopause. The muscular elements seem to be destroyed by fatty disintegration, while the connective tissue masses shrink and become atrophic and thus lead to a sort of cirrhosis of the growth. While such a condition is often observed in the bodies of people of advanced age, it may also be met with in rather young individuals. We may also include in this category all those cases in which a conspicuous and permanent decrease in the size of the uterine tumor has been observed during the life of the patient. Prieger,[3] Simpson,[4] and Kidd[5] have each reported a case of this kind. In Kidd's case, a tumor, which at one time reached midway between the symphysis and the umbilicus shrank, until only a small remnant could be detected. Meadows[6] and many others have recorded similar cases. It must be acknowledged, however, that many of these observations are of questionable value. Pelvic exudations have been confounded with tumors, and the transient enlargement of a tumor during the catemenial epoch, with a subsequent decrease in size, has been mistaken for induration. The latter error has certainly been committed by Bartels,[7] whose observation was disputed by C. Mayer as soon as it was promulgated.

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[1] Kl. Beiträge für Gynäkologie, III., p. 152.
[2] Beiträge zur Geburtshulfe, etc., Berlin, 1874, III., p. 34.
[3] Monatsschrift für Geburtskunde, I., 1853.
[4] Obstetr. Memoirs, I., 115.
[5] Dublin Quarterly Journal, August, 1872.
[6] Obstetr. Journal, Dec. 1875.
[7] Verhandlungen der Berliner Geburtshülflichen Gesellschaft, 1852, p. 1.

The last step in regressive metamorphosis, and one which follows closely on the heels of induration, is calcification. This process opposes a permanent barrier to the further development of these tumors, which thereby become stationary, and are, as it were, destroyed. It consists in the impregnation of the connective tissue with lime salts, and is, in truth, an amorphous petrifaction. The salts most frequently observed are phosphates, carbonates and sulphates.

As it not infrequently happens that these calcified fibroids are expelled from the uterus, they were formerly regarded as genuine uterine calculi, and were supposed to have originated in the same way as vesical calculi. It is true that we now and then meet with concretions in the vagina having some kind of foreign body as a nucleus (a fragment of bone, more often a pessary, etc.), and thus producing some analogy with the mode of development of vescal calculi, but stones coming from the uterus are probably in all instances only calcified fibromata.

It is certainly astonishing that as recently as August 9, 1874, Avietà Candura (El Siglo) could have discussed the various conditions favorable to the formation of true calculi within the uterus, asserting that the employment of hard water for drinking purposes was particularly noxious in this respect. But it is still more astonishing to find such an article deemed worthy of serious consideration in the columns of the Annales Gynécologiques, III., page 160.

Calcification usually affects the connective tissue of the tumor, and we, therefore, often find concentric strata of lime salts, generally of the phosphatic variety, usually traversing the tumor irregularly, but still following in the main the course of the bundles of fibres. It is much more rarely the case that only the outermost layers of the tumor, or the connective-tissue capsule alone is affected. We can readily conceive, then, how when the connective-tissue components of a tumor become calcified, the interspersed muscular elements are so prone to undergo degeneration, as is often observed. As both calcification and induration most frequently occur during the climacteric years, these processes are probably influenced to a great extent by the condition of the vessels of the uterine walls.

The more the nutrient vessels of the tumor atrophy, the greater the extent to which they are affected by atheromatous degeneration, the more readily will calcification develope. The size of the tumor seems to exercise no essential influence in this respect, for both small pediculated, as well as large interstitial growths, have been found in a state of calcification. Turner (l. c.) maintains that the constitution of the pedicle and the condition of its vessels are factors of prime importance in this respect, but adduces no evidence in support of his view. That even very large fibromata may become calcified is shown by Prumet[1] who speaks of a tumor of this kind weighing ten kilogrammes.

[1] Thèse sur les tumeurs de l'utérus, Paris, 1851.

In the older literature of the subject calcification has sometimes been held to be ossification, but there can be no question that the formation of bone is not met with in this connection. Nevertheless Freund[1] gives the following description of a tumor: "After having been sawn through, the larger tumor was seen to be of a deep yellow color, the cut surface being smooth, and developing a high degree of polish after being rubbed upon a whetstone. After being moistened with hydrochloric acid, osseous tissue with well-marked bone corpuscles was distinctly seen under the microscope in the peripheral portions of the tumor. Towards the centre there was an ordinary incrustation with lime salts, after the removal of which, by prolonged immersion in hydrochloric acid, the texture of the fatty degenerated fibroid tissue came prominently into view."

With reference to the much discussed question, may fibromyomata of the uterus undergo cancerous metamorphosis, it cannot be positively denied that such an occurrence is possible, in so far as cancerous infiltration may spread from the overlying mucous membrane to the subjacent muscular elements. But decisive observations, at least as far as regards the development of primary carcinoma, have not as yet been reported. A combination of fibroma with carcinoma of the uterus is by no means rare, but up to the present time no instances have been reported of the isolated cancerous degeneration of a fibroid. The older reports of this nature are unreliable, in the first place because fibromata themselves were formerly classed among the malignant tumors, and secondly because sarcomata have been confounded with carcinomata.

Klob[2] reports a case of this description, but so imperfectly that, to say the least, it can scarcely be regarded as conclusive. Förster's diagnosis in the case of Gläser[3] is just as uncertain. At any rate, so great an authority as Virchow[4] believes that in this instance a mistake may have been committed as between sarcoma and something else. Virchow himself (l. c. 172) reports some examples of myomata affected by cancerous disease. But Simpson,[5] the very man who is always quoted as the authority for this occurrence, emphatically states that he has never observed the carcinomatous degeneration of a fibroma. On the other hand, he has on several occasions met the two affections side by side in the uterus, and in these cases he is inclined to attribute the development of the carcinoma to the continual local irritation excited by the presence of the other tumor. Kiwisch's cases are equally indefinite in this respect. Benporath and Liebmann[6] describe a fibroma affected with cancerous infiltration, oc-

[1] Beiträge zur Gynäkologie, III., p. 152.
[2] Patholog. Anatomie der Weibl. Geschlechtsorgane, p. 163.
[3] Virchow's Archiv. XXV., p. 422.
[4] Geschwülste, III., p. 172, and II., p. 350.
[5] Obstetr. Memoirs, 1st ed. I., 114.
[6] Monatsschrift für Geburtskunde, 25, p. 50.

curring in a case of primary cancer of the vagina, the cancerous infiltration also involving that portion of the uterine wall immediately surrounding the fibroid. Hegar[1] states briefly that he has enucleated a submucous myoma, "on that side of which, lying next the mucous membrane, a carcinoma had developed, after perforation of the capsule." In view of the uncertainty surrounding this subject, and the admitted rarity of cancerous

FIG. 16.—FIBROID OF THE UTERUS, WITH EPITHELIOMA OF THE CERVIX AND VAGINA. From the Obstetrical Collection at Strasburg.

degeneration of fibroids, the statements of Rodering (l. c.) appear very remarkable. This author mentions 24 instances of such degeneration occurring in 570 cases of fibroid. But it does not appear from his descriptions whether these cases were supposed to be examples of transformation of fibroid tumors into cancer, or whether there was a mere association of distinct morbid processes. There is probably no unimpeachable case on record of cancerous degeneration affecting a fibroid. But it should be mentioned here that adenoma may lead to such a transformation, and further that the mucous membrane in cases of fibromyoma may assume the character of a diffuse adenoma.

As previously stated, the association of epithelioma of the cervix with

[1] Operative Gynäkologie, p. 246.

fibromyoma of the uterus is not uncommon. In these cases the combined affection runs a course parallel to that of cancer pure and simple, the additional presence of a myoma being of very little account. In another

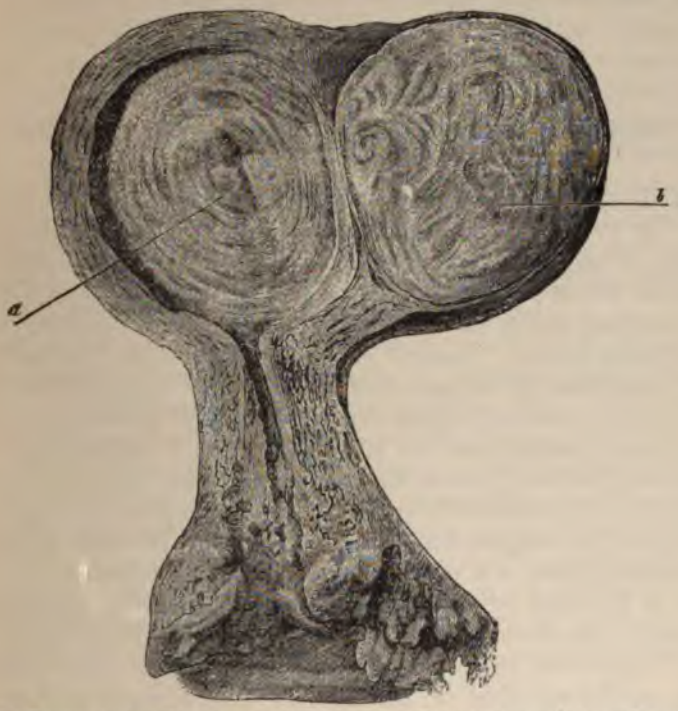


FIG. 17.—FIBROID OF THE UTERUS, WITH CANCER OF THE VAGINAL PORTION OF THE CERVIX. Stenosis of the internal os and dilatation of the Cavity of the Uterus. *a*, Cavity of the Uterus. *b*, Subserous Myoma. (Specimen of *Dr. Wyder*.)

chapter, when we reach the subject of sarcoma, we will investigate the question, whether fibromata may become transformed into sarcomata, or, rather, to speak more exactly, whether the former may undergo sarcomatous degeneration.

# CHAPTER III.

## THE ETIOLOGY OF FIBROIDS OF THE UTERUS.

WITH regard to the causation of uterine fibroids we know as little as we do about that of most pathological neoplasms, namely nothing. This dictum must be adhered to in spite of the ingenious reasonings of Virchow (Geschwülste III. p. 150), and in spite of the careful and interesting studies on this topic by Winckel,[1] which support the views of the former author. Virchow called attention to the "irritative character" manifested in the growth of myomata, and suggested that in these cases either an unusually aggravated degree of local irritation, or a condition of local anæmia was the efficient agent. As acceptable as these phrases may be in a general way, as little are they supported by direct observation. And when in this very instance Virchow and Winckel refer to the periodical congestions of the uterus, to the processes occurring in the puerperal state, to a previously existing chlorosis and so forth, they do not in the least help to explain how these every-day occurrences can give rise to the development of myomata in individual cases. Moreover, if importance be attached to the condition of the functions of the uterus, on the one hand to their exercise (miscarriages, births), on the other to their abeyance (sterility,) we find that the examination of statistics throws no light upon this topic. But, although such statistics are, as we shall see, quite unreliable, considering the imperfections inherent to this method, yet we should not, in our devotion to a pet theory, exclude them as altogether worthless. As far as concerns diseased conditions in the vicinity of the uterus or within that viscus, these are just as likely to be effects as active causes in the formation of tumors. The portio vaginalis affords a good illustration of the etiological insignificance of local irritation. Although this region is most exposed to injurious influences, it is very rarely the seat of myomata. These tumors, moreover, are scarcely ever observed in prolapsed uteri.

Patients' statements are not of the slightest value in determining questions of etiology. Of what avail is it to us to be told that three out of one hundred and fifteen patients affected with uterine fibroids noticed the first symptoms of the disease immediately after marriage. (Winckel.

[1] Ueber Myome des Uterus, etc. Volkmann's Klin. Vorträge, No. 98.

Moreover, although Winckel quotes statements according to which violent vomiting, a fall downstairs, intense mental excitement, etc., are positively put forth as the starting-points of the disease, he himself points out the fallacies contained in such statements. Granted even the correctness of these observations, as far as concerns the patients themselves, this does not bring us any nearer the solution of the question. At any rate, as far as I am concerned, I must confess that to me the formation and development of fibroids is just as incomprehensible now as formerly. I can understand how colds, improper behavior at the menstrual epoch, etc., may give rise to metritis, catarrh, and other affections, but I cannot conceive in what manner even "long continued and very fatiguing singing at the time of the monthly flow" may "under favorable conditions" lead to the formation of a myoma. Engelmann,[1] indeed, found that catching cold during menstruation was the etiological factor in one (*sic*) out of three hundred and sixty-two cases of uterine fibroma!!

It has already been stated that Cohnheim[2] attributes all neoplasms to the development of embryonal deposits, to germinal matter which has not been used in physiological, normal growth. Thus Cohnheim states that the phenomena of pregnancy afford proof of the truth of his hypothesis as far as regards the uterus, that is, as showing that this organ contains germinal matter which, under physiological stimulation, is capable of manifesting periodical growth. It is surely conceivable that this germinal matter may occasionally undergo irregular, atypical development without physiological stimulation, and this is particularly liable to occur when physiological stimulation is exercised seldom or not at all. This coincides closely with the fact that uterine myomata always develop after puberty, and are especially liable to be met with in old maids. We will shortly have to investigate how far the latter assertion is actually correct or the opposite. However this may be, it suffices to have directed attention to the importance of the above hypothesis of Cohnheim, which is satisfactory in so far at least as it serves to again direct the researches concerning the causes of tumor formation into anatomical channels. Whether these researches result in the demolition or in the further support of the hypothesis, they will at any rate furnish us with wider views as to the etiology of tumors than the hitherto current, wholly unsatisfactory ones.

In view of the imperfections attaching to medical statistics in general, all statements concerning the frequency of myomata possess very little value, if any. The inconsistencies in the individual reports are of so gross a nature that they only serve to lessen in a greater degree their mutual value. The experience of any single observer, no matter how extensive it may be, is probably of scarcely any consequence. According to

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[1] Zeitschrift für Geburtshülfe, I., p. 130.

[2] Vorlesungen über allgemeine Pathologie, Berlin, 1877.

the statements of Bayle, which are perhaps the best known, and are of late so frequently quoted, among one hundred women above thirty-five years of age at least twenty possess such tumors. Again Monat found among the patients of the Salpêtrière, one-fifth affected with uterine fibroids. In contradistinction to these, Richard found only seven examples of fibroma in eight hundred autopsies, and Pollock found only thirty-nine tumors of this character among eight hundred cases of uterine disease (compare West, l.c.)

Klob, on the other hand, claims that forty per cent. of all females above fifty years of age are affected with these growths.

Little reliance can be placed upon statements as to the frequency of the individual varieties or the site of these tumors. Among a total of ninety-eight cases, Hewitt encountered only fourteen of sub-mucous (pediculated) fibroids. Of ninety-two cases reported by various observers in Mecklenburg (Winckel, l. c.), thirty-nine were pediculated. Of two hundred and thirty cases collected by Marion Sims[1] and Winckel, (l. c.), twenty-six were of the sub-mucous, seventy-four of the sub-serous, and one hundred and thirty of the intra-parietal variety. Of these one hundred and four were located on the anterior, and seventy-seven on the posterior wall of the uterus.

Schorler (l. c.) observed 27 cervical tumors and 307 affecting the body of the uterus out of a total of 334 cases of fibromyoma. Of the 307 tumors of the uterine body, 106 were interstitial, 128 sub-serous, 24 sub-mucous, and 49 were classed as polypoid. The interstitial growths were found three and a half times more frequently in the anterior than in the posterior wall, whereas the sub-serous neoplasms occurred three times more frequently in the opposite situation.

Jacubasch (Charité-Annalen, 1881) saw sixty cases, and of this number the body and fundus were the seat of the tumor fifty-eight times, the cervix was only twice occupied by the growth. Twenty-two cases belonged to the sub-mucous variety of fibroid.

As regards the age of the patients, it may be stated that no indubitable case exists in which the disease has either been detected or has grown considerably before puberty, or after the occurrence of the climacteric period. It is rather difficult to determine whether, within these limits, certain ages are especially disposed to diseased action in this direction. It is useless to collect medical observations for the settlement of this question unless pathological research shall at the same time furnish us with approximate figures as to the frequency with which such neoplasms are met with in all autopsies held on females. More than this, the ratio of the ages of all the females in each of the districts from which the statistics emanate, would previously have to be determined.

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[1] Uterine Surgery, 1866, p. 95.

I have collated from the compilations of West, Beigel, Hewitt, Dupuytren, Moore Madden,[1] Engelmann,[2] Röhrig[3] and from my own notes, the following nine hundred and fifty-three cases, which are calculated to be of some service in this connection, and may be classified according to age as follows:

| | |
|---|---|
| 10 years old, | 1 |
| 14 " " | 1 |
| 16 " " | 1 |
| 17 " " | 1 |
| 18 " " | 3 |
| 19 " " | 8 |
| 20 to 30 years old, | 156 |
| 30 " 40 " " | 357 |
| 40 " 50 " " | 338 |
| 50 " 60 " " | 36 |
| 60 " 70 " " | 12 |
| over 70 " " | 5 |

Of five hundred and twenty-eight cases collected by Winckel (which are not comprised in the foregoing table, because West's, Hewitt's and Beigel's cases have been included in both tables) there were:

| | |
|---|---|
| Under 20 years old, | 9 |
| 20 to 30 " " | 98 |
| 30 " 40 " " | 180 |
| 40 " 50 " " | 180 |
| 50 " 60 " " | 52 |
| 60 " 70 " " | 6 |
| 70 " " | 2 |

These statistics demonstrate that most of the patients affected with fibroids were between twenty and fifty years of age at the time when they first sought medical relief. Nothing is to be gained by classifying the above cases according to the age at which the first symptoms were noted.

The latest table prepared by Schröder[4] presents results which differ somewhat from previous averages. 798 cases are tabulated as follows:

| | | | | |
|---|---|---|---|---|
| 19 years, | 2 | cases equivalent to | 0.25 | per cent. |
| 20 to 30 years, | 58 | " " " | 7.26 | " " |
| 30 " 40 " | 229 | " " " | 28.69 | " " |
| 40 " 50 " | 407 | " " " | 51.00 | " " |
| 50 " 60 " | 94 | " " " | 11.77 | " " |
| 60 " 66 " | 8 | " " " | 1.00 | " " |

[1] Obstetr. Journ., I., p. 468. [2] Zeitschrift für Geburtshülfe, I, p. 130.
[3] Berliner Kl. Wochenschrift., 1877, No. 30.
[4] Krankheiten der Weibl. Geschlechtsorgane, Leipzig, 1884, p. 216.

A more interesting question is what influence do the sexual functions exert upon the development of fibromata. The opinion has been and still is widely entertained in Germany, that unmarried individuals of advanced years are particularly disposed in this respect, but the experience of physicians shows that the contrary is undoubtedly true, and leads rather to the assumption that the exercise of the sexual functions favors the development of such tumors.

The perusal of the reports of Schröder (l. c.), Hewitt, Marion Sims, Moore Madden, Engelmann, and of my own notes, discloses the fact that of nine hundred and fifty-nine patients affected with fibroids, six hundred and seventy-two were married, and two hundred and eighty-seven unmarried. It is not to be supposed, of course, that all the individuals included in the latter category were virgins. Of those that were married, four hundred and sixty-four had borne children, the remainder were sterile. It will be shown later, that, according to the experience of physicians at least, this sterility is a result rather than the cause of the tumor formations.

Routh's statistics[1] form quite a valuable contribution for determining this question. His cases, however, as well as those of Winckel, which will be given shortly, may not be simply added to the foregoing 959 cases, or we should commit numerous errors in counting the same case two or three times over.

Routh found that, of three hundred and one patients affected with myomata, two hundred and forty-one, or eighty per cent., were married. This fact, according to the author, must carry the more weight, when it is remembered that in England the number of unmarried females is twice as large as the number of married. (This observation possesses, however, but little value, since children are included in the above cases.)

Some additional statistics of Routh's are more interesting in this connection. He states that the average age of married women in England is 40.6 years. Now between the ages of thirty-five and forty years, he found that fibromata were present in twenty-two married, but only in five unmarried females—or, in other words, that at this time of life such tumors occurred 4.4 times as often in the married as in the unmarried. The importance of this ratio is, however, lessened by the fact that at this age the percentage of the married to the unmarried is as 3.7 to 1.

Winckel's deductions are based upon a total of five hundred and fifty-five patients. Of these, one hundred and forty, or 24.2 per cent were single and childless, four hundred and fifteen, or 75.8 per cent. were married, and of the latter number one hundred and thirty-four, or 24.3 per cent., were sterile. According to Winckel, there are in Saxony two thousand seven hundred and ninety-seven married females of middle age, to two thousand two

[1] Vide Schmidt's Jahrbücher, 1866, Vol. 129, p. 236.

hundred and three single women, that is as 9 to 7.3, while the prevalence of myomata among the unmarried is to that among the married as 3 to 9——in other words, tumors of this nature occur almost twice as often among the married as they do among the unmarried.

It cannot be shown that childbirth exerts any influence upon the development of myomata. We shall, however, discuss this topic more fully in another chapter.

All the other agents that have been here and there advanced as etiological factors in the development of fibromata, are the outcome of purely subjective reasoning on the part of their propounders, and may with propriety be passed over in silence. One point is, however, deserving of mention, namely that, according to the statements of Gaillard Thomas and St. Vel and Demarquay, these tumors are probably more prevalent among certain other races (particularly the negro) than among the European.

Hereditary disposition has, up to the present time, not been shown to play any *rôle;* still I have recently twice found fibroids in two sisters. This may be only a coincidence, yet it is an occurrence to which it may be worth while to direct attention.

# CHAPTER IV.

## THE COURSE, SYMPTOMS AND COMPLICATIONS OF UTERINE FIBROIDS.

THERE are but few pathological processes, which in themselves anatomically so simple as uterine fibromata, are yet calculated to give rise to such manifold symptoms. The morbid manifestations naturally vary according to the size and location of the fibroids. In the first place it is a noteworthy fact that a not inconsiderable number of these tumors develop no symptoms at all during the life of their bearers. This is shown by their being frequently detected by pure accident in the living, but still more often in the dead subject. As a rule, the tumors give less trouble the smaller they are and the less active the sexual functions are. Thus, we find that, in individuals who have reached the climacteric period, they often, indeed usually, exist for years without creating any disturbance. This is also often the case in individuals who rarely or never have sexual intercourse, while, *per contra,* symptoms often manifest themselves with great intensity and astonishing rapidity, as soon as a patient affected with one of these tumors enters into wedded life or passes through a confinement.

The symptoms of uterine fibromata develop chiefly after puberty and probably depend, in the main, upon the location of the growth. Nevertheless the individual phenomena are neither so characteristic nor so constant as to enable us to determine from them alone the location of the tumors, namely whether they are sub-serous, sub-mucous, or chiefly interstitial. This is the more readily understood when we remember that even the anatomical limits between these three varieties cannot always be accurately defined. In the following paragraphs each symptom will be discussed singly, but their bearing upon the question of the location of the tumors will be considered under the heading of diagnosis.

Among the various symptoms of fibroids of the uterus, there are two which for constancy of occurrence and importance are pre-eminent; these are hemorrhage and pain.

Hemorrhage is usually the first, at any rate certainly the most frequent symptom, and in the majority of cases it occurs chiefly under the guise

of a profuse menstrual flow, *i.e.*, menorrhagia. The amount of the flow is often very considerable within a few moments, so much so that patients justly speak of a gush of blood when they have their courses. In other instances the great amount of blood lost during a period is due to the latter being prolonged over many days, so many, in fact, that there is often an interval of only a few days between successive menstrual epochs. While the menstrual type of hemorrhage is in this manner finally obliterated, irregular hemorrhages (metrorrhagias) also not infrequently occur, especially after insignificant exciting causes, such as lifting a weight, and so forth.

Hemorrhages are usually entirely absent in cases of well-marked sub-serous uterine myomata, especially when these are provided with a pedicle. Still, sub-serous tumors, even when pediculated, may be associated with such pathological conditions of the uterine mucous membrane as will give rise to hemorrhages; this will happen when the tumors are so situated as to interfere with the circulation within the uterus. Hemorrhages are, however, observed more constantly and are of greater severity in all examples of sub-mucous, and in most instances of interstitial myomata. Sub-mucous pediculated tumors usually occasion the most profuse hemorrhages while they remain enclosed in the cavity of the uterus. The bleeding very often ceases as soon as they protrude beyond the os uteri, but it is not seldom aggravated by this occurrence, as in case the contraction of the os is sufficiently powerful to induce venous stasis in the tumor and its enveloping mucous membrane.

It is only in very exceptional instances that the hemorrhage proceeds from the tumor itself, as most of the ordinary forms of uterine myomata are but poorly supplied with blood-vessels, and are, moreover, always covered by the uterine mucous membrane. Blood can escape from the tumor itself only when the latter is provided with vessels of large calibre, or with distended sinuses which have been laid open by ulceration or some other injury. Klob observed hemorrhage from the tortuous vessels enveloping a uterine myoma, after fracture of the pelvis. Matthews Duncan [1] observed fatal hemorrhage from the rupture of a venous sinus in a case of interstitial myoma.

Cruveilhier describes a similar case, the bleeding proceeding from an opening in a uterine sinus in the lower part of the tumor. (Matthews Duncan, l. c.) It is often stated that the investing uterine mucous membrane is the source of the hemorrhages ordinarily encountered in patients affected with these tumors, but this can only be true of a small number of cases. The investing mucous membrane of sub-mucous, pediculated tumors will bleed, only in case it is in a state of venous stasis, as the result

[1] Edinb. Med. Journ., Jan. and Feb. 1867.

of compression, or when it is ulcerated. In either of these events uterine contractions give rise to profuse or even fatal hemorrhage from the torn and dilated veins.

But this accident scarcely ever happens when the tumors are submucous and attached by a broad base, or when they are interstitial. In these cases the mucous membrane enclosing the tumor is more or less thinned, atrophied and stretched, according to the size of the growth, and


FIG. 18.—MYOMA OF THE UTERUS. Death following rupture of a venous sinus (a). (After *Matthews Duncan.*) Edinb. Med. Journ. 1867.

is only here and there permeated by thin-walled, ectatic veins of larger calibre. There is neither sufficient evidence, nor are there known analogous conditions to warrant the acceptance of the assertions of Atlee[1] and others, who claim that such veins may tear at any menstrual epoch, and

[1] Compare M'Clintock, Diseases of Women, p. 152.

may thus occasion hemorrhage. At the same time I will not assert that such an occurrence is impossible. In fact I shall take occasion to describe later on a case, which belongs, perhaps, in this category.

The stretching and atrophy of the investing mucous membrane always induce marked collateral venous stasis in the remainder of the mucous membrane, which condition in itself leads to swelling and increased succulence, and thereby to profuse hemorrhage at the menstrual period, just as always occurs under similar conditions, such as chronic metritis. To what an extent collateral congestion may develop, in cases of large-sized uterine fibromata, is well described by Cruveilhier:[1] "Les veines utéro-ovariennes

Fig. 19.—Rupture of a Uterine Sinus in the Lower Segment of a Fibroid, with Fatal Hemorrhage. (After *Matthews Duncan.*)

et les veines utérines qui viennent de l'hypogastrique ont un volume énorme, dans un cas de ce genre, où les veines superficielles avaient sillonné la surface de l'utérus, plusieurs avaient le volume d'une très-grosse plume à écrire et même d'avantage. Les artères n'avaient augmenté de volume que dans une bien moindre proportion."

The changes in the uterine mucous membrane are not always produced in a purely mechanical way by congestive hyperæmia. Tumefaction of the mucous membrane of a more inflammatory nature may also occur, arising from irritant action of the tumor. Thus hemorrhages sometimes, although rarely, occur in cases of pure sub-serous fibromata associated

[1] Traité d'Anatomie pathologique, III., p. 677, quoted from M. Duncan, l. c.

with a diseased condition of various parts of the uterine tissue, which may best be designated as chronic metritis, and is more often associated with the presence of interstitial growths. How greatly developed and extensive the collateral congestion may be, is well shown by an observation of Rokitansky, who reports a case of fatal hemorrhage from rupture


FIG. 20.—ATROPHY OF MUCOUS MEMBRANE (*a*) IN A FIBROID. Magnified 20. (Specimen of *Dr. Wyder.*)

of a greatly dilated varicose vein of the mucous membrane of the bladder, in a patient affected with a uterine fibroid. The menstrual flow has always been unusually profuse in the few cases of uterine tumors, which have been both observed by me during the lifetime of the individuals, and recognized as pure myomata on *post-mortem* examination. In these cases

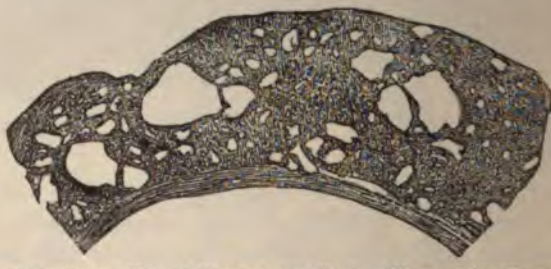

FIG. 21.—HYPERTROPHY OF MUCOUS MEMBRANE IN FIBROMA UTERI, with dilatation of the glands (endometritis glandularis). Slightly magnified. (Specimen of *Dr. Wyder.*)

the myomata had usually grown rapidly, especially in consequence of pregnancy, conformably to which the uterine mucous membrane was exceedingly hypertrophic and was permeated by large venous sinuses.

In 1878 Wyder [1] showed that the presence of fibroids of the interstitial and sub-serous varieties, leads to certain definite changes in the mucous

[1] Beiträge zur normalen and pathol., Histol. d. menschl. Uterusschleimhaut, Archiv. f. Gynäkol., vol. XIII., p. 35, 1878.

ane of the uterus. He describes this condition in the following

e mucous membrane appeared much thickened. The microscope showed considerable proliferation of the uterine glands. In some

2.—Hypertrophy of Mucous Membrane (endometritis glandularis) in Uterine Fibroma. of *Dr. Wyder.*)

ens they were closely crowded and appeared like cork-screws placed dicularly to the surface. In other cases the mucous membrane ed a more areolar appearance. Dilated, but not cystic gland were found in these. The tubules were separated from each

other by broad trabecles of interglandular connective tissue." Wyder further emphasizes the fact that these changes resemble the condition known as adenoma diffusum. The observations of Wyder have since been confirmed by von Campe.[1]

In spite of the fact that in most cases of fibromyomata there is a constantly present swelling of the mucous membrane, the secretion from the latter, outside of the menstrual epoch, is by no means always uniformly profuse. Just before and after the periods there is usually a rather free mucous discharge which in many instances soon ceases entirely, or at any rate diminishes to such an extent that patients do not pay any attention to it. In case a purulent discharge, the so-called fluor albus, makes its appearance later, we will almost always be able to detect an ulcerated condition of the os uteri, with changes in the mucous membrane of the cervix. On the whole, it may be safely stated that a muco-purulent secretion is by no means a prominent feature in the life-history of uterine fibroids.

Pain, or at least abnormal sensations of some kind, are almost invariably present. The important bearing which this symptom, under certain circumstances, exercises in the diagnosis of the variety and location of a uterine tumor, compels us to enter into a rather detailed analysis of its various features. In the first place pain in most cases manifests itself at first during menstruation, and is of a stretching or dragging character, depending upon the distension of the uterine walls, or upon a swollen condition of the tumor itself in consequence of menstrual congestion. This kind of pain is quite characteristic of the more interstitial tumors, and in cases of this description it frequently developes to an intense degree before the appearance of the menstrual flow; in fact it is often markedly relieved by the latter occurrence.

Even in cases of pediculated sub-serous myomata we not infrequently find patients complaining, at the time of menstruation, of similar pains, resulting from tumefaction of the tumor, and this seems mainly dependent upon the manner in which the tumor is connected through its pedicle with the uterus. The more abundant the vascular supply of the tumor by way of the uterus, the more extensively will the former participate in the menstrual swelling. In such cases well-marked peritoneal irritation not infrequently affects the serous envelope of the tumor, and in this event there is acute pain on external pressure.

Peritoneal pain is not often observed, outside of the monthly periods, in patients with sub-serous fibroids, but when it does occur it is in many instances dependent upon true perimetritic processes, characterized by fever and other signs of peritonitis. These inflammations are probably

[1] Verhandl. d. Gesel. f. Geburtsh. u. Gynäkol. in Zeitschr. f. Geb. u. Gynäk., vol. X., p. 356 1884.

often excited by the mechanical irritation incident to movements of the tumor, but they may of course develop during menstrual congestion. They often lead in an astonishingly short space of time to adhesions of the tumor with the surrounding organs, so that a distinctly movable, pediculated fibroma may quickly become fixed. As we shall soon see, these tumors may cause peritonitis in other ways. The painful sensations which are felt during menstruation in cases of sub-mucous fibroids are of an entirely different nature They bear a closer resemblance to labor pains the more the tumors project into the cavity of the uterus, and are frequently so intense that the neck of the uterus commences to dilate, thus permitting the tumor to become visible. As the uterine contractions induced by the menstrual hyperæmia abate, the tumor retracts and the os again closes.

This so-called 'birth' of a sub-mucous fibroma often requires many menstrual periods for its completion. It depends to a certain extent upon the size of the downward growing tumor, but the chief factors are probably the thickness and breadth of the pedicle through which the growth is attached to the muscular tissue of the uterus. The greater the resistance of the former the more powerful are the uterine contractions, which come to a standstill only when the tumor actually protrudes beyond the os. It is self-evident that similar labor-simulating pains may also occur in cases of interstitial tumors, but this is observed much less frequently. I have often been struck with the great intensity of these pains (uterine colic), when the fibromata were soft, that is, when they consisted almost entirely of muscular tissue. It would seem in these cases as if the tumors themselves participated in the contractions and thus aggravated the pains to an unbearable degree.

As soon as uterine fibroids have grown at all considerably, the above described paroxysmal pains connected with menstruation are associated with the most varied abnormal sensations in the lower part of the abdomen. A sense of fullness, of weight in the true pelvis, and of downward pressure, persists after the uterine colic connected with menstruation has subsided. Painful sensations of a more chronic inflammatory character may also be present in these cases in consequence of perimetritis. There is rarely enough pressure on the nerves traversing the pelvic cavity to give rise to distinct neuralgia, still Kidd[1] describes a case of sciatica caused by a uterine fibroid and relieved by lifting the fibroid out of the pelvis by means of an air pessary.

Jude Hüe[2] relates a similar case of long-standing sciatica, which was cured by the same method of treatment.

This kind of pain is produced by the pressure of the tumor, and is but one of the manifold and inconstant pressure-symptoms developed by fibromata. While no symptoms of this nature are caused by pediculated

[1] Dublin Quarterly Journal, 1872. [2] Annales de Gynécologie, IV., p. 239.

sub-serous myomata, a retro-vaginal, tightly wedged-in tumor may imperil the life of the bearer by pressure on the neighboring organs. The more closely the tumor is connected with the uterus, and the more sub-peritoneal it at the same time is, the more readily will it occasion marked displacements of the uterus, retroversion, retroflexion, or even complete dislocation forwards, and these changes of position will modify the whole train of symptoms accordingly as the uterus itself is more or less enlarged by venous engorgement, etc.

Very large sub-serous fibromata, which greatly distend the abdominal cavity, may also exert sufficient downward pressure to give rise to irreducible prolapsus of the uterus and vagina. A comparatively more frequent

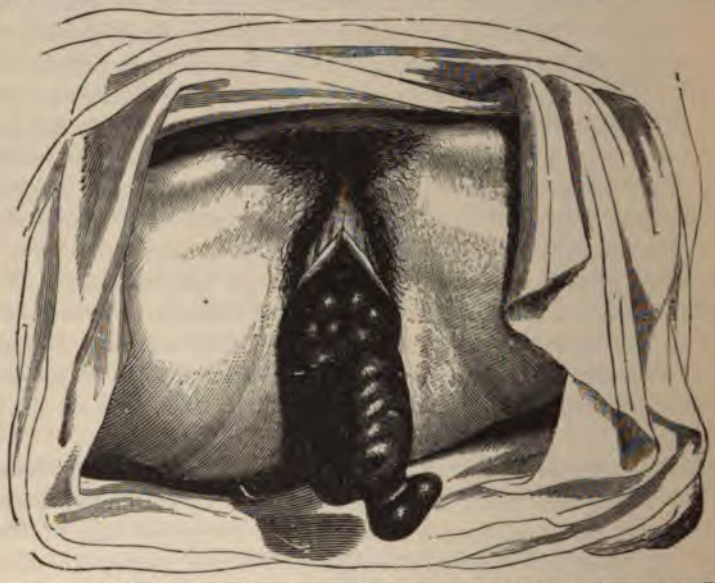

FIG. 23.—COMPLETE INVERSION OF UTERUS WITH PROLAPSE, CAUSED BY SMALL PEDICULATED FIBROID OF THE FUNDUS. (After *McClintock*.)

occurrence is inversion of the uterus dependent on sub-mucous fibroma.

If such a tumor be situated at the fundus, its very weight may drag the latter downwards, but inversion of the uterus cannot take place until the tumor has passed the neck of the uterus. After this has been accomplished, either, as is usually the case, in consequence of powerful uterine contractions, or very slowly by gradual dilatation of the os uteri, the facility with which the fundus is extruded through the os, or even beyond the external genitals (as I have once observed it), will vary according to the closeness and breadth of its connections with the tumor. It is evident that pediculated myomata, so-called fibrous polypi, will much more rarely, or scarcely ever, give rise to inversion, as their distinct pedicle permits them to prolapse beyond the os uteri without at the same time

dragging the fundus after them.[1] Cases of this kind have been described with sufficient exactness by Higgins, Oldham, Valenta, Velpeau, Santesson,[2] Langenbeck,[3] Copeman,[4] and Betschler.[5]

Martin[6] observed inversion of the uterus in a nullipara from a pediculated, dense fibroma. McClintock[7] met with one instance of inversion of the uterus with prolapse of the organ, after violent emesis, in a patient affected with a tumor scarcely as large as an egg (compare illustration of case, Fig. 23). The same author describes a similar case (Fig. 24) in which a very small tumor of this kind also occasioned inversion. (This is probably the same case which is quoted in West's text-book, p. 282, from Crosse.)

Pozzi[8] collected twenty-one cases from the literature, where fibromata attached to the fundus of the womb led to inversion and later to amputation of that organ. It is questionable whether sub-serous fibromata may under certain conditions, such as perimetritic fixation of the inferior segment of the uterus, cause inversion.

Still Louis Mayer[9] describes a case which may perhaps be an instance in kind. Enough has been said to show that inversion of the uterus is very rarely occasioned by broadly attached fibromata.

Among four hundred cases of inversion collected by Crosse (cited by West, l. c. p. 282), there were only forty which had developed in this manner, and even this small number includes numerous doubtful cases from older literature. Now although we must assume that there exists in these cases a certain amount of relaxation of the uterine substance adjoining the growth, or an atrophy of that part of the fundus corresponding to the seat of the growth, yet in the only case which I have encountered[10] nothing of the kind could be found. Neither was there any fixation of the lower segment of the uterus, which, if present, would have favored the extrusion of the base of the uterus by labor-like pains. I have, moreover, not been able to find in the literature of the subject any statements bearing upon these points.

Other and sometimes very peculiar displacements and distorsions of the uterus are particularly liable to be induced by all myomata, that in any way fill out the pelvis. They are usually large sub-serous tumors growing

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[1] Compare Scanzoni, Beiträge, 5, p. 83.
[2] Compare Scanzoni, l. c. and Virchow, Geschwülste, III., p. 170.
[3] Monatsschrift für Geburtskunde, XV., p. 174.
[4] London Obstetric. Transactions, 1872, p. 232.
[5] Beiträge zur Gynäkologie, I., p. 3.
[6] Monatsschrift für Geburtskunde, 34, p. 410.
[7] Clinical Memoirs on Diseases of Women, Dublin, 1863, p. 97.
[8] De la valeur de l'hystérotomie, etc., Paris, 1875, p. 150.
[9] Beiträge zur Geburtshälfe, II., p. 26.
[10] Vide my paper on Carcinoma Uteri, Volkmann's Clinical Lectures.

from a broad base and which, starting generally from the posterior wall, develop in a downward direction so as to become retro-uterine, or even actually retro-vaginal, pushing the *cul-de-sac* of Douglas before them. In consequence of their location and size, these tumors are immovably fixed in the pelvis, although they need not always have become adherent to the walls of this cavity. They constitute the wedged-in, the incarcerated, fibromata previously alluded to.

FIG 24.—CROSS-SECTION THROUGH AN INVERTED UTERUS WITH FIBROID OF THE FUNDUS. (After *McClintock.*)

Similar conditions may obtain in cases of large sub-serous tumors, originating on the lateral borders of the uterus, and growing between the folds of the broad ligament, so-called intra-ligamentous fibromata. Sub-serous tumors growing from the superior parts of the uterus, and large sub-mucous growths completely filling up the uterus, can only become incarcerated in the pelvis in case either the uterus or the tumors have previously contracted adhesions as the result of perimetritic processes. In

either of these events the most varied symptoms of pressure with reference to the pelvic viscera may be developed.

In the first place and most frequently this pressure manifests itself by pain or other abnormal sensations (tingling, etc.) in the lower extremities, as has already been alluded to. I have neither myself observed any instance of true paralysis from this cause, nor have I been able to find any references thereto in literature. Indeed, very little mention is made of the remaining pressure symptoms, although the lighter degrees occur very frequently, and the severer forms, such as often enough lead to the death of the sufferer, are by no means rare.

Let us first consider the symptoms of pressure upon the urinary apparatus, particularly the bladder and ureters. Both movable and stationary tumors do not, as a rule, exercise any severe pressure upon the bladder; they simply prevent full distension of this viscus, and thus occasion frequent micturition or only a desire to pass water frequently. On the other hand they sometimes cause retention of urine, and in this way favor the development of vesical catarrh. With reference to this point, Hardie[1] calls particular attention to those fibromata which are situated in the anterior wall of the uterus, and which, although so small as not to excite any symptoms of incarceration, yet exert pressure upon the neck of the bladder and urethra, especially if they become more or less swollen during menstruation.

Kidd[2] describes the occurrence of similar conditions in cases of small tumors when these have given rise to retroversion of the uterus. Close adhesions between tumor and bladder may also so obstruct the evacuation of urine as to render even catheterization difficult. Fourestié describes a case of this kind, where the bladder, although empty, was spread out like a fan in front of the uterus, and extended as high as the umbilicus.

These conditions derive, of course, much greater importance in case the pressure upon the bladder and ureters is continuous or, worse still, is increasing, as happens in cases of incarcerated fibromata, which have either become firmly attached to the walls of the pelvis and to the neighboring viscera by perimetritic adhesions, or which, as is certainly much oftener the case, are firmly retained within the pelvis, being "incarcerated" in the true sense of the word.

Instances in which uræmic symptoms terminating fatally have been due to pressure exercised by the tumor upon the bladder and ureters, have been enumerated by Jude Hüe[3] and Murphy.[4] Hanot[5] records a case

[1] Edin. Med. Jour., Jan. 1873.
[2] Dublin Med. Journal, 1875, Nov. p. 456.
[3] Annales de Gynécologie, Oct. 1875, IV., p. 239.
[4] London Journal of Medecine, Oct. 1849.
[5] Soc. Anat. de Paris, Feb. 28, 1873.

of double hydronephrosis and consequent fatal uræmia, induced by a tumor having a diameter of twelve centimetres, and adherent to the walls of the pelvis. Hubert[1] observed albuminuria, and diagnosticated "Morbus Brightii" in consequence of compression of the ureters.

Budin's[2] case is of importance from a diagnostic point of view. The patient was affected with a small, interstitial myoma in the inferior portion of the anterior wall of the uterus, completely occluding the outlet of the bladder, with great distension of the viscus. The swelling was diagnosed as an ovarian cyst, and was punctured with a fatal result, the cause of death being "Phlebitis uteri." Caternault[3] and others mention similar errors in diagnosis. Dolbeau's[4] patient died of uræmia from a purely incarcerated tumor without adhesions. Fourestié[5] and others report the formation of abscesses of the kidneys from pressure on the ureters (?).

Slight uræmic symptoms, such as persistent vomiting associated with scanty urination, are not infrequently observed.[6]

Incarcerated tumors very often, of course, exercise pressure on the rectum. Nélaton[7] reports such cases, among others, one in which total occlusion of the rectum having been produced by a small uterine fibroid, he performed enterotomy, with a fatal result. A similar case, in which Broca[8] performed enterotomy, also terminated disastrously. In this case the occlusion of the intestine was produced by adhesions, not by the direct pressure of the tumor. Ducheussoy[9] observed a case which terminated in death, with the symptoms of intestinal obstruction from pressure upon the rectum. Similar cases have been observed by Holdhouse,[10] Dolbeau[11] and P. Eade,[12] intestinal occlusion having been produced by cord-like adhesions between small tumors and intestine

Ringland's[13] and Jude Hüe's[14] cases pursued a more favorable course, albuminuria and the symptoms of intestinal occlusion passing off after elevation of the tumor out of the pelvis. Let me also call attention to the fact that such tumors, although firmly adherent within the pelvis,

[1] Bull. de la Soc. Anat., 1873, p. 870.

[2] Archives de Tocologie, II., p. 60.

[3] Essai sur la gastrotomie, etc., Paris, 1866.

[4] Milliot: Sur les complication des tumeurs fibreuses de l'utérus, Thèse, Paris, 1875.

[5] Gaz. Méd. de Paris, Nos. 6 and 7, 1875.

[6] Compare Winckel, Ueber Myome des Uterus. Volkmann's Clinical Lectures, No. 98.

[7] Guyon: Des Tumeurs fibreuses, etc., Paris, 1860, p. 49.

[8] Faucon: Gazette des Hôpitaux, 1873, Nov. 29.

[9] Jude Hüe, l. c., p. 241.

[10] Transact. of the Patholog. Society of London, III., 371.

[11] Gazette des Hôp., 1873, Nov. 29.

[12] Lancet, Dec. 21, 1872.

[13] Dublin Quart. Journal, August, 1867, p. 248.

[14] L. c., p. 247.

and giving rise to symptoms of pressure, may yet manifest a certain degree of mobility on vaginal exploration, in so far as the vagina moves along with them.[1] Further information concerning incarcerated uterine fibromata may be gained by consulting the papers of Spiegelberg[2] and P. Müller.[3] Mild symptoms of pressure upon the rectum, such as obstinate constipation and hemorrhoidal conditions, are very frequently caused by even small fibroids.

Among the very rare sequels of pressure by these tumors, is their growth into contiguous organs, the so-called hernia of the tumor. The hitherto reported descriptions of this occurrence are the more unreliable, the less attention has been paid to the condition of the neoplasm.

Nothing is more common than the rupture of a tumor into the neighboring viscera, after it has undergone suppuration or putrid liquefaction. These cases will be discussed later. But in the cases to which we have reference at present, the unaltered tumor has made its way into the bladder, rectum, etc., by causing pressure-atrophy of their walls. When we closely examine large tumors which are situated in the cervical canal, or which have passed the external os, we not infrequently observe, as an initial stage of perforation, an atrophic excavation in the opposed wall with erosion of the mucous membrane. Bennett, Montgomery, Churchill and others have described this condition.

Thomson[4] relates the case of a fibroma growing into the bladder, the intervening tissues having undergone absorption from pressure. In Fleming's[5] case a diagnosis was made during life of vesical calculus, which proved *post-mortem* to be a calcified fibroma growing from the anterior wall of the uterus. Lisfranc reports the growth of a fibroma through the vagina into the bladder, from which the tumor could not be dislodged. In the last mentioned and in other cases the tumors filled out the false passage so as to completely prevent the escape of urine through the latter. Monod[6] describes a case in which a tumor tunneled its way through the anterior wall of the uterus and through both walls of the bladder, leaving a hole as large as a five-franc piece, through which some urine escaped by way of the uterus, only a small amount passing off by the natural outlet. The tumor lay directly against the symphysis pubis, which could be felt on passing the finger into the uterus, and thence through the three perforations. This patient died of peritonitis. Rokitansky (quoted by Klob) mentions perforation of the rectal wall. Lisfranc[7] also describes an instance of perforation of the rectum by a uterine fibroid, the tumor pro-

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[1] Herrgott: Memoires de la Société de Chirurgie, July, 1873.
[2] Archiv. für Gynäkologie, V., p. 100. [3] *Ibid.*, VI., p. 125.
[4] Cited by Klob and elsewhere.† [5] M'Clintock: Dublin Quart. Journ.
[6] Bullet. de la Soc de Chirurg., IX., p. 526.† Cited by Demarquay and St. Vel: Traité, etc., p. 157.
[7] Demarquay, l.c.

truding from the anus during every act of defæcation, after which it could be pushed back. It finally dropped off spontaneously. Larcher[1] observed attenuation of the uterine walls, with and without absorption of the peritoneal envelope. A not very large tumor which had developed in the region of the os internum, bored a passage through one side of the uterus into the vagina, projecting into the latter canal. The tumor had also pushed forward in another direction until it penetrated into the abdominal cavity, giving rise to fatal peritonitis. In a case of retro-vaginal fibroma of the uterus, Roux[2] observed perforation of the posterior roof of the vagina. It must remain undecided whether in the above-mentioned and in other similar cases perforation has been accelerated by uterine contractions. The cases in which this factor has undoubtedly played some part have been observed during and after childbirth,[3] and will be considered later on.

Matthews Duncan[4] observed a case of fatal peritonitis excited by a fibroma which had worn away the wall of the uterus as far as the peritoneal envelope. Most of the other reported instances of perforation do not concern us at present, as they have either been associated with a sloughy condition of the tumor, or are, to say the least, doubtful, like the case of Demarquay,[5] who found a large, oval hole in the posterior wall of the bladder and anterior wall of the uterus, with ragged edges, the growth being situated in the anterior wall of the uterus. In this case Huguier's dilator had previously been employed. Loir's[6] case is equally doubtful. In this instance a fibroma, after causing perforation of the walls of the uterus and abdomen, was thrown off as a "black mass." Dumesnil's[7] case was undoubtedly one of expulsion of a gangrenous tumor. There were several brownish spots on the most attenuated portions of the skin of the abdomen, covering a tumor of the uterus which reached high as the umbilicus. Pressure on this point gave rise to distinct emphysematous crackling, while the percussion tone in the same situation was tympanitic. A few months later ulcers formed at these points, through which fungoid masses of the tumor sprouted. The various openings finally coalesced into a single large aperture, through which the gangrenescent tumor protruded and was at length expelled spontaneously, the patient recovering.

Other instances of the same kind will be found under the heading of gangrene of fibromata. While the bursting through of the tumors is due in these cases to their decomposition, the contrary occurred in the cases

[1] Archives Génér. de Méd., 1867, p. 545.
[2] Demarquay, l.c.
[3] Hecker: Klinik d. Geburtskunde, II., p. 133.
[4] Edinburgh Med. Journal, Aug., 1867, p. 179.
[5] Soc. de Chirurg. de Paris, June 22, 1859. Union Méd., Paris, 1859, II., p. 609.
[6] Polypes Utérins, Mém. de la Soc. de Chirurg. de Paris, 1851, II.
[7] Gazette des Hôpit., 1869, No. 6.

described by Schröder.[1] In the latter the abdominal walls were greatly thinned, and were pushed out, so as to resemble hernial protrusions, by the pressure of large interstitial and submucous fibromata. In one case the abdominal wall was distended until it was as thin as a sheet of paper and finally underwent mortification, fully exposing the otherwise intact tumor. Neuschler's[2] case is almost identical.

While peritonitis very seldom results in consequence of perforation from the pressure of fibroids, it develops more frequently as the result of mere tension of the peritoneal investment of these tumors, in case they begin to grow very rapidly or have become tightly wedged in the pelvis. Still, most of the cases of peritonitis which are observed in patients affected with myomata, are due to changes which have taken place in the tumors themselves, such as calcification and purulent liquefaction. Indeed, in cases of incarcerated fibromata the incipient stage of sloughing, the œdematous softening which is so frequently observed as the result of pressure, often leads to fatal general peritonitis, or to circumscribed perimetritis.

As frequently as perimetritic and parametritic processes occur in these and other cases of fibromata, as seldom do they, as a rule, end in the formation of abscesses. M'Clintock[3] describes five cases of this description, death resulting in four from general peritonitis. One of these cases should perhaps be excluded, as the disease occurred in connection with the operative removal of the tumor—a not infrequent sequel. Köberlé[4] reports a case of fibroma in which a peritoneal abscess broke externally, leaving a fæcal fistula.

Ascites is a not very frequent accompaniment of uterine fibromata, although, on the other hand, it does occur if the tumors have undergone softening, or if great anæmia has been caused by hemorrhage. Even when present it need not excite any symptoms. Cases of very abundant ascites persistently recurring after tapping have been described by Köberlé and Péan.[5]

We need make but passing mention of some other symptoms of uterine fibroma, œdema, petechial extravasations on the lower extremities during the menstrual period (Winckel, l. c. p. 25), thromboses in the encircling veins, more rarely persistent vomiting and enlargement of the breasts. They are so seldom observed in these cases, besides being occasionally met with in all sorts of uterine diseases, that a characteristic relation to fibromata cannot be assigned to them.

We see then, that fibromata, even when they are stationary, give rise to very varied symptoms; moreover, that their course is usually one of un-

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[1] Handbuch, etc., p. 223.

[2] Würtemb. Corresp. Blatt., 36, 2, 1866.† Cited from Schröder.

[3] Clinical Memoirs, Dublin, 1873, p. 444.

[4] Gaz. Méd. de Strasbourg, 1866, No. 5.

[5] Caternault: Essai sur la Gastrotomie, etc., Paris, 1866, pp. 11, 62.

interrupted growth up to the time of the menopause. This reached, a number of the more important symptoms, prominent among which is profuse menstruation, usually pass away, although this is not invariably the case. The tumor stops growing and the patent is relatively cured.

While this is a not infrequent occurrence, it certainly happens much more rarely that patients perish in consequence of the tumor, provided the latter have undergone no morbid alteration. In these cases death may be due to severe hemorrhages, to acute peritonitis, or to uræmia from pressure on the pelvic viscera, as has previously been described. Mention should also be made, in this connection, of fatty degeneration of the heart. It has been observed by others as well as myself in cases of uterine fibroids, and is presumably due to chronic anæmia of the patients. This condition is doubtless frequently responsible for the fatal issue of the cases under consideration. Indeed, Röhrig (l.c.) observed "heart disease" in 8.4 per cent. of his cases. (*Cf.* also the article of Rose.)[1]

The course of the tumors under consideration is influenced chiefly by the anatomical changes to which they are liable. Among these the most favorable, and consequently the most important one is their complete disappearance, either by absorption (an undoubted but uncommon event), or more often by spontaneous exfoliation. Both processes are, indeed, exceedingly rare. While it is doubtful, to say the least, whether the former is often caused by parturition and childbed, the latter appears to be chiefly dependent on these states, as will be shown in another chapter.

Many refuse to accept the possibility of the perfect regressive metamorphosis of these tumors, and many of the reported instances of this occurrence are undoubtedly illusory. Diagnostic errors of this kind have been made in numerous cases of parametritic exudation, of the presence and course of which we formerly possessed but imperfect knowledge. Hard, indolent, often spherical pelvic exudations attached to the uterus are, even at the present time, often diagnosed as fibromata, and nothing is more common than the disappearance of such infiltrations after a longer or shorter interval. Prieger's[2] cases may probably be included in this category. On the other hand, fibromata often undergo atrophic shrinkage after the menopause, and it is at least questionable whether these cases belong here. Moreover, fibroids not infrequently enlarge during pregnancy, in consequence of swelling, and return to their original size during childbed. One cannot in these cases speak of an absorption of the tumor, in the proper sense of the word.[3]

Notwithstanding all these objections, there remain a number of authentic instances, in which absorption has certainly been observed. But these cases are by no means as numerous as many have asserted. Thus,

[1] Deutsche Zeitschrift f. Chirurgie, vol. XIX. [2] Monatsschrift, I., 1853.

[3] Bartels: Verhandl. der Geburtsh. Gesellschaft zu Berlin, 1852, p. 1, with subsequent discussion.

hile Schröder[1] collected thirty-six cases of this character from the literaıre of the subject, careful sifting of the original reports demonstrates ıat a large number of these will have to be excluded. Among these ıere is one reported by Clarke (quoted by Ashwell), who states that the ımor was "as big as a child's head," and was provided with two excres-ɔnces which became smaller after two years of observation, the uterus being ı large as this organ is in the fifth month of pregnancy. Of Ashwell's[2] ıses at least one must be regarded as an exudation.

Matthews Duncan[3] observed a fibroma as large as a child's head, hich disappeared so suddenly that he himself imagined that it had been ıucleated spontaneously and had been expelled unnoticed. Playfair's[4] rst case was probably one of pelvic exudation (compare my review in anstatt's Jahresbericht, 1869); in the second case the tumor underwent ıppuration. Burnton[5] speaks of the disappearance of a "fibrous enırgement of the whole uterus" (probably chronic metritis) and menions particularly that it was "not a distinct or separate fibrous tumor," nd again that "it was not a distinct tumor growing into or from the ıterus." In short this case is not one of absorption of a fibroma. G. Braun[6] describes in detail the suppuration of the tumor. Madge[7] observed a diminution in size, that is to say, a partial disappearance of a fibromyoma after childbed. The description of Rigby's case, cited by Ashwell, is also so imperfect as to be unserviceable. In addition to the above nine cases I shall have to exclude one of Goodell, and one of Velpeau, as I have not been able to obtain the original communications. That of Velpeau, moreover, seems to be the same one described by Cazeaux.

The following are positive examples of complete absorption of uterine fibromata:

M'Clintock,[8] one case; Ashwell (l. c.) three cases—one disappeared in consequence of childbed; Kidd,[9] two cases—one after menopause, one during childbed; Simpson,[10] one case.

Guéniot[11] reports the absorption of a large fibroid with febrile symptoms. He also mentions an instance of complete absorption observed by Depaul, also one of marked diminution in size after premature delivery, and a case of Béhier's. He also states that Herpin noticed the complete disappear-

[1] Lehrbuch, p. 228.
[2] Lancet, 1854, p. 180.
[3] Edinb. Med. Journ., 1867.
[4] London Obstetr. Transact., X., p. 102.
[5] Obstetr. Transactions, XIV., p. 227.
[6] Wiener Wochenschrift, 1868, No. 100.
[7] Obstetr. Transactions, XIII., p. 227.
[8] Clin. Mem. on Dis. of Women, Dublin, 1863, p. 141.
[9] Dubl. Journ. of Med. Science, 1872.
[10] Diseases of Women, Edinb., 1872, p. 693.
[11] Bulletin Gén. de Thérap., March 20, 1872.

ance of a fibroma after Cæsarian section (?) In Cazeaux's[1] two cases pregnancy and childbed respectively were the exciting causes of absorption. Courty[2] and Péan[3] each record a case of this description, but so imperfectly that the observations are not convincing. Hildebrandt[4] observed absorption not connected with childbed, Routh[5] two cases during the menopause, while Boinet[6] reports three cases of this description. Sedgwick[7] claims to have observed this occurrence thrice during childbed. The influence of childbed in this direction was clearly demonstrable in Scanzoni's,[8] Gussmann's[9] and Schröder's[10] cases, and I am positive that I have seen one similar case myself, while in several other instances the rapid disappearance of previously felt tumors threw a doubt on the correctness of my diagnosis, and served but to prove to me how very easy it is to commit errors of diagnosis in similar cases in spite of conjoined manipulation and rectal palpation.

The cases of Holst and Spiegelberg[11] have been very carefully observed, while Meadow's[12] should probably not be considered here, as the disappearance of the tumor (by absorption?) occurred only after artificial dilatation of the os uteri and partial enucleation from the capsule. During the progress of a confinement Lorain[13] noticed a uterine fibroma as large as a child's head. On the death of the patient twenty-two days later the tumor was no larger than a nut. If we include this case among those of complete absorption, my list will embrace thirty authentic cases, of which thirteen have occurred in conjunction with childbed, while most of the others developed during the menopause. I may as well state, in this connection, that in none of the cases is there reasonable ground for assuming that treatment exercised the least curative influence.

We shall be more likely to gain an insight into the nature of the circumstances which lead to absorption, if we assume that this phenomenon took place chiefly in those cases of pure myomata which were imbedded in the tissues of the uterus, without the intervention of a capsule, as was emphasized by Spiegelberg (l. c.) The cases of Freund and A. Martin show that fatty metamorphosis alone is not sufficient to cause absorption, nor is pulpy softening more efficacious in this respect (compare Hecker, l. c.). If, however, these changes occur in soft myomata, which

[1] Bulletin de la Société de Chirurgie, 1857, p. 94.
[2] Traité de Malad. de l'Utérus, Paris, 1868, p. 828.
[3] Gaz des Hôp., 1871.
[4] Berl. Klin., Wochenschrift, 1872, No. 25.
[5] Cited by M'Clintock.
[6] Gazette Hébdom., 1873, No. 18.
[7] St. Thomas' Hosp. Rep., 1870.
[8] Lehrbuch, 4 ed. I., p. 212.
[9] Würt'bg Correspondenzb., 1868.
[10] L.c. 229.
[11] Archiv. für Gynäkologie, VI., p. 512 and 515
[12] Obstetric Journal, Dec. 1874.
[13] Atrophie des corps fibreux de l'utérus après l'accouchement, Gaz. des Hôp., 1869, p. 361.

re directly imbedded in uterine tissue, their absorption is the more omprehensible, as is also the influence in this direction of parturition and hildbed, during which processes the contractions of the uterus and the volution of this organ induce similar changes in the entire mass of e muscular substance of the uterus.

We can also understand that the soft tumors will participate more readily the general atrophy of the uterus which takes place at the menopause, an will dense, encapsulated fibromata. Of course I do not intend ereby to deny the possibility of the disappearance of encapsulated fibroata, but I believe that the latter diminish in size rather as the result of duration and atrophy, and that distinct residua often remain, which atomical investigation at least will succeed in detecting. It is just this ndition of induration of the tumor, this diminution in size at the menouse, which is so very frequently combined with calcification, as has eviously been stated. The cases of Hildebrandt,[1] Fehling,[2] Lente[3] and arge number of others are of this description.

Another very favorable, but equally rare event, is the spontaneous pulsion of fibroids. This may happen, on the one hand, in cases of liculated tumors as the result of simple tearing of the pedicle, or the nor may actually be born, so to speak, through the medium of violent erine contractions, and may then break off. But even in the case of more interstitial tumors, those deeply seated beneath the mucous mbrane, the capsule may be ruptured by the pains, and the entire ss may then be cast off. Both occurrences, although rare, terminate orably with scarcely any exceptions. At most the act of expulsion is mentarily accompanied, or preceded, by a short period of profuse morrhage. Cases in which fibromata have torn away purely in conseence of their own weight have been described by Routh[4] and R. Lee c.). Mansfield Clarke mentions vomiting as contributing to the same sult, Marchaud[5] the association of straining during defecation, with lent hemorrhage.

Barnes[6] observed the expulsion of a fibroma as large as a walnut after pture of the thin capsule, or avulsion of the pedicle from uterine conctions resembling labor pains, Whiteford[7] after intense pains lasting eral days, Dorsch[8] a similar event. Berdinel[9] describes a case in which ulsion was preceded by pains resembling those of labor and by hemorge during a period of two months. During a violent paroxysm of ghing, associated with very profuse hemorrhage, the tumor suddenly

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Berl. Klin. Wochenschrift, 1872, No. 25.
Archiv. für Gynäkologie, VII., p. 384.
Med. and Surg. Reporter, 1874.
Virchow, Archiv., LXVII., p. 206.
Glasgow Med. Journal, Aug. 1872.
Archiv. de Tocologie, III., p. 249.
[4] British Med. Journal, 1864.
[5] Obstetr. Transact., VI., p. 101.
[8] Deutsche Klinik, 1874, No. 5.

sank until it lay just within the external genitals. No pedicle was detected. The patient died. Hybre[1] reports a similar case of a myoma weighing 2420 grammes, which was driven down as far as the vulva. It will be shown later that such accidents are very prone to occur during or after parturition.

The expulsion of uterine tumors after the occurrence of dissecting suppuration or disintegration takes place much more frequently than the above-described varieties of spontaneous extrusion. The processes of disintegration do not affect the body of the tumor, or if so, only to a slight extent, but are confined to the capsule or to the lax connective tissue surrounding the growth. The inflammation either starts, as is usually the case, from the enveloping mucous membrane, or the latter only becomes secondarily affected. The tumor is in every instance expelled *en masse*, except that scattered patches of the growth are here and there encountered in a sloughing condition. This mode of expulsion is sometimes associated with febrile manifestations, but generally terminates without danger to the patient. Calcified fibromata—so called uterine calculi—are most frequently cast off in this manner. These cases also are often intimately connected with the processes incident to parturition and childbed. Instances of this description are numerous. Field[2] and Barnes[3] each observed a case several weeks after childbed, Küchenmeister[4] saw one forty-five days after confinement, and Schneider[5] one five weeks after confinement. It would take up too much space to mention all the cases reported in the literature of the subject: let it suffice to call attention to those of Kauffman, Ruge,[6] and Wardie.[7]

Although the process of expulsion after dissecting suppuration is in many respects analogous to that of purulent liquefaction of the entire mass of the tumor, yet there is a broad line of demarcation between the two, both the course and the final termination being essentially different. Thus, while dissecting suppuration usually leads in a short time to the expulsion of the tumor, purulent liquefaction generally requires a much longer time for its completion, according as the tumor is large or small. Moreover, the process of purulent liquefaction necessarily carries with it the greater dangers of pyæmic infection, and consequently often leads to a fatal termination.

Uterine fibromata very frequently slough in consequence of the employment of various operative procedures, either for purposes of diagnosis

[1] Annales de Gynécologie, I., p. 153.
[2] Boston Gynæcol. Journal, III., 342.
[3] Obstetr. Transact., VII., p. 13.
[4] Oesterr. Zeitschrift für Heilkunde, 1869, No. 33.
[5] Schweizer Correspondenzblatt, 1872, No. 16.
[6] Beiträge zur Geburtskunde, Berlin, III., p. 72.
[7] Med. Times, July 6, 1872.

(sponge tents, incision of the mouth of the womb), or in order to check hemorrhage (intrauterine injections), or finally after attempted extirpation of the neoplasms. The injury inflicted in these cases upon the enclosing mucous membrane, often interferes with the nutrition of the tumor to such an extent as to induce mortification of the latter. The more extensive and severe the traumatism, and the more intimate the connections of the tumor with the uterus, the greater is the liability to septicæmia and pyæmia. At any rate there is no doubt that a much larger number of those patients die in whom operative interference has been followed by sloughing of the tumor, than of those in whom the tumor has undergone gangrene spontaneously. It is self-evident that the duration of the gangrenous process as well as the size of the tumor involved are of prime importance in this respect.

Spontaneous gangrene develops most frequently from ulceration of the mucous membrane covering the tumor. Ulceration occurs quite rarely as long as the tumor is still entirely within the cavity of the uterus, and so long as no operative measures of any kind have been attempted. Under these circumstances it is most prone to develop during childbed, as will be shown hereafter. But these injuries occur very readily when the tumor has forsaken the uterus, and rests either wholly or partly in the vagina. On the other hand it has previously been explained how hemorrhages into and œdematous softening of a tumor may lead to spontaneous gangrene of the latter.

It may also be stated here that according to Cruveilhier this process may be excited by thrombosis of the surrounding veins. Whenever I have found venous thrombi in the vicinity of sloughing tumors it has always seemed to me as if the former were rather the result than the cause of the latter.

When gangrene starts from the mucous membrane and commences as an ulceration, hemorrhages are usually observed from the outset, and are followed almost immediately by a fetid and putrid discharge. When sloughing occurs from other causes, in an uninjured tumor, it is very often preceded by the symptoms of softening or of the so-called inflammation of the tumor. The growth becomes larger, more tense, and frequently yields a feeling of fluctuation. It is painful to the touch, and spontaneously excites either painful contractions of the uterus, or painful sensations in the peritoneum. As far as my experience goes, these occurrences take place spontaneously more often when the fibromata are soft —that is, when we have to do with myomata or myoma—than when the tumors are dense, although mortification is relatively frequent in cases of calcified fibromata. But in these instances it usually results from dissecting suppuration. The patients suffer from fever, rapidly emaciate and lose their appetite. Violent uterine contractions cause the mouth of the womb to dilate, and then the gangrenous tissue is expelled, usually in

rather large pieces mixed with an exceedingly fetid discharge of bl and pus.

In other cases there is merely a discharge of a very penetrating o At the same time very high fever is almost always present, together all the signs of putrid infection. The further progress of the cas pends upon whether the sloughy masses have a free exit or not also upon the size of the tumor. In any event recovery is very ly observed. In cases that have terminated favorably errors of nosis have often been committed, in so far as the condition has pro been one of loosening and expulsion of the tumor *en masse*, aft questration by sloughing. Still, there have been occasional recoverie sloughing of the tumor in its entirety. Thus recovery occurred in of uterine myoma extending an inch above the umbilicus, report Ziemssen.[1] This writer emphasizes the fact that the expelled consisted chiefly of muscular tissue, a fact to which attention has been directed, and which suggests the question—are pure myomat ticularly susceptible to mortification, or does the intervening conn tissue slough away more rapidly and thus set free the muscular bu

Baker Brown[2] observed sloughing in a tumor of this nature, the p lasting two years before the patient recovered. Braun, Chiari and S report two favorable cases, in which the mortified tissue was ex through the patent os uteri by violent contractions.

In M'Clintock's[4] paper, on the spontaneous elimination of u tumors, several instances are described of tumors which were first by uterine contractions outside of the vulva, and then became gangr Similar cases have been reported by Field,[5] Säxinger,[6] Kristeller,[7] He Playfair,[8] Chassagnac, and Demarquay.

Calcification, as has been already stated, appears to facilitate t velopment of spontaneous gangrene, and under these circumstan covery not infrequently takes place (Lumpe[9]). Under the head treatment, attention will be again directed to the fact that operative ference in cases of uterine tumors is liable to lead to gangrene, eit an accidental sequel, or as an intentional therapeutic measure.

The course of spontaneous gangrene differs widely from that in by artificial means. In the former event recovery may take place,

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[1] Virchow's Archiv., XVII., p. 340.
[2] Obstetr. Transact., I., p. 330.
[3] Klinik, etc., pp. 402, 403.
[4] Dublin Quart. Journal, Feb. 1868, p. 24.
[5] Boston Gynæc. Journal, III., p. 342.
[6] Prager Vierteljahrsschrift, II., 1868, p. 72.
[7] Berl. Klin. Wochenschrift, 1872, No. 35.
[8] Obstetrical Journal, June, 1874.
[9] Zeitschrift d. Gesellsch. d. Aerzte., Vienna, 1860, No. 29.

been shown above. In the latter, as we shall see, almost all the patients perish. Even when symptoms of septicæmia manifest themselves during the course of spontaneous gangrene, the final result of the affection may be favorable, as is seen in a case reported by Hardie.[1] In the whole literature of the subject I have succeeded in discovering but one case of fatal pyæmia following the spontaneous mortification of a myoma. This was reported by Spiegelberg,[2] and even in this one instance there is considerable doubt as to the spontaniety of the process. Compare also Braun, Chiari and Späth, l. c. Spontaneous gangrene, followed by expulsion and ending in the death of the patients, are also described by Labat[3] and Jackson.[4]

Although it may be true that numerous cases of spontaneous gangrene have not been made public, as not having been sufficiently striking, there is yet a well-marked difference in the course and final result of these cases, as contrasted with those of artificially induced gangrene. The why and wherefore of this difference will be best explained by the recollection of the fact that, spontaneous gangrene occurs, as a rule, only after the tumors have been cut off from their nutrient source, that is, from their connections with the rest of the body, while in every instance of operative interference, not only are fresh wounds inflicted, which facilitate the entrance of septic agents into the system, but the entire tumor still remains intimately connected with the uterus.

These remarks do not, it is true, apply to the application of a ligature to the neck of a pediculated myoma, as the result of which sloughing almost inevitably occurs. The dangers of this procedure will be made apparent later. But in these cases the connection of the tumor with the rest of the body becomes very insignificant. When death results in cases of spontaneous gangrene it is more often caused by peritonitis, which is not necessarily due to the escape of mortifying tissue into the abdominal cavity. Cases have been reported by Braxton Hicks,[5] Maisonneuve and Maslieurat-Laguémar.[6] Cockle[7] reports a case of fatal peritonitis due to the passage of sloughy masses of the decomposed tumor through the dilated right Fallopian tube into the abdominal cavity.

Finally rupture may occur in any direction in cases of central mortification, or when the os uteri does not dilate sufficiently to permit of the exit of the discharge, or when the tumor does not project into the cavity of the uterus. The perforation may occupy the abdominal wall in case this has previously become adherent to the surface of the tumor.

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[1] Med. Times, July 6, 1872.
[2] Archiv. für Gynäkol., V., p. 108.
[3] Progrès Méd., 1880, p. 26.
[4] Obstet. Jour. of Gr. Brit., No. 139, 1880.
[5] Obstet. Tr., VII., p. 110.
[6] Comp. Demarquay et Saint Vel. Maladies de l'Utérus, p. 158.
[7] Med. Times, 1863, p. 697.

In addition to those instances of this accident which have been spoken of on page 220, let me mention one reported by Neugebauer.[1] The patient was affected with a subserous pediculated fibroma, partly calcified, which became adherent to the abdominal parietes after parturition, and sometime afterwards underwent spontaneous mortification, with the formation of an opening on the external surface of the abdomen. From this fragments of necrosed tumor tissue were removed, and there remained for a long time a cavity bounded by a calcareous shell. The patient finally recovered.

Loir's[2] case of gangrenous interstitial myoma, which worked its way through the walls of the uterus and abdomen, terminated unfavorably. Similar cases have been narrated by Dumesnil (compare page 220), Pinault[3] and Huguier.[4] Viardin[5] observed perforation of gangrenous masses into the abdominal cavity, followed by fatal peritonitis.

I should like to mention in this connection a very peculiar and interesting communication by W. A. Freund.[6] This gentleman observed in two cases of uterine fibroma, which were attacked by spontaneous softening or inflammation, the complete elimination of the tumors in the shape of a very profuse fluid discharge, mixed with solid fragments. No other signs of decomposition were present. The discharge was never fetid, there was no fever, there were no pains like those of labor, in short there were none of the symptoms which usually accompany the occurrence of true gangrene. The expelled masses consisted simply of softened fibroid tissue, with "*eingesprenkelten gelben, sehr lockeren Parthien, ohne jeden auffälligen Geruch und von blassgelber Farbe.*" They also contained concretions of lime. Microscopical examination showed mainly fatty degeneration of the elements of the tumor. Both patients recovered completely. It must of course remain undecided whether, as asserted by Freund, the softening and expulsion of these tumors was due to the use of the mineral waters of Jastrzemb.

A second case, of the same nature probably, is reported by Boturean,[7] who found a fibroma converted into a faintly yellow, purulent, and but slightly fœtid fluid.

Nothing need be added to what has been said above as to the final results of the calcification of uterine fibromata. These tumors either remain stationary and then give rise to no disturbance, or they are ex-

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Monatsschrift für Geburskunde, No. 28. p. 401.

[2] Mémoires de la Société de Chirurgie de Paris, 1851.

[3] Bulletin de la Société Anatomique, III., 1828.

[4] Hystérotomie, p. 180.

[5] Bullet. de la Société Anatom. de Paris, IX., p. 43. Paris, 1834.

[6] Klin. Beiträge, etc., III., 1865, p. 142.

[7] Bull. de la Soc. Anatomique, XVII., p. 139.

l in the form of so-called uterine calculi,[1] after isolation by dissect-
ıppuration.

ırtial calcification, however, leads much more frequently to gangrene
all its attendant dangers. Perforation into the peritoneum, followed
tal peritonitis, and perforation of the bladder by a calcified tumor,
also been observed (M'Clintock, l.c.). Compare also Simpson[2] and
.[3]

he freely discussed question—Do uterine fibroids recur after removal?
y be answered in the negative. Tumors, which possess a structure
respects similar to that of the tissues upon which and from which
have originated, manifest the peculiarity of developing at several
s at the same time. But after removal they do not recur in the
situation. This definition of benignity also holds good clinically in
ase of uterine fibroids. All observations which appear to show the
ary are susceptible of different explanations. Not a single one is
lated to prove beyond doubt the recurrence of these tumors. When
ome to the consideration of sarcomata of the uterus it will be shown
the so-called "recurrent fibroids" of the English are probably
ing else than sarcomata. This is clearly demonstrated by a recent
vation of M. Müller,[4] who found a sarcoma occupying the situation
which fibro-myomata had previously been removed.

ı other cases there seems to have been only the later growth of an
ıpletely extirpated fibroma. Thus Valenta[5] records an instance
ıroma which was cut away as far as possible after the vagina had
ne invaded, but which grew so rapidly that within a few months it
ı reached as far as the vulva, requiring the removal of additional
es weighing 1¾ pounds. L. Mayer[6] offers the same explanation for
eappearance of a peculiarly lobulated fibroid in a situation from
ı a similar tumor, as large as a child's head, had been removed two
previously.

nother explanation of seeming recurrence is that after the extirpa-
of a large tumor, other previously existing but small, and therefore
tected, tumors continued to grow until they attained a size sufficient
use disturbance. Multiple occurrence is very characteristic of uterine
ids. This affords the simplest explanation of cases like that of Kidd,[7]
removed from the uterus of a young woman twenty-nine different
us polypi in the course of a few years.

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rumet: Thèse sur les tumeurs de l'utérus, Paris, 1851, and Hénocque:
ves de Physiologie par Brown-Séquard, etc., Paris, 1873, No. 4, p. 425.
Obstetr. Works, I., p. 135. [3] Maladies de l'utérus, p. 835.
Archiv. für Gynäkologie, VI., p. 125. [5] Memorabilien, 1867, part I., p. 3.
Beiträge d. Gesellschaft f. Geburtsh., Berlin, II., 1874, p. 80.
Publ. Journ., Nov. 1875, p. 456.

Finally it has happened to me (G. Braun[1] describes a similar case) to have removed only the lower half of an hour-glass-shaped fibroma, under the impression that it was the entire tumor, the remaining upper half not being detected until some time afterwards. When such an oversight is committed one is very liable to regard the subsequently appearing tumor as a recurrence.

[1] Wiener Wochenschrift, 1869, Nos. 35 and 37.

# CHAPTER V.

## THE DIAGNOSIS AND PROGNOSIS OF FIBROIDS OF THE UTERUS.

UTERINE fibroids can be diagnosticated only by careful palpation of the pelvic organs. Although the recognition of these tumors is ordinarily easy, it may be rendered difficult by various circumstances.

Until submucous fibromata have attained a certain size, about that of an apple, they can be recognized by the touch only when they have caused dilatation of the os uteri, sufficient to render their smooth inferior border accessible to the palpating finger. The diagnosis is, of course, still easier when the tumor has become completely extruded from the uterus and can be felt, together with its pedicle, in the vagina. The dilated os may so tightly clasp the pedicle, if the latter be slightly developed or if the base of the tumor be very broad, as to closely simulate inversion of the uterus. The position of the fundus may be determined by the sound, by conjoined manipulation, and, if necessary, by rectal palpation, and errors in diagnosis may thus be prevented.

It is well known that the opposite and more serious mistake of considering an inverted uterus an extruded fibrous polypus has been much more frequently made. Fibromata which had completely escaped from the uterine cavity have, also, been mistaken for prolapsus uteri.[1] Foster[2] met with a case in which the prolapsed uterus was regarded as a fibroma and accordingly removed. The patient survived. Such errors could certainly be prevented by careful examinations.

So long as small submucous fibromata are not accessible to direct palpation, performed according to the method already described, they dilate the uterus to an extent commensurate with their size. The uterus is, almost always, symmetrically enlarged, since the tumors are situated in its cavity. It has also preserved its natural form, or is, at the most, more globular than normal.

Although the profuse hemorrhages and the uterine discharge may, in such cases, suggest the existence of chronic metritis, the uterine pains which are seldom absent, and which resemble those of labor, will direct

[1] Hall-Davis: Obstetr. Trans., IX., p. 152. Comp. also Scanzoni: Beiträge, II., p. 99.

[2] Allgem. Wien Med. Zeits., 1863, No. 26.

attention to the possible presence of a foreign growth in the uterine cavity. The tumor can, however, only be diagnosticated after the dilatation of the cervix by means of a sponge tent, or of several laminaria tents simultaneously introduced. Shortening of the vaginal portion of the cervix uteri specially points to the presence of such a neoplasm in the uterine cavity. Owing to their great mobility, submucous fibromata are early forced against the os internum. Interstitial fibroids of small dimensions are, likewise, difficult to diagnosticate. The enlargement and increased consistency of the uterus are, in this instance, likely to lead to the diagnosis of chronic metritis, since that disease accompanies the development of the neoplasm. In many cases the little fibroid may be discovered on the anterior or posterior uterine wall by conjoined manipulation. The sound furnishes more definite information, since the shape of the uterine cavity is of equal diagnostic importance with its enlargement. Anteflexion and retroflexion may, moreover, be excluded by the use of the sound. In many cases, however, it will be necessary to dilate the os uteri, and even this procedure will fail of establishing the diagnosis provided the tumefaction of the endometrium be slight.

If the interstitial fibromata be of large size they are easily accessible to palpation. The enlarged uterus is mobile as a rule, and has either descended lower into the pelvis than is normal or has risen above the superior strait. The nearer the tumor is located to the internal os the more is the vaginal portion of the cervix shortened. The only other cases in which a similar shortening is observed are those in which the tumor encroaches considerably upon the uterine cavity. The sound often reveals sinuosities and changes of direction in the uterine canal, and, usually, an enlargement of the uterus corresponding to the size of the tumor. These signs sometimes fail, however, and it is not always possible to reach the fundus with the sound. The diagnosis is specially difficult if several fibroids are present. Whatever cannot be detected in these cases by palpation, cannot, usually, be established by the sound. The depth of an interstitial fibroid beneath the uterine mucous membrane and the breadth of its base can, ordinarily, only be discovered after a thorough dilatation of the cervix.

Efforts at determining the firmness of its attachment by traction upon the tumor are fraught with danger, if the removal of the fibroid be impossible, because suppuration of the neoplasm may orginate in the lacerated wounds thus induced. The active and frequently repeated employment of sponge-tents must also be avoided, lest we produce gangrene of soft myomata situated immediately beneath the mucous membrane.

The direction of the cervix uteri often serves to indicate the seat of the tumor. If it be notably inclined toward one side, the assumption that the tumor is located on the other side is justifiable. If the position of the cervix be unchanged, the fibroma is usually pediculated, submucous and small.

The question whether an interstitial fibroma be located in the anterior or in the posterior uterine wall may be settled by feeling the extremity of the sound, on bi-manual exploration, either before or behind the tumor.

The diagnosis of subserous fibromata will be easy, in proportion to the facility with which their connection with the uterus can be determined. This connection may often be discovered, in obscure cases, by imparting simultaneous movements to the tumor and the uterus by means of the sound. The looser the connection between the uterus and the tumor, the less marked is the enlargement of the former. The broader the base of the sub-serous fibroid, the more difficult is it to decide whether the tumor belongs to the uterus or only adjoins it. This is particularly true if the fibroma be of large size. The difficulties of diagnosis increase if the neoplasm has become retro-vaginal and incarcerated, or if adhesions attach it in the pelvis or to other abdominal organs. This point will receive special consideration in our remarks on differential diagnosis. On the other hand easily movable subserous fibromata with thin pedicles may likewise present difficulties in the way of diagnosis.

The statement that cervical myomata are easily diagnosticated is, indeed, true of those tumors which may be easily felt because located in the lips of the os, or attached to them by a pedicle. When, however, small subserous or interstitial tumors are developed in the supra-vaginal portion of the cervix, their diagnosis is often very difficult, especially if they be encapsulated. When a fibroma, developed in one of the lips of the os, has attained a certain size, experience and authority confirm the fact that the difficulties of diagnosis are very great. Owing to the downward growth of such a tumor, which often completely fills the vagina, the os escapes upward. The free lip of the os is subjected to severe traction by the lateral growth of the tumor, and is transformed into a thin fold, lying in close apposition to the fibroid. An inversion of the uterus is thus simulated. A correct diagnosis is, however, easily made if the fundus be readily recognized by palpation. Breisky (l. c.) very pointedly calls attention to the fact that this is not always an easy matter. He says that the fundus is recognizable, however, by palpation of the round ligaments, the ovaries and the points of tubal attachment, either on one side or the other. If this cannot be easily effected rectal palpation may afford the desired information, although this is impracticable when the vagina is distended with large fibromata. Persistence in the investigation usually succeeds in the utilization of the sound, but the discovery of the os often demands much time and skill.

If the neoplasm is located in the anterior lip of the os, an examination in the lateral position with Sims's speculum is recommended. This method of examination is also adapted to cases in which the tumor develops in the posterior lip. If the os be discovered, the thorough introduction of the sound proves the absence of inversion. Such

cases have been described by Freund,[1] O'Connel,[2] Barnes,[3] Léon Lefort[4] and others. I myself encountered in two similar cases considerable difficulties in making a diagnosis, and overcame them in one instance only by rectal palpation, and in the other by means of the sound.

Simpson[5] likewise emphasizes the diagnostic difficulties presented by such cases.

It has been asserted that the sensitiveness of the uterine mucous membrane, as contrasted with the insensibility of the fibroid tumor, may assist the physician. I once had occasion to enucleate a fibroma from the fundus of an inverted uterus, but could not discover any difference between the sensibility of the mucous membrane and that of the tumor. Inflammation had, however, resulted from the inversion.

The relative amount of muscular tissue and of connective tissue composing the myofibroma has some bearing upon treatment. Pure myomata have, in my experience, been characterized by severe paroxysmal pains, resembling those of labor, which could be induced by touching the tumor with the sound. Similar pains, of great severity, accompanied each menstruation, and at that time the tumors, which had been of a soft consistency, seemed to become harder and smaller, owing, probably, to their own contraction. In other cases pure fibromata seemed, rather, to become soft and large from congestion. The remark may be made, in passing, that these soft myomata are well adapted to treatment with ergot, but that they readily become gangrenous if any intra-uterine treatment is adopted.

Only a few other morbid conditions simulate uterine fibromata. In the first place the symptoms, and even the pathological processes, may point to chronic metritis. This is the more likely to occur since, in many cases of uterine fibroid, the uterus is, actually, in a condition of chronic venous hyperæmia. The differentiation of fibromata from chronic metritis is only difficult when the former are small sub-mucous or interstitial ones. Larger tumors always occasion changes in the form of the uterus, and are, therefore, directly accessible to palpation.

Even small fibroids usually produce decided uterine pains, which are rarely so well marked in chronic metritis. A uterus containing submucous neoplasms is, moreover, of a globular form, and the vaginal portion of its cervix is often notably short, while the reverse conditions obtain in chronic inflammatory diseases of the uterus. Symptoms of uterine catarrh, particularly ulcerations of the cervix, accompany the

[1] Betschler: Beiträge, III., p. 105.

[2] Journal of the Gynæc. Soc. of Boston, I., p. 270.

[3] Transactions of the Obstetr. Soc. of London, III., p. 211.

[4] Tumeur fibreuse de l'utérus simulant un renversement, Bull. de la Soc. de Chirurg., 1872, p. 441.

[5] Obstetrical Works, 1st ed., vol. I., p. 120.

latter, while such morbid phenomena less constantly accompany uterine fibroids.

Fibromata are readily distinguished from uterine displacements, particularly ante-flexion and retro-flexion, by the condition of the uterine cavity. The direction of the uterine canal is, however, only to be determined by the sound. The reposition of the uterus by conjoined manipulation is by no means sufficient for the differential diagnosis of these conditions, for, on the one hand, the uterus may become fixed in an abnormal position, and, on the other hand, tumors, (those which have sunken low into the *cul-de-sac* of Douglas for instance,) may be displaced upward, together with the uterus. Evacuation of the bladder, by means of the catheter, must always precede the above-mentioned diagnostic manipulations. Even a moderately full bladder often interferes with examination.

In the case of Budin[1] a small fibroma having sunken into Douglas's *cul-de-sac*, and occasioned partial retention, the condition of affairs was not appreciated, and the bladder, consequently, punctured. Such cases are, fortunately, rare.

Barnes[2] discovered, by means of the catheter, that a fibroma, which seemed to be located in the anterior uterine wall, really belonged to the posterior wall of the bladder.

Interstitial fibromata often produce an abnormal prominence of the opposite uterine wall, a condition usually only discovered during sounding.

Fibroids must, farther, be differentiated from epithelioma. An epithelioma of the vaginal portion of the cervix, or carcinoma of the body, is not likely to be mistaken for a fibroma, but the reverse has occurred on several occasions. When a fibro-myoma has escaped from the external os and become gangrenous, the general condition of the patient is not only so bad that she presents a marked "cachectic" appearance, but the local condition may closely resemble epithelioma of the *portio vaginalis*, as I have myself once observed. The palpating finger penetrates a soft, pulpy mass which seems to distend the fornix vaginæ, while gangrenous shreds adhere to the finger. The discharge is exceedingly copious, offensive and often bloody. If the other hand discovers, on abdominal palpation, that the enlarged uterus is globular in form, an error is, however, readily prevented. If this be impracticable on account of the small size of the tumor, the relation of the gangrenous mass to the vaginal parietes must be discovered. Gangrenous epitheliomata always involve the vaginal walls, to a greater or less extent, while a gangrenous myoma leaves them intact. The healthy smooth lips of the dilated os uteri can always be discovered if the case be one of fibroma. It is also not so easy to remove parts of a gangrenous fibroma with the finger, as it is in cancer, and the shreds of the latter are soft and friable, while those of a fibroid

[1] Arch. de Tocologie, II., p. 60.

[2] Diseases of Women, p. 766.

are firm and fibrillated. A microscopical examination will clear up all doubts. (*Conf.* Braun, Chiari, and Späth, Klinik, p. 403.)

Only carelessness in examination can cause advanced cases of pregnancy to be mistaken for uterine fibroids. Real difficulties in the differential diagnosis will be encountered only in the earlier months of pregnancy, when neither heart-sounds nor fœtal members can be distinguished. Absence of menstruation and enlargement of the breasts are points in favor of pregnancy, although the mammæ sometimes enlarge and discharge colostrum in cases of fibroid. The uterus is, ordinarily, soft and elastic in the earlier months of utero-gestation, while the sensation of a solid body floating in fluid is obtained on palpation of the abdomen. The other signs of pregnancy will also be present. The diagnosis can, however, in some instances, only be made with certainty after the observation of farther uterine development, or the discovery of the heart sounds.

Spencer Wells, and particularly Winckel, have recently again called attention to the auscultatory signs of uterine fibroids. These were earlier studied by M'Clintock.[1] Besides pure arterial sounds heard here and there, there is most constantly present a murmur resembling, in every particular, the familiar uterine souffle. Winckel heard it in 54 per cent. of his cases of uterine fibroma. It is by no means so infrequent as is commonly assumed, but is, usually, only observed in connection with large sized-tumors. McClintock states that he has heard it only in cases of interstitial, or, at least, never in cases of pediculated fibroids. This sign has no bearing upon the differentiation of pregnancy from fibromata. In one of Bricheteau's cases,[2] his diagnosis of extra-uterine pregnancy was based upon the presence of the uterine murmur. Laparotomy was performed, the case was found to be one of sub-serous fibroma, and the patient died on the 6th day.

Many cases are recorded in literature in which the diagnosis fluctuated, for a long time, between fibroma and extra-uterine pregnancy.[3] The symptoms of pregnancy or the termination of the cases finally solved the problem.

Uterine fibroids are usually readily distinguished from ovarian tumors by the facts that the latter fluctuate and are not directly connected with the uterus, but are capable of independent motion. If these signs be absent the diagnosis may be difficult or impossible. Since the so-called fibro-cysts of the uterus are to be separately considered, I refer the reader to the chapter treating of the differences between ovarian cysts and fluctuating myomata. Allusion may, however, be made to the fact that sub-serous fibromata, with pedicles, have often been regarded as solid ovarian tumors

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[1] Clinical Memoirs, p. 130.

[2] Sébileau : Des tumeurs fibreuses dans leurs rapports avec la grossesse, Thèse, Paris, 1873.

[3] Comp. Routh : Brit. Med. Journ., 1864.† Jobert de Lamballe : Annales de Chirurg., 14, p. 219.† Courty : Maladies de l'Utérus, 1st ed. p. 820.

(*conf.* Spencer Wells, Fig. 4., p. 9), because they seemed to have no connection with the uterus. Auscultation gives no aid in such cases.

Since solid ovarian tumors (ovarian fibromata) are rare, any solid, movable abdominal tumor originating in the pelvis is, probably, a pediculated uterine fibroid. Solid ovarian tumors have, in my experience, caused few symptoms, while solid uterine fibromata have occasioned much inconvenience. If ovarian tumors, especially small ones or those with solid walls, are adherent to the uterus, their differentiation from sub-serous uterine tumors is almost impossible, so long as they do not fluctuate. In such cases an exploratory puncture may furnish the desired information.

Those cases are especially complicated in which, besides a uterine fibroma, an ovarian tumor is suspected. In such a case there should be two tumors, plainly distinguishable from each other. One of these is intimately connected with the uterus, while the other is distinct from it and independently mobile. If the latter also fluctuates, an ovarian tumor and a uterine fibroma are, in all probability, both present. The diagnosis is very difficult if one tumor is fixed in the pelvis and the other freely movable above it, because either ovarian or uterine tumors may be fixed in the true pelvis. Ovarian tumors usually grow much more rapidly than uterine fibroids. Puncture of that tumor which fluctuates the more plainly will establish the diagnosis. The cases of Grenser,[1] Jules Simon,[2] and Bouchet[3] belong in this category.

In a case of this kind I decided that the tumor which was the more closly connected with the uterus was a fibroid, because I had perforated the uterus with the sound, although the sounding was conducted with caution I assumed that such a change in the uterine parenchyma as would render it so friable, would rather attend the development of a uterine fibroma than of an ovarian tumor. The perforation of the uterus has not resulted prejudicially to the patients in those cases which have come under my observation. Although the diagnosis of fibroid was established in the case just referred to, I subsequently encountered a patient with an ovarian tumor, the parenchyma of whose uterus was so friable that every introduction of the sound, unless very carefully conducted, sufficed to produce perforation of the uterus.

In a large number of cases the diagnosis rests between inflammatory pelvic exudation, hæmatocele, and fibroma, and is often difficult, since doubtless all, or almost all, the cases of fibroid said to have been cured by baths have really been inflammatory exudations. The distinction between these morbid conditions should, ordinarily, be easy if the history and the symptoms be duly considered. In pelvic inflammation there is fever, and hæmatocele is developed with great rapidity. In fibroid there

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[1] Arch. f. Gynäkologie, VIII., p. 347. [2] Bull. de la Soc. Anat., III., p. 69.† [3] *Ibid.*, 29, p. 136.†

is almost always a tumor with well-defined outlines, which is not the case in pelvic inflammatory exudations or in hæmatocele. If these effusions are present they may, moreover, be shown to be firmly connected with the pelvic parietes and to be directly continuous with the soft parts of the pelvis. This is true no matter how closely the uterus may be connected with, or how completely it may be displaced by, the extravasated blood or inflammatory exudation. Softness or fluctuation of the tumor usually speaks against the presence of uterine fibromas.

After what has been said, it might seem almost impossible to confound the conditions in question. But the so-called incarcerated fibroids easily lead to errors. Kiewisch[1] and Spiegelberg designate as incarcerated fibroids only those which are originally interstitial, and which, growing downward, more or less completely fill the true pelvis, and can neither be moved in or displaced from it. This designation is certainly applicable to a large series of tumors, susceptible of exact anatomical differentiation. These tumors may grow so far downward as to become retro-vaginal, and may be occasionally mistaken for vaginal neoplasms. Since incarceration and its phenomena can only become the basis of a clinical classification, it is proper to include among the incarcerated fibromata all those tumors which, having either developed in or sunken into the pelvis, have not escaped from it in the process of growth. This definition has special reference to those fibroids which have become fixed in the pelvis by inflammatory processes.

The interesting case reported by Leopold[2] proves that tumors developed from the fundus may become fixed in this manner. Since such displaced and firmly fixed tumors readily become œdematous, soft, or even fluctuating, from venous congestion, it may often be quite impossible to distinguish between them and pelvic exudations, particularly since the latter frequently complicate fibroids. So long as there are no inflammatory deposits the diagnostician can, usually, succeed in passing his finger between the globular tumor and the pelvic parietes, or in producing an indentation between the symphysis and the tumor by abdominal palpation, thus rendering the presence of a uterine neoplasm probable.

Rectal palpation is unavailing in these cases. Whenever it can be utilized the case is not one of incarcerated fibroma.

Exploratory puncture is of value in differentiating hæmatocele and pelvic exudations from fibroids, but is not an entirely safe procedure. In incarcerated fibroids it is specially liable to result in circumscribed pelvic peritonitis. Even gangrene of the fibroma has been known to follow the operation and lead to a fatal issue. Spiegelberg[3] saw this accident result from frequent examinations of the fibroma.

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[1] Klin. Beiträge, I., p. 452. [2] Arch. für Heilkunde, 1876, p. 408.
[3] Arch. für Gynäkologie, V., p. 100.

My experience impels me to disparage the use of Dieulafoy's aspirator in these cases. The forced action of the instrument often produces extravasation into the tissues of the tumor, accompanied by gangrene of the latter, or hemorrhage into Douglas's pouch attended by inflammatory symptoms.

In a majority of these cases one must rest content with a diagnosis of probability, and must not aggravate the condition of the patients by a resort to dangerous aids to diagnosis.

The prognosis in cases of uterine fibromata, if received from a purely anatomical standpoint, might be unhesitatingly pronounced good. These local and homologous tumors are, *par excellence*, of a benign character, so that the patient may be regarded as absolutely cured after their successful removal. On the other hand it is obvious, from the preceding clinical history of these neoplasms, that they constitute grave morbid conditions and may jeopardise life in many ways. No farther explanation of this point seems necessary, since no individual case resembles any other with reference to the prognosis. Particular attention must be given to the location and the size of the tumor, to the chief symptoms, and to the age and general condition of the patient. An accurate appreciation of these varying conditions constitutes the chief skill of the gynecologist.

# CHAPTER VI.

## THE TREATMENT OF UTERINE FIBROIDS.

THE first indication in cases of uterine fibroids relates to their removal, by which the complete recovery of the patients is ordinarily assured. Symptomatic treatment is only necessary before the removal of the tumors, and in cases unsuitable for operative interference.

Since time immemorial, two leading methods have been resorted to, for the cure of fibromata. One of these consists in the administration of medicines operating both generally and locally—the other in complete or partial removal of the tumors by instrumental interference. It is unanimously conceded that we possess no certain means, no trustworthy methods, of producing reabsorption of a fibroma by constitutional treatment.

Cases are, however, reported in which the use of Kreuznach, or some similar mineral water, is said to have cured such tumors. A similar result is reported to have followed the administration of calcium chloride (M'Clintock), bromide of potassium, iodide of potassium, phosphorus, arsenic (Guèniot), and mercury. The general opinion is that, if resorption of a fibroid have ever occurred during the use of these remedies, it must be regarded as an accident. The majority of such cases may probably be referred to errors in diagnosis, involving the confusion of these tumors with hæmatoceles or inflammatory deposits. We shall, later on, recur to the value of some of the above-mentioned remedies, in the palliative treatment of fibroids.

We cannot, as yet, pass so definitive a judgment upon the results of hypodermic injections of ergotin, as first employed by Hildebrandt.[1]

It is not to be denied that, in pure myomata, especially if, as rarely happens, the tumor is not separated from the uterine parenchyma by a capsule, ergot may so influenc the muscular fibres in and around the fibroma as to cause its atrophy and disappearance from defective nutrition. Spiegelberg[2] has particularly emphasized this fact, which is not, however, supported by any considerable statistical data Five cures have been observed by Hildebrandt in 25 cases of this nature, but so far as I know

[1] Berlin Klin., Wochenschr. 1872, No. 25, and Beiträge z. Geburtshülfe, etc., von der Berlin, Gesellschaft für Geburtshülfe, III., p. 261.

[2] Arch. f. Gynäkol., IV., p. 515.

no others appear either in German or French literature. On the other hand Byford[1] cites, from American literature, 18 cures effected by White, Goodrich, Howard, Jackson and others. The accuracy of this statement is, however, rendered somewhat doubtful by the fact that Byford quotes a case of Chrobak,[2] as cured, while Chrobak himself only claims that the symptoms were cured, while the tumor, a large part of which had been removed, could still be felt. It must, however, be admitted that a number of complete cures have been effected by the hypodermic use of ergotin. The possibility of errors in diagnosis, in some of the reported cases, must always be borne in mind. Even Hildebrandt[3] admits in his fifth case, the possibility that an inflammatory deposit may have been mistaken, for a fibroid.

This method of treatment is an exceedingly uncertain one, since, according to universal experience, a cure can be counted on with but very little confidence. If it were possible to make the diagnosis of fibromata, with reference to their histology and their connection with the uterus, more exact, it might be easier to designate those cases in which hypodermic injections of ergot would be efficacious. It may be appropriate at this point to consider the value of this method of treatment in general. E. Jäger[4] found that, out of 27 fibro-myomata of the uterus, treated by Hildebrandt, with hypodermic injections of ergotin, the tumor disappeared in 5, or 20 per cent. In 16 cases, or 64 per cent., amelioration of the symptoms occurred, *i.e.*, hemorrhages were less frequent and the size of the tumors diminished. In 4 cases, *i.e.*, in 16 per cent., no result was attained. In 20 other cases, reported by Bengelsdorf, Chrobak, Henning Scanzoni, Keating and Burrows, Jäger found improvement nine times, *i.e.*, in 42 per cent., no benefit eleven times, *i.e.*, in 55 per cent., and no cures at all. He farther reports eleven cases, from E. Martin's clinic. In two of these improvement occurred, and in ten no result followed treatment. In five cases A. Martin (Jäger, *l. c.*) saw no result from hypodermic injections of ergotin. Fehling,[5] however, saw notable diminution in a tumor thus treated, and good results were attributed to the method by the members of the Leipzig Obstetrical Society, on the occasion of Fehling's report.

Eggel, Schrenk, Löhlein, and E. Martin reported four unsatisfactory cases to the Berlin Obstetrical Society.[6]

On the other hand Winckel,[7] although he failed of observing any complete cure after this treatment, still confirmed Hildebrandt's statements relative to the arrest of hemorrhage and the reduction in the size of the

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[1] The Address in Obstetrics, Trans. of the Am. Med. Association, Philadelphia, 1875.

[2] Arch. für Gynäkol, VII., p. 293. [3] Beiträge, III., p. 270.

[4] Behandlung der Fibromyome des Uterus, etc., Inaug. Diss, Berlin.

[5] Arch. für Gynäkol., VII., p.384. [6] Beiträge, etc., III., pp. 9 and 21.

[7] Klin. Vorträge, No. 98, l. c., p. 29.

tumors. A considerable number of uterine myomata have been treated at my clinic, in careful pursuance of the method in question, and chiefly by my former assistant, Prof. Zweifel. We were unable to observe any considerable decrease in the size of the tumors, although the hemorrhages were, in many instances, checked, for a varying period, after the treatment.

The diminution in the size of the tumors was transient and often characteristic, as long as the contractions referable to the ergotin continued. True diminution cannot, however, be said to have occurred. A similarly deceptive appearance of diminution may be produced by congestion occurring at the menstrual epoch.

In a case, observed by myself, the dimensions, taken with all possible precautions, were as follows: Circumference, at the umbilicus, 87 ctm.; at a point midway between the navel and the symphysis, 86 ctm; distance between the ensiform cartilage and the umbilicus, 17 ctm.; distance from the symphysis to the xiphoid cartilage, 38 ctm. These dimensions increased, during the eight days preceding the menses, to 90, 89, 18 and 40 ctm., in spite of injections of ergotin and without complicating tympanites. After violent hemorrhage, which continued 5 days, they were again reduced to 85, 85, 15 and 33 ctm., respectively. Later they returned to their former size, and remained, thereafter, unaffected by the hypodermic administration of ergot.

Emmet and Barker[1] also reported, to the N.Y. Obstetrical Society, that they had had no success with this method of treatment. On the other hand Byford (*loc. cit.*) finds the results, in 61 cases, to have been as follows: Completely cured, 18; reduction of the size of the tumor and arrest of hemorrhage, 26; arrest of bleeding, only, 5; no results, 12.

Quite recently Leopold[2] has published the following observations on the use of long-continued hypodermatic injections of ergotin. His cases were twelve in number. In three of them no change occurred in the fibroids. In five the hemorrhages were considerably lessened, and in four cases the tumors also became somewhat reduced in size. Similar experiences were recorded by Schorler (*l. c.*) at Schröder's clinic. In not a single instance was a cure obtained. Out of 61 cases occurring in private practice, 37 were improved, and 24 not improved. Of twenty dispensary patients, seven were improved and 13 not improved.

On the other hand Jakubasch[3] states that in 22 cases he "almost invariably observed an amelioration of symptoms." Fritsch,[4] Brubecker,[5] and Dean[6] have described cases of expulsion of sub-mucous fibroids

[1] Obstetrical Journal, II., pp. 432 and 433.
[2] Archiv. für Gynäkol., XIII.
[3] Charité-Annalen, 1881.
[4] Centralblatt für Gynäk., 1879, p. 18.
[5] Philadelphia Med. Times, 1878, Jan. 19.
[6] Boston Med. Journ., 1878, Jan. 24.

through the vagina, terminating favorably, after treatment of this kind. P. Müller[1] has published four cases in which he observed considerable reduction in the size of the tumors, following the injection of ergotin.

All observers agree that, even when the treatment is most carefully conducted, *i.e.*, by means of deep injections into the upper abdominal regions, very violent local pains, indurations, inflammation and abscesses of the skin may be the results. Transitory symptoms of ergot poisoning have, moreover, been occasionally observed. Considerable unanimity of opinion prevails regarding the necessity of making more than 50 hypodermic injections before any definitive conclusion can be drawn concerning their efficacy in any individual case. This fact makes it the more necessary to take the irritating local effects of the treatment into account.

Lent[2] observed notable improvement in one case, after the hypodermic use of ergotin. A peritonitis, of problematical source, caused the patient's death, and no statement is made concerning the possible connection between the peritoneal inflammation and the treatment.

Allen[3] observed reduction in the size of the tumor and diminution of hemorrhage after the hypodermic use of ergotin. The injections were made, in his case, on the left side of the abdomen. After the 30th injection an extensive thrombosis occurred in the veins of the left leg and persisted for three months. When metrorrhagia recurred, after several months, injections of ergot were resumed, this time on the right side of the abdomen, and were soon followed by serious venous thrombosis in the right leg.

Lusk[4] treated a case of large myoma for one month by almost daily injections of one grain of ergotin. The tumor diminished in size, but became gangrenous. The patient died of peritonitis.

A brief review of the preceding cases will beget the conviction that Hildebrandt's method of sub-cutaneous ergotin injections constitutes a very valuable accession to our therapeutic armamentarium against uterine fibroids. This method seems well adapted for permanent or, at least, for long-continued arrest of hemorrhage, however uncertain its results may be with reference to the complete re-absorption or to a reduction in the size of the fibroids. In spite of the disagreeable results which may possibly result from this method, it is nevertheless the least dangerous and the most certain, particularly in cases of pure myomata of the sub-mucous variety.

Hildebrandt very properly emphasizes the fact that this method should not be employed if the tonicity of the uterine walls be impaired by either atrophy or areolar hyperplasia. If inflammatory products, resulting from parametritis or from perimetritis, be present, the method in ques-

[1] Deutsche Zeitschrift f. Chirurgie, 20.
[2] Abstract in Annales de Gynécologie, II., p. 240.
[3] Abstract *Ibid.*, IV., p. 385.
[4] New York Med. Jour., July, 1882.

tion is not to be recommended. Hildebrandt advised the use of a solution of the aqueous extract of ergot, 3 grammes, in glycerin and water, each 7.5 grammes. An amount of the solution equal to the quantity contained in a Pravaz's syringe is used for each injection. Later, the same author used solutions of the aqueous extract of ergot, 3 grammes in distilled water, 15 grammes, and the preparation of Wernich. Martin employed a solution of extract of ergot, 2 grammes, and of carbolic acid, one drop, in 10 grammes of distilled water. The aqueous extract of ergot deserves our preference, according to my experience. Wernich's preparation, for sale at the Augusta pharmacy, in Berlin, seemed to me to have no advantages, either with regard to certainty of its results or to freedom from pain, after its injection. It also spoiled very rapidly.

Dragendorff's sclerotinic acid was very badly tolerated by one of my cases, perhaps because it was not neutralized. The preparation of Zweifel deserves careful trial.

For the sake of completeness I shall now mention other methods employed for the radical cure of uterine myomata. None of them can claim recognition as genuine methods of treatment. Freund[1] saw spontaneous degeneration and extrusion of the tumors in two cases, after the internal use of the Jastrzember saline waters. Simpson[2] calls attention to the possibility of producing calcification of the fibroid by irritating it. Breslau[3] attempted this method and jeopardized the patient's life by inducing pelvic peritonitis. A. Meadows[4] violently opposes this treatment. Kimball[5] tried electrolysis, introducing needles through the abdominal wall into the tumor, and employing a Bunsen battery. He claims to have completely cured a very large fibroma by this means. Routh[6] reports a similar result.

Freeman[7] uses electrolysis by introducing one needle into the tumor through the cervix, and the other through the abdominal walls. He reports a case of large myoma, which almost disappeared after eight applications of this kind.

A. Martin,[8] of Paris, employed this method as follows: The positive electrode is applied to the cervix and the negative is placed over the abdomen. Eighty to one hundred séances are necessary, and fifteen to twenty-five cells are used in the battery. Out of twelve cases thus treated, four were cured, four improved, and four not benefited.

Zweifel[9] used electricity in two cases, in one of which a beneficial result

[1] Klin. Beiträge, part 3, Breslau, 1865, p. 142.
[2] Obstetrical Works, 1st ed. vol. I., p. 115.
[3] Monatsschrift für Geburtskunde, suppl. XXV., p. 134.
[4] Obstetrical Journal, vol. II., pp. 481 and 563.
[5] Boston Med. Journal, 1874.† Canstatt's Jahresbericht, 1874, p. 758.
[6] Brit. Med. Journal, 1864 † (abstracted in Schmidt's Jahrbücher, vol. CXXIX.)
[7] Centralbl. für Gynäk., 1878. [8] Annales de Gynécol., 1879.
[9] Centralbl. für Gynäkol., p. 50, 1884.

was obtained. Cutter[1] used "electro puncture" in fifty cases of large fibroids. The electrodes were plunged through the abdominal parietes into the tumor. Each séance occupied from three to fifteen minutes, and the whole number from one to nineteen. Intervals of one or two weeks were allowed to elapse between the sittings. In seven cases no result was obtained, four times death ensued, thirty-two tumors ceased to grow, three were improved, and four "cured."

Repeated efforts have been made to artificially produce gangrene of the tumors, which, when it occurs spontaneously, usually leads to favorable results. This method has been generally abandoned, on account of the great dangers incident to it, chief among which is absorption of septic material from the gangrenous tumor, which is still intimately connected with the uterus. Spontaneous gangrene is not attended by this danger, since it usually results from a separation of the tumor from the uterus. This point will be considered, at length, in our remarks concerning the enucleation of fibromata. Retzius[2] first purposely induced spontaneous gangrene by repeated applications of the actual cautery. A cure ensued after protracted suppuration. West[3] produced gangrene of a myoma by partial enucleation and multiple incisions. The course of the case was at first favorable, but the patient finally succumbed to peritonitis.

It was Baker-Brown who emphatically recommended partial excision of fibromata in order to render them gangrenous. He incised the capsule, and chiseled or scraped out as much as possible of the tumor with a knife. He describes a successful case thus treated in the "Obstetrical Transactions," London, I., p. 329. Only sub-mucous fibromata, with broad bases, are, according to him, adapted for this treatment.

In the "Obstetrical Transactions," III., p. 67, Baker-Brown reports six other cases treated in this way. In one of these the tumor disappeared by gangrene. In four cases marked diminution occurred, and death, resulting from pyæmia, terminated one. Baker-Brown subsequently partly abandoned the operation.[4] Nevertheless he reported two more successful cases. It produces a painful impression to find the statement frequently repeated by Baker-Brown, in the debates of the London Obstetrical Society, that any one can assure himself of the truth of his statistics by making inquiries at the London Surgical Home.

This method of treatment has not found many adherents. Playfair[5] reported a case of complete cure after long suppuration, by this means. Greenhalgh's new method, consisting in incision of the capsule and destruction of the tumor by the actual cautery, belongs in this category. In one of his cases

[1] Amer. Journ. Med. Scien., July, 1878.
[2] Neue Zeitschrift f. Geburtsk., vol. XXXI., p. 423.
[3] Frauenkrankheiten, Göttingen, 1860, p. 364.
[4] Obstetrical Transactions, V., p. 21; also Surgical Diseases of Women, p. 196.
[5] Obstetrical Journal, II., p. 152.

the tumor was an incarcerated fibroid of the posterior lip. Its capsule was opened, at its most dependent part, and the tumor itself cauterized with the hot iron. After the occurrence of gangrene, a tumor larger than a child's head was gradually peeled out, the operation occupying a number of days. The cure was complete. In another case the hot iron was applied directly to a tumor occupying the os externum. The gangrene, inaugurated by this process, lasted some months, but the patient made a good recovery.

Far more bold and original methods were resorted to in three other cases of incarcerated fibromata, which were not accessible from the os uteri. In these cases Greenhalgh reached the tumors by perforating the vagina with the hot iron, at the points where the pressure of the fibromata produced bulging of the vaginal walls. Gangrene occurred in two cases. In one of these the tumor was entirely extruded, after repeated cauterizations, and the patient recovered. The other case terminated in fatal pyæmia, after sloughing had lasted a month. The third case was one of incarcerated, spontaneously sloughing fibroid, which terminated by peritonitis.

The operation of spaying must be classed with the symptomatic remedies, since it aims chiefly to bring about a cessation of bleeding. But it has also been claimed for this operation, that it diminishes or even obviates the necessity for the more radical surgical measure of enucleation of the fibroid tumor.

The operation of castration (spaying) was introduced into modern gynecology by Hegar, and immediately following him by Battey. This was in 1872.[2]

The removal of healthy ovaries in cases of fibroids of the uterus was first practiced by Trenholme[3] (January, 1876), and a little later by Hegar (August, 1876). The latter has very clearly explained the principles underlying the subject under consideration.

Experience has shown that with the advent of the menopause, the bleeding caused by fibroids not infrequently ceases, and that, moreover, retrogressive changes are inaugurated. It is certain that these tumors often cease growing after the climacteric period is reached. Now, an artificial "change of life" can be secured by removal of the ovaries, and, as Hegar has pointed out, ligation of the nutrient vessels probably plays some part in bringing about this result. At times, however, no effect of this kind is obtained, and cystic degeneration of the uterine tumor occurs. For this reason Hegar advises that castration should not be done when the patient is already near the menopause, nor in those cases in which the

[1] Greenhalgh: On the Use of the Actual Cautery in the Enucleation of Fibroid Tumors of the Uterus, Medico-Chirurg. Transact., vol. LIX., p. 876.

[2] Hegar and Kaltenbach: Die operative Gynäkol., 1881; also Centralbl. f. Gynäkol., 1877, No. 5; and Stahl: Deut. Med. Woch., 1876, No. 51.

[3] Amer. Journ. of Obstet., 1876.

growth of the uterus is undergoing degeneration or shows cystic formations, nor, finally, when the tumors are very large.

Hegar also holds that sub-peritoneal fibroids with accessible pedicles, and sub-mucous fibroids projecting far into the cavity of the uterus, should be removed and should not be treated by castration. On the other hand, spaying is indicated in small intra-parietal tumors, and in all those cases where enucleation or extirpation is beset by difficulties

Since 1881 I have collected a number of cases, fifty-seven in all, including twenty-one reported by Hegar. Of this number ten died, forty were very much benefited, and in seven cases no improvement resulted. In no instance did the tumor disappear. It appears from this computation that the mortality was 17.5 per cent.

Wiedow[1] has collected a larger number of cases. He found records of one hundred and forty-nine operations for fibroids, and fifteen of the number had a fatal result. This is equivalent to a mortality of about 10 per cent.

In seventy-six cases particulars of the final result of these castrations are given. There were observed:

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|---|---|
| Atrophy of the tumors and menopause, . . | 54 times |
| Occurrence of menopause alone, . . . . | 7 " |
| Atrophy of tumors alone, . . . . . | 2 " |
| Diminution of bleeding and atrophy, . . . | 6 " |
| Menopause of three months duration followed by expulsion of tumor, . . . . . | once |
| Irregular slight hemorrhages, . . . | 2 times |
| Irregular severe hemorrhage, . . . . | once |
| Immediate good results followed by severe bleeding and growth of the tumors, . . . | 3 times |

At the present time, therefore, the following may be said concerning the value of spaying for uterine fibroids

The operation leads with great certainty to an arrest of hemorrhages, provided the uterine tumors are not too large, and not in a condition of cystic degeneration.

It is a much safer operation than extirpation by laparotomy. (The mortality of castration has been reduced to about ten per cent., that of radical extirpation is above thirty per cent.)

On the other hand those who recover from the operation of castration still carry with them their uterine tumors, the presence of which entails manifold dangers. Again, a not insignificant proportion of those operated upon continue to have the same pains, and other symptoms due to the presence of the fibroids, as before spaying.

[1] Archiv. für Gynäkol., vol. XXV.

Those who survive extirpation of the fibroids are permanently and completely cured.

Spaying must be classed with those measures which are directed against the chief symptom of fibroids, namely, the bleeding. Certainly among these measures, the operation is one of the most valuable, particularly as it can be used even in those cases where extirpation of the myoma seems contra-indicated or actually impossible.

Spaying is indicated, more particularly, in cases of smaller fibroids that give rise to severe hemorrhages, and in all those cases where removal of the tumors appears too dangerous.

It must, nevertheless, always be conceded that total extirpation of the fibroids is the "ideal" method of dealing with these growths. So, too, in comparing mortality statistics of the two operations under discussion, it must not be forgotten that myomotomy has certain "cures" in its favor, which experience has shown to be unattainable by castration.

It seems sufficiently demonstrated, by the results of the above-mentioned modes of treatment, that radical relief from uterine myomata can be attained only by extirpation. In view of the numerous difficulties and dangers attending these tumors, their extirpation is indicated whenever practicable. The operation is easy in cases of sub-mucous fibroids which are provided with pedicles. The pedicle may be divided, even if it be rather broad, provided the tumor projects sufficiently beneath the mucous membrane to permit of its being encircled by the fingers or instruments, and to allow its pedicle to be elongated by traction.

Attempts at extirpation are facilitated by projection of the myoma beyond the os uteri, particularly if it be possible to easily trace the pedicle upward. This is usually practicable, because the most violent symptoms only occur after the tumor has been forced through the os uteri

When dilatation of the os has not taken place, the tumor must be rendered accessible by sponge-tents and incisions into the cervix. It is ordinarily impossible to decide whether the tumor be provided with a pedicle or not until it is drawn downward. If the tumor be small, a sharp hook or a *pince à crémaillére* will suffice to draw it down. If it be larger it cannot be moved without Museux's or Greenhalgh's hooked forceps.

The larger the tumor, the more necessary it is to draw it downward in order to reach the pedicle, and the more dangerous is it to do so, because of the liability to traction upon, and injuries to, the peri-uterine tissues resulting in para-metritis and peri-metritis. Inversion of the uterus may also happen, in which case severe injuries may be inflicted upon the uterine parenchyma by the measures adapted for the removal of the fibroid. If the tumor be of large size it is often impossible to reach the pedicle with such ease, and reduction of the dimensions of the tumor by partial excision is inexpedient on account of the profuse hemorrhages certain to attend this

operation. Under these circumstances, the pedicle may be best reached by a resort to the method described by Simon.[1]

Transverse incisions are made into the tumor, or only through its capsule, with Cooper's scissors. The growth can then be elongated by traction applied to its most dependent part, and the pedicle is thus rendered accessible. Hegar attains the same end by spiral incisions around the tumor.

The pedicle having been reached by one of the above methods, and rendered tense by traction upon the tumor, it is severed by Casper's long scissors, or by Siebold's instrument, or by one similar to it, and the growth is removed by means of rotary movements. If the removal of the tumor be difficult, owing to its large size, it may be comminuted or compressed. No other instruments designed for severing the pedicle deserve mention, as they are either unnecessary or inappropriate. The conviction that the removal of a fibroid provided with a pedicle, by section of the latter, is the simplest and best method, is at present pretty generally accepted. The danger of hemorrhage during, or, rather, after such an operation was, at first, much dreaded and considerably overestimated. Experience shows that the pedicles very rarely contain vessels of large size, and that hemorrhage from the severed end is, consequently, insignificant. Should it be at all profuse, it may be readily checked by a good tampon, or by cauterization of the bleeding point.

The possibility of violent secondary hemorrhage from pedicles which do contain larger vessels must, however, not be disregarded. The primary hemorrhage, even in such cases, is trivial, because the muscular contraction resulting from the mechanical irritation of the uterus controls the bleeding. After a certain time the muscular contraction ceases and hemorrhage occurs. It is consequently advisable, when the patient cannot remain under the immediate supervision of the gynecologist, to insert a tampon. If hemorrhage be particularly apprehended, by reason of anæmia on the part of the patient, the pedicle may be severed by the galvano-cautery,[2] which is, however, very unsatisfactory, because one is by no means certain of obtaining an apparatus in good working order, and because it does not perfectly protect against secondary hemorrhage.

Separation of the pedicle by means of the wire *écraseur* of Braxton-Hicks, by that of Meier and Meltzer[3] or by the constrictor of Maisonneuve[4] is simpler, but does not secure complete protection against hemorrhage. The ordinary *écraseur* is very difficult of application, in spite of Marion Sims's chain adjuster, and does not afford immunity from hemorrhage.

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[1] Monatsschrift für Geburtsk., XX., p. 467.

[2] Küchenmeister: Küchenmeister's Zeitschrift, II., p. 378.†

[3] Especially recommended by Hildebrandt-Volkmann: Vorträge, No. 47.

[4] Guéniot: Arch. de Tocologie, II., p. 149.

Bayard[1] witnessed such dangerous bleeding, after removal of a pediculated tumor by the *écraseur*, that a resort to acupressure was necessary. The chief danger attending the use of the *écraseur* consists in the inclusion by the loop of the tissue adjoining the tumor.

Tillaux[2] opened the peritoneal cavity, while removing a fibroid with the *écraseur*, and death resulted from peritonitis.[3] The removal, by Boeckel,[4] of a myoma attached to the posterior lip of the os uteri, with a wire constrictor, was followed by fatal tetanus.

The separation of pediculated fibromata by ligation of the pedicle, a method often resorted to since the time of Levret, must be absolutely rejected. The danger from septicæmia, phlebitis, peritonitis, etc., attending this method, are so great that its employment might almost be designated as malpractice. Idras[5] recently reported another fatal case of this kind. West[6] says that R. Lee lost nine out of twenty cases of this variety, thus showing the mortality attending the method to be almost twice as great as in lithotomy, and higher than in Asiatic cholera. If the pedicle can be easily ligated and if hemorrhage seems likely to occur from anæmia, let ligation be resorted to, but let the pedicle be immediately cut off, below the ligature, in order that gangrene of the tumor be avoided.

In some cases, the pedicle is so thin and slender that a few powerful, rotatory movements suffice to separate the tumor. This process is, however, seldom adapted to the removal of pediculated fibroids, and must be employed only where it succeeds without resort to unusual force.

The pedicle must be divided as near to its uterine attachment as possible. In certain cases this rule may be disregarded, since its observance is often difficult and liable to produce lesions of the uterine tissue. The remnant of the pedicle usually produces no inconvenience. It contracts and remains as an insignificant stump, or gradually sloughs away. If such a remnant be easily accessible, it may be destroyed by cauterization. It is not proven that new fibroids may be developed from the stump of the pedicle, a fact explained by the anatomical character of these tumors. The case is, of course, different if only partial enucleation of a large fibroma has been performed.

Although the removal of pediculated fibromyomata is not always easy or safe, the operation is still so comparatively trivial and so free from danger, that it is the plain duty of the physician to remove them, as soon as the pedicles are accessible without much difficulty. The reverse is true of

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[1] Boston Gyn. Soc., IV., p. 144.
[2] Annales de Gynécol., II., p. 461.
[3] Comp. also Annales de Gynécol., III., p. 70.
[4] Gazette Méd. de Strasbourg, June, 1875.
[5] Canstatt: Jahresbericht for 1874, II., p. 758.
[6] Frauenkrankheiten, German Translation, Göttingen, 1860, p. 379.

interstitial fibromyomata. These interstitial tumors which have grown symmetrically in both directions, and hence project equally into the uterine cavity and into the peritoneal cavity, must not be enucleated, since the operation would involve too serious a laceration of the peritoneum.

Sub-serous fibromata are not adapted for enucleation. Only those interstitial fibroids which project far into the uterine cavity are to be treated by this method. The separation of broad-based fibromata, with very large pedicles, is, under these circumstances, not always easy, and many contradictory statements, in the literature of the subject, may be explained by this fact. Many an operator has been astonished at the facility with which the "enucleation" of a large interstitial myoma was performed because he had really only been dealing with a broad-based fibrous polypus. The only practical point of distinction between these varieties is the capsule of the tumors. If the removal of the fibroid can only be effected after the perforation of a genuine capsule the tumor is, indeed, an interstitial fibroma, and enucleation has in that case really been accomplished.

If the capsule be absent, the case is one of fibrous polypus, or of a half-extruded interstitial myoma, which had already perforated its capsule and could be easily removed, either artificially or spontaneously.

Velpeau seems to have first conceived the idea of enucleation of fibromyomata projecting into the uterine cavity. Amussat first performed the operation and invited criticism upon it.[1]

He was followed by Velpeau, Boyer, Bérard and Maisonneuve.[2] Somewhat later Atlee gave a new impulse to the performance of enucleation in his work entitled "The surgical treatment of certain fibroid tumors of the uterus, heretofore considered beyond the resources of art," Philadelphia, 1853.

Various authors (as, for instance, Gilette, Annal. des. Gynécolog. 1875, III. p. 68) have called attention to the worthlessness of all so-called statistical compilations regarding the result of any operation for determining the value of the latter. In the first place it is well known that more successful than unsuccessful cases are published. There are, moreover, great differences in the temperaments of various patients and in their physical conditions at the time of the operation. The manner in which the operation is performed, or accidental circumstances relating to the after-treatment, also, often influence the result.

So far as the operation in question is concerned, there are special difficulties in the way of utilization of statistics, because, in the first place, the exact significance of the term enucleation has not been definitely established. It is, moreover, frequently not stated whether, in a given case, the

[1] Revue Médicale, August, 1840, and Mémoire sur l'Anatomie pathologique des Tumeurs fibreuses de l'utérus, Paris, 1842.

[2] Comp. Jarjavay: Des opérations aux corps fibreux de l'utérus, Paris, 1850.

myoma was an encapsulated or only a broad-based one. In some instances the operation has been performed upon gangrenous tumors, and, in others, the expectant treatment has been adopted, after the first operative interference, until gangrene has occurred. In still other cases the tumor has been removed at one sitting.

It is even more important, in estimating the results of a given plan of treatment, to ascertain whether enucleation was performed upon a tumor already protruding into the os uteri, and was consequently of easy access, or whether the reverse conditions obtained. The above remarks will suffice to show the hopelessness of attempts at proving the value or otherwise of this operation by statistics, and yet one cannot dispense with the latter as a starting-point for inductive reasoning.

The same statement holds for all important operations. Statistics concerning ovariotomy, for instance, only proved, in the beginning, that the operation was justifiable in certain cases. At present the statistics are disregarded, and scientific significance is alone attributed to the results of individual operators.

Just so long as the enucleation of interstitial fibromata is not performed, in any considerable number of cases, by individual operators, so long must we be content with statistical evidence obtained from medical literature. We, therefore, insert separately at this place the statistics at present published. These must not be tabulated together, since some series of observations might then be counted several times. An analysis of these statistics, which are of varying value, would necessitate too detailed a consideration of each case, and thus transcend the limits of the present work.

West[1] carefully collected the cases published between 1840 and 1858, and reports 27 of enucleation with 14 deaths and 13 recoveries. He, therefore, justly characterized the operation as one of the most dangerous kind. Männel's[2] well-known work, containing reports of 47 cases with 30 cures and 17 deaths, next appeared. Männel, himself, collected 22 new cases (since 1858), in 17 of which complete, and in 5 of which partial, enucleation was performed. Three cases resulted fatally. Twelve of the 17 were neither pregnant nor puerperal women, and all made good recoveries.

C. Braun[3] collected 60 enucleations, with cures in 41 cases, *i.e.* in 68 per cent.

A. Martin[4] collated 50 new cases, only 7 of which, or 14 per cent, terminated fatally. Männel's and Martin's operations amount altogether to 66, with a mortality of 12 per cent. It is interesting to note that, ac-

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[1] Loc. cit. p. 358.
[2] Prager Vierteljahreschrift, 1871, 2, p. 29.
[3] Wiener Wochenschrift, 1874, Nos. 39–41.
[4] Zeitschrift für Geburtshülfe, etc., 1876, p. 143.

cording to Martin's investigations, out of 12 cases in which enucleation was performed after the tumor had partially escaped into the vagina, three were fatal. The mortality thus amounted to 25 per cent. in these cases.

On the other hand, those cases operated on before the tumor had escaped from the os uteri showed a mortality of 12½ per cent.

Pozzi [1] gives very carefully prepared statistics of 64 enucleations with 16 deaths, or 25 per cent.

To these contradictory statistics I now subjoin the cases collected by myself, including those of West, because his cases show so high a rate of mortality, and because I shall, by including them, avoid the error to which the exclusive publication of favorable cases leads. I have not been able to consult the original report of West's cases, in all instances. I have either excluded the cases of all other observers which I could not find in the original, or have referred to the author's papers. I have not introduced cases of partial enucleation which lead to a cure by gangrene of the tumor, because they will be separately considered.

On the other hand, enucleations which were begun but not completed have been included in the following list. The distinction between enucleations which were intentionally partial, and those in which accidental circumstances led to an interruption of the operation, is not observed in the majority of the reports.

The following are the favorable cases among those collected by West: Amussat, 2; Maisonneuve, 2; Grimsdale, Teale, each 1; Atlee, 7.

I have also found the following cases which resulted favorably: Routh,[2] 7; Hegar,[3] 7; Demarquay,[4] 3; Matthews Duncan,[5] 3; Hutchinson,[6] 12; Hutchinson,[7] 9, in which the capsule was perforated by means of the actual cautery; the same,[8] four incomplete records; Guyon,[9] 5; Byford,[10] Whiteford,[11] Boye,[12] each 1 case; Marion Sims,[13] 8; Meadows,[14] 1; Hall Davis,[15] 2; A. Martin,[16] 4; Ruge,[17] John Scott,[18] Scott,[19] Bourgeois,[20]

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[1] De la Valeur de l'Hystérotomie, etc., Paris, 1875.
[2] Brit. Med. Journal, 1864; Schmidt's Jahrb., vol. 129.
[3] Operat. Gynäkolog., etc., p. 247.
[4] Maladies de l'utérus, p. 266.
[5] Edin. Med. Journal, 1867, p. 707, and 1869, p. 848.
[6] Med. Times, 1857; Schmidt's Jahrb., vol. 129.
[7] Cited by Courty, p. 830. [8] Cited by Courty, Mal de l'Utérus, p. 830.
[9] Cited by Courty, p. 830. [10] St. Louis Med. Journal, 1869, p. 241.
[11] Edin. Med. Journal, Feb. 1870, p. 691.
[12] Canstatt. Bericht., 1871, p. 565.
[13] Uterine Surgery, p. 110; and On Uterine Fibroids, N. Y. Med. Journal, April, 1874.
[14] Obstet. Journal, I., p. 34. [15] Obstet. Transact., II., p. 17; and X., p. 227.
[16] Zeitschrift für Geburtshülfe, etc., I., p. 143.
[17] *Ibid.*, p. 168. [18] Edin. Med. Journal, 1868, p. 362.
[19] Lancet, Dec. 20, 1872 [20] Canstatt's Bericht., 1874.

Fleischer,[1] Giommi,[2] R. Barnes,[3] Chroback,[4] Männel,[5] Retzius,[6] (each one case); Jordan,[7] Frankenhäuser,[8] Gusserow,[9] (each 2 cases); C. Braun,[10] (6 cases.)

The enucleations with a favorable result, collected by myself from the literature of the subject, thus amount to 103. We should remark that one of Frankenhäuser's favorable cases died, a year after the operation, from obliteration of the vena cava, said by Frankenhäuser to have depended upon morbid processes in the uterus.

The following cases resulted fatally: Atlee, 5; Bérard, Baker-Brown, (each 2 cases); Maisonneuve, Boyer, Simpson, West (each 1 case); (quoted by West); Velpeau,[11] 2, (one of which was an unfinished operation); Routh, (*loc. cit*) 2; Hegar, Demarquay (*loc. cit*) each one; Hutchinson, (*loc. cit*) 6, in which the capsule was split with the knife; 6 in which it was opened with the hot iron, and 2 unfinished operations. Guyon, (*loc. cit.*) 9; Symington Brown,[12] 1 (incomplete); Marion Sims (*loc. cit.*) 5 (3 of them unfinished). Gusserow, 2 (not published and both unfinished). Total number of fatal cases 51. The total number of operations amounts to 154, with a fatal issue in 51 cases, *i.e.*, in 33.1 per cent.

The cause of death was usually pyæmia or septicæmia, produced by gangrene of retained portions of the tumors. In other cases death resulted, sometimes after weeks or months, from thrombosis, embolism, peritonitis or hemorrhage. 15 unfinished enucleations, with 9 deaths, are included in the above tables. In 29 cases the operation was done at different sittings, the intervals between which varied. Eight of these cases were fatal.

It could be easily shown that improvements in technique, and a more careful selection of cases suitable for operation, have led to better results even up to the year 1877. But the introduction of antiseptic precautions has worked almost a revolution in this, as in so many other operations.

Thus, for example, Lomer[13] has collected 130 cases embracing the period from 1873 to 1883. Of this number 18 died and 112 recovered, *i.e.*, a mortality of 16 per cent. A few of the cases collected by him are contained in the above references, which extend up to 1877. The progress from a mortality of 33 per cent. to one of 16 per cent. is a decidedly remarkable one.

Chrobak[14] has added 11 cases of his own (all successful), and 12 operated

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[1] Canstatt's Bericht,, 1875. [2] *Ibid.*, 1875. [3] Obstet. Transact., 7, p. 55.
[4] Med. Chirurg. Rundschau, 1871, cited by Männel.
[5] Prager Vierteljahr., 1871, p. 29.
[6] Neue Zeitschr. f. Geburtsk., 31, p. 430. [7] Lancet, March 20, 1872.
[8] Correspondenzblatt für Schweizer Aerzte, 1874.
[9] Monatsschr. f. Geburtsk., 32, p. 83.
[10] Wiener Med. Wochenschr., 1874, Nos. 39–41.
[11] Cited by Hegar, loc. cit., p. 247. [12] Philad. Surg. Reporter, 1871, No. 25.
[13] Zeitschrift f. Geburtsk. u. Gynäkol., vol. IX., p. 277.
[14] Wiener Med. Blätter, 1884, Nos. 24–26.

upon by C. v. Braun,[1] with 5 deaths, to this number, which brings the total up to 153 with 23 deaths, a percentage of 15. If we add 2 cases by Bidder,[2] and Engström,[3] and two unpublished cases of my own, which were all successful, we get a grand total of 157 cases and 23 deaths, which is equivalent to a mortality of 14.6 per cent.

From the statistics given above, it is at least possible to deduce the conclusion that the enucleation of interstitial fibromata is an exceedingly dangerous operation, and yet not so dangerous as to be unjustifiable, under certain conditions. The statement made above, that every submucous, pediculated fibroma, which is accessible, should be removed, does not by any means apply with equal force to all interstitial myomata. In the first place it must be established what tumors of this variety appear accessible for the purpose of the operation, and then the indications for the operation in these cases must be defined.

We have already stated that only those interstitial myomata are adapted to the operation which have been chiefly developed in the direction of the uterine cavity, and are, therefore, covered by as thick a muscular layer as possible. It is by no means easy to establish the existence of these relations. It has been held that tumors of this description can not be sufficiently displaced from their original seat, by uterine contractions, as to become accessible. But this has not been established. The relations of the tumor to the peritoneum may be better determined by palpation, and if possible by rectal touch. During enucleation it is also wise to locate the tumor, from time to time, by external palpation or by rectal touch, especially when considerable downward traction is being employed.

Although large tumors are often successfully removed, very bulky ones projecting far into the abdominal cavity are not adapted to the operation for several reasons. It is, in the first place, rarely possible to completely encircle them. Moreover, marked attenuation of the uterine walls attends the development of such fibromata, and they often can not pass through the pelvis, even when comminuted. Finally gradual and partial enucleation is attended by especial dangers.

Enucleation is, also, always contra-indicated when the tumor has no capsule, or when the tumor's attachments to the uterus are so intimate and so extensive that a separation seems impossible. The so-called adhesions between the tumor and adjoining tissues, which are usually only strong muscular fasciculi extending into the tumor from the uterine walls, very frequently render enucleation impracticable, or so hinder it that it must be interrupted in order to be resumed after the occurrence of necrosis. There are, unfortunately, no means of discovering this connection between the uterine parenchyma and the tumor before the operation. The relation

[1] Lehrbuch d. ges. Gynäkol., 1881, p. 457.
[2] St. Petersb. Med. Wochenschr., 1884.
[3] Gynäkol. Meddel., IV.

of the fibroma to the lowest segment of the uterus has the most important bearing upon the success of the operation. A long and conical portio vaginalis, with occluded os uteri, renders every effort at enucleation futile. In these cases, the tumor is either located so high in the uterus, or in such close proximity to the peritoneal cavity that the operation is either impracticable or too dangerous. The prospects of a successful operation are in direct ratio to the shortening of the lower uterine segment, to the permeability of the os uteri and to the facility with which the tumor may be felt within the latter.

Courty evidently does not make a sufficiently sharp distinction between interstitial and broad-based sub-mucous fibromata when he requires, as one of the favorable prognostic signs, that the tumor shall, on traction, show evidences of possessing a pedicle. This is, however, often difficult whether from a clinical or from an anatomical standpoint.

At all events, all severe traction on such a tumor, before the perforation of the capsule, should be discountenanced, since it may lead to inversion, rupture of the peritoneum, hemorrhages, and, through injury of the capsule, to gangrene.

If all the above-mentioned conditions are favorable, the indication for an operation is seldom doubtful. A fibroid of the kind in question almost always produces violent hemorrhages, which, of themselves, threaten the life of the patient. The pains are also, rarely absent, and the beginning symptoms of incarceration are often present. Rapid growth or sterility (Marion Sims) may likewise justify the operation of enucleation, more particularly in cases of cervical tumors. Another indication for enucleation is beginning gangrene of the tumor, for the danger of systemic infection is only obviated, in such cases, by the removal of the offending mass. In this spontaneous gangrene the removal of the tumors is, ordinarily, easy, since the capsule has already burst, and the connections between the fibroma and the uterus have been weakened by a dissecting necrosis. One must, nevertheless, not operate too early, even in these cases, for the more difficult the operation the more numerous and unavoidable are the wounds necessitated by its performance and the more easy the absorption of septic matters.

Even if strictest antiseptic precautions will doubtless diminish the dangers of an operation under such circumstances, surgical interference must never be attempted too soon. The general condition of the patient will have to govern our decision in this direction.

There is an evident diversity of opinion regarding the method of the operation, some recommending that the enucleation be performed at one and others at two sittings.

Matthews Duncan, Marion Sims, many others and myself have recommended the latter method, but never to the exclusion of the former.

If it be easy to remove an intra-parietal myoma at one sitting, it would

of course be unwise not to do so. It only seems advisable to await the effect of the pains and of beginning necrosis in order, perhaps, to bring the operation to a speedy end, at one or more subsequent sittings. This method is, at all events, better than a systematic attempt at the invariable completion of the operation, during one sitting. If the operation be undertaken with this end in view, it is often necessary to inflict most serious injuries, and even then to abandon the undertaking, after great exhaustion and injury to the patient.

After the patient has been thoroughly brought under the influence of an anæsthetic she should be placed in the lithotomy position. Some operators, as Marion Sims, always prefer the lateral decubitus. The location of the tumor sometimes renders the latter position more appropriate. Even after careful disinfection of the vagina, and, if possible, the cavity of the uterus, it is well to employ a two to three per cent. solution of carbolic acid throughout the entire course of the operation.

If the os uteri is not sufficiently patulous to render the tumor accessible, it should be enlarged with scissors. Dilatation of the os with sponge tents, etc., is slower, less certain and more dangerous, because gangrene and infection are thereby invited. Even after enlargement of the os, by means of incisions, the tumor is often not sufficiently accessible. In this case the operation must be interrupted and ergot given with a view to producing descent of the tumor by means of uterine contractions. When the tumor has been brought within reach, which is effected through fixation of the uterus by external pressure on the fundus and by means of traction with a sharp hook, the capsule should be split, at its mostdependent part, with a bistouri or the scissors. (If the fibroid projects far into the uterine cavity it may be better treatment to make the incision into the capsule as near the base of the tumor as possible. Hegar). It seems superfluous to use Sims's speculum for this procedure, or to excise a part of the capsule (Meadows).

Perforation of the capsule with escharotics (Simpson), with the hot iron (Hutchinson), or by the galvano-cautery (C. Braun), has not been generally adopted. These methods are recommended for the prevention of hemorrhage, when the capsule is perforated, but they fail of accomplishing this object in serious cases. The bleeding may, then, be best controlled by immediate section of the vessels in the capsule, and by a rapid completion of the operation, but it may become so severe as to necessitate the use of the tampon.

The use of styptics during the operation is inappropriate. If a portion of the tumor is exposed by the incision in the capsule, enucleation is at once begun. For this purpose the tumor must be seized and drawn as far downward as possible. Museux's, Greenhalgh's, or similar toothed forceps may be used. Marion Sims, A. Martin and others have invented special sharp hooks or hooked forceps, by which it is claimed that the

tumor may be more firmly held, and the soft parts of the patient protected. None of the instruments perfectly accomplishes these ends. For reasons already given, too powerful traction must not be made with such instruments upon the tumor. Traction should never be so firm as to invert the uterus, as Hutchinson recommends.

Enucleation may be best accomplished with the fingers, which usually separate the loose tissues of the capsule with facility. Tumor adhesions should be divided with the knife or scissors. If the hand can not reach high enough, it may be replaced by the enucleators recommended by Sims. C. Braun sometimes successfully used the cranioclast for crushing the tumors. As the enucleation proceeds the tumor must be drawn or twisted in a downward direction. If it is not easily accomplished the capsule may be separated, so far as possible, and the operation suspended for a few days, until beginning gangrene shall have produced a diminution in size, and a loosening of the connections of the fibroma.

The expulsion of large fibroids from the vagina after their enucleation is sometimes quite difficult, resulting even in rupture of the perineum. Incisions into the latter are occasionally necessary (Dupuytren, Marion Sims), or the tumor must be comminuted before its expulsion can be effected. After the removal of the tumor it is usually unnecessary, and may even prove dangerous, to remove shreds of tissue or retained portions of the capsule with sharp instruments. Let the uterus and vagina be washed with a five per cent. solution of carbolic acid (or 1:2000. bichloride of mercury), and tampons dipped in glycerine and iodoform be inserted. The after-treatment, such as drainage, etc., is conducted in accordance with general surgical principles.

Beside the manifold dangers attending the operation, which have been cited above, collapse may follow. It is proportional in severity to the length of the operation and to the loss of blood. The general condition of the patient, also, at the time of operation will, of course, have important bearings on the development of this as well as other complications.

A special modification of the operation of enucleation has been recently devised for those cases in which the fibroids start from the cervix, and are situated without the peritoneal cavity, growing in a downward direction. Such growths have been observed to narrow the lumen of the vagina. Caselli[1] has reported a case of this kind, in which he successfully removed a myoma by splitting the vaginal wall which formed a covering for the tumor. Van Derveer[2] proceeded in a similar manner in the case of a sub-peritoneal fibroid growing from the posterior wall of the uterus. By opening Douglas's pouch he succeeded in removing the growth per vaginam.

Czerny[3] has also recorded two successful cases of this kind, in one of

[1] Annali di Ostetr., 1881. [2] Boston Med. and Surg. Journ., 1879.
[3] Wiener Med. Wochenschr., 1881, Nos. 18 to 19.

ch Douglas's pouch had to be opened. He likewise mentions two other s, one of which had a fatal termination. Lomer (l. c., p. 283) men- s a successful case operated upon by Frankenhäuser, and a second case Schröder. In the latter case the tumor occupied the anterior wall of uterus, and was successfully "peeled out" of the loose tissue beween bladder and uterus. A case operated upon by Olshausen,[1] also belongs his category. It concerned a tumor that had grown downwards push- the posterior vaginal wall down before it. Enucleation was made sible without opening the peritoneal cavity and the patient made a d recovery.

n a general way it may be stated that this method is applicable only he smaller tumors which are situated outside the cavity of the peri- eum. Growths so situated are, however, very apt to cause consider- e disturbance.

Ve have already emphasized the difficulties attending a strict discrim- tion between partial enucleation or amputation of a fibroma, and omplete enucleation. There are numerous cases, however, in which impossibility of a complete removal of the tumor is recognized from beginning, and in which, nevertheless, circumstances make it neces- to at least amputate a portion of the fibroid. Cases of incarcerated omata, reaching low into the pelvis, and producing serious symptoms pressure upon the intra-pelvic organs, are those to which the above ark applies. In these cases it is at least necessary to remove those ts of the tumor situated within the pelvic cavity. The results of the ration, when performed under these circumstances, are very variable. s may be partly due to the difficulty with which broad-based sub-mu- s fibromata are differentiated from interstitial ones. It is easier to lerstand how the remnant of the tumor should, in the former case, ain unchanged than in the latter class of cases, in which an intersti- fibroid is partially destroyed and robbed of its nutrient vessels by in- nplete enucleation.

P. Müller,[2] Männel (*loc cit.*), Chiari,[3] Chrobak,[4] Hutchinson, McClin- k, Schröder and others have reported favorable cases in which partial putation of the tumor resulted in the removal of the symptoms due pressure. In some instances cicatrization, even attended in certain es by diminution in the size of the tumor, occurred along the line of ision. In very rare instances the tumor is subsequently entirely ex- lled, without undergoing mortification.[5] After partial enucleation gan- ne, however, usually occurs, and may, in isolated cases, lead to a cure, tumor being expelled or gradually undergoing complete mortification.

[1] Klin. Beitr. z. Gynäkol. u. Geburtsk., Stuttgart, 1884, p. 96.
[2] Archiv für Gynäkol., VI., p. 127. [3] Klinik der Geburtshülfe, p. 408.
[4] Med. Chirurg. Rundschau, p. 871.
[5] Frankenhäuser, Correspondenzblatt f. Schweiz, Aerzte, 1875, p. 225.

In the majority of the cases death results from pyæmia or septicæmia, the danger of which should be always borne in mind when partial enucleation is undertaken. Very instructive cases, of this kind, are reported by Marion Sims, by Spiegelberg,[1] Riedinger[2] and Breisky.[3]

In all those cases of uterine fibroids which threaten the patient's life, and in which relief can not be obtained from the operations already described, laparotomy with removal of the tumor, or of the uterus with the tumor, is the last resort. The following remarks will show that this operation is undoubtedly justifiable in certain cases, although the belief that laparotomy for the removal of large uterine fibroids is neither more difficult nor more dangerous than ovariotomy, is decidedly erroneous. These operations are not to be compared, even with reference to their relative utility.

Laparotomy has passed through different periods of development, just as so many major operations, particularly ovariotomy, have done. Lizars (1825), Dieffenbach (1826), Atlee and others, opened the abdominal cavity for the purpose of performing ovariotomy when, really, only uterine fibroids were present. Considering it impossible to remove such tumors in this way, those observers simply closed the abdominal cavity. Out of fourteen cases of this kind, in which the operation was not performed, five died from the effects of the surgical interference.[4]

Chas. Clay, in August, 1843, and Heath, in November, 1843, went a step farther: Having opened the abdomen, for the removal of what they supposed to be an ovarian tumor, they found uterine fibroids alone present and removed them through the abdominal wound. Both patients died.[5] Chas. Clay (1844) and Parkmann (1848) had similar cases. Burnham (1853) having committed a like diagnostic error, removed the uterus, with its contained fibroids, and saved his patient's life.

Peaslee (1855), Boyd (1856), Spencer Wells (1869), and Sawyer (1860), having made similar mistakes in diagnosis, performed the same operation without success.

Kimball[6] was the first to extirpate a previously diagnosticated uterine fibroma, with the uterus, in 1853. This case ended in recovery. Koeberlé (1863), was the next to perform this operation, which was now removed from the domain of accident, and received among approved surgical

[1] Archiv für Gynäkol., V., p. 100.

[2] Wiener Med. Wochenschr., No. 20, 1883.

[3] Zeitschr. f. Heilkunde, vol. V., 1884.

[4] Pozzi: De la Valeur de l'Hystérotomie, etc., Paris, 1875.

[5] Hegar, Operative Gynäkologie, p. 214, says that Granville removed a pediculated subserous myoma by laparotomy in 1837. The patient died. Atlee and Lane performed the same operation with success in 1844. Hegar does not mention his authority for these statements.

[6] Boston Med. & Surg. Journ., 1855. Compare Péan, Hystérotomie, Paris, 1873, p. 6.

measures, although it was reserved for later times to show in how far it is justifiable.

All the statements made in our remarks on enucleation, regarding the uncertainty of deductions concerning the value of operations, as based on statistical evidence, apply equally to laparotomy in cases of uterine fibromata. In order, however, to give a point of departure for an estimate of the danger attending the operation I here append the statistics, published until 1878, without criticism, although many require it very much.

It is not, as a rule, clearly stated in these reports, whether only the tumor was removed through the abdominal wound, the uterus and ovaries being left behind, or whether the latter were also extirpated. Moreover, all operations, of this kind, done on cysto-fibromata, are included in the tables. Péan (*loc. cit.*) collected 44 operations with 30 cures. The mortality here amounted to 68.2 per cent. Marion Sims (on intra-uterine fibroids) found, among 11 extirpations done in England, 2 cures, *i.e.*, a mortality of 82 per cent.; among 11 operations performed in America, 4 cures, *i.e.*, a mortality of 64 per cent.; among 18 operations, in France, 11 cures, *i.e.*, a mortality of 39 per cent.

Koerberlé[1] found, up to 1864, 50 laparotomies, performed for the purpose in question, 35 of which were completed. 12 cures were attained, and 23 deaths occurred.

Caternault[2] found among 20 gastrotomies, in which only the tumors were removed, 12 deaths, or 60 per cent. Among 12 extirpations of the uterus with the fibroids, he found 32 deaths, or 76 per cent. Routh[3] collected 48 laparatomies, performed on account of uterine tumors; 15 of these were not completed (with 7 deaths), and 33 were completed (with 23 deaths.)

Gaillard Thomas's[4] statistics are the most unfavorable of all. According to Storer, he cites 24 operations, with 18 deaths, or 75 per cent., and in addition quotes 10 other operations, done in America, all of which had a fatal termination. Schröder[5] found, among 108 laparotomies, performed for uterine fibroids, 16 cures and 78 deaths, *i.e.*, cures in 14.7 per cent. and death in 85.3 per cent. of the cases. Of these 108 laparotomies, 73 were combined with extirpation of the uterus. Among these cases there were 55 deaths and 18 recoveries The tumor alone was removed 35 times, death occurring in 23, and recovery in 12 cases. Pozzi

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[1] Documents pour servir à l'Histoire de l'Exstirpation des tumeurs fibreuses de l'Utérus, Strasbourg, 1865.

[2] Essai sur la Gastrotomie dans les cas de tumeurs fibreuses péri-utérines, Paris, 1866.

[3] On some points connected with the pathology, etc., of fibrous tumors of the womb, London, 1864.

[4] Frauenkrankheiten. Translated by Jacquet, Berlin, 1873, p. 420.

[5] Lehrbuch, p. 241.

(*loc cit.*) collected, up to 1875, 119 cases of this kind, among which there were 77 deaths, *i.e.*, a mortality of 64.7 per cent.

All these statistics furnish, on the whole, a comparatively uniform and very unfavorable result. I have endeavored to prepare a more useful statistical table, which I now append. In the first place, I have omitted all cases in which laparotomy was done for the removal of a cysto-fibroma, because these tumors will be separately considered in the next chapter. Then, the laparotomies in which the uterus was not exsected have been carefully separated from those in which both uterus and tumor were removed.[1]

I. *Laparotomies for the Removal of Pediculated Sub-serous fibromyomata, without extirpation of the uterus.*

Koeberlé 3 cases (2 reported by Caternault, *loc. cit.*, 1 in Gazette Méd. de Strasbourg, 1866, No. 5). Two fatal results.

Sands 1[2] case. Death 5 minutes after the operation, from laceration of the common iliac vein.

Gillespie.[3] Large fibroma with many adhesions. Pedicle attached by clamp at lower angle of the wound. Death on the 2d day, from peritonitis.

Hackenberg.[4] Pedicle separated by *écraseur*. The tumor was considered ovarian. Death on 3d day, from peritonitis.

Burnham,[5] recovery.

Laudi.[6] Large soft myoma, considered an ovarian tumor. Death after 45 hours from peritonitis.

Boye.[7] In one case the pedicle of a sub-serous myoma was ligated and fixed in the lower angle of the wound. Death in 30 hours. In the other case the pedicle was secured with a clamp. Death on the 16th day.

Vogt.[8] Pediculated myoma, considered an ovarian tumor. Adhesions with arteries. Death on the 7th day.

Routh.[9] Very large tumor (17½ pounds) with ascites. Pedicle attached by clamp. Recovery.

Spencer Wells.[10] Fibroid mistaken for ovarian tumor. Pedicle held in clamp and ligated. Death on 3d day.

Spencer Wells.[11] Tumor with broad base, attached to fundus. The pedicle, when divided by the *écraseur*, gave rise to hemorrhage, which could not be controlled until 2 needles were passed through the uterine wound, and having been surrounded by ligatures applied in a figure of 8 form, were held in the lower angle of the wound. Recovery.

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[1] Although these tables are omitted in the last edition of this work, it has been deemed advisable to retain them here, as they are useful for reference.—*Ed.*

[2] American Journal, Canstatt, 1866.

[3] Edin. Med. Journal, July, 1866.

[4] N. Y. Med. Record, Jan. 15, 1868.

[5] Boston Med. Journal, Jan. 9, 1868.

[6] Lo Sperimentale, 1871, p. 21.

[7] Canstatt's Bericht., 1871.

[8] Canstatt's Bericht., 1873.

[9] Obstet. Transact., XVIII., p. 5.

[10] Obstet. Transact., XI., p. 73.

[11] Med. Times, July 29, 1871.

E. Martin.[1] Pedicle secured with clamp. Death from internal hemorrhage.

Hegar[2] extirpated the tumor only. Death.

Péan.[3] One case. Recovery.

The total number amounts to 17 laparotomies, with removal of the fibroma only. Among these 12 deaths or 70.5 per cent.[4] (Koeberlé collected 20 such cases, including cysto-fibromata, with 8 recoveries, *i.e.*, a mortality of 60 per cent.)

II. *Cases of extirpation of the uterus for fibromata.*

Koeberlé[5] 3 successful cases. In one there was ascites and strong adhesions to the pelvic wall.

Cutter.[6] A sub-peritoneal fibroid. Adhesions to omentum. Death in 10 hours.

Cutter.[7] Death in 75 hours.

Peck.[8] The tumor was considered ovarian. Death on the 2d day.

Holston.[9] Very large tumor, also thought to be ovarian. Death on 2d day.

Atlee[10] saw death occur on the 5th day, as result of hemorrhage from the adhesions of the tumor.

Hofmokl[11] had a fatal case.

Kimball.[12] 9 extirpations of the uterus; 3 cures.

Lawson Tait[13] successfully removed the uterus with a tumor weighing 11 pounds.

Chadwick.[14] The cervix was secured in a clamp, after removal of the uterus. Death on 8th day from tetanus.

Baker-Brown.[15] Death in 12 hours from hemorrhage.

Billroth[16] lost one patient by septicæmia and another by shock, after extirpation of the uterus. A 3d recovered. He cites a 4th fatal case in

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[1] Monatsschrift für Geburtskunde, 33, p. 242.

[2] Operationslehre, p. 214.

[3] Clinique Chirurgicale, Paris, 1876, p. 690.

[4] Kaltenbach describes two more cases of extirpation of the tumor by laparotomy (Zeitschr. f. Geburtshülfe und Gynäkol., Stuttgart, 1877, II., p. 186), which resulted favorably. These were not included in the above enumeration.

[5] Gaz. Méd. de Strasbourg, 1866, No. 72. Compt. Rend., 56, 1863. Professor Koeberlé very kindly informed me recently, that, up to the end of 1877, he had performed laparotomy 19 times for the removal of fibrous tumors of the uterus, and of those cases 9 ended in recovery.

[6] Medical Record, New York, June 1, 1868.

[7] *Ibid.*, October 15, 1869.

[8] Phila. Med. Reporter, 1869.

[9] *Ibid.*, 1869.

[10] Am. Med. Journal, 1869.

[11] Wiener Med. Presse, 1873, Nos. 32 and 33.

[12] Boston Med. Journal, 1874.

[13] British Med. Journal, November, 1874.

[14] Boston Med. Journal, 1875.

[15] Obst. Trans., VI., p. 249.

[16] Wiener Med. Wochenschr., 1876, Nos. 1 and 2.

the practice of a physician of Zürich. The case described by Billroth,[1] in which an ovarian tumor was inseparably connected with a uterine fibroid, and in which death resulted from peritonitis, ought not, strictly speaking, to belong in this class.[2]

Hegar[3] reports 2 recoveries. In one, abortion was artificially induced before the operation.

K. Thornton[4] saw recovery after extirpation of the uterus, silk sutures having been passed through the cervix.

Péan[5] performed 16 extirpations for fibromata, (not counting cysto-fibromata). 10 cures and 6 deaths.

E. Boeckel.[6] One fatal extirpation. The tumor was considered ovarian. I finally cite, according to Pozzi (*loc. cit.*) 9 other hysterotomies (done by Richet, Labbé, Ollier, Howtig, Stadfelt, Gayet and Pope). All of these ended fatally. One of Labbé's patients died of tetanus. One of Howtig's operations resulted favorably.

The total number of extirpations of the uterus for simple (*i.e.*, not fibro-cystic) myomata, thus amounts to 55. Among these there were 23 cures and 32 deaths, *i. e.*, a mortality of 58 per cent.

We must compare with these results the statistics in which the fibro-cystic tumors are included. They are as follows:

Koeberlé found among 42 cases of extirpation of the uterus, collected by himself, in 1866, 8 cures. The mortality was thus 81 per cent. Boinet (1873) collected 42 cases, with 10 recoveries, *i.e.*, a mortality of 73 per cent.

Péan collected (*loc. cit.*, 1876, p. 690) 25 hysterotomies with 17 cures, *i.e.*, a mortality of 32 per cent.

Among all these statistics the fact of the greatest value is that Péan (Pozzi, *loc. cit.*) saw, among 24 extirpations of the uterus, 8 deaths and 16 recoveries. Koeberlé notes, among 8 operations of this kind, (Pozzi, *loc. cit.*) 3 cures and 5 deaths.

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[1] Wiener Wochenschr., 1873, No. 1.

[2] Billroth (Wiener Wochenschr., 1877, No. 40) recently reported another successful case of extirpation of the uterus, which is not included in the present list. There is still another case reported by Wölffel, in Langenbeck's Archiv for November, 1877.

[3] Berliner Klin. Wochenschrift, March, 1876.

[4] Med. Times and Gazette, April 7, 1877.

[5] Clinique Chirurgicale, 1876, p. 690. The statistics of all Péan's operations (which cannot be included here) will be found in the Gaz. Obstet., No. 7, 1877. (Comp. Wiener Med. Wochenschr., No. 45, November 10, 1877.) We find from this report that Péan performed 33 extirpations of the uterus; of these there were 21 for fibromata with 14 recoveries; 6 for "fibrocystic tumors" with 4 recoveries; 4 for "cystic tumors of the uterus" with 3 recoveries, and finally 1 fatal case of "cystic carcinoma."

[6] Gaz. Méd. de Strasbourg, June 1, 1875.

The figures certainly plainly showed the unusual danger of laparotomy and hysterotomy, for the removal of uterine tumors.

Since 1878, owing to the introduction of antiseptic methods of operation, a great change has been wrought as regards the value of laparotomy in myoma of the uterus. Although the successful results of the operation cannot be compared to those obtained in ovariotomy, they nevertheless constitute one of the most marked advances of operative gynecology. A reasonable hope may be entertained that further progress may lead to still better results, especially as regards the more dangerous kinds of tumors under consideration.

Although it has been repeatedly shown that statistics are not of very great value, they are nevertheless essential to give us some general and approximate idea of the progress made in the results of operative interference. For this reason it seems proper to here borrow some figures from Bigelow's elaborate compilations. This author collected up to 1883, 573 cases of laparotomy for the removal of uterine fibroids. Of this number 311 recovered and 241 died, a mortality of 41.05 per cent.

In 106 cases the tumors alone were removed (myomotomy in the strict sense), with a mortality of 49.03 per cent. In 229 cases the uterus was also removed (amputatio uteri supra-vaginalis), with a mortality of 41.04 per cent. As these computations include some of the older cases, the figures given have only a slight value. Nevertheless even they indicate progress.

I have myself endeavored to collect as many cases as possible. Thus I found 359 cases, with 237 recoveries and 122 deaths, a mortality of 33.9 per cent. To this number 245 other cases (by Schroeder, Olshausen, Braun, Tauffer and myself) should be added. Of the above-mentioned 359 cases, 295 were amputations at the internal os, with a mortality 36.2 per cent., and 64 were simple myomotomies, with a mortality of 20.5 per cent.

The results published by individual operators are far more valuable than these general figures. The table on page 268 is the original of Bigelow,[1] supplemented by Hofmeier,[2] and still later by myself.

Bigelow (l. c.) has collected 279 cases occurring between the years 1878 to 1883, with 244 recoveries, and a mortality of 35 per cent.

All these figures merely show, in a general way, how much progress has been made in this operation. But as regards the advantages of any particular method of operation they show nothing at all, since it was not possible to separate one method from another. To compare myomotomy with ovariotomy is certainly inadmissible.

Ovariotomy is always pretty nearly the same kind of operation, no

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[1] Amer. Journ. Obst., 1883 and 1884.

[2] Die Myomotomie, etc., Stuttgart, 1884, p. 7.

matter whether there are greater or lesser technical difficulties in the way of its performance. But this is by no means true of the operations for the removal of uterine fibroids.

| | | Cases. | Recov'ries. | Deaths. | Mortality. |
|---|---|---|---|---|---|
| Bantock | Until March, 1883 | 22 | 20 | 2 | 9.09% |
| Tait | " Sept. 1882 | 30 | 20 | 10 | 33.3% |
| Wells | 1882 | 40 | 19 | 29 | 52.5% |
| Thornton | 1882 | 25 | 16 | 9 | 36.0% |
| Koeberlé | 1882 | 19 | 9 | 10 | 52.0% |
| Billroth | 1882 | 25 | 10 | 15 | 60.0% |
| Schröder | 1884 | 100 | 68 | 32 | 32.0% |
| Hegar and Kaltenbach, | Sept. 1881 | 12 | 11 | 1 | 8.3% |
| Savage | 1882 | 9 | 6 | 3 | 33.3% |
| Thomas | Sept. 1882 | 13 | 7 | 6 | 46.1% |
| Kimball | Oct. 1883 | 11 | 6 | 5 | 45.4% |
| Péan | July 1881 | 51 | 33 | 18 | 35.2% |
| Keith | Dec. 1883 | 25 | 23 | 2 | 3.0% |
| Kaltenbach | 1883 | 10 | 9 | 1 | 10.0% |
| Olshausen | 1884 | 29 | 20 | 9 | 31.03% |
| A. Martin [1] | 1884 | 60 | 27 | 23 | 38.3% |
| K. Braun [2] | 1884 | 16 | 10 | 6 | 37.5% |
| Tauffer [3] | 1884 | 16 | 12 | 4 | 25.0% |
| Gusserow [4] | Early in 1885 | 20 | 12 | 8 | 40.0% |
| Total | | 533 | 338 | 185 | |

Average mortality, 34.8%.

The following classification may properly be made:

1. The removal of pediculated or broadly attached sub-serous fibroids, simple myomotomy.

2. The removal of tumors that have penetrated more or less deeply into the substance of the uterus, with partial excision of the womb, and with or without opening of the cavity of the uterus, amputatio uteri partialis.

3. The removal of fibroids with excision of the uterus above the vaginal junction, *i.e.*, invariably with opening of the cavity of the uterus, amputatio uteris supra-vaginalis.

4. The enucleation of fibroids after opening the abdominal cavity, with or without opening of the cavity of the uterus. (Spiegelberg).[5] Also the enucleation of these growths from within the cavity of the uterus, after incision of the latter as in Cæsarean section. (A. Martin.[6])

5. Enucleation out of the cellular tissue of the pelvis, in those cases where the tumor has developed between the broad ligament, or altogether

[1] Magdeburger Naturforscherversammlung, Arch. f. Gynäk., 25, p. 147.
[2] Wiener Med. Wochenschrift, 1884, Nr. 22 u. 30.
[3] *Ibid.*, 1885.
[4] Not published.
[5] Archiv f. Gynäk., vol. VI., p. 341.
[6] Deut. Med. Wochenschr., 1880, No. 27.

outside of the peritoneal cavity, as in myoma of the cervix. These operations are to be considered quite apart from ordinary enucleations involving peritoneal adhesions.

They are very difficult of performance, and offer a correspondingly poor prognosis.

6. Total extirpation of the uterus, as suggested and carried out in some cases of this kind.

In briefly considering these different methods, it may be premised that all those precautions characterizing "strictest antisepsis," are invariably to be taken.

In dealing with the pediculated variety of sub-serous fibroid, the operation will resemble simple ovariotomy. The pedicle is transfixed, secured by ligature near the uterus, and cut. If the pedicle is very broad, or very vascular, it is advisable to ligate each bleeding vessel, or to secure it by suture.

If it becomes necessary to cut a part of the tumor out of the substance of the uterus, owing to a very broad attachment, the uterine wound is to be sewed up.

These operations being comparatively simple, justify a favorable prognosis. Thus out of 21 cases Schroeder only lost 2, a mortality of 9.5 per cent.

The cases mentioned under the second and third categories entail much more difficult and complicated methods of operation. In performing either partial or supra-vaginal amputation of the uterus, it is necessary to secure both the round and broad ligaments by double ligatures. When the uterus and the tumors that grow from it are thus made freely movable, it is best to place a rubber tube around the cervix, or at a point corresponding to the site selected for amputation. (Kleeberg.[1]) The uterus and tumor are then removed by ablation. If by this procedure the cavity of the uterus has not been opened, the wound is closed by suture, just as in simple myomotomy. In supra-vaginal amputation, the uterine cavity is of course always laid open, which constitutes a serious complication. The question in such cases is what to do with the pedicle, consisting of the cervix or the stump of the amputated uterus. At first, just as in ovariotomy, it was deemed advisable to use the extra-peritoneal method. But later the intra-peritoneal method was more generally adopted. Nevertheless, even at the present day, this point is still in dispute.

In my opinion the intra-peritoneal method is to be preferred, as doing all that the others can do, but being in addition more simple and always possible of execution. Still, it is not to be denied that, in certain cases, the extra-peritoneal treatment of the pedicle may be almost a necessity.

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[1] St. Petersburg Med. Woch., 1879, No. 1.

Two objects must be kept in view in treating the pedicle. The first is to obviate bleeding, and the second is to prevent infection. The older method, as practised by Péan, Koeberlé and Rose,[1] consists in carrying through the region of the internal os a large needle armed with a double ligature of silk or wire, and then to tie the ends laterally. This prevents bleeding from the uterine arteries, and also shuts off the cervical canal. The stump can be secured by clamp in the lower margin of the abdominal incision, and kept, so far as possible, in an aseptic condition.

But to carry out systematically the extra-peritoneal method of treating the pedicle, Hegar's plan is to be preferred to the others. This author stitches the pedicle to the abdominal walls in such a way that the parietal peritoneum is carefully sewed to the pedicular peritoneum. In this way the cervical wound is kept altogether without the cavity of the peritoneum.

For intra-peritoneal treatment Schroeder's plan is the simplest. After ablation of the tumor and while the rubber tube is still in position, the stump is trimmed in such a way that two opposing flaps are formed. These are secured by sutures placed in rows at different levels (*Etagennähte*). The edges of the peritoneal investment are finally closed by a series of very fine sutures.

Olshausen excises a part of the mucous membrane of the cervix, closes the opening by stitches of catgut, but does not use the Schroeder sutures at different levels. He also catches the peritoneum as he goes along, in place of employing a series of separate stitches for that membrane. I have also always employed the latter method. I have simply closed the wound in the stump by very deep sutures, and have then introduced a tampon of iodoform from the vagina.

Olshausen has, under certain conditions, allowed the constricting rubber band to remain *in situ*, without untoward effects, barring the formation of a fistula in one case. I have not deemed this necessary, always, like Schroeder, removing the rubber after application of the sutures.

It cannot be denied that the ligatures which are dropped down with the pedicle have at times set up later disturbances. In those instances in which it is difficult to apply the rubber band, I have followed the method of Péan described above.

It seems advisable in these operations to remove the ovaries, along with the uterine tumor. These organs are at best useless after so large a portion of the uterus has been removed. Indeed they may do harm by being allowed to remain. Thus Péan lost a case in consequence of hæmatocele, which took its origin from menstrual congestion of the ovary Koeberlé observed extra-uterine pregnancy, after extirpation of the uterus with-

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Zeitschr. f. Chirurgie, 1883.

out the ovaries, the cervical canal having been allowed to remain open. In another case of a similar kind, hemorrhage into Douglas's pouch and rectal bleeding occurred at the next menstrual epoch following the operation.

It follows, therefore, that as a rule, the ovaries should be removed in the operation. If it is found, however, that owing to adhesions, or other pathological conditions, this procedure would be difficult, it is best not to prolong the operation by attempts at removal of these organs.

The methods just described presuppose a pediculated tumor, or at least, that the uterus can be made use of for the formation of a pedicle. It was for a long time thought that growths of a certain size invading the cervix, and those projecting into the cellular tissue of the pelvis, were not amenable to surgical treatment. Spiegelberg was the first to devise a method of dealing with tumors of the former variety. In a broadly attached cysto-fibroma, he performed abdominal section, split the capsule of the growth, enucleated it and then closed by suture the large uterine wound. The patient died. Other cases [1] in which the uterine wound was not sewed up, also ended fatally. More recently, aided by antiseptic measures, some successful cases have been recorded. It is always well to use the rubber tube for purposes of constriction, and with the idea of limiting the loss of blood.

Sometimes, in doing this operation, it will be found that the uterine wound is so completely closed by contraction of the organs, that sutures are not necessary. But as a general thing it is advisable to sew up the uterine wound, especially when the uterine canal has been laid open.

Operations of this kind have been performed by Schroeder (Hofmeier l. c.), Martin (l. c.) eight cases with three deaths), Möricke,[2] N. Eck,[3] Olshausen (l. c.), Gusserow (one successful case), and others.

More recently successful enucleations of tumors growing into the pelvic tissues have been recorded by Schroeder, Rose, Olshausen, Kaltenbach, Küster, Gussenbauer, Breisky and others. In such cases also, whenever possible, "rubber constriction" should be used, in order to control bleeding. The peritoneal investment of these growths is to be split, and the tumor peeled out by the aid of blunt instruments, or preferably the fingers. Firm bands are to be ligatured and cut. The uterine wound is to be closed by deep sutures. Drainage will be necessary in some cases. Whether the additional performance of amputatio uteri is called for depends of course upon the uterine relations of the growth and its size. Prognosis is naturally made worse by the extent of the surgical interference. Schroeder lost twelve cases out of twenty-one of these complicated enucleations, a mortality of 57 per cent.

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[1] Billroth, Wien. Med. Woch., 1876. Péan, Lyon Méd., 1869.
[2] Zeitschr f. Geburtsk. VII. [3] Centralbl. f. Gynäk., 1878.

Finally, total extirpation of the uterus has been advised and done for difficult cases of this kind. Bardenheuer (l. c.) performed the operation successfully four times. Kottmann[1] and v. Maudach[2] have also reported similar cases.

On the whole, it does not seem clear what advantages this extremely difficult operation possesses over other methods of treatment, and, indeed, it has not beeen generally followed.

For completeness sake, we here present Pozzi's (*loc. cit.*, p. 150) statistics concerning amputations or extirpations of the uterus, most of which were undertaken on account of an error in diagnosis, occasioned by the development of fibroids at the fundus, and consequent inversion of the uterus. Two of these operations, performed with the knife, resulted favorably. Five amputations of the uterus, with the tumor, finished by means of the ligature, resulted in two recoveries and three deaths. In eight cases both methods were combined. The ligature having been first allowed to remain *in situ* for some time, so that adhesion between the opposite uterine walls should occur at the point of constriction, the amputation of the fundus uteri and of the tumor was then undertaken.

In these cases cures were effected five times and death resulted three times. The operation was also performed three times with the *écraseur*. In two of the cases death followed. The operation was performed once, but unsuccessfully, with Maisonneuve's constrictor. One successful operation was done with the galvano-cautery. (The bibliography of the subject can be found in Pozzi's work.)

The most frequent cause of death is septic infection, running its course under the form of septic peritonitis. Then follow loss of blood, shock, intestinal obstruction, uræmia in consequence of ligation of the ureters, thrombosis of the crural or pelvic veins, and cardiac failure. The last-named cause of death is brought about by changes in the muscular substance of the heart, such as traumatic atrophy and fatty degeneration following loss of blood. (Hofmeier, Rose, l. c.)

It has been shown that the particular method of operation to be chosen for the removal of myomas will depend chiefly upon the seat of the growth and its relation to the uterus. But a more difficult problem presents itself when we attempt to clearly formulate the indications for operative interference.

Now for uterine growths of the kind in question removal is by no means a simple necessity, such as is generally the case in ovarian tumors.

Even if we should succeed in reducing the mortality of extirpations of fibroids to the level of ovariotomy, we would nevertheless still have to take into account that fibroids *per se* are not dangerous to life. Hence

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[1] Correspondenzblatt f. Schweizer, Aerzte, 1882. Total extirpation per vaginam.

[2] *Ibid.* Total extirpation by the method of Freund.

the mere diagnosis of fibroid of the uterus is not equivalent to an indication for operation. Such indication is found, however, in the following: Rapid growth of the tumor, a size leading to disturbances of circulation and respiration; ascites, origin of the growths in the true pelvis, leading to symptoms of incarceration; violent pains (especially when they suffice to incapacitate the the patient for work), and finally hemorrhages that are not to be controlled by other measures.

Among the rarer indications for surgical interference we will find pregnancy and changes occurring in the tumor, such as gangrene, etc. In all cases the condition of the patient, her age and her station in life, are also to be considered. In persons who depend for existence upon their ability to work, an operation is sooner called for than in those who can command every care and comfort.

In these considerations there will also be found a reason why these operations will not easily give as good results as ovariotomy. The latter is called for in every case where the tumor is large, whereas extirpation of

Fig. 25.—Greenhalgh's Forceps.

fibroids is indicated generally in those cases that, owing to their course and symptoms, justify a poor prognosis.

The above considerations sufficiently establish the fact that, in many of these cases, symptomatic and palliative treatment can alone be aimed at. In the first place we must consider those measures which try to arrest the growth of the tumor, or to even reduce its size. We must next discuss all those methods of treatment the object of which is to produce by constitutional treatment a favorable effect upon the development of the tumors and upon the symptoms. Finally we shall consider the treatment appropriate for individual symptoms.

We have already stated that there is no therapeutical agent by which a fibromyoma may be made to entirely disappear. No measures adopted for this end can boast of brilliant results. Even when the tumors have disappeared, under a given treatment, it has not been proven that their removal was the result of the therapeutic measures resorted to. The use of ergotin (according to Hildebrandt's method) and the internal administration of ergot[1] are perhaps exceptions to this rule, although too little clinical evidence regarding this point has been accumulated. It is,

[1] Brunton: Obstet. Transact., 1872, p. 282.

however, not to be denied that some of the methods of treatment originally suggested for the complete removal of the fibroids have proven empirically useful in many instances. After their employment many of the symptoms have disappeared, or the growth of the tumor has seemed to be more gradual.

The supposed advantages of all the modes of treatment are seldom appreciable, while unfavorable results often follow them. Neither have we any criterion by which to judge whether any given treatment will furnish better results in one individual case than in any other. One often sees no result, or an unfavorable one after an apparently appropriate course of treatment, while benefit may accrue to the patient from measures apparently not at all indicated.

We must assign the first rank to those methods of treatment designed to operate more or less directly upon the tumor. Among these methods, the subcutaneous or internal administration of ergot and its preparations is most trustworthy. Although abscesses, at the point of puncture, and even symptoms of ergotism may attend the use of this drug, it, nevertheless, very often retards the growth of the tumors. Particularly the soft tumors which are rich in muscular tissue, become harder, smaller and appear to undergo an arrest of development. After the use of ergot diminution in the hemorrhage, either brief or lasting, very often occurs. Almost as frequently, however, all these favorable results are lacking, and the unpleasant ones necessitate an interruption of the treatment. The subcutaneous injection of ergotin is tolerated, with special difficulty, by very fleshy persons, such as are so liable to suffer from fibroids at the menopause. We should entirely discountenance the internal administration of iodine and bromine preparations, no matter of what form, as well as of chlorate of potassium, arsenic,[1] mercury, turpentine and other similar drugs. There are no convincing proofs of their utility; on the contrary, most of them are calculated to act harmfully by disordering digestion.

Certain celebrated medicinal waters and sea baths are now much employed. Their efficacy, in certain cases, cannot be well denied, although their value is, on the whole, slight, and their effects uncertain. I have observed that, in general, anæmic persons do not derive benefit from mineral-water baths. Such patients rather experience relief from sea baths, or from the influence of life near the sea, upon their general health. It is difficult to distinguish between the local and general effects of these baths. They sometimes seriously aggravate the hemorrhages. Although a diminution of the menstrual flow often results from their use, I have quite as frequently seen an increase of it following their employment. This is probably referable to increased afflux of blood to the

[1] Péan saw a tumor, which filled the pelvis, disappear almost entirely after the use of arsenic. L'hystérotomie, p. 36.

abdominal cavity. This is also the reason of the prejudicial effect of hip baths, in these cases.

The springs at Kreuznach, Reichenhall, Hall, Krankenheil, and Kissingen, in Germany, and at Salins and Salies de Béarn, in France, enjoy an especial although undeserved reputation in the treatment of uterine fibroids.

The springs of Kissingen, Marienbad, Carlsbad and Vichy, and of Bourbonne, in France, are efficacious for fleshy persons inclined to constipation. These waters probably reduce the size of the uterus, and possibly of the tumor, by diminishing the tension in the abdominal arteries. I have often observed a temporary amelioration of some of the symptoms, particularly of the hemorrhages, after the use of these waters.

Few general directions can be given regarding the constitutional treatment of fibroids, although it is doubtless of great importance. It relates chiefly to regulating the mode of life, and must be carefully adapted to the requirements of each individual case. Some form of iron is indicated by the anæmia of most patients suffering from fibromata. Even in those cases, however, in which it is tolerated by the stomach, producing no digestive disturbances, I have never been able to observe any appreciable benefit resulting from its use.

In those cases not adapted to operative interference, we are reduced to the necessity of symptomatic treatment. The symptom which is seldom or never absent; in cases of sub-mucous and interstitial tumors, and which, at all events, most imperils the patient's life, is hemorrhage. The means for checking dangerous hemorrhages are numerous and well-known. Among drugs for internal use, we shall consider at this time only ergot or ergotin; the utility of extr. hydrastis canadensis, so warmly recommended by Schatz[1] and others, is not yet sufficiently well established. Aside from these remedies cold applications to the abdomen, and cold vaginal douches prove valuable. I have never obtained permanent results from hot injections. The hemorrhage was indeed at once arrested by them, as a rule, but soon recurred.[2]

Astringent vaginal injections of diluted liq. ferri chloridi, tannin, etc., likewise produce only temporary results. The only speedy and certain method of arresting the bleeding, consists in the careful introduction of a perfect tampon, preferably composed of cotton wool dipped in styptic solutions.

I find by reference to modern literature, that transfusion has been twice performed, after threatening uterine hemorrhage. One patient died during the operation,[3] the other recovered.[4] Only human blood should

[1] Centralblatt für Gynäkol., 1883, No. 46.
[2] Runge: Berlin Klin. Wochenschr., No. 13, 1877.
[3] Filliette: Archiv. de Tocol., II., 444.
[4] Gentilhomme: Gaz. Hébdomad., No. 39, 1868.

be used for the transfusion. I should not have attended to this point were it not for the fact that the transfusion of blood from an inferior animal is favorably mentioned in a new gynecological text-book which is in many respects meritorious. It is a striking proof of the unscientific principles often governing modern medical practice that so venturesome and purely empirical a procedure as the transfusion of animal's blood should attract such general attention, at a time when the experiments of Panum and others have proven the deleterious results of the exchange of blood between different animal species.

The prevention of the recurrence of hemorrhage and the moderation of menstruation is more important than the temporary arrest of bleeding, which is usually easily accomplished. The means adapted for this end are local and general ones.

The latter variety embraces really only the subcutaneous administration of ergotin, according to Hildebrandt's method. The hæmostatic effect of this drug, in a considerable number of cases, is beyond question, and although this effect be by no means certain or permanent, it still has the advantage of harmlessness over other methods of treatment.

The most radical measure for the prevention of hemorrhage is the extirpation of both ovaries, even when sound. By this means the menstrual congestion of the pelvic organs, which is the chief cause of the profuse bleeding, is obviated. But this subject has already been fully considered.

The operation is certainly not indicated if the hemorrhages have lost their menstrual type, or if the menopause has arrived.

Baker-Brown[1] first performed a much less formidable operation for the relief of hemorrhage. It consisted in incising the cervical canal, the os internum, and, if practicable, the capsule of the fibroid. Experience shows this operation to be adapted to the long-continued control of the bleeding. Nélaton, McClintock,[2] Spiegelberg,[3] Barnes,[4] Savage,[5] and others, including myself, have obtained good results from this method. The *rationale* of the effect produced by this, by no means trifling operation, is explained in some cases by the section of many dilated vessels in the uterine mucous membrane, and their subsequent obliteration by the process of cicatrization.

In the majority of cases, however, the result is, according to my experience, attained by the release from pressure of the uterine mucous membrane, which has been distended and partly destroyed by the tumor. In consequence of this relief, the collateral congestion of the remaining mucous membrane is relieved, and hemorrhage from it diminished.

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[1] London Obstet. Transact., III., p. 67, and VI., p. 21.

[2] Clinical Memoirs, etc., p. 149.

[3] Monatsschrift für Geburtsk., 29, p. 87.

[4] Diseases of Women, London, 1873, p. 773.

[5] Lancet, 1879, Sept. 29.

Spiegelberg first advanced this theory, and supported it by demonstrating the fact that this method is only successful when the tumor is adjacent to the os internum, and the mucous membrane covering the growth is, therefore, directly relieved from pressure by the incision. Since the presence or absence of the anatomical conditions necessary to the success of the operation are not easily determined in advance, it has not found general acceptance.

I have always performed the operation with Sims's curved scissors, after dilating the cervical canal by means of sponge tents, and have in addition incised the mucous membrane in and above the os internum. I have never seen unpleasant consequences follow the operation, nor are any recorded in literature. Yet it might give rise to parametritis, peritonitis and septicæmia, just as readily as incision of the cervix for other objects. Like most gynecologists, probably, I have not recently performed this operation.

Several authorities, as for instance Scanzoni, recommend local abstraction of blood in order to prevent excessive menstruation by depletion of the uterine vessels. The distinction between the loss of blood produced by artificial means, and that due to natural agencies is so slight that benefit is probably only exceptionally afforded by this treatment. It has not been generally adopted, so far as I am informed.

Cauterization of the uterine mucous membrane has been quite properly received with greater favor. This intra-uterine method of treatment is, in many cases, the only one capable of setting a limit to the bleeding. Since solid escharotics are unsatisfactory, on account of the frequently varying form of the uterus, and because they usually only affect the secretion which covers the mucous membrane, without reaching the latter, fluid escharotics have long been exclusively used.

The *modus operandi* of the different escharotics is identical. The cauterizing fluid, when brought in contact with the uterine mucous membrane, saturates it as far as possible, diminishes its tumefaction, tans it, as it were, and antagonizes menstrual congestion. The large, dilated vessels contract and are partially obliterated. Sometimes the escharotics produce superficial follicular ulcers, which interfere with the growth of the tumor or leave, as a result of their cicatrization, a tough cicatricial tissue in the place of the swollen hypertrophic mucous membrane.

The many dangers attending intra-uterine injections are now known and sufficiently appreciated. The injections may produce uterine colic, which may, if too often repeated, lead to metritis, perimetritis and peritonitis. The irritation may directly involve the parametrium or the perimetrium, and so give rise to dangerous inflammation.

The injected fluid may, under exceptional circumstances, in the presence of special pathological conditions, pass through one of the Fallopian tubes into the peritoneal cavity. The following cut represents the

uterus of a patient, in whose case intra-uterine injections of liquor ferri chloride had been repeatedly made and with excellent results. After one injection made, perhaps, when the os uteri was not sufficiently dilated, all the symptoms of peritonitis from perforation appeared, and the patient quickly succumbed The peritoneal cavity contained a large quantity of the fluid, which had escaped through an aperture in the uterine wall. The perforation had resulted from rupture of the wall, which was atrophied, as is so often the case with uterine fibromata. The atrophied portion had yielded to the pressure of the injected fluid, since *post-mortem* experiments proved that the syringe used could not have reached the point

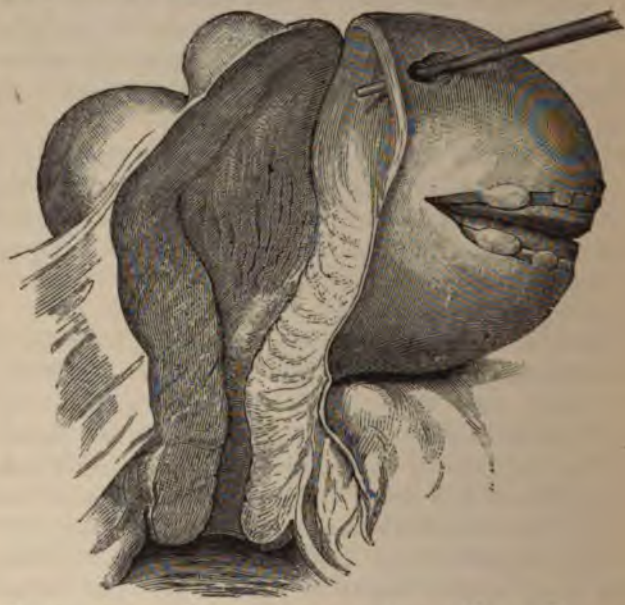

FIG. 26.—UTERUS SHOWING A FIBROID, WITH ATTENUATION OF UTERINE WALL, AND PERFORATION AFTER AN INTRA-UTERINE INJECTION.

of perforation, and was hence guiltless of the injury. These dangers may be completely avoided by never resorting to intra-uterine injection, unless the cervical canal and the os internum have been sufficiently dilated to afford the injected fluid free exit in a stream of the same size as the in-flowing current.

The uterus must be merely washed out. The fluid must never be allowed to remain in the uterus, in order that the latter not be over-dilated or unduly irritated.

It is more difficult to guard against one other source of danger, *viz.*, the results of follicular ulceration. Such ulcers may exert a very favorable influence upon the course of the disease by healing and cicatrizing. They may lead to adhesion of the opposing uterine walls, to obliteration

of the cavity of the uterus, and to cessation of hemorrhage, as G. Braun[1] has observed.

A frequent result of these ulcers is, however, gangrene of the tumors, which may terminate in expulsion of the fibroid and a complete cure.[2] Fatal septicæmia may, however, follow the gangrene, as I have observed in one case.

When, therefore, one feels confident that ulceration has occurred, after repeated injections, he will under all circumstances be acting wisely to suspend treatment for a time, resuming it cautiously when recurrent hemorrhages show it to be indicated.

I desire to particularly disparage long-continued intra-uterine injections, in cases of probably soft myoma. Such tumors are specially inclined to become gangrenous, and their intimate connection with the uterine parenchyma facilitates the absorption of septic matters.

Even this slight interference is not to be attempted without the rigid enforcement of antiseptic details.

The form of syringe to be employed is of no more special importance than the kind of fluid used. Personal preference and experience must settle this question, and the fluids recommended are so numerous that we must forego an enumeration of them. There are really only two favorite fluid escharotics, *viz.*, liquor ferri chloridi and the tincture of iodine. Both should be used undiluted. The former is, on account of its free hydrochloric acid, more caustic, but is still weaker since it coagulates the blood covering the mucous membrane, and hence operates less effectively on the membrane itself.

Tincture of iodine is said not to be open to this objection.

Formerly I occasionally saw symptoms of iodine poisoning, in sensitive persons, after repeated applications of the tincture.

But since employing irrigation of the uterine canal after every such application, I have never met with this accident, and I now prefer iodine to other remedies.

Other escharotics, as nitrate of silver, nitric acid, acetate of lead, iodide of lead (Freund), etc., have been employed and commended. The application of these remedies in the form of ointments (Routh, Scanzoni and others) has not met with general favor.

Curetting of the uterine cavity is now also generally employed, since the opinion has gained ground that pathological conditions of the mucous membrane of the uterus are so largely responsible for the hemorrhages observed in cases of myoma. This operation is done as follows: The patient being anæsthetized, the uterus is pulled downwards and its cavity washed with an antiseptic solution. The curette or blunt scoop is then in-

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[1] Wiener Med. Wochenschrift, 1868, No. 100.

[2] Whiteford: Glasgow Med. Journal, 1872.

troduced, and the cavity thoroughly scraped. I commonly inject iodine after the curetting, and then again wash out the uterine cavity with an antiseptic. In a rather large number of cases treated in this way I have never had occasion to observe serious consequences. Slight cellulitis has, however, sometimes occurred.

The second almost constant symptom, treatment of which is essential, is pain. The prevailing pain with sub-serous tumors, is due to inflammation produced by traction upon and irritation of the peritoneum. Acute circumscribed peritonitis may be often developed, chiefly at the time of the menstrual congestion.

If the pain be referable to inflammation, antiphlogistic measures afford the most ready relief. Local abstraction of blood may be indicated in the case of strong persons, with sub-serous fibroids, particularly if the menses be scanty, as often happens. In still other cases good results will follow the local use of cold, by means of ice bags, cold applications, wet packs, etc. An abdominal supporter often renders good services if the pains be produced or augmented by unusual mobility of the tumor.[1]

Greene's case,[2] in which he performed laparotomy, on account of the intolerable pain, is unique. After the abdomen had been opened, it was found impossible to remove the fibroma and the wound was closed. The patient recovered and remained permanently free from pain, no change having occurred in the uterus.

Pains resembling those of labor, and due to uterine contraction, are produced by fibroids, particularly by those which are sub-mucous or interstitial. Although these contractions are often of benefit in producing the expulsion of the tumors, they are sometimes so severe as to require alleviation. Morphia or other anodynes are, aside from operative measures, the only resource in these cases.

The anodyne may be administered in a vaginal or rectal suppository, hypodermically or in a small enema.

Pain is also produced by pressure of the tumors upon neighboring tissues. Pain due to this cause may often be relieved by pushing the tumor upward, out of the pelvis, and retaining it in its new position by a pessary. (Kidd.) Ringland[3] once displaced a tumor upward by means of a Barnes dilator introduced into the rectum. In the majority of these cases, however, provided they are not adapted to other modes of treatment, narcotics are our only resource.

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[1] Guéneau de Mussy: Bulletin de Thérapie, 1867, p. 356.

[2] Boston Med. Journal, 1867, No. 23.

[3] Dublin Quarterly Journal, 1867, p. 248.

# CHAPTER VII.

## CYSTO-FIBROMATA OF THE UTERUS.

### BIBLIOGRAPHY.

In addition to the works before mentioned, the following monographs have en consulted: Schuh: Ueber die Erkenntniss der Pseudoplasmen, Wien, 1851. ıncer Wells: Diseases of the Ovaries, London, 1872.—Atlee: Ovarian Tu- ors, Philadelphia, 1873. — Peaslee: Ovarian Tumors, London, 1873.— Gallez: ystes de l'Ovaire, Bruxelles, 1873. — O. Schröder: Ueber Cystofibroide des ·erus, Inaug. Dissert., Strassburg, 1873.—O. Heer: Ueber Fibrocysten des ·erus, Inaug. Dissert., Zürich, 1874.— Grosskopf: Zur Kenntniss der Cysto- yome des Uterus, Inaug. Dissert., München, 1884.

VE are, as yet, obliged to designate by the above name, a class of uterine tumors by no means identical in their morbid anatomy. ıey are either changed fibromyomata, or belong to the group of fibroids. ıeir common feature is the accumulation of fluid within the substance of ı uterus.

The special practical significance of these tumors is found in the fact ·t they have usually been mistaken for ovarian tumors, by reason of ir location and of their fluid contents.

Aided by Virchow (Geschwulstlehre, III., p. 124) we have recently just begun to establish pathological distinctions between the various ıors included in this class. Only uterine myxomyomata may, with priety, be considered as constituting a special species of myomata. ·se are characterized, according to Virchow, as myomata with ndant interstitial tissue which is rich in fluid and closely resembles ple œdema. The microscope, however, shows that proliferation is oc- ring in the tissue of the neoplasm, since nucleated, round cells are nd in the interstitial fibres. The fluid contains mucin. I have been .ble to find, in literature, any statements regarding this subject, other ı those of Virchow, and consider it difficult to separate myxomyomata n the sarcomata.

'he other forms of the fibro-cystic tumors are fibromyomata in which ain pathological changes have occurred. The most frequent change sists in œdematous infiltration of the tumor. At the same time the a-muscular connective tissue undergoes changes, apparently consist- at first in œdematous swelling. Finally, however, the tissue is com-

pletely disintegrated, and there appear spaces filled with clear fluid, similar to and in many cases identical with lymph, in its chemical composition. The muscular fibres of the neoplasm are pressed together, and become atrophic. The tumor fluctuates plainly, but usually contains no large cavities, so that puncture only furnishes a little fluid. In some cases the fluid is more abundant.

In many cases the fluid possesses the peculiar property of spontaneous coagulability, and this might lead to the assumption that the tumors in question belong to the class of lymphectatic myomata, soon to be described. That they are not akin to these, is proven by the fact that all observers have failed to find any endothelial lining of the spaces containing the fluid. These alveolæ must, therefore, be simple interspaces in the tissues, and not genuine cysts. It is true that Péan (*loc. cit.* p. 84) attributes to Ranvier and Melassez the discovery of a lining composed of "pavement epithelium" in the spaces. The tumors they examined were, however, probably lymphectatic myomata, to the connection between which and this form of tumors we shall immediately recur. Although only a few well-investigated cases are to be discovered in literature, the majority of the fibro-cysts probably belong to this class of infiltrated fibromata.

Spiegelberg[1] describes a case belonging in this category as follows: "Thick and transparent, easily isolated membranous folds, permeated with numerous vessels, visible to the naked eye, and with connective-tissue bands, separate, complete and other incomplete cavities, varying in size from the head of a pin to a walnut, or from the boundaries of irregularly shaped cracks and orifices. In the solid portions between the connective-tissue fibres, are found numerous round, stellar or fusiform cells, of various sizes, and with one nucleus or several nuclei, together with muscle fibres, either entire or disintegrated. Nuclei, blood corpuscles and detritus are also seen. The membranous parts of the spongy tissue are composed of young connective tissue, permeated by a close-meshed capillary plexus, and by vessels of larger calibre. Pavement epithelium was absolutely lacking. The fluid is dark yellow. Its s. g. is 1020 and its reaction neutral. About one-fourth of its total quantity is composed of large gelatinous, yellowish coagula, consisting of fibrin. The fluid portion contains large quantities of serum albumin. Paralbumin and mucin are wanting."

The second case of Frankenhäuser[2] in which the fluid coagulated on evacuation, appears to belong here, although it was not anatomically investigated. Similar cases were those of Baker-Brown,[3] Spencer Wells,[4]

[1] Archiv für Gynäkologie, VI., p. 348.

[2] O. Heer: Ueber Fibrocysten des Uterus, Dissert. Zürich, 1874.

[3] Path. Transact., XIV., p. 198.

[4] Diseases of the Ovaries, London, 1872, p. 194.

Storer,[1] Schuh, Thomas Bryant,[2] and probably most of Atlee's[3] cases. One case of this kind reported by myself[4] was carefully investigated.

The intra-uterine tumor discharged, on simple manipulation, large quantities of fluid spontaneously coagulable when exposed to air, which contained no mucin, but large quantities of serum, albumin and fibrinogenous material. At the autopsy (von Recklinghausen) the tumor was found imbedded in the posterior uterine wall, and covered to the depth of 2 to 10 mm., by uterine parenchyma, the mucous membrane covering which was still intact. The tissue of the neoplasm is reddish. Below it is paler; at the fundus quite gelatinous and only slightly trabeculated. Between the individual bands of fibres there are no large cavities, but only small spaces or chinks, of the size of a pea. The walls of these spaces are formed by the tissue itself. The microscope showed the tissue to be very rich in cells. Most of the cells are purely fusiform, or being rounded at one end are pointed at the other. On both sides of the spindle cells one sees fine, pale prolongations which terminate in part by free extremities, and in part are connected with other spindle cells. The cells themselves have rod-like nuclei, and are slightly granular. Large collections of connective tissue are rarely found, except in the superficial parts which are in close apposition to the uterine parenchyma. In those places where the fibres above-described are present in large numbers, and where only a few spindle cells are imbedded between them, one also finds large round cells of the size of mucous corpuscles, and larger, granular and not distinctly nucleated. Similar cells are found disseminated through the whole mass, either isolated and at long intervals, or closely packed together between the fibrous processes of the spindle cells. In some places are seen small masses of granular detritus, and also masses penetrated by bright fibres similar to the processes of the cells, and filled with little granules.

If this process of softening becomes widely disseminated, large cavities, often containing several quarts of fluid, may form in the uterine substance. These cavities have no special walls, but are surrounded by torn muscular fibres, undergoing degeneration, and so separated as to form trabeculæ. Dupuytren compared the inner wall of those spaces with that of the cardiac cavities.

The tumor consists of a metamorphosed solid fibromyoma, as Virchow (*loc. cit.*, p. 200) definitely stated. This must be emphasized, because faulty interpretations of the pathological conditions are often found in foreign literature. The larger the cavities the more are their contents composed

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[1] Am. Journal of the Med. Sciences, 1866.

[2] Obstet. Transact., XIV.

[3] Ovarian Tumors, 1873, p. 263 *et seq.*

[4] Comp. O. Schröder: Ueber Cystofibroide des Uterus, Inaug. Dissert., Strassburg, 1873

of detritus of the tissues, mixed with more or less blood, since numerous blood-vessels, large and small, are involved in the destruction of the muscular tissue. In accordance with the period at which the blood became mingled with the contents of the "cysts," their color is changed from bright red to dark brown or yellowish brown. The fluid mass usually does not coagulate It may partially coagulate, if it contains large quantities of comparatively fresh blood.

The cavities vary from the size of a small nut to that of the adult male head. Although the terms myoma cysticum and cystofibroma are applied to this tumor, it is not a genuine cyst, since an independent wall, which is the chief characteristic of a cyst, is wanting.

A case observed by Spiegelberg and kindly placed at my disposal for publication, best illustrates the close connection of this kind of fibrocysts with that just described, and shows them to be nothing more than a more fully developed form of the same. I again openly return thanks to Spiegelberg for his permission to utilize this case.

The tumor was a large abdominal one, which presented all the physical properties of a multilocular ovarian tumor. Since, however, at the exploratory puncture, 800 gm. of a thin sero-sanguinolent, spontaneously coagulable fluid was obtained, ovarian tumor was excluded. No direct connection between the tumor and the uterus could be discovered. The sound entered the uterine cavity to the depth of 9 ctm. The patient died suddenly of peritonitis, complicated with septicæmia, in consequence, as was subsequently ascertained, of gangrene in the tumor. The gangrene was the result of the use of the uterine sound, which had been twice introduced to the depth of 17 ctm. by an assistant. The autopsy revealed the fact that the sound had perforated the uterine wall, and penetrated the tumor.

The autopsy (Dr. Weigert) also revealed a large tumor, attached to the uterine wall, and permeated by innumerable small and large cavities varying from a hardly perceptible size to that of a child's head. The largest one, near the fundus uteri, was connected with the uterine cavity, by means of the artificial opening. The contents of these apparent cysts consists partially of sanguinolent and partly of yellowish fluid material. The walls of the cysts have, in some parts, a smooth glittering appearance, but no genuine membranous lining. The microscopical examination of the fluid showed red and white blood corpuscles. No epithelium can be found in the cyst wall, whether the specimen be fresh or hardened. The entire tumor consisted, for the rest, of smooth muscular fibres.

This case is well adapted to show the genetic relation between the two forms of cysto-fibromata already described. The majority of the cases encountered in literature belong to the latter variety.

It seems as though the processes of pregnancy and of the puerperal state had some influence upon the production of this metamorphosis in

bromyomata. This view is rendered more probable by the case of Hecker[1] than by any other of the recorded cases. These peculiar pro-

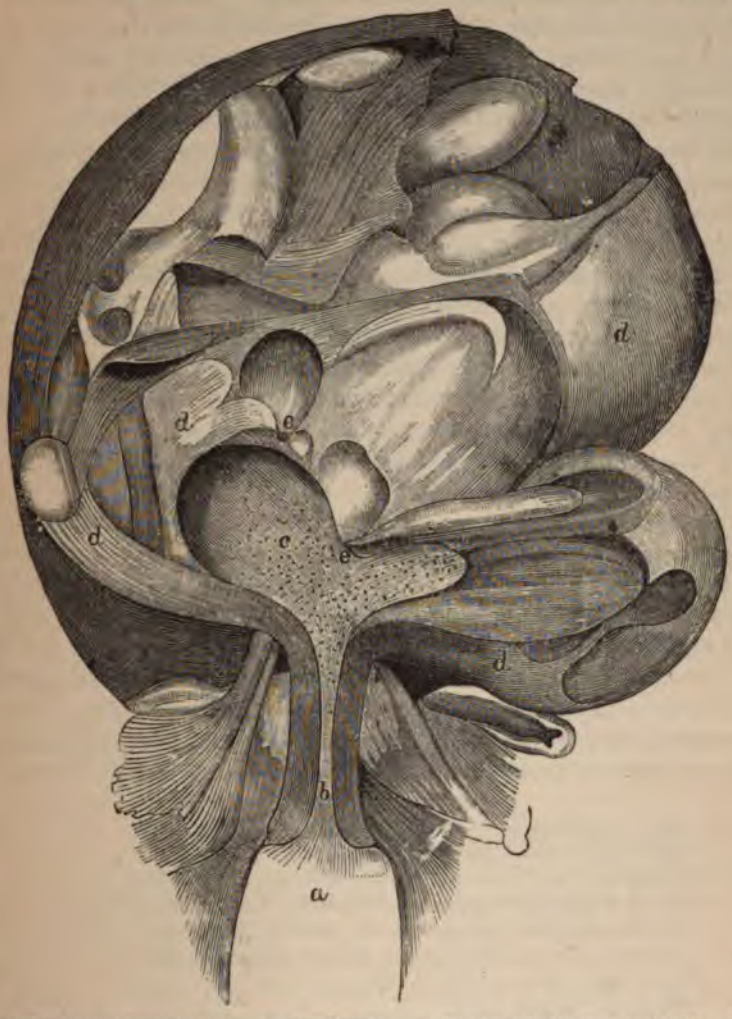


FIG. 27.—LARGE CYSTO-FIBROMA OF THE UTERUS. *a*, Vagina; *b*, Cervix; *c*, Cavity of the uterus; *d*, Walls of the Uterus with Cysts; *e*, Points of Perforation. (Case of *Spiegelberg*.)

esses of infiltration have probably not been always distinguished from angrene.

The following cases undoubtedly belong to the class now under dis-ussion, and have been studied by myself in the original reports. Ki-

[1] Klinik der Geburtskunde. Leipzig, 1864, II., p. 126.

wisch,[1] Braun, Chiari and Späth,[2] Spencer Wells,[3] C. Mayer,[4] Groethuysen.[5] Tanner's case[6] seems to have been possibly a cyst of the ligamentum latum. Haker,[7] Schuh, Atlee, Peaslee.[8] Compare farther, the histories of O. Schröder,[9] of O. Heer,[10] and of Péan, Urdy and Pozzi. Also compare Robert,[11] Bryant, Bixby,[12] Demarquay,[13] and Isaac Brown.[14]

Koeberlé[15] expressed the opinion, as early as 1869, that a number of these cysto-fibromata owed their origin to dilatation of the lymphatics. Klebs[16] also called attention to the fact that in uterine fibromyomata, the lymph spaces are dilated into "smooth-walled cysts, devoid of a special membrane, and filled with a clear fluid."

Leopold and Fehling,[17] however, made the first determined effort to separate one particular form of cysto-fibromata from the others, and to designate it by the term fibromyoma lymphangiectodes.

Their case was that of a tumor which had been diagnosticated as a uterine myoma with cystic degeneration, and which yielded, on puncture, 1500 gm. of bright yellow fluid, which immediately coagulated when exposed to the air. The reaction of the fluid was alkaline, and its s. g. 1025. Its composition was as follows: Water 93.1, solids 6.9, salts 0.7, albumen 6.0, fat 0.04, fibrin 0.1.

A characteristic ingredient of the fluid is, therefore, fibrin. The microscope showed that the tumor was a myo-sarcoma filled with cavities, which were lined with a fine endothelial covering, so that the case was plainly one of lymphangioma. Only one similar case has been reported since that one, by Rhein.[18] This case makes the identity of the three forms of cysto-fibromata which have been considered probable, and suggests the propriety of regarding them all as lymphangiomata.

In Rhein's case there were large and small cavities filled with masses of tissue and a spontaneously coagulable fluid resembling blood. Microscopi-

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[1] Klin. Vorträge, I., p. 455.
[2] Klinik der Geburtshülfe und Gynäkologie, 1855, p. 404.
[3] Diseases of the Ovaries, London, 1865, pp. 354 and 356.
[4] Verhandlung der Berliner Geburtshülfl. Gesellschaft, IV., p. 97.
[5] Monatsschrift für Geburtskunde, 1863, XXI., p. 243.
[6] Virchow, loc. cit., III., p. 199; Obstet. Transact., III., p. 14.
[7] Brit. Med. Journal, 1863, p. 225.
[8] Ovarian Tumors, p. 147.
[9] Dissertation, Strassburg, 1873.
[10] Dissertation, Zürich, 1874.
[11] Obstet. Transact., 1872, p. 309.
[12] Boston Med. Journal, August 6, 1874.
[13] L'Union Medicale, 1868, p. 113.
[14] Transact. of the Path. Soc., XVIII., p. 196.
[15] Gaz. Hebdomad., February.
[16] Handbuch der Patholog. Anatomie, Part. 4, p. 887.
[17] Archiv für Gynäkologie, VII., p. 531.
[18] Archiv für Gynäkologie, IX., p. 414.

cal investigation showed that the smallest cavities possessed no wall of their own, but were here and there connected with spaces covered with endothelium, and which were, therefore, lymph channels. Rhein mentions still another case, that of Heintze, in which the wall of such cavities, in a fibromyoma, possessed a plain endothelial layer.

However deficient our knowledge may be regarding the pathological genesis of cysto-fibromata, and however doubtful it is whether there be any anatomical distinctions between the different groups of these tumors, there is at least one class which can be anatomically, although not clinically separated from them. These are the myomata telangiectodes seu cavernosa of Virchow.

The characteristic of this form is the abnormal development of blood-vessels in the myomata. Thoughout the whole, or in certain parts of the tumor, the blood-vessels dilate into cavities as large as a hemp-seed or a pea, so that the neoplasm presents a spongy tissue, filled with blood, and closely resembling the corpora cavernosa penis.

Virchow,[1] who first called attention to this form of myoma, quotes cases of this variety reported by Cruveilhier, Krull, R. Lee and Klob. He also remarks upon the marked difference in the volume of the tumors before and after menstruation.[2]

Since that time there has been, strictly speaking, only one carefully observed tumor of this kind reported, that of Leopold.[3] The tumor was very large, sub-serous and attached to the fundus uteri. Even its capsule contained numerous vessels as large as a goose-quill. The neoplasm itself consisted of a dark, reddish brown, spongy mass containing innumerable cavities of variable size. All the cavities contained soft, brownish red thrombi. The parietes of all the spaces were of a dark, reddish-brown color, tender, thin, and nowhere possessed of a structure resembling that of a vein or of an artery.

These large blood-spaces connected intimately with each other, had no peculiar channel of supply. The system of vascular cavities resembled that of the pregnant uterus, and was directly connected with the large blood-spaces in the capsule of the tumor. The cavities had thin walls invested with endothelium, so that they proved to be enormously dilated capillaries. Leopold believed that the thickness of the capsule, the bundles of muscular fibres which interlaced, in most instances, at right angles, and the weight of the tumor itself, could have produced such a venous congestion, that dilatation of the capillaries was the result. Similar cases are reported by Weber[4] and Grammatikati.[5]

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[1] Geschwulstlehre, III., p. 195; Archiv VI., p. 553.

[2] Virchow: Gesamm. Abhandl., p. 358. [3] Archiv für Heilkunde, IV., p. 414.

[4] Zur Casuistik des Myoma telangiektodes s. cavernosum Uteri, Allgem. Wiener Med. Zeitung, 1860, Nos. 7 and 8.

[5] Archiv f. Gynäkol., vol. XVII.

Although the so-called fibro-cystic tumors are, anatomically speaking, of dissimilar nature, it has thus far been impossible to establish clinical distinctions between the different classes. The diagnosis and treatment of these neoplasms will, therefore, not be discussed separately, but the common term cysto-fibroma will be applied to all the varieties.

These tumors rarely occur in the uterus. O. Schröder (Dissert. Strasburg) collected thirty-one cases and O. Heer (Dissert. Zürich) seventy, from the whole domain of literature. This gives an idea of the comparative rarity of these neoplasms. They are sub-serous, in the great majority of cases. O. Heer found only five interstitial and two intra-uterine tumors among his seventy cases. Coussat[1] mentions a cysto-fibroma, which sprang from the os uteri. These neoplasmata often attain enormous dimensions, especially when they contain several cysts, and have been known to weigh twenty-nine, forty, and even eighty pounds.

When the sarcomatous and fibroid degenerations are associated, the result may be tumors of incredible size. This actually occurs, although the individual cases have not been very carefully conducted. In rare instances uterine cysto-fibromata and ovarian cysts have existed simultaneously, rendering the diagnosis exceedingly difficult. Supported by a few such cases, and by some actual diagnostic errors, Boinet[2] made an absurd effort to disprove the existence of uterine cysto-fibromata. He regarded all these tumors as ovarian cysts closely connected with the uterus. This view does not claim any farther refutation than is afforded by pathological facts.

Sub-serous collections of fluid found sometimes in the uterus and in the pelvic connective tissue, and which have probably been reckoned among uterine "cysts," have nothing in common with the variety now being discussed.

After Koeberlé and others had called attention to the fact that the fluid from fibro-cysts coagulated spontaneously and immediately on contact with the air, Atlee, who found that this rule obtained in all of his cases, laid great stress upon its diagnostic value. Although the spontaneous coagulability of the cyst fluid is a very characteristic and constant condition in a large number of the cases, it is by no means constant. O Heer only found this phenomenon mentioned in fourteen of his seventy cases.

The cystic fluid is more or less bloody, dark black, or consists of a viscid pulp containing shreds of tissue. The variable nature of the fluid is easily explained by the differences in the genesis of the neoplasmata

Only the lymphangiectatic tumors, or those connected with them, will contain a thin, spontaneously coagulable and usually clear fluid. Since

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[1] Bulletin de l'Académie Belgique, 1862.

[2] Gazette Hebdom., 1873, p. 117 *et seq.*

studies into the etiology of fibromata have not resulted in enlightenment on this subject, we are obliged to admit that future investigations of the same question promise but little information. In regard to the age of patients, Heer found among fifty-one cases,

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|---|---|---|---|---|---|---|
| 8 | cases | between | 20 | and | 30 | years. |
| 17 | " | " | 30 | " | 40 | " |
| 23 | " | " | 40 | " | 50 | " |
| 3 | " | " | 50 | " | 53 | " |

It would be of interest, as Leopold suggested, to inquire if it be possible to obtain an anatomical investigation whether any obstacles have existed in the circulation which could have produced ectasia of the lymph or blood-vessels of the tumor, and what the nature of the obstacle was, if any such existed. We have already stated that injuries may produce hemorrhage within a myoma. In the majority of these cases the bleeding is followed by gangrene, which is not always carefully distinguished from tumors, which are, properly speaking, cysto-fibromata.

We shall inquire farther on, to what extent the existence of the puerperal state may favor the development of cysto-fibromata.

The symptoms of these tumors are almost identical with those of myomata in general. Routh[1] calls attention to the infrequency of hemorrhages due to them. This is accounted for by the fact that most of the fibromyomata are sub-serous, and hence have but little influence upon the mucous membrane of the uterus. In the case of sub-mucous fibro-cysts, observed by me, the hemorrhages were profuse, and a large quantity of watery fluid, similar in its character to the fluid in the tissue, was discharged in the intervals between the hemorrhages.

The only symptom which can be regarded as somewhat characteristic of these tumors is their rapid growth, which results in an equally rapid aggravation of the disturbances referable to their pressure. We shall consider their physical signs in our discussion of the diagnosis. The fact that the varying arterial tension during and after menstruation produces great changes in the size and consistency of the myoma telangiectodes or cavernosum, may assist in the diagnosis of this class of fibromata, although the same phenomena are also encountered in other varieties.

Weber (*loc. cit.*) also noticed the immense distension of the dilated vessels in the case of a sub-mucous myoma cavernosum, which was expelled under his observation.

The diagnosis of these tumors has only been made in the most exceptional cases, and even then has been the result of accident rather than of correct appreciation of the symptoms. Fibro-cysts so closely resemble multilocular ovarian cysts, particularly in their location and in their

[1] Obstet. Transact., VII., p. 252.

fluctuation, that the frequency with which they have been mistaken for ovarian tumors is not astonishing.

The slow growth of the fibro-cysts, as contrasted with the rapid development of ovarian tumors, has been suggested as a diagnostic distinction between these tumors, but the exceptions to the rule are so numerous as to render it uncertain. The same remark applies to the differences said to be discovered by palpation. Péan and Urdy emphasize the remarkable hardness, and others the usually smooth and uniform surface of fibro-cysts. Beatty[1] states that they impart the sensation of soft flesh, being less tense than ovarian tumors. All the other diagnostic criteria, based upon palpation, have no practical value, although they may be useful in isolated cases.

On auscultation one hears vascular murmurs, but not so frequently as Péan believes. If they be present it is probable that the tumor belongs to the uterus, although such murmurs are rarely heard over ovarian cysts. In the differentiation between ovarian tumors and cystomyomata, it is first necessary to establish the relations existing between the uterus and the tumor in question.

If the tumor can only be moved together with the uterus, if it appears continuous with the uterine tissues, and if the sound when introduced into the uterine cavity, follows every impulse imparted to the tumor through the abdominal walls, the neoplasm is very probably a fibro-cyst. But all these phenomena are observed in cases of ovarian tumors which are closely connected with the uterus, as is not seldom the case. On the other hand, cases of uterine cysto-fibroma have been reported in which the tumor was attached to the uterus by means of a pedicle, was freely movable, and in short presented all the signs of an ovarian tumor.

Spiegelberg has announced that rectal palpation affords no further information in such cases. The only definitive information is obtained by puncture of the tumor. The trocar enters cysto-fibromata with difficulty, and very often only a few drops of sanguinolent fluid are evacuated through it. Although the same phenomena may occur with ovarian cysts, they are more characteristic of cystic myomata. If the fluid be clear, yellowish, slightly tinged with blood, and immediately coagulates when exposed to the air, we have to deal, not with an ovarian tumor, but as far as our present knowledge teaches,[2] with a cystic fibroma.

All these tumors have not, however, contents of this nature, and one accordingly often obtains, on puncturing the neoplasm, a bloody fluid filled

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[1] British Med. Journal, Nov. 4, 1871.

[2] A spontaneously coagulating fluid may be present also in ovarian tumors by reason of similar changes in the lymphatic vessels. These cases, however, are very rare, and the instances recorded are not so absolutely certain but that the dictum above enunciated will hold good in the vast majority of cases.

with shreds of tissue, such as is occasionally found in ovarian tumors particularly malignant ones. The discovery of smooth muscular fibres, on microscopical examination, would establish the existence of a uterine fibro-cyst.

The question now arises whether puncture for the purpose of establishing the diagnosis, be justifiable. Fehling and Leopold state that death occurred in ten out of eleven cases, as a result of the puncture. The danger of the operation is dependent upon the fact that the walls of these tumors are unyielding, and readily allow the access of air. The trocar, moreover, easily produces hemorrhage in the vascular and degenerated tisues; experience must decide whether a tentative puncture by means of Dieulafoy's aspirator, be attended by similar dangers. I am inclined to believe, with McGuire,[1] that an exploratory abdominal incision, which will afford a view of the tumor, is the safest procedure, especially since extirpation of the tumor may be at once performed if the case be suitable for the operation.

Isolated cases, as that of Spencer Wells,[2] in which the autopsy revealed the fact that a tumor, considered ovarian during and after the operation, was in reality a uterine tumor, show that even exploratory abdominal incision will not always establish the diagnosis. This fact is best illustrated by Virchow's case,[3] in which it was even difficult, at the autopsy, to recognize a preuterine ovarian sarcoma to be such, and to distinguish it from a uterine tumor.

The symptomatic treatment of the tumors in question differs in no respect from that of uterine fibromyomata. We desire to earnestly disparage the puncture of these fibro-cysts. Their extirpation by means of an abdominal incision, is rather indicated for their rapid growth; and their tendency toward gangrene decidedly distinguishes them from ordinary sub-serous or other uterine myomata.

The fact that fibro-cysts are far more dangerous than simple myomata is shown by the statistics of O. Schröder and Heer, according to which the duration of the disease is relatively short. The longest period which elapsed before death was ten years, while many cases terminated fatally in a few months.

In speaking of the operations for the removal of uterine fibroids, it was stated that rapid growth constitutes an indication for early interference. Now cysto-fibromata are especially characterized by the rapidity of their development.

The cystic tumors are also more dangerous on account of their tendency to become gangrenous, and to lead to thrombosis.

Hence this class of tumors will frequently come under the surgeon's knife, even if their true nature has not been discovered. On the other

[1] Medical Times, 1872, No. 1. [2] Ovarian Diseases, p. 200.
[3] Geschwülste, III., p. 208.

hand, when a clear diagnosis is possible, their removal must generally be urged.

Formerly the majority of operations of this kind were undertaken in consequence of faulty diagnosis, the growths being mistaken for ovarian cysts. The following cases belong in this category:[1]

1. Neugebauer,[2] who removed a pediculated uterine cysto-sarcoma through the abdominal walls, with a fatal result.

2. Routh[3] could not complete the operation. The patient died of hemorrhage from the walls of the cyst.

3. Demarquay.[4] The patient died thirty-six hours after the operation, at which the tumor could be separated from the fundus.

4. Browne.[5] The operation was not completed. The patient died.

5. Roberts.[6] The clamp was used. Recovery.

6. Bryant.[7] The tumor had a pedicle which was clamped. Recovery.

7, 8, 9. Treenholme,[8] Frankenhäuser (Dissert. of Heer). Keith (Lancet, 1875) operated successfully.

10, 11. Cheever [9] and Landi [10] lost their patients.

The following cases were diagnosticated as cysto-fibromata and then operated upon:

12. Koeberlé.[11] Recovery.

13, 14. Keith (*loc. cit.*) Two successful cases.

15 to 22. Péan[12] extirpated eight fibro-cysts of the uterus. The operation was successful in six cases. There are besides the following cases (*conf.* Gazette des Hôpit., 1869, and Pozzi, *loc. cit.*):

Unfinished operations:

Atlee 1849, one successful case.

Baker-Brown 1860 and 1862, two fatal cases.

Spencer Wells 1864, one case with fatal issue.

Completed and successful operations:

Lane 1844, seven cures; Fletcher 1862, Storer 1865, Atlee 1868, E. Böckel 1876, Krassowsky 1876, Hakes 1863, Wells 1863, Koeberlé 1863, Atlee 1862, Stokes 1863, Ollier 1874, Hegar 1876, James Henry.

I merely mention Spiegelberg's [13] case in this connection, but do not include it in this class, since it relates to a special operation, *viz.*, the

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[1] This list is not reproduced in the 2d edition of Gusserow's treatise, but is retained here as valuable for reference, and for the sake of completeness.—Ed.

[2] Scanzoni: Beiträge, VI., p. 125.

[3] British Med. Journal, April, 1866; and Obstet. Transact., VII., p. 252.

[4] Union Médicale, No. 113, 1868. [5] Transact. Path. Soc., XVIII., p. 196.

[6] London Obstet. Transact., 1872, p. 309.

[7] *Ibid.*, 1873, p. 79. [8] Lancet, November, 1874.

[9] Boston Med. Journal, December, 1874.

[10] Lo Sperimentale, 1871. [11] Gaz. Méd. de Strasbourg, No. 6, 1869.

[12] Hystérotomie, and Pozzi loc. cit. [13] Archiv für Gynäkologie, VI., p. 341.

enucleation of a cystic myoma from the uterine wall, through the abdominal cavity.

The final result, attained by the difficult method of comparing statistics, vitiated by the reprehensible custom of repeatedly reporting the same case, is that laparotomy has been performed forty-one times, for fibro-cystic uterine tumors, with twenty-two recoveries, *i.e.*, 53.6 per cent. It was impossible to carefully separate those cases in which the tumors were removed alone from those in which the uterus was likewise extirpated. Only seven of the thirty-eight operations could be completed. Only one patient recovered from the effects of the operation. It is certainly remarkable that out of the eleven extirpations performed after the diagnosis had been correctly made, only two proved fatal.

From these meagre details it appears nevertheless that the extirpation of cystic myomata by laparotomy, furnishes better results than the same operation when done for non-cystic tumors.

In explanation of this circumstance, it is to be remembered that the former variety of growths are more easily removed, since they are specially connected with the exterior of the uterine wall and are less frequently interstitial.

Under the influence of modern antiseptic methods, still more favorable results have been obtained. What has been already said in connection with fibroids in general, applies with equal force to the cysto-fibromata. It is not necessary to insert separate tables here, showing the detailed results of operations. Grosshoff has collected fourteen cases from the literature of the last few years, with a mortality of only four.

# CHAPTER VIII.

## UTERINE FIBROIDS IN THEIR RELATIONS TO PREGNANCY, PARTURITION AND CHILDBED.

### BIBLIOGRAPHY.

Here, as elsewhere, the titles of the monographs only are given, the reader being referred to the text-books on obstetrics for the complete literature of this subject. Puchelt, B. R.: De tumoribus in pelvi, partum impedientibus, etc., Heidelberg, 1840.—Michauk: Beitr. z. Pathologie d. Uterusfibroids, Inaug. Dissert., Leipzig, 1868.—Guyon: Des tumeurs fibr. de l'utérus, Thèse de Concours, Paris, 1860.—Dubar: Des tumeurs fibr. de l'utérus compliquant la grossesse, Thèse de Paris, 1864, No. 29.—Etcheverry: Des corps fibr. de l'utér. au point de vue de la grossesse, etc., Thèse de Paris, 1864, No. 5.—Ebner: Dissert. de tumor. quorund. fibrosor. uteri in part. et puerp. hab., Inaug. Diss., Königsberg, 1865.—Lambert: Des grossesses compliquées de myomes utérins, Thèse de Paris, 1870, No. 268.—Magdelaine: Étude sur tumeurs compliquants la grossesse, etc., Thèse de Strasbourg, 1866.—Süsserott: Beiträge zur Caustik der mit Uterusmyomen complicirten Geburten., Inaug. Disser., Rostock, 1870.—Nauss: Ueber complikation von Schwangerschaft, etc., mit Myomen des Uterus, Inaug. Diss. Halle, 1872.—Sébileau: Des tumeurs fibreuses dans leurs rapports avec la grossesse, etc., Thèse de Paris, 1873.

THE fact that sterility results from uterine myomata is easily explained. The manifold pathological changes in the uterine mucous membrane, dependent upon the development of these neoplasms, in addition to the catarrh and the profuse hemorrhages resulting from them, are obstacles in the way of conception. Numerous changes in the relations of the uterus to the adjoining organs, especially to the Fallopian tubes and the ovaries, and alterations in the form of its cavity, offer notable mechanical impediments to conception. This is specially true of submucous tumors, although the statement is equally applicable to certain sub-serous fibroids. We accordingly regard sterility as a frequent sequel of fibromata, although there has always existed great diversity of opinion in regard to this point. Since the time of Bayle, pathologists—as, for instance, Meckel, Cruveilhier, Virchow and recently, Cohnheim—have steadfastly maintained that fibroids occur predominantly in nulliparæ or in women who have not had sexual intercourse. From this premise they have deduced the conclusion that complete inactivity of the genital ap-

paratus is either an exciting or at least a predisposing cause of the neoplasmata.

Almost all gynecologists, with the exception perhaps of Scanzoni and Spiegelberg, have entertained the opposite view, and Winckel and Rörig have quite recently demonstrated, by incontrovertible arguments, that sterility in these cases is the result of the tumor's presence.

It is the more interesting and important to discuss this question, because Cohnheim[1] adduces the presupposed fact that sterility leads to the development of myomata in support of his hypothesis concerning the formation of tumors in general.

A definitive settlement of the question seems unfortunately impossible at present, because statistics, upon which the decision must depend, furnish as yet too few and too uncertain data. Another prime reason is that anatomists have tabulated no numerical statistics to be compared with those of gynecologists. Since, therefore, the latter have only the opportunity of observing those cases of fibroma which produce troublesome symptoms during life, it is quite possible that the view of the pathologists would be generally adopted if the total number of uterine myomata, discovered after death, were known.

The scanty material at our disposal must be considered from two points of view. In the first place, it must be determined whether myomata are more frequent in nulliparæ, and in those who have not had sexual intercourse, than in women who have had intercourse, and have given birth to children. Then it must be ascertained whether women suffering from fibroids are or are not fruitful.

The first question can only be answered with approximate accuracy by the pathologists. Gynecologists can only state to which of these classes the majority of cases of fibroids presenting themselves for treatment belong.

Now the records all go to show, without exception, that these tumors occur with much greater frequency in married than in single women. Among 959 myomata, collected by ourselves, 672 occurred in married and only 287 in unmarried persons. The investigations of Routh have proven that these tumors also attack married women with decidedly greater relative frequency in England.

Winckel likewise reached the same result, having found the disposition to the development of fibroids twice as marked in the married as in the unmarried, that is in those persons who had seldom or never gratified their sexual desires.

Beigel (*loc. cit.*, p. 425) found 86 married women among 146 who had fibroids. Michels found only 33 unmarried women among 160 patients with fibromata. Schröder (Schorler, l. c.) found 614 married women

[1] Vorlesungen über Allgemeine Pathologie, Berlin, 1877, p. 641.

among 792 cases, *i.e.*, 77.5 per cent. A long series of observations leading to the same results might easily be adduced.

A similar unanimity of opinion prevails concerning the relation between fibromata and sterility. West found that only 7 among 43 married women with fibroids were childless. The remaining 36 had, however, only given birth to 61 children altogether, and 20 of the women had borne only 1 child each.

Among 106 married patients Rörig found only 31 childless, although 40 of the women had each given birth to but one child. The total number of children borne by 75 of the women was 190. Among Beigel's 86 married patients 21 were sterile, and among 21 patients treated by McClintock, 10 were childless.

Scanzoni found 35 childless women among 69 married women affected with fibroids. Michel had only 26 cases of sterility among 127 patients. Winckel's statistics on this point are the most elaborate.

Among the 415 cases of married women with fibroids collected by him, only 134, or 24.3 per cent., were sterile and 281 or 51.5 per cent. had borne one or more children. His statistics regarding the number of children borne by 108 women, affected with uterine fibroids, are most important. Winckel himself observed 46 of these cases and borrowed 62 from the statistics of Süsserott (Inaug. Dissert., Rostock, 1870.)

37 of Winckel's 46 patients had borne 114 children.

Süsserott's 62 patients bore 162 children. The average number of children for each woman was thus 2.7, while the average in Saxony was 4.5 children to each mother.

A second table prepared by Winckel, embracing these 108 cases, is still more instructive:

| | I-p. | II-p. | III-p. | IV-p. | V-p. | VI-p. | VII-p. | IX-p. | XI-p. | XIII-p. |
|---|---|---|---|---|---|---|---|---|---|---|
| Winckel | 10 | 6 | 8 | 6 | 2 | 3 | 1 | 1 | — | — |
| Süsserott | 27 | 10 | 10 | 7 | 4 | 1 | 1 | — | 1 | 1 |
| Total | 37 | 16 | 18 | 13 | 6 | 4 | 2 | 1 | 1 | 1 |

37=41.6% I-p. 43=48.3 plurip. 9=1.2% multip.

In Saxony the tables were as follows:

22.7% I-p.; 55.2% plurip.; 22.1% multip.

Schröder (Schorler, l.c.) found among 604 cases of fibroids, 400 (66.3 per cent.) fruitful, and 204 sterile women (33.7 per cent.) Schröder has published this table:

Private cases:

146 *i.e.* 39.6% were sterile.
12 *i.e.* 3.2% had aborted
211 *i.e.* 57.1% had children.

Dispensary patients:

58 *i.e.* 24.7% were sterile.
12 *i.e.* 5.0% had aborted.
105 *i.e.* 70.3% had children.

Again 376 women had 1295 children, an average of 3.45. If the entire number of children is proportioned to the number of married women having fibroids, each woman would have 2.1 children. But the average number, according to the above, would be 4.5.

Although the number of cases in these tables is not large, the conclusions deducible from them are surprising. Although the number of patients with myomata, who have had one child, is quite large, the number of pluriparæ and of multiparæ is far below the usual average. This fact can only be explained by the supposition that the myoma prevented later conceptions.

From the above tables, together with my own recorded cases, I was able to collect 564 cases of fibroids in married women. 153 of these were sterile. Mention should be made at this time, of Marion Sims's [1] statistics, which are based on original observations. Among 255 women who had borne one child and then become sterile, he found fibromata present in 38 cases, *i.e.*, 1 to 6.7. Among 250 married women who were childless, he found 57 cases of fibroid, or 1 to 4.3, and finally among 100 virgins who complained of pain in the hypogastrium, 24 fibromata, or 1 to about 4.15.

We accordingly reach the conclusion that uterine myomata are much more frequent in those persons who regularly gratify their sexual desires, than in those in whom a similar gratification can not be assumed.

The fruitfulness of women suffering from myomata is much diminished, but one is justified, in the above statistics, in regarding this as the result of the tumor's development. This view of the gynecologists concerning the relation of myomata to conception, based, it is true, upon incomplete statistical data, does not accord with the experience and theories of pathologists. The point in dispute can only be decided by farther observations, particularly by those relating to pathological anatomy.

The fact that pregnancy occurs with the greatest relative frequency in cases of sub-serous myomata, which produce the fewest pathological changes in the uterine cavity and the uterine mucous membrane, and that it occurs least frequently with sub-mucous fibroids, confirms the view that fibroids are rather the cause than the result of sterility.

The above statement that pregnancy occurs most frequently in cases of sub-serous fibromyomata can hardly be established by figures, unless all the histories be passed in review. It may be said that the tumor present in every carefully described case of uterine fibroma, in which pregnancy

[1] Uterine Surgery, 1866, p. 94.

occurred, was of the sub-serous variety. The cases of interstitial and particularly of sub-mucous tumors is insignificant, as will be seen from what follows.

The fact that one often has opportunities of observing fibromata, in pregnancy and parturition, which do not affect these conditions, because they are sub-serous, accords with the above statement. Such cases are, of course, not published, and therefore the claim can not be substantiated by any considerable number of recorded cases.

It may be remarked, however, that Schröder's figures do not confirm this view. His table is as follows:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Of 85 | cases of | interstitial fibroids | 21 | were | sterile, | *i.e.* | 24.7% |
| " 92 | " | sub-serous | " 44 | " | " | | 47.8% |
| " 18 | " | sub-mucous | " 7 | " | " | | 38.8% |
| " 44 | " | polypoid | " 4 | " | " | | 9.0% |
| " 14 | " | cervical | " 3 | " | " | | 18.7% |

From this table it would appear that sub-serous tumors, more than any other variety, predispose to sterility, which is not in conformity with what has already been said.

Great diversity of opinion has prevailed, particularly among French authors,[1] concerning the changes effected in the development of fibroids by the physiological processes of pregnancy.

Many tumors are not at all affected by pregnancy. Others are materially changed thereby. Both conditions depend upon the seat and the structure of the tumor. The more closely connected the fibroma is with the uterus, the more will it participate in physiological processes occurring in that organ. The closer its resemblance to the uterine tissue, the more radical will these changes be.

Sub-serous tumors are least changed by pregnancy, while sub-mucous and interstitial fibromata undergo the most marked alterations in structure. Again, those sub-serous fibromata which have a long, thin non-vascular pedicle, are least affected by pregnancy, while the reverse obtains in the case of tumors with a broad base. The interstitial and sub-mucous fibromata which are separated from the uterine parenchyma by a stiff, firm capsule, containing few blood-vessels, undergo the least marked changes during pregnancy.

While, therefore, the degree of the changes in the tumor is chiefly determined by the nature of its attachment to the uterus, the character of these changes will depend upon the structure of the fibroid. Pure fibromata, composed mostly of connective tissue, are but slightly changed, if at all. They become swollen and œdematous, owing to their great vascularity and that of the neighboring tissues. This morbid condition is frequently described as softening, and is so in reality, but must not be

[1] Corps fibreux de l'utérus pendant la grossesse, Gaz. des Hôp., 1869.

confounded with those metamorphoses which pathologists designate by the name softening, and which consist of actual disintegration of tissue. Vascular fibromata and those composed largely of muscular tissue, most frequently become œdematous during pregnancy. Those tumors which are almost entirely composed of muscular tissue, and which are not encapsulated, grow very rapidly during pregnancy by hypertrophy, and perhaps by hyperplasia of their elements. The more closely identified these tumors are in structure with the uterine walls, the more do they participate in the changes which pregnancy produces in the latter.

It is still doubtful whether sufficiently extensive extravasations take place in these fibromata before birth, to augment the size of the tumors, and to occasion farther changes in their tissues. In most cases these hemorrhages are probably produced by the efforts attending parturition or by the pressure of the child's head.

Cappie[1] had a unique case, illustrative of the condition under discussion. A woman was seized in the fourth month of utero-gestation, with violent peritonitis and symptoms of internal hemorrhage.

The diagnosis of sub-serous uterine tumor which had grown rapidly during the later months of pregnancy was made. Abortion was induced but did not save the patient. The autopsy revealed, as the cause of the fatal attack, a softened, pediculated sub-serous myoma, which had become gangrenous owing to torsion of its pedicle.

Quite recently Doléris[2] has asserted that the enlargement of myomata during pregnancy was due chiefly to proliferation of connective tissue, showing a tendency to undergo colloid or myxomatous degeneration.

The cases of growth and enlargement of uterine myomata during pregnancy, by one of the methods described, are numerous and authentic. The fibroids may have been so small as not to have attracted attention before the occurrence of pregnancy, and may have developed into enormous tumors, during its progress. On the other hand, the tumors have long existed, in some cases, as small though distinct prominences, and have produced various disturbances by their rapid growth. We shall find, as a general rule, that those tumors which increase rapidly in volume during pregnancy, diminish with equal rapidity during the puerperal state.

The cases of this kind are so numerous that only the most important ones can be cited. Ingleby[3] mentioned these occurrences, and Montgomery[4] also referred to them, but called attention to the fact that growth of the tumor does not necessarily occur.[5]

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[1] Obstet. Journal, vol. II., p. 303.
[2] Archiv. de Tocol., Jan. and Feb., 1883.
[3] Edin. Med. & Surg. Journal, 1836, p. 107.
[4] Signs and Symptoms of Pregnancy, 1856, p. 344.
[5] Dublin Med. Journal, vol. VI., 1835, p. 418.

Then followed the reports of Ashwell,[1] Priestley,[2] Hall Davis,[3] Madge,[4] Depaul, Danyau, Cazeau,[5] etc. Playfair,[6] Lorain[7] and Pagan,[8] all had the opportunity of twice observing, in the same person, the growth and disappearance of one and the same myoma during pregnancy and the puerperal state. The cases of Spiegelberg,[9] of Breslau,[10] and of many others should be compared with these. (Compare also Demarquay and St. Vel, Maladies de l'Utérus, p. 169.)

Hardly a case of fibroids complicated with pregnancy is published without the statement being made that the tumor grew notably during utero-gestation. It is important, therefore, to emphasize the fact that there are numerous exceptions to this apparent rule. Guéniot,[11] Scanzoni,[12] Guyon, d'Outrepont, Thibaut and others, beside Montgomery, have called attention to this point.

We have already stated that any genuine softening, aside from the œdematous infiltration above described, does not occur in these tumors during pregnancy. This is confirmed by the statement of Nauss[13] that he discovered, on *post-mortem* examination of nineteen such cases, that only œdematous infiltration was present in thirteen of them. In the remaining literature of this subject I am unable to find any well-authenticated cases of softening due to other causes.

Cases said to present softening of another kind have usually owed their necrotic disintegration to uterine contractions or to puerperal processes.

It cannot, however, be denied that this change may occur in such tumors during pregnancy.

Besides these changes in the growth of myomata during pregnancy, alterations in their forms are sometimes observed, and produce an apparent disappearance of the tumors. Myomata located in the lower segment of the uterus may be so distorted and flattened by uterine contractions, particularly if they be interstitial, that they can be no longer discovered by palpation. After the evacuation of the uterus the tumors reappear, owing to the diminution in the size of the uterine parietes.

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[1] Guy's Hospital Reports, 1st Series, vol. I., 1836, p. 300.
[2] Transact. of London Obstetr. Soc., vol. I., p. 217.
[3] *Ibid.*, vol. VIII., p. 11.
[4] *Ibid.*, vol. XIV., p. 227.
[5] Comp. Magdelaine: Études, etc., Thèse Strasbourg, 1869, No. 171.
[6] Obstet. Journal, May, 1877, p. 116.
[7] Gazette des Hôpitaux, 1869.
[8] Lambert: Des grossesses compliquées de myomes, Thèse Paris, 1870.
[9] Archiv für Gynäkologie, vol. V., p. 100.
[10] Monatsschrift für Geburtskunde, vol. XXV.
[11] Gaz. des Hôp., 1869.
[12] Lehrb. d. Krankh. d. Weibl. Sexualorgane, 1857, p. 208.
[13] Ueber Complikation von Schwangerschaft, etc., mit Myomen des Uterus, Inaug. Dissert., Halle, 1872.

The flattening of the fibroids may be produced by the pressure of the growing ovum, but is usually referable to the above-mentioned changes in form of the pregnant uterus. The flattening has always been most marked in the case of pure myomata lying free in the muscular walls. Such cases have been observed by Depaul, Guéniot,[1] Spiegelberg,[2] and Olshausen.[3] Guéniot[4] describes a similar case of a large, pediculated submucous fibroma, which had been so imbedded in the uterine tissues during pregnancy, that it was considered an interstitial tumor. It obstructed labor to such an extent that it was necessary to perforate the child. The mother died, five days later, from peritonitis, and it was then discovered, for the first time, that the tumor was pediculated and might possibly have been removed before the death of the child.

Mention should be made of the displacement of fibroids from their original sites during pregnancy. Charrier[5] saw a firm fibroma extruded from the uterus into the vagina of a woman in the seventh month of pregnancy without the occurrence of uterine contractions. It then began to mortify, and spontaneous abortion, which occurred twenty-four days later, was followed by recovery. When the tumor finally appeared at the vulva it was gradually excised. It is doubtful whether it be wise to leave a gangrenous tumor so long connected with the uterus during pregnancy, parturition and the puerperal state as Charrier recommends. While this is the only case of the kind, so far as I know, which has been observed during pregnancy, similar ones are far more frequently encountered during labor. It is easy to understand how the uterine pains may force downward movable tumors occupying the lower segments of the uterus.

These changes in the seat of fibro-myomata are rare, but subserous tumors, situated in the body of the uterus, frequently wander from the pelvis into the abdominal cavity as the pregnant uterus enlarges. Numerous cases have been reported in which such a tumor, which originally completely filled the pelvis, gradually escaped from it into the abdominal cavity.

However various the results of pregnancy may be upon the course of fibro-myomata, the influences of these tumors upon utero-gestation are still more manifold and of far greater importance to the patient. Cases are by no means rare in which pregnancy, labor and the puerperal state are not disturbed by the presence of such tumors.

It is oftentimes surprising that these functions should be faultlessly

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[1] Comp. Magdelaine: Thèse Strasbourg, 1869.

[2] Lehrb. der Geburtsh., 1877, p. 292, and Monatsschr. f. Geburtsk., XXVIII., p. 426.

[3] Nauss: Dissert., Halle, 1872.

[4] Gaz. des Hôp., 1864, Nos. 43 *et seq.*

[5] Gaz. des Hôpitaux, No. 4, 1875.

performed in spite of great distortion of the uterus by numerous fibroids. Guéniot[1] mentions the case of a woman whose pregnancy and confinement were normal, but whose uterus was filled with twenty fibromata of various sizes. Hecker[2] and others report similar cases.

On the other hand, abortion and premature delivery are often induced by comparatively diminutive tumors. Toloczinow[3] found 21 cases of abortion among 119 pregnancies complicated with fibroids. West found 28 abortions among 36 similar cases, and Winckel 16 abortions out of 46 cases. Nauss found 47 cases of abortion among 241 pregnancies, and Sébileau[4] 15 abortions among 47 cases. Lefour[5] observed 39 abortions in 307 cases. The mothers died 14 times. He also saw 23 premature confinements, with 3 deaths of the mothers.

It is impossible to decide, by reference to the data at our disposal, whether the tendency of fibromata to induce abortion be directly proportionate to the extent of their projection into the uterine cavity. It would rather seem that interruption of pregnancy is the more frequently produced by these neoplasmata the lower their seat in the uterus, and the closer their approximation to the cervix.

According to Forget, Sébileau, and Toloczinow, those tumors which are attached to the fundus rather produce abortion, while those located at a lower point induce premature deliveries. This theory has not been universally accepted.

Abortion, when produced by these tumors, is caused by changes in the position of the uterus, by incarceration of that organ in the pelvis, and by hemorrhages referable to the presence of the tumors. But these exciting causes may be wanting, and the expulsion of the ovum be directly due to the tumor, or, rather, to its influence upon the uterine walls. Such cases of course occur more frequently than one would suppose from an examination of the literature of the subject, since only few of them are interesting for publication. Hall Davis[6] describes such a case which produced the mother's death by pyæmia. Beatty[7] reported a case of abortion at the third month, after which the tumor led to the development of uterine inversion.

Fibromata very often produce backward displacements of the uterus in the first months of pregnancy. These retroflexions of the pregnant uterus are produced by the pressure of a very large fibro-myoma situated

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[1] Quoted by Demarquay et Saint Vel. loc. cit., p. 176.

[2] Monatsschrift f. Geburtsk., XXVI., p. 458.

[3] Wiener Med. Presse, No. 30, 1869.

[4] Des tumeurs fibreuses dans leurs rapports avec la grossesse, etc., Thèse Paris, 1873.

[5] Des fibromes utérines au point de vue de la grossesse, Paris, 1880.

[6] Med. Times, Feb. 17, 1866.

[7] Transact. of the Coll. Phys. of Ireland, vol. VI., 1824, p. 1.

either at the fundus or on the anterior uterine wall. Still more frequently the displacement is due to pediculated or non-pediculated subserous tumors on the posterior wall.

In some cases the uterus, together with the tumor, spontaneously returns to its normal position. In other instances symptoms of incarceration manifest themselves, and manual reposition or artificial abortion become necessary. Sometimes spontaneous abortion results from the incarceration or from attempts at reposition. Such cases of retroflexion of the gravid uterus, induced by tumors at the fundus, in which, after successful reposition spontaneous abortion occurred, are described by Simpson;[1] Lorimer,[2] who reported a case in which a fibroma as large as an orange and in the posterior wall, produced retroflexion and incarceration of the uterus, which rendered artificial abortion necessary. The patient nevertheless died of gangrene of the bladder. Other cases are cited by Depaul and Ziegler (*Conf.* Nauss, *loc. cit.*)

More frequently, for the rest, it happens that a myoma of the posterior uterine wall, which of itself produces incarceration of the uterus in the true pelvis and consequently induces threatening symptoms, is mistaken for retroflexion of the gravid uterus. Hall Davis[3] describes such a case as *retroflexio uteri.*

Exceedingly severe symptoms of incarceration, produced by a tumor on the posterior wall, or, more probably, in the cervix, occurred in a woman during the third or fourth month of pregnancy. Reposition seemed impossible. When the sound was introduced it showed that there was no retroflexion. As a result of the exploration a putrescent fœtus of about four months was expelled, after which the tumor was easily displaced from the pelvic into the abdominal cavity. The patient died of pyelonephritis.

Depaul[4] reported a similar case, in which so marked an incarceration of the tumor and the uterus occurred, in the fourth month of pregnancy, that the patient could neither defecate nor urinate, and the diagnosis of incarcerated hernia had been made. Artificial abortion resulted in the expulsion of an entirely flattened fœtus. The patient recovered, and, after five months, the tumor was no larger than a small apple.

Sedgwick's[5] case proves that incarceration may be remedied by the upward displacement of the tumor beyond the superior strait. This case, however, terminated in spontaneous abortion. At a later stage of pregnancy the symptoms of incarceration may become so violent that all possibility of inducing artificial abortion disappears.

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[1] Edin. Monthly Journal, 1848.
[2] *Ibid.*, July, 1866.
[3] London Obstet. Transact., vol. VIII., p. 11.
[4] L'Union Médicale, 1857, p. 548.
[5] St. Thomas Hosp. Reports, 1870, p. 349.

In such a case Cazin[1] successfully performed Cæsarean section in the seventh month of pregnancy. We shall revert to this subject later.

Hemorrhage must be cited as another threatening symptom liable to result during pregnancy from fibro-myomata. It is not often mentioned, because pregnancy rarely exists together with sub-mucous fibroids. Among nineteen cases of hemorrhage during pregnancy, collected by Nauss, there were sub-mucous myomata in eleven, interstitial in six and sub-peritoneal in two cases. These hemorrhages usually induce abortion. Nauss found only eight cases in which pregnancy reached a normal termination in spite of repeated hemorrhages.

Ramsbotham, Pajot, Ashwell, and Grimsdale[2] cite cases of abortion, accompanied by profuse bleeding, produced by fibroids. Lloyd Roberts[4] saw a sub-mucous, pediculated fibroma extruded with violent hemorrhage from the os uteri during the sixth month of pregnancy. Premature delivery did not occur in this case until a month later. Grimsdale was obliged to enucleate a fibro-myoma from the posterior uterine wall during pregnancy, on account of dangerous hemorrhage. On the second day after the operation a fœtus, four months old, was expelled. The mother recovered.

Tarnier[5] and Daly[6] mention violent pains, unaccompanied by inflammatory phenomena, among the symptoms of fibromata complicating pregnancy. Worship[7] saw death result in the sixth month of pregnancy from peritonitis. The fœtus was not expelled. In this case a cystic myoma of the fundus was discovered to be the cause of the peritonitis. An attack of peritonitis, produced in the fifth month of pregnancy by inflammation in a pediculated sub-serous myoma, terminated in a similar manner. At the height of the disease artificial abortion had been induced. (R. Lee.[8]) I have been unable to find any case of rupture of the pregnant uterus resulting from the growth of tumors.

It would not be surprising if these tumors often gave rise to extra-uterine pregnancy. I have, however, been unable to find more than two such cases. Stolz[9] observed tubal pregnancy in a case where a sub-mucous fibroma filled the entire uterine cavity, and George Harley describes a tubal pregnancy which ended in fatal rupture of the uterus the fifth month. The uterus contained several sub-serous fibromata. One of these, situated at the junction of the left Fallopian tube with the

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[1] Archiv. de Tocologie, vol. I., p. 704.

[2] Comp. R. Lambert: Des grossesses compliquées de myomes utérines, Thèse Paris, 1870, No. 268.

[3] Lancet, 1867, p. 333.

[4] Marion Sims: Uterine Surgery, p. 117.

[5] Gazette des Hôpitaux, 1869.

[6] Obstet. Transact., XVIII., p. 65.

[7] Obstet. Transact., London, XIV., p. 305.

[8] Clinical Midwifery, London, 1842.

[9] Cited by Demarquay et Saint Vel., p. 171.

uterus, was of specially large size. The ovum had been developed in the left Fallopian tube.[1]

Nauss found the placenta abnormally located in only 16 out of 241 cases of myomata. Placenta prævia occurred twice.[2] The placenta was situated very deeply in three cases. In eight cases the placenta was situated entirely or in great part upon the tumor, and, in three instances, a small portion of it was located upon the neoplasm. In eight of the last-mentioned cases sub-mucous tumors were present. It is at least probable that threatening hemorrhages, and perhaps gangrene of the tumor, in the

FIG. 28.—LARGE UTERINE FIBROIDS AND TUBAL PREGNANCY. (After *G. Harley.*)

puerperal state, may occur, with special frequency, after the expulsion of a placenta thus abnormally situated.

Michauk[3] describes a deficiency in the membranes as large as a saucer, produced by their adhesion to a sub-mucous fibroid and the consequent retention, in utero, of a part of their tissues.

Morbid changes in the fœtus, referable to these tumors, are rarely discoverable during pregnancy. Gussmann[4] saw death of the fœtus result from premature separation of the placenta produced by a fibroid.

So long as the amniotic cavity is intact and the fœtus is alive, or even with a dead fœtus, so long as the liquor amnii has not materially diminished in quantity, a fibroid can have but little influence on the shape

[1] London Obstet. Transact., vol. I., p. 101.

[2] Chadwick (Transactions of the Am. Gynecol. Soc., vol. I., p. 255) found eight cases of placenta prævia complicated with fibromata. The death of the mother occurred in five of these cases.

[3] Dissert. Leipzig, 1866.

[4] Württem. Correspondenzblatt, No. 19, 1868.

of the child, which is protected by the fluid from the pressure of the tumor. Flattening of the fœtus, fissures of the skull, etc., occur only when labor is rendered very difficult by one of these tumors, and we shall revert to the consideration of these tumors in another place. The fœtus is only compressed when it has died during utero-gestation, and been reabsorbed. Depaul[1] and Lachapelle describe cases of this kind. Lever[2] saw a premature child born alive, but with its lower extremities bent, as if from close contact with a round body, in a case of fibroma which was large and hard.

Pregnancy complicated by uterine tumors often renders a diagnosis exceedingly difficult. It is very common for either the pregnancy or the tumor to be overlooked. All the diagnostic symptoms of tumors cited above, as well as all the signs of pregnancy, must be carefully sought for. The most numerous and fatal diagnostic errors have been made because the possibility of co-existing pregnancy has not been considered.

The fact that many of the tumors produce no symptoms during pregnancy, accounts for the fact that they often escape observation. In other cases the symptoms due to the tumors become so prominent as to overshadow those of pregnancy. Whenever a tumor, occurring in a patient at puberty, grows rapidly or induces violent symptoms with relative rapidity, one must always consider the possibility of co-existent pregnancy. The œdematous infiltration of myomata, during pregnancy, has often caused these tumors to be regarded as of ovarian origin and to be punctured. The latter operation usually leads to abortion, and even to gangrene of the tumor. James Henry[3] undertook the operation of ovariotomy in a case which proved to be a softened sub-serous myoma. The patient died two and one-half hours after the operation, and the autopsy disclosed a fœtus four months old in the uterus.

The symptoms of pregnancy, combined with those of the tumor, have led, in a few cases, to the diagnosis of extra-uterine pregnancy, the inaccuracy of which has been demonstrated by the occurrence of spontaneous and normal labor. Madge[4] and Simpson[5] described such cases. The patient of the latter observer died two weeks after her normal confinement, and a sub-serous uterine fibroma, the pedicle of which had been torn from its uterine attachments by the process of involution, was found fixed by adhesions to the anterior abdominal wall.

The treatment, during pregnancy, must be expectant and symptomatic. If symptoms of incarceration of the tumor in the pelvis appear, efforts at reposition must be made as soon as possible. Should these attempts

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[1] L'Union Médicale, 1857.
[2] Guy's Hosp. Reports, vol. VII., 1842.
[3] Boston Gynecol. Journal, vol. IV., p. 330.
[4] Obstet. Transact., London, vol. XIV., p. 227.
[5] Obstetrical Works, Black, p. 155.

fail, abortion or premature labor must be artificially induced, if possible, before the symptoms have reached a dangerous degree of intensity.

These views have recently been opposed. It has been pointed out that abortion is dangerous to the mother, owing to the tendency to hemorrhage caused by the presence of the tumor, and again because the growth might undergo disintegration in childbed. Influenced by these considerations, Schröder [1] has done laparotomy for the removal of a myoma in the sixteenth week of pregnancy. The patient recovered and gave birth to a child at full term. The same surgeon did two similar operations in the third month of pregnancy, and both patients recovered.[2] These operations were performed on account of the dangerous condition of the patients, brought about by the rapid growth of the tumors.

Hegar[3] removed a sub serous myoma of the uterus in the third month of pregnancy; the patient died of septicæmia. Kaltenbach[4] performed a successful operation of this kind in the fifth month of pregnancy. Wasseige[5] had a similar but unsuccessful case. Studsgaards[6] removed a pediculated sub-serous fibroid in the third month; the woman recovered and did not have an abortion.

Thornton[7] had a similar but fatal case. Péan[8] performed an operation of this kind, but overlooked the existing pregnancy (fifth month) on account of the enormous size of the tumor. The patient aborted but recovered.

Landau[9] removed two sub-serous pediculated tumors in the third month, the patient recovering and giving birth to a child at full term.

Owing to these favorable results, it is certainly justifiable to remove fibroids during pregnancy, if these tumors produce serious symptoms. The induction of abortion, apart from its inherent dangers, does not rid the patients of their tumors.

The influence of these tumors is still more marked upon parturition than upon pregnancy. The number and size of the fibroids is of less importance, with reference to their effect upon parturition, than their seat. Although tumors located in the cervix often obstruct labor owing to their size, the obstruction may usually be readily removed by the enucleation of the fibromata. Such cases are reported by Danyau,[10]

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[1] Zeitschr. f. Geb. u. Gynäkol., vol. V.
[2] Hofmeier (l. c.).
[3] Hegar u. Kaltenbach: Operat. Gynäkol., 2d edition, p. 426.
[4] *Ibid.*
[5] Extr. bullet. de l'Acad. Roy. de Méd., Belge., vol. XIV.
[6] Hospital Tidende, No. XIV.
[7] Quoted by Studsgaards, l. c.
[8] Clin. Chirurg., 1876, p. 679.
[9] Berlin. Klin. Woch., No. 13, 1885.
[10] Gaz. des Hôp., No. 42, 1851.

Langenbeck[1] and by Braxton Hicks[2] who enucleated from the anterior lip of the cervix a myoma which weighed one pound and had prevented the entrance of the head into the pelvis. The labor was easy and the case resulted favorably for mother and child.

Sub-mucous fibro-myomata, particularly if pediculated, give rise to comparatively few disturbances of parturition. When located in the lower segments of the uterus they may be expelled in advance of the presenting part of the child, and are often spontaneously separated from their uterine attachment, provided the pedicle be long and slender. Forget, Ramsbotham, Marchal de Calvi (Demarquay and Saint Vel., malad. de l'utér.). Dubois and Depaul have observed cases of this kind. In other instances it was necessary to separate a pediculated tumor from its attachments before the expulsion of the child, because the former offered an obstacle to delivery or occasioned profuse hemorrhage. J. Bell[3] and Fergusson[4] describe such cases. A calcified fibroma was in one instance mistaken by the physician for the child's head, and delivered with the forceps. The pedicle was next severed, and the child, which presented transversely, extracted by means of version. The tumor weighed about eleven ounces, was nearly four inches in length and three inches wide. (Säxinger[5]). A similar diagnostic error, committed by Fergusson,[4] had a less fortunate sequel. He mistook a soft, pediculated myoma for the child's head, applied the forceps and extracted the tumor after tearing through the pedicle. The patient died after forty-eight hours, and a laceration of the uterus was found at the point of insertion of the pedicle.

If such a pediculated tumor be located higher in the uterus, labor may be obstructed owing to limitation of intra-uterine space, so that perforation of the child's head may be called for. (Guéniot,[7] Priestley.[8]) These tumors are, however, usually not observed until after the birth of the child, at which time they occasion bleeding, and are extruded from the uterus by the after-pains. They are then ordinarily removed by one of the methods above described, or are spontaneously separated from their uterine attachments. (*Conf.* cases of this kind observed by Depaul, Gardiner, Montgomery, Holyoke, Radford, Collins and Churchill.[9])

If the tumor be interstitial and located in the lower uterine segment, thus partially belonging to the class of cervical myomata, it may lead to such a limitation of the intra-pelvic space as to seriously obstruct labor. These incarcerated myomata will be considered hereafter in connection with the sub-serous cervical tumors. Interstitial myomata frequently have no direct influence upon parturition. They sometimes precede the

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[1] Deutsche Klinik, No. 1, 1859.
[2] London Obstet. Trans., vol. XII., p. 273.
[3] Edin. Med. Journal, 1820, p. 365.
[4] Quoted by Lambert, p. 116.
[5] Prager Vierteljahrschrift, vol. II., 1868.
[6] Lambert, loc. cit., p. 119.
[7] Gaz. des Hôp., 1864, p. 197.
[8] London Obstet. Trans., vol. I.
[9] Quoted by Lambert.

child's head in its descent into the pelvis, but often recede again into the abdominal cavity, particularly after the rupture of the membranes, or are gradually retracted over the head and trunk of the child by the uterine contractions. In other cases they are so soft as to be flattened out by the advancing fœtus. (Tarnier.)

It is more frequently asserted than directly proven that these tumors enfeeble the pains. This may be explained by the circumstance, pointed out by Nauss, that a large part of the fibroids consist chiefly of smooth muscular tissue, which perhaps participates in the uterine contractions. Serious and even fatal secondary hemorrhages have, however, often been observed in these cases, and are referable to uterine atony.

Fibroids may so protract labor as to imperil both mother and child. Treuer reports such a case, in which the labor was terminated by the forceps, after it had lasted three days, and the mother died.

Böhmer and Barnetsche report a case in which the woman's death occurred forty-eight hours after the termination of a labor which had continued six days.[1] M'Clintock[2] saw death occur from exhaustion fifty hours after the beginning of labor, in a case of triple pregnancy. In none of these cases was there any obstruction due to the tumor, and enfeeblement of the uterine contractions could, therefore, be properly assumed as the cause of the protracted labor.

Sub-serous myomata, when located in the cervix, complicate labor in the most dangerous manner. The nearer their location is to the fundus the less manifest is their influence upon the parturient act, although they may occasion weakening of the pains when occupying that position.

Chaussier and d'Outrepont describe cases of sub-peritoneal fibroids, in which uterine atony led to fatal hemorrhages. Puchelt and Simpson mention cases in which "exhaustion" from the same source is cited as the cause of death (quoted by Magdeleine). When, however, these sub-serous tumors are pediculated, they may occasion, even when located near the fundus, very dangerous symptoms of incarceration. This is particularly the case if they possess a long pedicle, and are thus enabled to sink downward into Douglas's *cul-de-sac*, where they either become adherent or are incarcerated by the enlarging uterus. Blot[3] was obliged to undertake a difficult version which resulted in the death of both mother and child, because of a large, pediculated, sub-serous myoma of the posterior uterine wall, which had become adherent to the pelvic parietes.

Madge[4] punctured an incarcerated myoma during labor, and was afterward able to force the tumor upward out of the pelvis. The woman

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[1] Cited by Lambert, p. 108.
[2] Clinical Memoirs, Dublin, 1863, p. 116.
[3] Gaz. des Hôp., 1869, p. 147.
[4] London Obstet. Trans., vol. IV., p. 129.

died of peritonitis and a sub-serous, movable tumor was found attached, by a long pedicle, from the fundus uteri.

Before considering the serious disturbances of labor referable to incarceration of fibromata in the pelvis, it seems appropriate to emphasize the other methods by which these tumors unfavorably influence the course of parturition.

First, in this connection, is the relation between these tumors and the position of the child. Nauss (Inaug. Dissert. Halle, 1872) found among 86 labors complicated by fibroids, 46 cranial presentations, *i.e.*, 53.4 per cent.; 22 breech, or 25.5 per cent.; and 18 transverse presentations, *i.e.*, 20.9 per cent. Süsserott (Inaug. Dissert., Rostock, 1870) found, among 68 such cases, 40 cranial presentations, *i.e.*, 59 per cent., 16 breech or 23.5 per cent., and 12 transverse presentations, *i.e.*, 17.5 per cent. Toloczinow,[1] obtained similar results, finding among 48 labors complicated with fibromata, 25 cranial presentations, *i.e.*, 52 per cent., 13 breech or 27 per cent., and 10 transverse presentations, or 20.8 per cent. Tarnier[2] encountered 9 breech presentations among 22 cases of this variety. The striking predominance of transverse and pelvic presentations will not excite surprise if one considers, beside the configuration of the uterine cavity, the fact that the entrance of the head into the pelvis must be impeded by the presence of fibromata deep in the pelvic cavity.

I have already stated that these tumors do not affect the uterine contractions to such an extent as might be expected or as has been assumed *à priori*. The frequency of hemorrhage, however, particularly of placental hemorrhage in the presence of sub-serous fibroids, may be, to a certain extent, dependent upon uterine atony. Nauss, nevertheless, found hemorrhage expressly attributed to atony of the uterus in only five cases. On the other hand Süsserott found that death was produced exclusively by hemorrhage in 9 out of 147 cases collected by himself. He also cites 33 cases of serious bleeding.

Winckel,[3] Segdwick,[4] Henry Yeld,[5] Senderling,[6] Hecker[7] and Daly[8] reported similar cases. Chaussier, Burlatour, Chailly and others (Demarquay and St. Vel, *loc. cit.*) saw fatal hemorrhages as the result of placenta prævia complicated with fibromyomata. This category farther includes hemorrhages in inversion of the uterus referable to the presence of myomata, which usually occur before the expulsion of the placenta. Lam-

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[1] Wiener Med. Presse, No. 30, 1869.
[2] Gaz. des Hôp., 1869.
[3] Klin. Beobacht. zur Pathologie der Geburt., p. 157.
[4] St. Thomas Hosp. Reports, 1870, p. 349.
[5] Brit. Med. Journal, June, 1871.
[6] Schmidt's Jahrbücher, vol. CXLV., 1870.
[7] Klin. d. Geburtsk., vol. II., p. 129.
[8] London Obstet. Transact., XVIII., p. 65.

bert quotes six cases of inversion complicated by fibroids. In two of these cases death occurred. In two simple cases reposition was resorted to, and in two instances reposition was performed after the removal of the tumor. In one case reposition failed.

Oldham, Desaulx and Herbiniaux report cases of inversion due to tumors and occurring after labor. (Demarquay, *loc. cit.*) If the placenta is attached over the seat of the tumor, profuse hemorrhages take place after confinement. Lambert cites seven such cases. In four of these most violent hemorrhage occurred, and two of the cases terminated fatally. (R. Lee and Ashwell.) Macfarlane,[1] Aubinais[2] and Ramsbotham witnessed the simultaneous escape into the vagina of the tumor and the placenta which had been located upon it. These observers believed, at first, that they were dealing with *post-partum* inversion of the uterus. In view of the fact that uterine atrophy often results from the growth of fibromata, and that the latter constitute absolute obstructions to delivery, one might expect that they would frequently produce rupture of the uterus. This is, however, not the case. Very few exact statements bearing on this point, aside from Fergusson's case, in which the rupture was produced by the operator, are found in literature. Nauss alludes to ten cases (beside that of Furgusson), but does not give their details. Among Süsserott's cases I only find five cases of rupture, and in only one of these, that of Vollmer,[3] can the rupture be attributed solely to the tumor.

In Bezold's[4] case a transverse presentation and a fibroma co-existed, and version was not performed until labor had continued for 13 hours. Abegg's[5] case does not belong to the class now occupying our attention. In his case there was a cancer of the portio vaginalis, with extensive carcinomatous infiltration of the uterine parenchyma, and a fibroma at the fundus. Rupture occurred in labor. It is doubtful to what extent the fibroma was responsible, in Shekleton's[6] case for the rupture, inasmuch as perforation and evisceration of the child, and amputation of its arm, were performed with a sharp hook after labor had continued seventeen hours! Lambert, moreover, mentions two cases in which women died of uterine rupture before delivery, the autopsy revealing fibromata of the uterus. Since, however, the presentations were transverse in each instance, the rupture was more probably due to that fact.

The case of R. Barnes[7] is unique. It was one of hard fibroid in the

[1] Ingleby : Obstet. Medicine, p. 142.
[2] Gaz. Méd. de Paris, 1844, p. 578.
[3] Schmidt's Jahrb., 1834, p. 28.
[4] Siebold's Journ. f. Geburtsk., vol. II., p. 125.
[5] Monatsschrift f. Geburtsk., vol. VII., p. 500.
[6] Dublin Quarterly Journal, 1869.
[7] London Obstet. Transact., vol. V., p. 171.

anterior inferior uterine wall, with rupture of the urinary bladder during labor. Including this case, thirteen women died undelivered, according to Süsserott's statistics, which embrace the early observations of Voigtel, Hildanus, Kiwisch, Lee, Bartholin and Vollmer. In the other cases, cited by him, *i.e.*, those of Hall Davis, Düntzer, Ostertag, and De Haän, the women died after the birth of the child, but before the expulsion of the placenta. Chaussier's case was one of transverse presentation, in which version was not undertaken. Lambert (*loc. cit.*, p. 201) quotes a similar case from Boivin and Dugès.

Intra-parietal fibromata of the uterine body, particularly if located in the posterior wall, as well as sub-serous ones situated at the fundus, may lead to incarceration during labor, by either accompanying or preceding the child's head in its descent into the pelvis.

These tumors, however, often spontaneously escape form the pelvis into the abdominal cavity; when the pains grow active, the head descends and the membranes rupture. The labor may then be easily accomplished. It is also often stated that these tumors may be displaced upward with surprising facility, by force applied to the vagina or the uterus. The case is quite different with another class of these tumors. They are located in the pelvis from the very commencement of pregnancy, become incarcerated very early, and increase so rapidly in size, owing to congestion of their vessels, that they often produce, even during pregnancy, partial or complete occlusion of the pelvic canal.

When labor begins they are pressed, if possible, still deeper into the pelvic cavity, and do not permit the descent of the child's head into the latter. In other cases the head, or some other member of the child, enters the pelvis simultaneously with a segment of the tumor, but the incarceration is thereby only rendered more complete, and delivery often becomes impossible. Cervical myomas, particularly if sub-serous, occasion these unfortunate results. Such occurrences are very frequently mentioned in literature. The seat of the tumors is, however, not clearly described, the degree and significance of the incarceration are not rightly appreciated, and doubt is thereby engendered regarding the operative procedures adopted.

There are, undoubtedly, cases in which delivery is normally accomplished without the displacement of a tumor, partially filling the pelvis. Such cases are reported by Ingleby, Hecker, and by Spiegelberg,[1] in which latter case maceration of the fœtus facilitated its expulsion. Similar cases are cited by Lachapelle,[2] Simpson,[3] Habit,[4] and by E. Martin.[5] In

[1] Monatsschr. f. Geburtsk., XXVIII., p. 426.
[2] Pratique des Accouchements, III., 381.
[3] Obstet. Memoirs, vol. I., p. 833.
[4] Zeitschr. d. Ges. d. Aerzte zu Wien, 1860, No. 41.
[5] Zeitschr. f. Geburtsk., 1876, vol. I., p. 232.

one of Martin's cases the expulsion of the child was rendered possible by rupture of the anterior fontanelle, and in the other by maceration of the dead child. These phenomena are rare, but those cases are still less frequent in which a tumor located in the *cul-de-sac* of Douglas, or in the superior strait, has spontaneously ascended under the influence of the pains, and has thus rendered delivery of the child possible. The tumors have, in these cases, probably been either usually or invariably interstitial, or sub-serous fibroids of the posterior wall, and not cervical tumors of large size.

Guéniot,[1] Blot,[2] Lehnerdt,[3] Spiegelberg[4] and Hecker[5] report such cases. Only such cases of fibroid are, of course, included in this category as seemed partially or completely incarcerated in the pelvis, so that in some instances the propriety of a resort to Cæsarean section had been considered.

Far more numerous and important, in their practical bearings, are those cases in which the tumor is deeply incarcerated in the pelvis at the beginning of labor, but is at a later period displaced upward by force applied in the vagina, thus enabling labor to be spontaneously or artificially accomplished. The reposition of the tumor seems to be most easily effected after the rupture of the membranes, because the uterus is then smaller and more movable. Reposition naturally fails if the presenting part of the child be at the same time firmly impacted in the pelvis. In one series of cases the tumor had been punctured before reposition was attempted, most frequently because it had been considered ovarian, owing to its soft consistency.

In other cases the puncture was made for the purpose of reducing the size of the tumor as much as possible, and rendering it more movable. The object of the puncture was attained in only a few cases, since only a little bloody fluid was evacuated in most instances. The very dangerous nature of this operation must not be forgotten. It often produces gangrene of the tumor or peritonitis. Späth,[6] Madge[7] and Spiegelberg (*loc. cit.*, p. 110) describe such cases, in which reposition of the tumor was effected, after its puncture, and delivery thus accomplished. In the two former cases the mother died. In Spiegelberg's she lived. Cases are more numerous in which simple reposition succeeded, and in these the women recovered with one exception, that of Pillore's[8] patient, who died

[1] Gaz. des Hôp., 1864, No. 53.
[2] Gaz. des Hôp., 1869.
[3] Beiträge z. Geburtsk., Berlin, IV., p. 16.
[4] Archiv f. Gynäk., V.. p. 100.
[5] Klinik d. Geburtsk., II., p. 124.
[6] Zeitschr. d. Ges. d. Wiener Aerzte, 1860.
[7] London Obstet. Transact., IV., p. 129.
[8] Gaz. des Hôp., 1854, p. 547.

after delivery. The other cases, fourteen in number, were observed by Ashwell, C. Mayer,[1] Wegscheider,[2] Siebold, Hecker,[3] Hoogeweg,[4] Beatty, Depaul,[5] Barry,[6] Rankin,[7] Thirion,[8] Playfair,[9] and Winckel. Reposition thus succeeded in eighteen such cases, in three of which the patients died.

There are, finally, some cases reported in which the tumor could be removed before the child, and delivery thus effected. These were, of course, cases of sub-mucous or interstitial tumors of the cervix or of the lower uterine segments. Danyau[10] succeeded in enucleating a large fibroma of the posterior cervical wall, which almost filled the pelvis. The child was macerated. The mother recovered. Heck's case (quoted by Süsserott, p. 34) terminated in a similar way, but both mother and child recovered.

Wynn Williams[11] met with a large calcified myoma, which was firmly pressed against the pelvic wall by the child's head. He could only extract the child after perforating its head, and crushing the myoma with the cephalotribe. Portions of the tumor were then removed and the child delivered. Heiss (Süsserott, *loc. cit.*, p. 21), Düntzer, Keating and Langenbeck[12] have described cases in which the tumor was removed before the child's extraction, but the mothers died.

When the tumors do not completely fill the pelvis, the method of delivery will depend upon the circumstances of the case, *i.e.*, upon the limitation of intra-pelvic space, the position of the child, the character of the pains and the condition of the child. In short, the most varied considerations which determine the nature of operative measures must be taken into account. Since this is not the place to explain those considrations we merely quote some statistics from Süsserott's carefully compiled tables.

Among 147 cases of labor complicated by fibroids, collected by him, the forceps were applied 20 times; 12 mothers and 7 children lived. Version was performed 20 times: 8 mothers and 3 children were saved. The placenta was removed by artificial means 21 times, and only 8 mothers recovered!

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[1] Verhandl. d. Berl. geb. Gesellsch., 1852, p. 206.
[2] *Ibid.*, 1855.
[3] Monatsschr. f. Geburtsk., XXVI., p. 446.
[4] Verhandl. d. Berl. geb. Gesellsch., 1852.
[5] Gaz. des Hôp., 1868.
[6] Edin. Month. Journal, 1848, p. 137.
[7] *Ibid.*, 1850, p. 12.
[8] Cited by Lambert, Thèse, p. 148.
[9] Obstet. Journal, 1877, p. 116.
[10] Gaz. Méd. de Paris, 1851, p. 239.
[11] Obstet. Transact., XVII., p. 172.
[12] Deutsche Klinik., No. 1, 1859.

After the induction of artificial abortion 3 mothers died and 5 lived. Death of the women resulted in 2 out of 6 cases in which the child was perforated. Delivery was effected with the blunt hook in 3 cases. In one of these the mother died.

Whenever the pelvis is so completely filled by the tumor that none of the methods of delivery mentioned are practicable, and when neither reposition nor removal of the fibroid is possible, Cæsarean section is our last resort. The results of the operation are worse if it be long postponed than when it is undertaken early, as is the case with Cæsarean section in general.

The prognosis is, however, also materially clouded by the uterine disease. Almost all operators specially allude to the profuse hemorrhages referable to increased vascularity of the uterus and to deficient contractility of the organ, both of which conditions are due to the presence and growth of the fibroids. I find, as does Cazin,[1] twenty-eight Cæsarean sections performed on account of uterine fibromata. Fourteen of these are carefully analyzed by Lambert. Beside these, mention should be made of the following: Braxton-Hicks,[2] Duclos,[3] Bristowe,[4] Netzel,[5] Spiegelberg[6] and Cazin (*loc. cit.* where references to the following cases may be found): Thomas, Shipman, Conway, Putégnat, (9 cases), Retzius, Laroche, Bird. Only 4 out of the 28 patients recovered. 15 of the children were born alive, 8 were dead, and nothing is stated concerning the remaining 5. Sänger[7] has recently collected 43 cases, in which Cæsarean section was performed on account of fibroids. Only seven women recovered, *i.e.*, a mortality of 83.7 per cent.

Eight of these cases occurred after 1876; of this number 3 were instances of Porro's operation, all three dying, and 5 Cæsarean sections, with only one death. 55.2 per cent of the children were extracted alive.

In Storer's case[8] a uterine tumor undergoing softening rendered extirpation of the entire uterus with its neighboring organs necessary, after the dead child had been extracted by Cæsarean section. The patient died.

A few cases of uterine fibroids have been cited above, in which peculiar injuries inflicted upon the child's head, during labor, must be attributed to the effect of the tumors.

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Archiv. de Tocologie, vol. III., p. 321.

[2] Obstet. Transact., XI., p. 99.

[3] Comp. Cazin: Archiv. de Tocol., II., p. 647.

[4] Path. Trans., London, vol. IV., 1853, p. 218.

[5] Archiv. de Tocol., III., p. 321.

[6] Archiv f. Gynäkol., V., p. 112.

[7] Festschrift zum Jubiläum, Credé's, Leipzig, 1881.

[8] Journal of the Gynec. Soc. of Boston, vol. I., p. 223.

Simpson,[1] Küchenmeister,[2] Lachapelle and Blot[3] saw compression and flattening of the child's skull. Chaussier (cited by Süsserott) and Boivin and Dugés[4] observed fractures of the cranium. E. Martin,[5] saw spontaneous rupture of the anterior fontanelle, and in another case laceration of the superior longitudinal sinus.

We present, in conclusion, some statistics which may have a valuable bearing on the prognosis in the complication of labor now under consideration.

Tarnier[6] found among seven cases of uterine fibroids, in which labor was normally accomplished, one which was fatal for the mother, and three which ended disastrously for the child. The fate of one child was unknown. Forceps was applied in six cases, in four of which the mother died. The child also perished in four cases. Among six versions three resulted fatally for the mother, and three for the child. Five women died before their confinement. Artificial abortion was once produced and the mother recovered. One embryotomy was performed and the woman died. In one case of enucleation both mother and child died.

Among 228 labors complicated by fibroids, 123 women or 53.92 per cent. died. Out of 117 children whose fate is mentioned 67 or 57.2 per cent. died (Nauss, *loc. cit.*) In 147 cases collected by Süsserrot, 78 mothers or 53 per cent. died. The result upon the children is only stated in 138 instances, 91 of whom, or 66 per cent., died.

Being unable to again enter into an extended consideration of the diagnosis of fibromyomata complicating labor, we shall now only briefly allude to the conditions for which they are most frequently mistaken. The fibroids have often been mistaken for a second child, or for some part of one. They have also given rise to the diagnosis of extra-uterine pregnancy. They have been taken for uterine malformations and for pelvic exostoses.

The fibromata are often confounded with ovarian tumors. This error is unfortunate, since it leads to puncture of the soft tumor from the vagina, which impairs the prognosis.

Our present allusions to the treatment of these tumors must also be brief. If it be possible to remove the tumor during labor without too great danger, this must not be omitted. If its removal be impracticable, labor must be terminated in various ways according to the position of the child, and to the pelvic obstruction present. Energetic attempts at

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[1] Obstetrical Memoirs, vol. I., p. 833; Obstet. Works, Ed. Black, p. 155.

[2] Michauk : Dissert. Leipzig, 1868.

[3] Gaz. des Hôp., 1869.

[4] Caternault : Thèse Strasbourg, 1866, p. 67.

[5] Zeitschr. f. Geburtsk., vol. I., 1876, p. 232.

[6] Gaz. des Hôp., 1869, p. 175.

reposition of the tumor through the vagina and rectum should always be made before more active measures of treatment are adopted.

The effects of fibromata upon the lying-in period, and that of the latter condition upon the tumors, are various and important.

In the first place we must remind the reader of the frequent and formidable secondary hemorrhages, due to uterine atony induced by the development of fibromata in the parenchyma of the uterus, which occur within a few days after delivery. I will here append the history of a case observed by myself, and attended by hemorrhage from the neoplasm

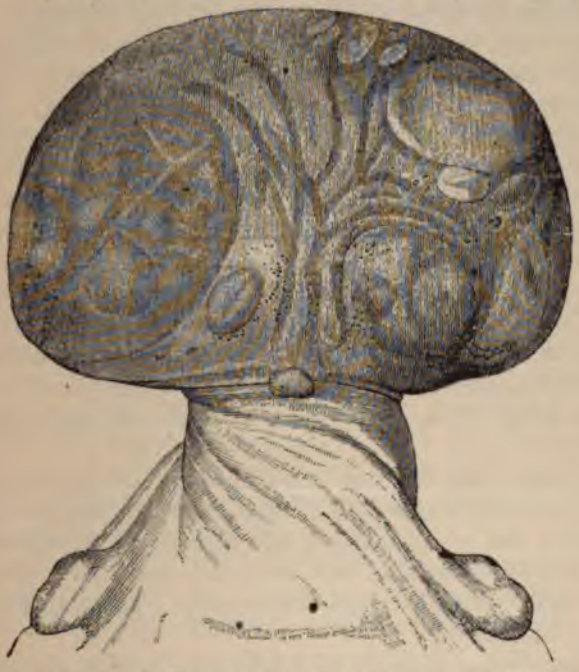

FIG. 29.—LARGE FIBROID OF THE FUNDUS UTERI. Death from internal hemorrhage quickly followed delivery. The bleeding proceeded from numerous small openings, mostly of the superficial veins. (From the Obstetrical Collection at Strasburg.)

itself. The case seems to be unique, as I have failed to find one of the same variety in the literature of the subject.

A woman twenty-seven years old presented herself at the Strasbourg gynecological clinic with a very large abdominal tumor, which presented fluctuation. The uterus was explored with a sound by the assistant physician. Soon afterward a macerated fœtus, aged four months, was expelled. Pregnancy had been masked by the enormously developed tumor. On the following day, about forty hours after delivery, the patient died suddenly with symptoms of internal hemorrhage. At the autopsy the abdominal cavity was found filled with blood. A large, soft, sub-serous

myoma was attached to the posterior uterine wall. The surface of the tumor was covered with very numerous large and broad veins situated directly under or in the peritoneal coat. The vessels were almost all perforated by very numerous little apertures, the size of the largest among which was that of a pin's head. (Compare the drawing, which does not well represent the appearances). The hemorrhage had proceeded from these apertures. Isolated openings of the same kind were found in the uterine substance near the vessels where there were no veins. The microscope showed (v. Recklinghausen) that there were no special morbid changes, but merely patulous interspaces between the tissue elements of the uterus. These spaces had passed quite through the walls of the veins, owing to the intimate connection between the muscles of the veins and those of the uterus, and had thus produced the hemorrhage. Since there was no evidence of any special morbid process, in this case the sieve-like perforation of the vessels must have been due to the effect of the muscular contractions of the uterus in labor or during the puerperal state.

The peritonitis, which often presents itself in cases of uterine myomata during labor, but principally in the *post-partum* state, is perhaps, also partly due to the uterine contractions. This remark applies only to those cases of peritonitis which occur without any change in the structure of the tumor, and are, therefore, not the result of softening or disintegration of the latter. Cases of this simple peritonitis are not very often encountered. Empis,[1] Winckel,[2] Dèsormeaux[3] and Hecker[4] report such cases.

Not only those cases are here cited in which the peritonitis seems to have been due to the tumor alone, without morbid changes in the same, but also those due to traumatism, but unattended by septicæmia. All cases are, therefore, excluded in which severe obstetrical operations, liable to produce peritonitis, were undertaken. The infrequency of the cases is thus explained

An interesting case observed by Spiegelberg,[5] shows how difficult it is, in any given case, to decide whether the tumor be the cause of the peritonitis, or be only simultaneously diseased. The case was one of purulent peritonitis, with ulcerative endocarditis and uterine lymphangitis. The fibroid was surrounded by a purulent fluid which infiltrated the uterus, and had in its interior numerous cavities filled with pus. The cavities were not the result of abscesses, but were dilated lymph-spaces, which, in common with the remaining lymphatics of the uterus, were filled with

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[1] Bull. de la Soc. Anatom., 1854, p. 336.
[2] Klin. Beobacht. z. Patholog. d. Geburt., 1869, p. 157.
[3] Caternault: Thèse loc. cit.
[4] Klin. d. Geb., vol. II., p. 129.
[5] Monatsschr. f. Geburtsk., vol. XXVIII., p. 429.

pus. Spiegelberg is inclined, in view of the history, to regard the tumor as the point of departure for the peritonitis.

It can be readily proven by all the cases in which a primary change can be discovered in the tumor, that the latter is very often the cause of general peritonitis, or of puerperal septic processes. This is most plainly seen in gangrene of sub-mucous fibromata projecting into the cavity of the puerperal uterus. Sub-serous and interstitial tumors of that variety may, however, undergo peculiar softening processes which lead to the above-mentioned general diseases. In sub-serous fibroids the process is most easily explained when, as in the case of Robinson, (Süsserott, *loc. cit.*, p. 8) a laceration of the peritoneal covering of the tumor, with hemorrhage into the peritoneum and consecutive peritonitis, is found.

E. Martin[1] describes gangrenous disintegration of sub-mucous tumors leading to fatal pyæmia.

Horwitz[2] mentions cases of sub-serous tumors leading to the same result. In his cases it is, however, doubtful whether there were actual gangrene of the tumors or necrotic disintegration of the same, presently to be described. It is also possible that the sub-serous tumors had undergone th changes above-mentioned, as a result of septicæmia. Polaillon[3] describes similar cases. Gangrene of sub-mucous fibromata, occurring in the *post-partum* state, by no means always leads to pyæmia or to other severe diseases. Extrusion of the tumor and a complete cure is perhaps more frequently the result of gangrene. Thus Küchenmeister (Michauk, *loc. cit.*) saw a myoma weighing 515 gm. expelled, on the forty-fourth day after confinement, after long-continued suppuration and high fever. Ramsey[4] witnessed the expulsion of a tumor weighing 1¼ kilogr., on the sixteenth day after labor.

A sub-mucous myoma of the posterior uterine wall was gradually expelled by a gangrenous process. In this case, gangrene was produced by injections of liq. ferri sesquichlorat. made immediately after labor, by Sedgwick,[5] on account of secondary hemorrhage. Maunoury (quoted by Süsserott, p. 14) and Ashwell (*ibid.* p. 20) witnessed the expulsion of such tumors by gangrene, during the *post-partum* state.

Such tumors are sometimes expelled during the puerperal state, by simple uterine contractions without gangrene or degeneration of the neoplasms, and a complete cure is thus effected in the safest possible way. Falin, Tarnier, Oldham (Demarquay et St. Vel, *loc. cit.*), Priestley[6]

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[1] Zeitschr. f. Geburtsk., vol. I., 1876, p. 232.
[2] St. Petersburger Med. Zeitschrift, XIV., p. 294.
[3] Archiv. de Tocologie, vol. I., p. 319.
[4] Edin. Med. Journal, July, 1858.
[5] St. Thomas Hosp. Reports, 1870.
[6] Trans. Obstet. Soc., London. vol. I., p. 217.

and Valtorta[1] observed cases of this nature. Gangrenous disintegration of the tumors, attended by septic symptoms, must be carefully distinguished from the peculiar necrosis occurring in large interstitial and subserous fibromata, which is almost exclusively observed in the puerperal state.

The necrosis under discussion is characterized by softening of the tumor, beginning in the centre. This process is, however, not dependent upon the ingress of air or of any substance capable of producing putrefaction. The softening seems to begin with an abundant serous effusion into the tissues of the tumor, occurring in the early periods of the *post-partum* state, and perhaps produced by vascular disturbances. At all events the tumor becomes larger and softer soon after parturition, or furnishes distinct evidences of fluctuation.

The change in size is often only apparent, because the diminution in the size of the uterus, in which the tumor does not participate, causes the latter to appear larger than before. In other cases this source of error may be easily eliminated, and the enlargement with concomitant softening clearly demonstrated.

The tumor is usually sensitive to pressure, under these circumstances, owing to its tense condition. This fact has often been referred to assumed inflammatory processes in the fibroid. Investigation of the tumors has, almost always, shown a disintegration of their tissues, attended by the formation of a soft, pulpy mass, which is of a light yellow color, if blood be absent. The pulpy mass is darker in color and not unlike coffee-grounds in appearance, if blood be present, and consists of disintegrated muscular and connective-tissue elements, the destruction of which seems to have been principally inaugurated by fatty degeneration.

Since firm connective-tissue bands, particularly those accompanying the vessels, often remain intact, the entire cavity of the tumor presents a trabecular structure, the interstices of which are filled with the pulp of the degenerated neoplasm. The fibroid thus frequently assumes the appearance of a compound cystic tumor. The most casual investigation shows, however, that the individual alveolæ or interspaces possess no wall peculiar to themselves, but consist merely of tissues undergoing degeneration. No considerable collections of pus have been discovered in the degenerated fibromata, although the morbid process affecting them has often been interpreted as a suppurative inflammation.

Even fatty degeneration plays only a subordinate *rôle* in this morbid process. The above-mentioned case of A. Martin is the only accurately reported one of fatty degeneration extant.

Beginning fatty degeneration of myomata has been more frequently observed to affect these tumors in the *post-partum* state, but it does not

[1] Monatsschr. f. Geburtsk., No. 31, p. 314.

lead to the above-described degeneration. The causes of this peculiar morbid process are not definitely known. It is unsatisfactory to refer it to circulatory derangements occurring during pregnancy and parturition. Nor can it be explained by the retrogressive changes in the uterine muscles taking place in the *post-partum* state, because it should if referable to this cause, consist essentially in fatty degeneration. A review of the cases bearing on this question plainly shows that this form of degeneration has been observed with special frequency after difficult and protracted labors. This fact suggests the thought that injuries of the tumors attendant upon parturition, and produced by compression of the fibroids between the child's head or the forceps, may act as a predisposing cause of fatty degeneration, by causing laceration of vessels with extravasation and consequent disturbances of nutrition.

O. Lehnerdt's [1] case is very instructive with reference to the question under discussion. In that case the pelvis was considerably obstructed by a fibroma, which was extracted with the forceps. One half of the tumor had been transformed into a reddish, pulpy mass "not like pus," and "of the consistency of apple sauce." In the solid parts of the fibroid there were numerous extravasations of blood, which were probably the result of the injuries inflicted during labor. Hecker [2] had a similar case. The question whether the tumor may be absorbed, and thus entirely disappear, must remain *sub judice*.

In some cases of this nature the softening of the tumor is said to have resulted from peritonitis or pyæmia (*conf.* the cases of Howiz, *loc. cit.*). This is doubtless the case when the tumors contain genuine abscesses, which are usually situated, as Spiegelberg's careful investigations prove, in the lymph spaces of the tumor. Besides the cases of this kind already referred to, those of Banetche and Hecker (*loc. cit.*) deserve mention. Both cases were terminated by fatal peritonitis, which was, it is true, very probably caused by the morbid changes in the tumors. In C. Mayer's case [3] the tumor was punctured during labor, and changes in its tissues, which led to a fatal peritonitis, thus induced. This case, therefore, does not perhaps belong in this category. We must finally allude to Ashwell's case (Süsserott, *loc. cit.*, p. 48) as belonging to this class.

Our knowledge concerning these changes in fibromyomata, during the puerperal state is therefore not exact, and the same remark applies to the *post-partum* disappearance of these tumors. We have already alluded to the absorption of fibromata, and cited a number of cases in which it occurred. The number of well-attested cases in which these tumors grew

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[1] Beiträge, etc., d. Berl. geb. Gesellschaft, IV., p. 16.
[2] Klinik d. Geburtsk., II., p. 125 *et seq.*
[3] Berliner geburtsk. Gesellsch., Feb. 1850.

smaller, in the puerperal state, is quite small, but their complete disappearance has been proven to occur in still rarer instances. Besides the cases above quoted, in which evident diminution of the tumors was demonstrated, we farther cite those of Cazin, (*loc. cit.*,) Braer,[1] Playfair,[2] Madge[3] and finally the interesting cases of Löhlein.[4]

It has already been stated that complete disappearance of uterine myomata is not easily imaginable, since the connective-tissue elements of these tumors can not be readily absorbed. It is, however, doubtless true that such a tumor, if rich in muscular tissue, may become so much reduced in size that it produces no symptoms, and can not be certainly demonstrated even by means of its anatomical characters. There is no doubt that such tumors do actually become decidedly smaller in the lying-in period.

The majority of the reported cases of this kind possess, however, very little significance, because they were probably cases in which a fibroma had become hypertrophied or only œdematous, in the manner described during pregnancy, and having undergone atrophic changes in the puerperal state, had been restored to its original size by uterine contractions. If, therefore, in such a case the tumor had not been detected before, but was discovered during labor and was observed to diminish *post-partum*, it seemed, to the observer, to actually disappear. In reality, however, it only returned to its original volume. Those cases in which this process could be studied in several pregnancies of the same patient are very instructive. The tumors which were not perceptible, or were discovered with difficulty before, grew considerably during each pregnancy, and returned in each instance to their former size during the puerperal state. Lorain,[5] Playfair (*loc. cit.*) and others report such cases. There are, however, a few carefully observed cases in which the size of the tumor before conception was known, and in which the neoplasm became decidedly smaller or almost entirely disappeared *post-partum*.

Löhlein's case belongs here, in which a large fibromyoma, which had been observed a long time before the beginning of pregnancy, diminished materially in size during the puerperal state, and did not even attain to its original dimensions in a subsequent pregnancy.

Kauffman[6] saw a large fibroma disappear after abortion. Pregnancy ensued, but the tumor did not reappear. We wish to again call attention to the fact that fatty degeneration of the neoplasms, although often assumed, has not been so often proven to exist.

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[1] Berliner Klin. Wochenschr., No. 26, 1875.
[2] Obstet. Journal, 1877, p. 116.
[3] Obstet. Trans., vol. XIV., p. 227.
[4] Zeitschr. f. Geburtsk. und Gynäk., vol. I., 1877, p. 121.
[5] Gaz. des Hôpit., No. 92, 1869.
[6] Monatsschrift für Geburtskunde, 1862.

In some cases it has been found possible to remove sub-mucous fibromata, according to various methods, either immediately after confinement simultaneously with the placenta, or during the earlier stages of the puerperal state.

This procedure is of course only really indicated when the tumor is easily accessible, and the injury inflicted trivial, since the prognosis of more serious operations might be sadly impaired by those conditions incident to the puerperal state. Henry Yeld, Senderling, Ramsay, Kiwisch, Wynn-Williams,[1] Matthews Duncan,[2] Weber,[3] and Düntzer[4] report cases of this kind.

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[1] Cited by Männel: Prager Vierteljahrsschrift, 1871.
[2] Obstet. Transact., XVII., p. 172.
[3] Monatsschr. f. Geb., XXV., p. 157.
[4] Neue Zeitschr. f. Geburtsk.. VIII., p. 219.

# CHAPTER IX.

## SARCOMA OF THE UTERUS.

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### Anatomy of Sarcoma of the Uterus.

VARIOUS neoplasms were formerly designated by the name of sarcoma. That term is now usually applied, at least in Germany, and according to the classification of Virchow, to all those tumors which be-

long to the connective-tissue series, and are characterized by abundant proliferation of the cellular elements which more or less displace the intercellular tissues. Such connective-tissue tumors of the embryonic type (Cohnheim) are observed in the uterus, and when occurring here are always reckoned among the malignant growths. They certainly present the clinical features of malignant connective-tissue tumors. It has as yet been impossible to establish a strict distinction between round-celled and spindle-celled sarcomata of the uterus, although, as we shall see, pure forms of the latter have certainly been observed.

Two forms of primary uterine sarcoma may, however, be easily distinguished by their clinical and anatomical features. These are fibro-sarcomata and diffuse sarcoma of the uterine mucous membrane.

The fibro-sarcoma, sarcoma fibrosum, s. nodosum, appears in the form of a firm or sometimes of a soft, globular tumor, which is developed from the uterine parenchyma. It may, like the pure fibroma, be either submucous, sub-serous or interstitial. These tumors consist in nodules of fibrous or muscular tissue, in which an abundant cell formation has occurred, and seems to have gradually displaced the original tissues. The growths are either sub-mucous, in which case they constitute broad-based polypous tumors, or they are interstitial. The predominant form is that of the round-celled sarcoma, but myxosarcomata are occasionally observed. Leopold, Grenser, Simpson and Schröder, (*loc. cit.*) each observed a simple isolated spindle-cell sarcoma.

Certain sarcomatous infiltrations of the uterine tissues, which do not proceed from sarcomata of the mucous membrane (soon to be described) but are found isolated in the uterine parenchyma, must be included among this group of the fibro-sarcomata. (Hegar.) The entire organ may be uniformly permeated by infiltrations of this kind. (L. Mayer.)

While some isolated cases of this kind are reported in earlier literature, and well characterized by the term "recurrent fibroid," attention was not specially directed to this form of tumors until Virchow's time.

This form seems, on the whole, to be rare—at all events less frequent than diffuse uterine sarcoma, which we shall soon consider. Kunert could discover only nine such cases. (*Vide ante.*) Since that time only the following cases have been reported. Leopold and Grenser, each one case of spindle-cell sarcoma of the portio vaginalis. G. Müller, Schwartz (Dissert. of Beermann), Schröder, Scanzoni, Gusserow (unpublished), each one case. A. Simpson two cases, and six of Frankenhäuser (Dissert. of Rogivue).

In addition to these, Breisky, Johannowsky, Zweifel and Garrigues have each reported one case, and Jacubasch four cases. Including the nine cases collected by Kunert, the total number of cases, therefore, amounts to thirty-two.

We must at once make the statement, however, that such statistics are

of a somewhat arbitrary nature, because it is by no means possible to decide with certainty, from the literature cited, whether any given case was one of genuine fibro-sarcoma, or of single irregular hyperplasia, in a soft sarcoma connected with the mucous membrane. It can not even be definitely settled whether combinations of both forms may not frequently occur. (Hegar.)

The anatomical characteristics of fibro-sarcomata are easily stated. They occur as roundish, isolated tumors, usually of firm, but sometimes of very soft consistency. The microscope shows evidences of their fibrous and muscular structure, which is more or less replaced by the abundant proliferation of cells, which are usually round. The pure spindle-cell sarcomata are an exception to this rule.

These sarcomata occur with the least frequency, as do fibromyomata, in the cervix. Only Spiegelberg, Leopold, Grenser, Scanzoni, Schwartz (Heermann, *loc. cit.*) and Zweifel have described undoubted cases of cervical fibro-sarcomata.

The view that these tumors are usually developed from simple homologous fibromata and myomata, and that they are rarely primary, was even advanced by Rokitansky, Virchow and others. Kunert, and recently Schröder, have advocated the theory that one always has to deal in these cases with a secondary metamorphosis of fibromyomata; that, therefore, fibro-sarcomata are always fibromata which have undergone sarcomatous degeneration.

The transformation of fibromyomata into sarcomata is certainly demonstrated by a series of carefully investigated cases, while the evidence in favor of the development of primary fibroid sarcomata is less convincing.

Chroback describes a case in which "an ordinary pediculated uterine fibroid" and a smaller cervical one were simultaneously developed. Sarcomatous tissue appeared in the older and larger tumor, and after the removal of the latter invaded the smaller, cervical tumor, probably by metastasis. When this latter tumor was removed after having grown rapidly for five months, a soft sarcoma, probably medullary, was found in the place of the original tumor. G. Müller's case was similar. He removed a portion of a large myoma which was producing symptoms of incarceration, and one year later excised from the same surface a cylindrical bloody excrescence, which was attached to the stump of the amputated fibroma, and proved to be sarcomatous. The large tumor, which had remained firm until that time, soon underwent sarcomatous degeneration, and produced metastases, which led to a fatal issue.

A. Simpson, Frankenhäuser[1] and Kurz[2] report similar cases.

The fact that no carefully observed case is extant in which a uterine

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[1] In Rogivue.

[2] Deutsche Zeitschrift für praktische Medizin, June 16, 1877.

sarcoma was provided with a "capsule," as is the case with most fibromata,[1] has an important bearing on the question of the metamorphosis of fibromyomata into sarcomata. Winckel's case (*loc. cit.*), which was farther observed by Schatz,[2] is the most noteworthy on record with reference to this point.

This case was at first one of a partially gangrenous myoma, in the posterior uterine wall, which was removed by Winckel. Within forty weeks after the operation, a soft sarcoma was developed near the stump of the pedicle and was excised. The tumor recurred half a year later, in the form of a round-cell sarcoma, and was spontaneously expelled after the injection of a solution of the chloride of iron. After more than two years a new tumor as large as a hen's egg pressed into the os uteri, was removed by Schatz, and proved to be a pure myoma without any trace of sarcomatous degeneration. It cannot be decided whether there was an actual recurrence of the original tumor in this case, or whether, as Schatz believes, the masses removed at the second and third operation were portions of inflamed myomata. This case possibly demonstrates the manner in which fibromata undergo the sarcomatous degeneration.

We merely allude, in this place, to other changes occurring in fibrosarcoma, *viz.*, transformation into myxosarcomata, cysto-sarcomata and other heterogeneous tumors.

A case of Rabl-Rückard deserves special mention, being adapted to show that uterine fibro-sarcomata may have certain intimate relations to carcinomata. A putrid tumor as large as a child's head was spontaneously expelled, during a coughing fit, from the uterus of a woman aged fifty-one years, who had suffered from uterine hemorrhages and violent pains. The tumor was a round-cell sarcoma with isolated carcinomatous nodules. The latter were elongated and formed of closely packed, large-sized epithelial cells, arranged at some points in concentric laminæ. (Wegner.) The neoplasmata found in the deeper layers of the uterine walls were decidedly cancerous in character, and the sarcomatous elements in them were represented only by the poorly developed interstitial tissue.

In this case at least a fibro-sarcoma was combined with a carcinoma, unless we are to assume the transformation of the sarcoma into a cancer, lately insisted on by R. Maier.[3] According to his researches it seems not improbable that a fibroma may be transformed into a carcinoma, by passing through the process of sarcomatous degeneration. It remains unsettled whether the above was a case of this kind or not.

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Winckel removed a large tumor "which consisted of a fibrous capsule, 8–15 cm. in thickness, and a mixed sarcoma larger than a child's head. The latter was easily isolated and enucleated entire." Berichte und Studien, II., p. 139.

[2] Arch. f. Gynäk., IX., p. 145.

[3] Virchow's Archiv., vol. LXX., p. 378.

A certain connection between cancerous degeneration and round-celled fibro-sarcomata cannot, after what has been stated, be positively denied. This connection is, however, so much more marked and constant in cases of so-called diffuse sarcomata, that it is almost doubtful whether they should be considered as a special variety of neoplasmata. The term diffuse sarcoma, sarcoma of the uterine mucous membrane, has been used since Virchow's time to designate a new growth proceeding from the connective tissue of the uterine mucous membrane, consisting mostly of small, closely-packed, round cells, though sometimes of spindle-cells, and con-

FIG. 30.—SARCOMA OF THE UTERUS. (*Gusserow's Case.*)

stituting an exceedingly soft, friable infiltration of the mucous membrane. This occurs in isolated clumps, or it may lead to a more decidedly symmetrical proliferation of the entire mucous membrane. It usually involves the uterine muscles, infiltrates or penetrates the walls of the uterus, and even leads to the development of the peculiar new growths upon the external uterine surface. (*Conf.* the cases of West and two of the author's, one of which is published and is represented by Fig. No. 30.)

The infiltration finally extends to the abdominal viscera and the abdominal walls, involving the adjacent organs in the sarcomatous degeneration.

Virchow first called attention to the primary development of the very

soft, round-cell, medullary sarcoma of the uterine mucous membrane, but characterized it as very rare.

Cases of this kind have, however, been rapidly multiplied recently, and among them have been also included those in which the sarcomatous proliferation was not really diffuse, but rather polypoid, so that this form has not always been sharply differentiated from the variety previously described.

FIG. 31.—SARCOMA OF THE UTERUS, AND TUMORS OF THE VAGINA. (From the Collection of the Pathological Institute at Strasburg.)

The proliferating tissues are always very soft, grayish-white, medullary, vascular and protrude, usually in forms resembling a cock's comb, above the healthy mucous membrane. Their surface is ordinarily undergoing disintegration. It is quite uneven and covered with blackish or brownish shreds. These new formations may be easily distinguished from benign hypertrophies of the uterine mucous membrane, *i.e.*, granulation tissues, both by their anatomical and by their clinical features. The author and

Hegar called attention, in the first publications of this kind, to the admixture of epithelial elements in these tumors, or, in other words, to the cancerous degeneration of the uterine mucous membrane. The number of cases of this kind has been so much augmented since that time, that Klebs (*loc.cit.*) properly points out the fact that most of these tumors are to be frankly styled carcino-sarcomata. Scanzoni calls attention to this fact as viewed from a clinical standpoint.

In most of these cases the uterus is enlarged, the os is patulous, which fact is particularly noticeable in nulliparæ, and the palpating finger easily enters the uterine cavity, the mucous membrane of which is found to present, either throughout or at one point, the proliferation just described.

FIG. 32.

FIG. 33.

SARCOMA OF THE MUCOUS MEMBRANE OF THE UTERUS. (Specimen of *Dr. Wyder.*)
MINUTE STRUCTURE OF SARCOMA OF THE UTERUS. (Specimen of *Dr. Wyder.*)

The fact that the cervical mucous membrane is very rarely the point of departure for the disease should be emphasized. (Veit, Spiegelberg, Schwartz, Zweifel.) In the great majority of the cases the sarcomatous degeneration originates in the sub-mucous connective tissue of the body of the uterus.

Among the sarcomata we must distinguish, as a separate variety, papillary growths taking their origin from the cervix. But there is certainly no reason why we should distinguish a separate class of tumors as "papilloma." We will return to this point later on.

Spiegelberg (l. c.) was the first to describe (in 1878) a case which he designated *sarcoma colli hydropicum papillare.*

It concerned a girl, aged seventeen, in whom papillary formations had rapidly grown from the anterior lip of the os uteri. They bled easily,

and recurred ten months after removal. Microscopical examination showed the growths to be sarcomatous. In consequence of the repeated recurrence of the tumors, Freund finally performed total extirpation of the uterus. The patient died. Rein (l. c.) has placed on record a similar case, calling it *myxoma enchondromatodes arborescens colli uteri.* There is no doubt that this was an instance of sarcoma and not myxoma. The patient was a girl aged twenty-one. The growths recurred and caused the patient's death by becoming gangrenous, and leading to septicæmia.

The next case of "papillary hydropic sarcoma of the cervix" is described by Spiegelberg (l. c.). The patient was thirty-one years old. The sarcoma took its origin from the cervix, and consisted of papillary excrescences, covered by epithelial layers. The interior of the tumor had a myxomatous appearance, owing to the great distension of the interpapillary lymphatics. The growth having frequently recurred, Spiegelberg at length performed total extirpation of the uterus after the method of Freund. The patient recovered.

Winckler (l. c.) has also described a case of this kind observed by Sänger. The patient died after repeated operations for recurrence of the growths.

These four cases are unquestionably instances of sarcoma of the cervix, that differ only in their papillary appearance and dropsical transformation from other cases of sarcoma. The anatomical structure of the cervix (richness of papillæ and lymphatics) sufficiently explains their peculiar features.

## Etiology of Sarcoma.

The causation of uterine sarcomata is involved in still greater obscurity than that of fibromata of the uterus. Our knowledge concerning the causes of sarcomata is, if possible, less definite than it is in regard to the origin of fibroids and of carcinomata, because the number of cases thus far observed is too small to permit of satisfactory generalizations. By adding four cases reported by Simpson, two recently observed by myself, and eleven others to the fifty-six cases which Rogivue collected, I obtained seventy-three cases distributed as follows, with reference to the ages of the patients.

| | |
|---|---|
| Before the 20th year, . . . . . | 4 cases |
| From 20th to 29th year, . . . . . | 5 " |
| " 30 " 39 " . . . . . | 15 " |
| " 40 " 49 " . . . . . | 28 " |
| " 50 " 60 " . . . . . | 18 " |
| Above 60 years, . . . . . | 3 " (one of which occurred in the 72d year.) |

If these statistics justify any conclusion, it would be that the period

of the menopause predisposes somewhat to uterine sarcomata, as it does to other malignant growths. I refer for the rest to what was said of the value of such statistics under the etiology of fibroids, and to what will be said on the same subject, under carcinoma, the cases of which are at least more numerous.

Since some etiological importance has been attributed to the number of births and to sterility by some authors, I here append a table bearing on that question.

Among seventy-four cases of sarcoma (fifty collected by Rogivue, four by A. Simpson, two by Gusserow and seven by J. Clay) twenty-five were sterile,

| | | | | |
|---|---|---|---|---|
| 6 | had | had | 1 | labor. |
| 10 | " | " | 2 | labors. |
| 6 | " | " | 3 | " [1] |
| 5 | " | " | 5 | " |
| 4 | " | " | 6 | " |
| 1 | " | " | 7 | " |
| 1 | " | " | 8 | " |
| 1 | " | " | 9 | " |
| 1 | " | " | 10 | " |

If it be desirable to deduce inferences from so few cases, the number of sterile patients is certainly striking, particularly since, at the age in which these new growths appeared in the above cases, sterility could hardly be regarded as the result of the sarcomatous growths. The reverse is true of fibroids. The contrast, in this particular, between sarcomata and carcinomata, may be noted, for in cancerous uterine disease fecundity seems augmented before the development of the tumors.

## Clinical History, Course, and Symptoms.

Our knowledge of the symptomatology of uterine sarcoma would not be essentially improved by a separate consideration of the two distinct forms of these tumors above described. The two forms have so much in common, have been so little studied and so poorly differentiated in the reported cases, that their clinical pictures cannot be sharply distinguished from each other. It may be stated as a general rule, that fibro-sarcomata present, at first, the symptoms of fibromata, and only demonstrate their sarcomatous nature by their later course. These tumors were, therefore, known in earlier literature, especially in England, as recurrent fibroids.

[1] A case of Simpson's is placed here rather arbitrarily, for he only makes the statement that "the patient had borne several children." Of J. Clay's seven cases, it is stated that six had had repeated labors, and one was barren. For this reason the six have not been reckoned in the special table.

There can be no doubt, after what has preceded, that the tumors in such cases were originally fibromyomata.

The symptoms are due to pressure, and vary according to the location and size of the tumors. The chief one is pain due to growth of the neoplasm, or to its propulsion downwards by uterine contractions. Hemorrhages at first occur particularly in the form of menorrhagia, exactly as they do with ordinary fibroids, and often change their character at a later period, or are followed by a discharge resembling bloody water.

A number of these tumors have been removed, as examples of fibromyomata, by operative means, and their malignant character only detected by subsequent microscopical examination. In other cases their recurrence and their farther course showed that they were not fibromyomata.

There is often, however, even from the beginning, a peculiar difference observed between these tumors and fibromyomata. It consists in softness of the tumor, from which, although it be not gangrenous, pieces may be broken off. These pieces may be penetrated by the finger. The absence of a capsule, in cases of fibro-sarcomata, is frequently striking, particularly during extirpation. Their growth is, moreover, rapid, the pains attendant upon their development unusually violent, and they occasion a discharge resembling the bloody water without becoming gangrenous. They also produce a cachexia, rapid emaciation and a loss of strength incompatible with their apparently benign character.

However variable these symptoms may be, and however little characteristic of sarcomatous growths, the farther course, in all cases of sarcoma, is the same. If they are removed, they soon recur (after an interval varying from four to six weeks, to one or two years.)

The tumor usually grows more rapidly after its recurrence, and occasions more violent hemorrhages, a more abundant discharge, more intense pain and more rapid and marked asthenia.

Repeated extirpations may arrest the course of the disease, even for six and a quarter years (West). Death, however, always occurs, being preceded by intense anæmia, and often with symptoms of fatty degeneration of the heart. In other instances the fatal issue may be referable to intestinal obstruction, peritonitis, or to pyæmia following gangrene of the tumor. (L. Mayer.)

Metastases are rare, but are found more frequently than in cases of diffuse sarcoma. They have been observed in the vertebræ (West, Hutchinson), the lymphatic glands, the lungs, the pleura, the liver, and in the pelvic connective tissue. In the last position the secondary tumors had not been developed on account of mere contiguity of tissue. (P. Müller.)

The symptoms of diffuse sarcoma are very similar to those described. In cases of this variety there is no distinct tumor perceptible by surface examination, the uterus is enlarged and moved with difficulty. (*Conf.* a few cases of West, Gusserow and others, in which these conditions did

not obtain.) The proliferating tissues often protrude, however, from the os uteri, and thus simulate a circumscribed tumor.

The fact that the sarcomatous growths have spontaneously protruded from the os, in these cases, is proven by the absence of genuine uterine pains. Small portions of the tumors are, moreover, easily separated from the latter, and are expelled with the discharge. This does not occur with any other uterine neoplasm. Very violent hemorrhages are hardly ever wanting. They usually soon lose the menstrual type, and are more copious when they begin at or subsequently to the menopause.

There are a few cases in which the hemorrhages, especially at the beginning of the disease, were trivial, or in which there was a persistent although trifling escape of blood.

Together with the hemorrhages and in the intervals between them there is an exceedingly copious, sero-sanguinolent discharge, which usually has a repulsive, fœtid odor, but is not the result of disintegration of the tumor. Disintegration of the sarcomata usually occurs, however, at an early period, and the discharge then assumes the character of the fluid emanating from gangrenous tissues. Most of the cases are characterized by the great severity of the pain, although pain may, in exceedingly rare instances, be absent.

The pains do not, as a rule, possess the characters of rhythmical uterine pains. They are agonizing, tearing pains, which often cause the patients to cry out, and which are frequently difficult to control.

It seems as if the special intensity of these pains was dependent upon the depth to which the sarcomatous infiltration had penetrated, and that the pains were due to morbid changes in the terminal nerve filaments. In regard to other points in the history of this form of uterine sarcomata, the statements made concerning fibro-sarcomas may be reiterated. Recurrences take place, at first, after long intervals. Later they follow each other with increasing rapidity. Death occurs sooner or later, as the result of anæmia and cachexia.

Metastases are far rarer with diffuse sarcoma than with fibro-sarcomata, but the former often penetrates the uterus, invading the abdominal cavity and attacking the pelvic connective tissue, the bladder, the vagina, the rectum and even the external genitals. Its similarity to carcinoma is thus shown.

We herewith present Rogivue's figures, which furnish certain data concerning the course of this disease. Among fifty patients who submitted to an operation, six died soon after the operation, nine escaped farther observation, and three seemed permanently cured.

Recurrences were observed in thirty-two cases. In eight of these the recurrence took place very soon after the operation. In twelve within six months. In ten within one year. In two after one year. Forty patients out of sixty-five died. Twenty-five of these died within a year after

the first investigation, and some of them after three, four and six years. The entire duration of the disease varied between four months (Frankenhäuser, quoted by Rogivue) and ten years (Hegar). The average duration was, according to Rogivue, three years.

Reference should be made, at this point, to the frequency of inversion of the uterus in cases of sarcoma. Taking into consideration the small number of uterine sarcomata actually observed, the number of inversions, four in all, is, at all events, relatively large. These cases were studied by Wilks),[1] Langenbeck (*loc. cit.*), Spiegelberg and A. Simpson. W. A. Freund's case is very peculiar. He diagnosticated sarcoma with hydrometra in the occluded left half of a *uterus septus* and confirmed his diagnosis by the autopsy.[2]

## Diagnosis and Prognosis.

The diagnosis of uterine sarcoma or carcino-sarcoma can, doubtless, only be made by histological investigations. These researches are, however, often impracticable during the patient's life and never furnish pathognomonic data for a diagnosis, unless an examination be made of the whole tumor or of the tumor and uterus while still connected. An approximately correct diagnosis, in cases of fibro-sarcomata, can only be made after extirpation of the tumor, while the small pieces, so readily obtained from a diffuse sarcoma, are by no means sufficient to positively establish a diagnosis.

Since, now, the question of extirpation is really decided by, and the prognosis is chiefly dependent upon, the nature of the tumor, we must attempt to establish the diagnosis by means of clinical data, utilizing microscopical examinations, so far as is possible. It follows from the fact that fibro-sarcomata are often gradually developed from fibromyomata, that a differential diagnosis between them is frequently impossible. All fibro-sarcomata which appear in the form of distinct and isolated tumors give rise to the symptoms of fibroids. We may, therefore, refer the reader to the earlier chapters for these phenomena.

The appearance of a so-called "fibroid," at the time of the menopause, or the sudden growth and increase at this time of a tumor which had previously been of small size, and had produced few symptoms or none at all, should arouse the suspicion that the tumor was originally a fibro-sarcoma, or has been transformed from a fibroid into a sarcoma.

The occurrence of hemorrhages in cases of so-called "fibroid," long after the cessation of the menses, has an important bearing on the diagnosis. While hemorrhages from fibromyomata frequently diminish or

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[1] Lectures on Pathological Anatomy, 1859, p. 404. Quoted by A. Simpson.

[2] The histories of two cases, observed by Gusserow, are here omitted.—Ed.

cease at the menopause, those due to fibro-sarcomata are most profuse at that epoch, since these tumors frequently make their first appearance then. An abundant sero-sanguinolent discharge is even more characteristic of fibro-sarcomata than these hemorrhages, for it is really never produced by simple fibroids unless they are undergoing gangrene. It is, however, not a constant phenomenon in cases of fibro-sarcomata. The chief reason for the difference between the two varieties of new growths, in this particular, is probably that fibroids possess a so-called capsule, which fibro-sarcomata almost always lack. Another prominent reason is that sarcomata are very vascular, and fibromata almost always but slightly so, or that only vascular fibroids are predisposed to sarcomatous degeneration.

The rapid growth of a doubtful tumor, particularly if it take place during the climacteric years, in which fibroids hardly ever grow to any considerable extent, is another evidence in favor of fibro-sarcoma. Unusually violent pains and soft consistency are also characteristics of the latter tumors.

If the tumor be accessible to direct palpation, the softness referred to above, which often permits the finger to penetrate the new growth, or to break off small portions of it, is almost pathognomonic of fibro-sarcoma. Gangrene of a fibromyoma must be excluded by a careful investigation of the case. The diagnosis is usually easy if, in addition to the points mentioned, marked emaciation, asthenia, cachexia, and anæmia make their appearance.

In the event of a successful extirpation, the microscopical examination, and, above all, distinct recurrences, afford definitive evidence concerning the nature of the neoplasm.

The diagnosis of diffuse sarcoma is not so comparatively easy in every case. A differential diagnosis between this variety of sarcoma and carcinoma of the fundus, may be at first impossible. This distinction is, however, practically useless, since a strict differentiation between diffuse sarcoma and carcino-sarcoma can not always be made, even by anatomical appearances.

Sarcoma of the cervix is easily distinguished from cervical cancer, by the healthy condition of the *portio vaginalis*.

The sarcomatous tissues occasionally protrude so far beyond the os externum that they quite cover the border of the os, and seem to completely fill the latter. Careful examination with the finger, and the speculum, must decide the question in such cases.

The differentiation of a diffuse sarcoma from certain benign hypertrophies of the uterine mucous membrane, especially that form recently described[1] by the name endometritis fungosa, is more important, and in

[1] Olshausen, Archiv f. Gynäk., VIII., p. 113.

fact more difficult. This disease occurs less frequently after the menopause than sarcoma, but the age of the patient is not a decisive diagnostic feature, inasmuch as the development of diffuse sarcoma is not exclusively confined to the period in question.

The general condition of the patient, when subjected to long-continued observation, is more significant. In benign fungous endometritis the patient may, it is true, become anæmic, but she never develops a pronounced cachexia.

Endometritis fungosa is rarely attended by any considerable discharge, especially since spontaneous gangrene, so common with sarcoma, never accompanies it. In sarcoma the os uteri is almost always permeable, in endometritis it is usually closed. In sarcoma the uterus is large, infiltrated, and ordinarily painful when it is moved. These points are absent in endometritis. In sarcoma the new growth often projects beyond the os, after the fashion of a polypus. This appearance is never observed in benign hyperplasia of the uterine mucous membrane. Endometritis always remains as a superficial proliferation of the mucous membrane, and never involves the parenchyma; while sarcoma, being originally developed, as a rule, in the deeper structures, always invades them, and extends into and through the uterine parenchyma. Genuine recurrences of endometritis, such as occur with sarcoma, are not observed. The differential diagnosis between these two morbid conditions ought not, therefore, to be very difficult.

The microscopical examination of isolated masses removed from the new growths (even when they belong to a sarcoma and are spontaneously expelled), does not furnish reliable evidence, since one often obtains pieces of healthy mucous membrane, in cases of sarcoma, and in endometritis polyposa, pieces looking like granulation tissue, or small-cell sarcoma.

We omit a consideration of the differential diagnosis between sarcoma, parametritis, cysto-fibromata, hæmatocele, etc., because a careful examination will protect from such errors, and because in cysto-fibromata, a strict distinction between sarcomatous and other cysto-fibromata is impossible, *intra vitam*. Our last reason for the omission is that, in specially complicated and difficult cases, no more can be stated than has been already done.

The prognosis in either form of uterine sarcoma must be characterized, after what has been stated, as unfavorable. These tumors are undoubtedly malignant. There is not a single well-authenticated case of sarcoma on record in which extirpation resulted in a permanent cure. Every tumor of this variety has led sooner or later to death. Nevertheless the prognosis, as contrasted with that of most uterine carcinomata, is a comparatively favorable one. The course of sarcomatous disease is much slower, at least in the beginning. Moreover the growths are more frequently diagnosticated at so early a period, that trivial operative measures, often repeated, may delay their progress and materially retard their development.

We have thus cited some cases above, in which the disease extended over a period of ten years, and the patients were not once so tormented by it as in cancer, but often enjoyed a very tolerable condition of health.

Timely operative treatment has, at all events, a favorable influence upon the course of the disease, since it remains a local one much longer than carcinoma does.

### Treatment.

There is little to be said regarding the treatment of uterine sarcomata, especially since it must be considered *in extenso*, under the head of carcinoma.

Every sarcoma must be removed as speedily and thoroughly as possible. If removal of the tumors is impossible, the treatment must be symptomatic and analogous to that of fibromyomata and of cancer.

In all cases of sarcoma the question will have to be considered of total extirpation of the uterus, or if the neoplasm is confined to the body of the uterus, of supra-vaginal amputation. Operative interference is always called for, provided a positive diagnosis can be made. A more extended consideration of this subject will be found under the head of cancer. It may be said in this connection that total extirpation of the uterus is all the more indicated, since the recurrence of the sarcoma is usually confined to that organ.

Supra-vaginal amputation of the uterus has been successfully performed for sarcoma by Schröder, by Gusserow and others. Total extirpation was done by Freund once (fatal result) and by Spiegelberg once (recovery). Total extirpation per vaginam was successfully performed by Zweifel.

Fibro-sarcomata should, if possible, be thoroughly excised with cutting instruments. Care should be taken not to wound healthy tissues, since the possibility of their inoculation with sarcomatous material (Spiegelberg) cannot be entirely denied. The removal of the tumor must be as complete as possible, because a radical cure is not to be despaired of, and because the recurrence is delayed the longer the fewer the remnants of the tumor left behind. It is, therefore, urgently recommended to excise the tumor as broadly and deeply as possible, and then to thoroughly cauterize the surface of the wound, if this be possible. If the tumor cannot be thus thoroughly extirpated, on account of its soft consistency or of its location, the last resort is the method invariably employed in cases of diffuse sarcoma. It consists in shaving off the diseased tissues with Récamier's curette, or with Simon's sharp spoon, and in energetic cauterization of the surface of the wound. The cauterization may be most effectively accomplished with a fluid escharotic, *viz.*, liq. ferri chloridi, acid. chromic, acid nitric. fort., etc. Under certain circumstances the actual cautery may, with advantage, be applied to the cavity of the uterus, either by

means of the porcelain electrode of a galvano-cautery instrument, or with Pacquelin's apparatus.

The cautery must, naturally, be so applied as to avoid, so far as possible, the dangers of infection, hemorrhage, burning and gangrene. The necessary precautions will be considered in the article on carcinoma.

## APPENDIX.

Although certain fibrous papillomata undoubtedly belong among the connective-tissue series of uterine new growths, it is as yet impossible to consider them separately from other papillomata. Allusion should, however, be made to Thiede's case,[1] in which abundant cartilaginous growths had so invaded a large fibrous papilloma of the *portio vaginalis*, that he designated the tumor a cartilaginous papillary fibroid. Since it recurred, however, after removal, and led to the patient's death by occasioning hemorrhage, we shall revert to the case under malignant papillomata.

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[1] Zeitschrift f. Geburtshülfe, etc., von Schröder, I., p. 460.

# CHAPTER X.

## POLYPI AND ADENOMATA OF THE UTERUS.

### BIBLIOGRAPHY.

The reader is referred to the text-books of former days for the old literature of uterine polypi. Indeed, in the following chapter but little reliance is placed on the older writings, as it was not so very long ago that all pediculated submucous fibromata were regarded as polypi. Billroth : Ueber den Bau der Sehleimpolypen, Berlin, 1855.—Beigel : Krankheiten des weiblichen Geschlechts, II., p. 468.—Hegar and Kaltenbach : Operative Gynäkologie, 1874, p. 258.—Wagner : Arch. f. physiolog., Heilkund, 1855.—C. Mayer : Ueber Erosionen, etc., Berlin, 1861.—Matthews Duncan : Edin. Med. Journal, July, 1871. Aran : Leçons cliniques sur les maladies de l'utérus, 1858, p. 429.—Luna : Des Kystes folliculaires de la matrice, Thèse Inaug., No. 8, Paris, 1852.—M. Martin : Essai sur la tumeur folliculaire hypertrophique, Thèse, No. 65, Paris, 1859.—Barnes : Diseases of Women, London, 1873, p. 789, and On the hypertrophic Polypus, St. Thomas Hosp. Reports, 1871.—Monfumat : Études sur les polypes de l'utérus, Paris, 1867.—McClintock : Diseases of Women, Dublin, 1863, p. 155.—More-Madden : On Diagnosis and Treatment of Uterine Polypi ; Obstet. Soc., Dublin, Obstet. Journal, I., p. 468.

### ANATOMY.

THE chapter on "Uterine Polypi" in German literature, was until recently a voluminous one. To day, however, it would perhaps be better, in the light of more thorough anatomical knowledge, to abolish this term, which is only based on external physical appearances. If, however, it be advisable to retain the expression uterine polypus for pediculated tumors, which seems desirable from practical considerations, only those proliferations of the uterine mucous membrane, which have long been known as mucous polypi, should be designated by the above title.

Pediculated sub-mucous myomata, hæmatoma of the uterus (fibrinous polypi) and proliferations of the mucous membrane are still indiscriminately designated, in accordance with their symptoms and treatment, as "Polypi."

We have already considered pediculated myomata as a special form of these neoplasmata, and we do not, from an anatomical standpoint, include uterine hæmatomata (placental polypi, etc.) among the new growths of the uterus. The term "polypus" must, therefore, be reserved to designate a pediculated proliferation of the uterine mucous membrane.

True, it is somewhat arbitrary, and only appropriate on account of practical reasons, to lay the greatest stress upon the pedicle, but only by it do these proliferations become tumors or neoplasmata in a clinical sense. The difference between a diffuse proliferation of the uterine mucous membrane and a mucous polypus, is only a rough anatomical one, based upon external appearances and not a genuine one, founded upon the structure of these formations. One may, perhaps, even say that we have to deal, in the case of mucous polypi, with isolated circumscribed hypertrophies of the mucous membrane, such as follow general tumefaction of the membrane dependent upon chronic catarrh.

To define adenoma according to modern views is still more difficult.

FIG. 34.—GLANDULAR POLYPI OF THE VAGINAL PORTION OF THE CERVIX. (After *Luna*.)

In the first place we must mention, in this connection, most erosions of the cervix accompanied by ectropium of the mucous membrane. Ruge and Veit[1] have shown that the majority of these conditions belong anatomically to the new formations. Nevertheless we are not in the habit of regarding them in this light, from a clinical point of view. But it is quite true, on the other hand, that as regards the treatment at present adopted by most gynecologists, these erosions are looked upon as growths to be dealt with by ablation, or even amputation of the cervix.

Another form of adenoma must be mentioned here. This variety has been known for a long time. Virchow described it as hypertrophy of

[1] Ruge u. Veit: Zur Pathologie der Vaginalportion, Stuttgart, 1878.—Fischel: Ueber den Bau, etc., der Erosionen der Portio vaginalis. Zeitschrift für Heilkunde, Prague, 1881.—Heitzmann: Spiegebilder der Vaginalportion, Wien, 1883.

the lips of the os, or as follicular hyperplasia. He has shown that these growths are follicular polypi, which produce considerable hypertrophy of the lip, from which they take their origin.

From simple hypertrophy of the cervix, these excrescences differ in being commonly pediculated and arising from a single point of the cervix or its mucous membrane.

The latter participates largely in the pathological alteration, there being crypts, dilated glands, but also new-formed or simply hypertrophied glandular structures. There can be no doubt that the primary affection has its seat in the mucous membrane, and that the hypertrophy of the lips of the os is secondary to that change. This hypertrophy is brought about by a kind of infiltration of new-formed follicles into the cervix. If this process is limited to a single point of the cervix, the diseased part becomes stretched and a pedicle results. But if the cervix is more uniformly affected, the disease has often been mistaken for epithelioma.

Since Oldham's observations, such growths are mentioned in English literature as canaliculated polypi. Not infrequently the large participation of the cervical papillæ, covered by pavement epithelium, marks a transitional form between these and papillomatous tumors.

In addition to the cases of this kind described by Virchow (l. c.), the following authors refer to them. E. Wagner,[1] Martin,[2] Beigel,[3] Barnes,[4] McClintock,[5] Luna,[6] Demarquay and St. Vel (l. c.)., and A. Schulz.[7] The cases of Simon and Ackermann, placed by most writers in this category, appear to belong rather to the papillomata, and will be referred to in that connection.

The third variety of neoplasms belonging to the adenomata differs entirely from those already described. It consists essentially of a proliferation of the mucous membrane of the cavity of the uterus, and quite rarely of that of the cervix.

Besides simple catarrhal swelling of the uterine mucous membrane (endometritis chronica), conditions have long been recognized in which more or less diffuse proliferations of the membrane have been particularly noticeable. Olshausen[8] has only recently described these conditions, and with perfect propriety has separated them, under the name *endometritis fungosa*, from the genuine new formations of the uterine mucous membrane.

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[1] Arch. f. phys. Heilk., 1856, p. 511.
[2] Berl. Beitr. zur Geb. u. Gynäk., II., p. 51.
[3] Frauenkrankheiten, II., p. 469, u. ff.
[4] Diseases of Women, p. 791, and Thomas's Hospital Reports, 1871.
[5] Clinical Memoirs, p. 155.
[6] Des Kystes folliculaires, etc., Thèse, Paris, 1852.
[7] Casuistik der Uterusfibroide, Diss. Jena, 1875, Fall 1.
[8] Archiv für Gynäkologie, VIII., p. 97.

Those symmetrical proliferations of the whole mucous membrane, which are usually connected with moderate dilatation of the glands, may occur isolate in various parts of the body of the uterus. They then appear as small, flat tumefactions of the mucous membrane, as large as a pea or a bean, with broad bases, and not only closely resemble an ordinary mucous polypus, but even produce the same symptoms as the latter. These simple mucous prominences consist of normal, symmetrically hypertrophied

FIG. 35.—FOLLICULAR HYPERTROPHY OF THE PORTIO VAGINALIS WITH SMALL MUCOUS POLYPI. (From the Collection of the Pathological Institute at Strasburg.)

mucous membrane, and have been described and depicted by Virchow.[1] Gusserow,[2] Olshausen (l. c.) and Schröder[3] have called attention to morbid states of the uterine mucous membrane, which, on the whole, completely correspond to *endometritis fungosa*, yet differ essentially from it in the active participation of the uterine glands. The name diffuse adenoma of the uterus has been applied to these conditions, and their malignancy has been maintained by many observers.

[1] Geschwülste, I., p. 241.
[2] Archiv f. Gynäkol., vol. I., p. 246.
[3] Zeitschrift für Geburtskunde, etc., I., p. 89.

Schröder has observed a similar condition, but more in the nature of isolated, pediculated growths, and he has designated it adenoma polyposum. Similar morbid changes have been described by Duncan[1] and Slaviansky, (the cases of Klob[2] and Adolph Schulz might also be placed in this category), by Maslowsky,[3] Winckel,[4] Kuhn,[5] Schatz,[6] and others.

Aside from the above-described *molluscum uteri* (Virchow), those circumscribed tumefactions of the uterine mucous membrane, which usually

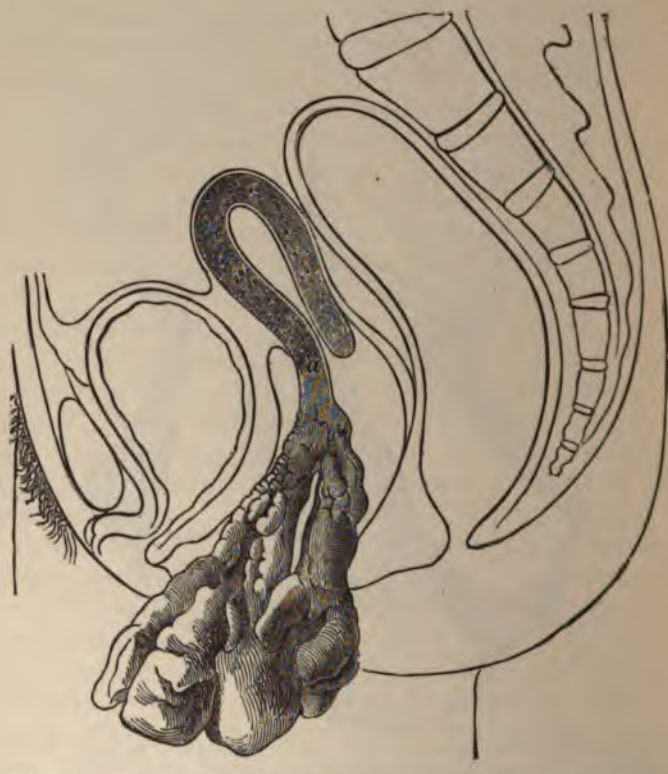

FIG. 36.—GLANDULAR POLYPUS OF THE ANTERIOR LIP OF THE OS UTERI. (After *Beigel.*)

proceed from a chronic catarrh of the cervical mucous membrane, and more rarely from the body, and lead to closure and dilatation of the mucous follicles, have been known as simple mucous polypi. The formation

[1] Obstetr. Journal, 1873, p. 497.

[2] Pathol. Anatomie d. weibl. Sexualorgane. p. 153.

[3] Edin. Med. Journal, Jan. 1882. Comp. also Centralblatt für Gynäkologie, 1882, No. 4.

[4] Pathol. d. weibl. Sexualorgane, p. 40.

[5] Correspondenzblatt schweiz., Aerzte, 1882, No. 17.

[6] Arch. f. Gynäkol., Bd. XXII.

pedicle, which is the essential part of the "polypus," is due to the and protrusion of the mucous follicles produced by swelling of ssues. The *ovula nabothi* are the simplest and clearest example of ocess.

ave here to deal with a retention cyst, which has, at first, a broad nd is elevated above the mucous surface. In its farther growth it es its base, by traction on it, and finally protrudes from the os as us polypus with a slim pedicle. The more such cysts combine with

7.—Cross-section through an Adenomatous Polypus of the Portio Vaginalis. Slightly

her, and the more the proliferating mucous membrane is attenuated tion, the larger and more complicated does the mucous polypus and the thicker is its pedicle.

e tumors, the smallest of which are as large as a pea, and the the size of a hen's egg, are composed of the elements of the uterine membrane, and are covered with layers of both cylindrical and nt epithelium. They contain between their connective-tissue læ numerous cavities, visible to the naked eye, which are dilated The cavities are filled with mucus, which is thick or thin accord-

ing to the period of its retention. There are usually no large vessels in the pedicle. The superficial vessels have ordinarily numerous ramifications and thin walls. This is the reason why the little neoplasms so readily occasion profuse hemorrhages. The favorite seat of mucous polypi is the cervix, which they often widely dilate and transform into a membranous, flaccid sac. They also protrude some distance beyond the os externum. Large-sized formations of this kind are much more rarely found in the mucous membrane of the uterine body. When they do exist they frequently protrude through the os internum or even present the appearance just described. In other cases the os internum does not dilate and the growths remain in the uterus, often without occasioning inconvenience.

The development of numerous small cystic proliferations in the mucous membrane is oftener observed than the formation of one or more large-sized uterine mucous polypi. In aged persons it is not very rare to find the entire uterine mucous membrane covered by numerous isolated, small cystic polypi, resembling the *ovula nabothi*. These polypous growths produce the same symptoms, *intra vitam*, as diffuse hypertrophy of the mucous membrane, with which they were earlier often confounded. *Endometritis fungosa* may, however, as already explained, be anatomically distinguished from *endometritis cystica polyposa*. (Virchow.)

Meixner and Küchenmeister[1] have given a good clinical history of such a case of multiple, small mucous polypi of the uterine body.

By way of appendix we here mention the new growths described by R. Maier,[2] under the title deciduoma. They were small, polypous tumors which projected from the cervix uteri and had been removed. They consisted of decidual tissue.

In one of the cases the patient was pregnant, so that it was probably not a case of tumor in our sense of the word. The other patient was not pregnant, and the supposed tumor, which consisted of decidual tissue, was a hollow cylinder. Farther observations are necessary before a new class of uterine tumors called deciduomata can be established.

Küstner[3] has described a case, called by him deciduoma, in which a tumor actually took its origin from a remnant of the decidua. He holds that this name should only be applied to such cases as he has described.

A unique case of uterine polypus has been recorded by Zahn.[4] The tumor was unquestionably composed of placental tissue, and had taken its origin from a piece of retained placenta. The neoplasm grew through the walls of the uterus, producing by their perforation a fatal peri-uterine hæmatocele.

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[1] Küchenmeister's Zeitschrift für Medicin, etc., 1863.

[2] Virchow's Archiv, vol. LXVII., p. 55.

[3] Archiv für Gynäk., vol. XVIII.

[4] Virchow's Archiv, vol. XCVI., p. 15.

## Clinical History and Symptoms.

The symptoms produced by those erosions which have been described as adenoma, do not differ from those of catarrh of the cervix and body of the uterus. Follicular hypertrophy of the lips of the os gives rise to the same phenomena observed in polypus. But adenoma diffusum as well as adenoma polyposum lead to hemorrhage. At first the bleeding usually retains the menstrual type, but in the farther progress of the disease, metrorrhagia appears.

In this way extreme anæm.a may rapidly supervene. In addition to the bleeding, these new formations are characterized by their tendency to

Fig. 38.—Mucous Polypus projecting from the Os Uteri. (After *Luna*.)

recur after removal, and by the undeniable fact that, in a certain proportion of cases, they eventuate in cancer. Observations confirming this have been recorded by Breisky, Schröder, Maslowsky, Winckel, Schatz and others.

The symptoms produced by the various kinds of polypoid growths are almost without exception simple and identical. Only when the polypus is in the uterine cavity does it occasion pain, and then only when it is unusually large, and has not passed through the cervical canal. When it has passed through this canal, or when its original seat is the cervix, as is usually the case, it produces no painful sensations. If the polypi are large enough to fill the vagina, or if in virtue of their long pedicles they

have protruded between the external organs of generation, they occasion in the latter symptoms of pressure and of irritation.

Two symptoms which are, however, very constant and of great importance, are seldom or never lacking. These are hemorrhage and a muco-purulent discharge. The hemorrhages due to the vascularity of these little tumors, and to the tenuity of the epithelium covering them, occur particularly in the beginning at the menstrual epoch. They are, however, often irregular and may be violent or trivial. Slight hemorrhages are especially liable to occur after every injury inflicted upon the polypus as it hangs in the vagina, as, for instance, after violent exertions, straining at stool, after every coitus, etc.

Any given hemorrhage is seldom dangerous, but frequently repeated losses of blood produce severe chronic anæmia

Besides the hemorrhages the patients are, almost without exception, afflicted with a copious muco-purulent discharge, which is partly secreted by the tumor, but is chiefly due to the chronic catarrh of the uterine and cervical mucous membrane. When the tumors are located in the cervical canal, or have escaped from it, and are situated at the os externum, the so-called erosions of the os, desquamation of the cervical epithelium, ulceration and extrusion of the swollen cervical mucous membrane are rarely absent.

Even very small polypi frequently cause sterility partly as a result of the conditions just described, and partly by occlusion of the os. When situated near the uterine opening of the Fallopian tube, they may occasion tubal pregnancy by mechanically opposing the exit of the ovum from the tube, or by producing catarrh of the tubal mucous membrane through their irritant action on all adjacent tissues. Such a case is detailed by Breslau,[1] in which the polypus, which was situated near the opening of the left Fallopian tube, had caused intense tumefaction of its mucous membrane, thus preventing the advance of the ovum.

Little need be said about the clinical history of polypoid growths. If not opportunely removed, they may induce extreme asthenia from hemorrhage, yet they may be tolerated during a life-time without great inconvenience. If the pedicle grows thin, owing to long-continued existence of the polypi, or to their rapid development, the latter are often spontaneously separated, and thus disappear. This frequently results from examination and use of the sound. In rare instances the tumors become gangrenous, and may, for a time, simulate carcinoma of the portio vaginalis, owing to their fœtid discharge and their eroded appearance.

### Diagnosis.

The diagnosis of polypoid growths is easy, so soon as they have effected their escape from the external os. Their softness and the presence of a

[1] Monatsschr. f. Geburtsh., XXI., Supplement, p. 119.

pedicle render them recognizable by touch and by the speculum. By the same methods we may discover whether the growths are connected with the external os, the portio vaginalis or the cervical canal. This distinction is difficult only when the tumors have a short pedicle, protrude but slightly from the uterus, show a lobulated structure, or are gangrenous, as is not often the case. In such cases the tumors have been mistaken for epithelioma.

Small polypoid growths which only reach and protrude into the os externum, have been overlooked or considered as erosions of the cervical mucous membrane. In these instances they were at fault for the persistence of the erosions.

Remnants of the membranes, shreds of decidual tissue and even a small ovum, in cases of abortion, have been mistaken for polypi. Careful examination by palpation and inspection protects against these and similar errors. It may often happen, however, that a small polypoid growth is plainly recognized at one examination, but can not subsequently be discovered, since polypi are often easily separated by manipulation.

While polypoid growths originating in the cervix may thus be diagnosticated without much difficulty, those situated in the uterus are often overlooked, because they cannot be recognized until the os uteri has been dilated. Patients with polypi are often subjected to a long course of treatment for menorrhagia, leucorrhœa and slight enlargement of the uterus, as cases of chronic metritis, until, finally, the dilatation of the os discloses the presence of a small polypoid growth. When the above-mentioned symptoms are present, and particularly when the hemorrhages are irregular, or the uterine discharge is sanguinolent, the attendant should dilate the cervix with sponge tents, or by other means, and convince himself either of the presence or of the absence of a polypus.

If the dilatation be carefully executed, it can result in no harm, and even a negative result of the examination will be useful with reference to the subsequent treatment. The use of the sound does not lead to so certain or easy a recognition of intra-uterine polypi, many authors to the contrary notwithstanding. Dilatation of the os internum must never be omitted if, in addition to the above signs of polypus, spontaneous dilatation of the os occurs, or the portio vaginalis assumes a semicircular form.

The diagnosis of the various forms of *adenoma uteri* (*diffusum et polyposum*) is only possible after the cavity of the uterus has been made accessible. In all cases of profuse and long-continued hemorrhage, it will be necessary to scrape the internal surface of the womb with a Simon's scoop, or simply with a curette. A microscopical examination of the removed masses will then have to be made, in order to determine the true nature of the affection. It is, however, by no means easy to always reach a diagnosis, especially as there occur transitional forms from simple endometritis fungosa to adenoma, and because the number and size of the uterine

glands varies within physiological limits. Nevertheless the larger the glandular formations and the greater their numerical preponderance over the interstitial tissue, the more certain it is that we have to do with adenoma. But microscopical examination will scarcely justify us in deciding as to the possible malignancy of an adenoma. For if we find cellular hyperplasias in the gland structures, and nests of atypical formations, we are no longer in presence of an adenoma, but are already dealing with cancer. Thus the clinical history of a given case, such as rapid recurrence of the growth, will afford more valuable evidences on the point in question than the microscope alone can furnish.

## Treatment.

The only treatment for polypoid growths consists in their removal. The removal of most of these tumors is very simple, owing to the tenuity of their pedicles. It is only necessary to seize them with appropriate forceps, and to separate them by torsion or evulsion. This method is not appropriate to the removal of large polypi with thick pedicles, which should be cut off. Should there be grounds to apprehend hemorrhage, which in some cases of cervical glandular polypi may, indeed, be considerable, the pedicle should be ligated before it is cut, or the wire *écraseur* or galvano-cautery be employed.

In general, however, one may dispense with these troublesome procedures and make use of the vaginal tampon, or of cauterization of the cut surface to arrest the bleeding. Serious injury hardly ever results from the removal of polypoid growths, unless metritis or parametritis are excited by dilatation of the cervix, undertaken for the purpose of removing the polypi.

Brown[1] saw tetanus follow the removal of an intra-uterine polypus by means of torsion.

His description plainly shows, however, that the case was one of mucous, and not of so called fibrous polypus. All the instruments invented for the removal of "polypi," and which are called "polypotomes," are superfluous, as has been previously explained.

The treatment of erosions is the same as that of catarrhal conditions, although at times it will be necessary to resort to surgical measures. But for follicular hypertrophy of the lips, ablation of the affected portions is called for.

The therapy of true adenoma is less simple. Curetting the cavity of the uterus under antiseptic precautions is necessary in the first place. Personally I am in favor of following this up by an injection of tincture of iodine, with the idea of preventing or retarding a return of the growth.

[1] Boston Gynecological Journal, vol. II., No. 2.

But the more clearly the case is one of adenoma, the smaller will be the benefit derived from this method of treatment. Preliminary dilatation of the cervix is not, as a rule, necessary for the performance of this operation.

If repeated recurrences of the new formations show that they are malignant, it only remains to practice supra-vaginal amputation, or to do total extirpation of the uterus, either by laparotomy or per vaginam.

The principles underlying our actions, as well as details of the technique, will be found under the head of cancer of the uterus. It may be said here, however, that the prognosis in adenoma is better than in carcinoma.

Schröder, Müller and myself have performed supra-vaginal amputation for adenoma diffusum without recurrence of the growth. Schröder, Schatz, A. Martin and others have done total extirpation of the uterus for this variety of adenoma. Martin reports that he has twice observed a recurrence of the adenoma, or the formation of cancer in the cicatrix. In these cases the uterus was removed per vaginam.

# CHAPTER XI.

## PAPILLOMA OF THE UTERUS.

### BIBLIOGRAPHY.

The following is not a complete list of all the works treating of papillomata of the uterus. The text-books, already several times referred to, have also been omitted. John Clarke: On the cauliflower excrescence from the os uteri, Trans. of a Society for the Improvement of Med. and Surg. Knowledge, vol. III., 1809, p. 321, also Edin. Med. and Surg. Journal, vol. XVIII., 1822, p. 480:—Charles Clarke: Observations on some diseases of females which are attended by discharges, London, 1821, vol. II.—Gooch: An account of some of the most important diseases of women, London, 1829, p. 300.—J. G. Simpson: Edin. Med. and Surg. Journal, 1841, p. 104, and Dublin Quarterly Journal of Med. Science, vol. II., 1846, p. 352. —Stafford-Lee: Von den Geschwülsten der Gebärmutter, Berlin, 1848, p. 96.—Virchow: Gesammelte Abhandlungen, 1856, p. 1015, und Cellularpathologie, Berlin, 1871, p. 551.—L. Mayer: Verhandlungen der Gesellschaft für Geburtshülfe, zu Berlin, vol. IV., p. 1851, 111.—E. Wagner: Gebärmutterkrebs, Leipzig, 1858, p. 12.—Mikschik: Zeitschr. d. Ges. d. Aerzte, Wien, 1856, XII., p. 40.—Braxton-Hicks: Guy's Hosp. Reports, 1861, VII., p. 241.—H. Beigel: Zur Pathologie d. Blumenkohlgewächse, Virchow's Archiv., vol. LXVI.

IT seems at least doubtful whether it is justifiable to retain the class of papillomata in the category of uterine tumors. Virchow's[1] statement that both connective-tissue tumors (fibromata) may occur in the form of condylomata and papillary tumors, and that cancerous and epitheliomatous formations may assume the cauliflower appearance is, doubtless, true. Since, however, the mere outward form of a tumor does not justify the establishment of a special class of neoplasms, *i.e.* the cauliflower growths of the os, this term, which since J. Clarke's time, has produced much confusion, should be simply dropped. From what follows it will, however, be seen that it is proper, viewed from either a clinical or an anatomical standpoint to apply the name cauliflower tumor or papilloma of the uterus to a certain class of neoplasmata.

Fibrous papillary tumors of the portio vaginalis are not frequent, and may be characterized as benign growths. They consist of enlarged and proliferating preexisting papillæ, and their surface is usually covered with squamous epithelium. Their fibrous character is shown by the fact that their pedicles are composed of connective tissue and muscular fibres.

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[1] Cellularpathologie, Berlin, 1871, p. 551.

These papillary fibromata thus completely resemble a "polypus," particularly in that they seldom attain any considerable size. Their symptoms are those of "polypi," *viz.*, hemorrhages and muco-purulent secretions. They rarely become gangrenous. They do not recur after removal. The purest example of this variety is described by G. Simon[1] under the title "wing-shaped elongation of the anterior lip with simultaneous abnormal elongation of the entire portio vaginalis of the cervix." The tumor, which was attached to the hypertrophied anterior lip, was pedicu-

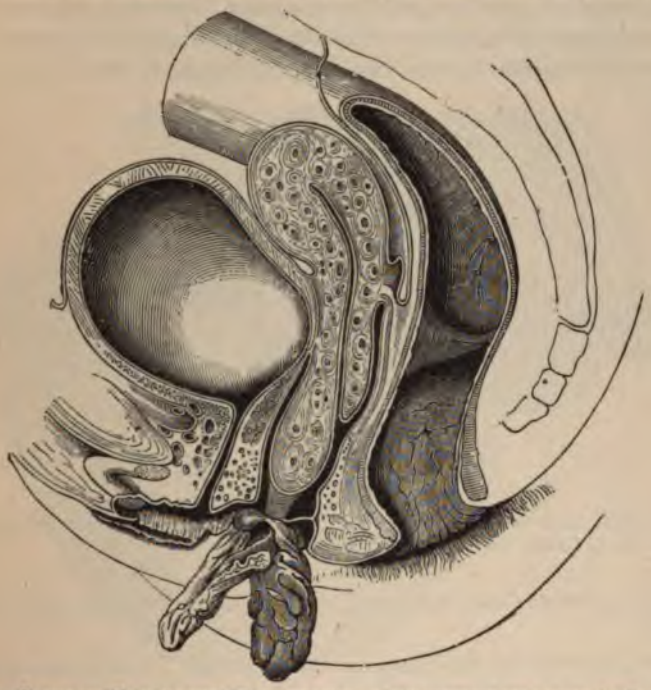

FIG. 39.—PAPILLARY FIBROMA WITH HYPERTROPHY OF THE ANTERIOR LIP OF THE OS UTERI. (After *G. Simon.*)

lated and composed of a layer of dense connective tissue from which closely approximated, slender papillæ projected.

The papillæ are covered with a thick layer of epithelium cells, superimposed upon each other in several strata. There is no trace of follicles or of mucous glands to be seen. The relations are more complicated and the diagnosis of the tumor more difficult if the glands are involved in the morbid process. This was the case with the tumor described by Ackermann,[2] as a "glandular polypus of the anterior lip."

The tumor was as large as an apple, was attached by a pedicle to the

[1] Monatsschrift für Geburtskunde, XXIII., p. 241.

[2] Virchow's Archiv., vol. XLIII., p. 88.

anterior lip, and consisted chiefly of connective tissue, which formed the pedicle and the ramifying papillary processes of the new growth. The papillæ were clothed with a thick coating of pavement epithelium arranged in numerous layers. In other places the surface was dotted with slender villi, covered with a single layer of cylindrical epithelium.

Sections from the interior of the tumor showed long cavities, opening, in part, toward the periphery and clothed with cylindrical epithelium. There was, therefore, a proliferation or new formation of the cervical follicles, together with the papillary growths. Two years after the tumor had been excised, on account of profuse hemorrhages, the cicatrix showed no noteworthy appearances. Two small, pediculated tumors, of the same

FIG. 40.—PAPILLARY FIBROMA WITH NEWLY-FORMED GLANDULAR TISSUE, STARTING FROM THE ANTERIOR LIP OF THE OS UTERI. (After *Ackermann*.)

kind had, however, been developed on the portio vaginalis and had been removed.

A case described by Rindfleisch,[1] by the name "papilloma cysticum," certainly also belongs in this category. In his case, however, the cavities lined with epithelium were said not to have originated from the follicles, but by coalescence of papillæ, at their apices.

Thiede's[2] tumor, called by him "fibroma papillare cartilaginescens," also belongs in this class, as do also the previously described papillary sarcomata.

It is certainly unjustifiable to erect these tumors into a special class, and even to call them cauliflower tumors, although they have many characteristic features, and can hardly, on account of their form and clinical history, be included with the fibromata.

Still less is this justifiable in the case of papillary cancer of the cervix,

[1] Pathologische Gewebelehre, 1869, p. 63.
[2] Zeitschrift f. Gynäkol., etc., v. Schröder, etc., I., 460.

or epithelioma, although the error is daily committed and has found its way into many text-books.

We shall see that this common disease has such well-defined anatomical and clinical features that it quite suffices to designate it by the term epithelioma, and that the addition of the title cauliflower growth has only produced confusion. If one says, as is now customary, epithelioma or cauliflower growth (papilloma) of the uterus, the latter name is superfluous and may be dropped.

Nevertheless, it seems proper, in accordance with the good, original observations of Clarke, Gooch and others, to apply the title cauliflower-growth (papilloma) to a peculiar form of cervical neoplasm in order to

FIG. 41.—MICROSCOPICAL SECTION OF THE TUMOR DEPICTED IN FIG. 40. (After *Ackermann*.)

emphasize the characteristic peculiarities of the same. It is certain that papillary tumors of the portio vaginalis are encountered, although very infrequently, which doubtless belong to the class of carcinomatous growths, but which are, for a long time, not cancers and do not possess the anatomical or the clinical features of the latter. These papillomata probably invariably become cancers, if left to themselves, but they are certainly not cancers for a long time and do not recur if removed during the period in question.

Clarke, and afterward Gooch, accurately described the tumors called, from their external appearance, cauliflower-growths of the uterus, as neoplasmata proceeding from the lips of the os, especially from their outer surface. They consist of isolated villi, which impart a wart-like appear-

ance to their surface, so that, in reality, no term so well describes their aspect as that in question. The color of the tumors is either light or dark red unless the surface be gangrenous, which is not often the case.

Even Clarke pointed out the vascularity of these tumors and compared them, in this particular, with the placenta. He also showed that, after removal of the tumor, it completely collapsed, owing to emptying of the vessels, and was found to consist of a small quantity of solid tissue. The later histological researches of Simpson, Virchow and others proved that these tumors consist of proliferation of the papillæ into the mucous membrane of the portio vaginalis. The papillæ are, according to Klob's perfect description,[1] either simple or compound. They usually terminate in fine points and are covered with a thin epithelial layer. In these slender papillæ, often consisting, as it seems, of embryonic connective tissue, are situated large capillary plexuses or single vascular loops with remarkably thin walls. None of these cases are characterized by ingrowing of the epithelium into the papillæ, by isolated epithelial proliferations, or, in fact, by any microscopical features of epithelioma. The clinical history of the new growths at first corresponds to their structure. The tumors occasion no pain, and their growth appears to essentially depend on the expansibility of the vaginal walls.

Even J. Clarke called attention to the fact that in nulliparæ whose vaginæ are narrow and rigid, the growth of papillomata is much slower than in multiparæ, the walls of whose vaginæ are always relaxed. Spontaneous superficial necrosis and gangrene of the tumors are, moreover, rare. The ever-present symptoms which early direct the attention of patient and physician to the new growths, are the profuse watery secretion and the unusually profuse hemorrhages. After the preceding description of the structure of these tumors, the above-mentioned symptoms are easily comprehensible.

The attenuated walls of the widely dilated vessels, and the thin layer of connective tissue and epithelium which separate the vessels from the surfaces, render an abundant serous secretion and the profuse hemorrhages almost unavoidable. The serous, watery, usually odorless discharge takes place continually, in almost incredible quantities. Ramsbotham (*loc. cit.*) mentions a case in which the patient used twenty dozen towels weekly to catch the discharge; all the towels were completely saturated.

The violent hemorrhages are due, at first, to accidental causes resulting in laceration of the tumors. At a later period they occur spontaneously. All observers have been struck with the comparative immunity of patients affected with these tumors from constitutional symptoms. The fact that new growths, such as those described, do not recur if carefully removed

[1] Path. Anatomie d. weibl. Sexualorgane, Wien, 1874, p. 141.

from a healthy portio vaginalis, harmonizes with the characteristic just alluded to. Such operations are followed by a complete cure. Simpson (*loc. cit.*) found that one of his patients was quite well six years after the removal of such a tumor, and that she had borne three children since the operation. Colombat found no traces of a recurrence two years after the operation, and Boivin and Duparque (quoted by Simpson) none in two cases, after four years.

Although these tumors, therefore, at first laid claim to a separate classification, farther anatomical and clinical observations soon proved their relation to carcinomata. It is due to this fact that papillomata, as has been above explained, are either erased from the list of uterine tumors or simply designated as epithelioma of the cervix. Neither course is correct.

Virchow deserves the chief credit of having first microscopically demonstrated that extensive epithelial proliferations, usually of an atypical nature, are already present in many of these "papillomata." He also showed that nests of epithelial elements are found in the tissue of their deeper layers, and that, in fact, the tumors are carcinomata, which have assumed the form of a papilloma. He accordingly made a positive distinction between benign papilloma and malignant papilloma, *i.e.*, epithelioma.

C. Mayer then demonstrated, by clinical investigations, that these cauliflower growths "constitute the first stage of cancer." Such papillomata doubtless become transformed into cancers by the proliferation of their epithelial elements, after having existed for a long time. One often encounters carcinomatous infiltration on extirpating a supposed papilloma, or the tumor recurs soon after its removal, either at the site of the operation or in its vicinity. Cases such as that so well described by E. Wagner (Gebärmutterkrebs, p. 13) unquestionably occur, in which, after the removal of a pure papilloma, such as those described above, and in which most careful examinations failed to detect any epitheliomatous tissue, death nevertheless resulted from pronounced uterine cancer five months after the operation

It is, therefore, certainly justifiable to recognize the connection between cauliflower growths and cancer, and, perhaps, to simply characterize them as initial stages of the latter. (*Conf.* also Gusserow, Carcinoma Uteri, Volkmann's Klin. Vorträg, p. 10.) It seems, however, practically important to dignify this initial stage of uterine cancer, which is so well defined in regard to both its anatomical and its clinical features, with a special name. The treatment of these new growths is identical with that of epithelioma, and the reader is accordingly referred to the chapter treating of that subject.

# CHAPTER XII.

## EPITHELIOMA AND CARCINOMA OF THE CERVIX UTERI.

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### ANATOMY.

THERE is no task more difficult, at the present time, than that of defining the anatomical conception of "cancer," from a purely medical point of view. While it seemed likely for a long time that histological investigations would furnish us with exact ideas as to the

causes of the malignancy of certain tumors that have for centuries been called cancer, almost the contrary has resulted; for our anatomical comprehension of this most important group of affections has been greatly obscured, on the one hand, by the multiplicity of observations, and on the other by the dispute as to the starting-point of cancerous development. Although it is true that the epithelial character of cancerous neoplasms is almost universally acknowledged, by which remark I do not mean to assert that it has been decided whether it is the connective tissue or already existing epithelium of whatsoever variety that furnishes the matrix, yet the mystic formula of "atypic epithelial proliferation" no longer suffices to characterize carcinoma. As before, these neoplasms are still "malignant epitheliomata." It is not their morphological constitution, but their biological history, their clinical course, the study of their conduct while still a part of the living organism, and their relations to the latter, which are decisive. For ages back it has been known that tumors often develop in the uterus, especially in its vaginal portion; that these tumors make their appearance as a rule in later life; that they often break down resistlessly, invading the surrounding tissues, causing hemorrhage and signs of gangrene, not infrequently giving rise to new deposits in distant organs unconnected with the original site of disease, and that finally they lead to the death of the individual, partly from the direct local effects of the disease and partly by its debilitating influence upon the whole organism (cachexia). These neoplasms constitute one of the most frequent sources of disease of the female genital tract and have always been termed cancer of the uterus.

Now, while the above purely clinical definition may sound very old-fashioned, it still possesses the undeniable advantage of not overstepping the bounds of what we positively know. Although anatomico-histological research has been unable as yet to give us a satisfactory explanation of the malignancy of cancer, and has yielded scarcely any definite information regarding its etiology, yet we can by no means afford to neglect results gained in numerous painstaking investigations, if we desire to obtain any enlightenment as to the nature and course of this malady.

We may divide cancer of the cervix uteri into two great classes, which we will designate by their old appellations of epithelioma and carcinoma. If we employ Kleb's[1] classification, which, as far as my experience goes, conforms most closely with clinical observations, we may distinctly differentiate the flat epithelioma of the cervix, the cancerous ulcer, from the papillary variety. We have, besides these, the parenchymatous or infiltrated form of cancer of the uterus, which we might as well call carcinoma. Let us see how far this division corresponds with Billroth and Waldeyer's classification of epithelial and glandular carcinoma. In the first place

[1] Handbuch der patholog. Anatomie, vol. I., p. 867.

let me give Kleb's description of the above-mentioned varieties in the words of their author: The "flat epithelioma" of the cervix originates from the internal surface of the os uteri, strictly speaking from that part which is provided with transitional epithelium. The deeper epithelial strata of this region penetrate, according to Klebs, into the stroma of the mucous membrane and into the muscular tissue. The more the circulation is affected by the inward proliferation, the more rapidly do the epithelial masses on the surface break down, so that we not infrequently find a deeply excavated, crater-shaped ulcer extending up to, or even beyond, the internal os at a time when there is as yet no trace of disease on the external surface of the vaginal portion. Every experienced gynecologist will remember having met with one or more instances of limited epitheliomatous ulceration of the external os, the portio vaginalis seeming to be in other respects healthy: these cases will have appeared to have offered a good opportunity for amputation through sound tissues, but close examination will have disclosed but too often that the cancerous destruction had already extended high up into the cervix and beyond the fornix of the vagina. The deeper the ulceration and the more extensive the invasion of the submucous tissues the greater is the attendant necrosis. In this way very large cavities are often formed—the destructive process invading the bladder, the vagina, and the rectum.

The papillary epithelioma begins, according to Klebs, on the vaginal aspect of the cervix, as a papillary hypertrophy. The proliferating epithelial investment of these new structures invades the subjacent tissues and then breaks down. New papillary excrescences develop on the base of the resulting ulcer, these in their turn necrose, and thus the process repeats itself until, finally, the most extensive destruction ensues, although perhaps its progress is somewhat less rapid than in the preceding variety.

Carcinoma proper begins in the deeper tissues of the uterus, and consists of more or less firm, nodulated deposits, covered by healthy mucous membrane, which, spreading towards the surface only after a time and by no means invariably, become gangrenous and break down, forming cancerous ulcers which produce rapid necrotic disintegration of the tissues. It was formerly believed that this form of cancer originated in the connective-tissue framework of the uterine substance, but such opinion is not accepted by modern investigators, who hold that this variety also commences in the mucous membrane. Klebs, for instance, is inclined to locate the starting-point of the disease in constricted cervical glands. He assumes that the ovula nabothi in the region of the internal os are to a certain degree disposed to undergo cancerous metamorphosis, and explains in this way how this form of carcinoma of the uterus tends to extend upwards into the body and fundus of the organ, as well as downward into the cervix. In either case spheroidal tumors develop, which project

beyond the surface, or are distributed as isolated nodules in the muscular strata of the uterus and also as large nodes in the pelvic connective tissue. The individual masses are usually soft and succulent, and consist of irregularly shaped epithelial cells, often imbedded in a scanty interstitial tissue. Almost all authors recognize two forms of carcinoma of the uterus. Förster describes a papillary and a parenchymatous epithelial cancer. Waldeyer[1] recognizes only epithelioma of the uterus. He has observed but one case of cancer develop from the glands of the cervical canal, and he believes that these cases are very rare. According to Waldeyer epitheliomata of the cervix originate from intra-papillary inward prolongations of the rete Malpighi of the lips of the os. If the papillæ of the mucous membrane participate to any great extent in the process, a papillo-villous growth results; otherwise the affection consists either of a circumscribed or a diffuse infiltration, occasioned by an ingrowth of the deeper layers of the epithelium into the connective-tissue substratum.

These views are on the whole nothing more nor less than the application of the current hypotheses of carcinoma in general to carcinoma of the uterus. The researches of Ruge and Veit have led these investigators to entirely different results, and have been widely accepted, especially since they allow a readier comprehension of the clinical history of the various forms of cancer. Even the treatment of cancer has been influenced by the results of their anatomical researches. Nevertheless we need further studies before we can decide upon the true value of their investigations. These authors, then, as well as Schröder, distinguish positively between cancer of the portio vaginalis and cancer of the cervix proper. They claim that cancer of the "vaginal portion" never originates in the pavement epithelium of the surface, but starts from the deeper connective tissue, or from the newly-formed glands found in erosions. Its boundary line would appear to be the external os, and it does not invade the cervix or body of the uterus. When it extends, the vagina and peri-uterine tissues become affected.

Cancer of the cervix, on the other hand, starts from the connective tissue of the walls of the cervix, from submucous nodules, or from the glands of the mucous membrane. The disease does not extend outward beyond the external os, but very readily passes beyond the internal os, and thus reaches the pelvic cellular tissue.

The simplicity of this description certainly has much in its favor, but we must not forget that daily practical experience shows that the above distinctions are not very easily ascertained. So that while these views may be welcomed as an attempt to elucidate a confused subject, they are not to be received as having finally settled it.

It has recently been demonstrated that carcinoma may develop from

[1] Spiegelberg, Archiv f. Gynäkol., II., 233.

adenomata, that is from neoplastic utricular glands. Testimony to this fact is offered by cases reported by Breisky-Eppinger, J. Veit, and others.

Heitzmann (l. c.) in many respects follows the teachings of Ruge and Veit. He describes, in addition, a variety of cancer resembling epithelioma of the skin, and corresponding to the "rodent ulcer" of older observers.

Apart from these observations, next to nothing has been written concerning the initial stages of carcinoma of the uterus Liebman[1] is of the opinion that epithelioma of the vaginal portion develops oftener than has heretofore been imagined from papillary excrescences of the mucous membrane of the cervix above the external os, and that it is therefore hidden from direct observation for a long time. He reports three cases of this description. Kiwisch, Wagner and others describe a similar condition. Virchow[2] in particular reports a case in which the cervical canal was in a

FIG. 42.—CAULIFLOWER EXCRESCENCE OF THE PORTIO VAGINALIS. (After *C. Mayer.*)

state of cancerous degeneration as far up as the internal os, while the external os was perfectly healthy. Starting from this point the cancerous infiltration had invaded not only the cellular tissue between the bladder and the vagina, but had also involved the lymphatic glands and the vessels of the uterine adnexa, and had given rise to metastatic deposit in the kidneys, the supra-renal capsules, and the cutis. Schröder[3] mentions a similar case.

Hegar[4] describes a case in which the vaginal portion had undergone cancerous degeneration, but which at the first glance seemed to differ in no respect from one affected by simple benignant hypertrophy. Microscopical examination disclosed marked hypertrophy of the connective tissue, with an abundant cellular proliferation, in the meshes of which

[1] Clinical notes on the early Course of Cancer of the Cervix Uteri. Transact. of the Obstet. Society, London, XVII., p. 66, and Cenni clinici intorno al primi stadii del cancro del collo uterino.

[2] Monatsschrift f. Gerburtskunde, X., p. 4.

[3] Handbuch der Krankheiten der weiblichen Sexualorgane, 1st ed., p. 270.

[4] Virchow's Archiv, vol. LV., p. 245.

were scattered collections of epithelial cells having no alveolar boundaries. No papillary excrescences could be detected in the mucous membrane of the cervix, nor was there any evidence of the origin of the neoplasm from the glandular tissue.

Although the title of this chapter would imply that in the consideration of cancer of the womb we have first to treat of the development of the disease in the cervix, we have nevertheless already identified carcinoma of the uterus with that of the vaginal portion. This is justified by the fact that the disease in the great majority of cases is confined to the cervix. Pichot[1] believes that an isolated affection of the fundus occurs only six times in one hundred cases of carcinoma of the uterus. Blau[2] found about the same ratio—that is, six instances of isolated affection of the corpus uteri among ninety-three cases of cancer of the uterus. Courty,[3] indeed, found but one case of this kind among four hundred and twenty-nine cases of carcinoma of the uterus. The statistics of Förster[4] yield almost the same result; of four hundred and twenty cases of cancer of the womb, observed in Vienna, but one of carcinoma of the fundus.

Goldschmidt[5] observed only one instance among 900 cases of malignant degeneration.

These figures will suffice to show the rarity of isolated, primary cancer of the fundus uteri. Now although it is true, as will be shown later, that recent investigations have demonstrated a somewhat greater frequency of these cases, still it must not be forgotten that quite a number of these tumor formations belong to the group of sarcomata, while others have been merely instances of extension of the disease from other organs to the fundus uteri, and therefore have no bearing on this point.

Of the various forms of cancerous disease of the cervix which we indicated above, both the flat ulceration and the papilllary cancerous ulcer should be grouped together under the common name of epithelioma, while the term carcinoma may be restricted to that variety which is located in the deeper tissues of the portio vaginalis, beneath the unaffected mucous membrane. This distinction is not without importance from a symptomatical and therapeutical aspect, but it cannot be strictly maintained, since both forms become similar as soon as necrotic disintegration has set in. Moreover, they are undoubtedly met with in combination, or, to speak more correctly, one may become converted into the other. Thus after removal of an epithelioma in the portio vaginalis, one not infrequently finds fresh cancerous nodules developing higher up in the uterus,

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[1] Étude clinique sur le Cancer du corps, etc., de l'utérus, Paris, 1876.

[2] Einiges Pathologisch-Anatomiches über den Gebärmutterkrebs, Berlin, 1870.

[3] Maladies de l'utérus, p. 1012.

[4] Scanzoni, Beiträge, IV., p. 30.

[5] Beiträge, etc., der Berliner geburtshülfl. Gesellschaft, III., p. 120.

although there is no recurrence of the epithelioma *in loco*. For these reasons it is also exceedingly difficult to determine, with any degree of accuracy, the frequency with which epithelioma and carcinoma of the portio vaginalis occur. In this connection I will mention only the results which I have tabulated in a previously published article,[1] according to

FIG. 43.—EPITHELIOMA INVOLVING THE MUCOUS MEMBRANE OF THE CERVIX UTERI. (From the Collection of the Pathological Institute at Strasburg.)

which, among 203 cases in which an anatomical diagnosis was possible, there were but 17 in which carcinoma alone, without papillary excrescences, was observed.

Even when we adopt the newer classification, as given above, the same difficulties present themselves. Thus Hofmeier[2] has collected 812 cases

[1] Volkmann's Klinische Vorträge, No. 18.

[2] Zur Statistik des Gebärmutterkrebses und seine operative Behandlung, Zeitschr. f. Geb. u. Gynäkol., vol. X., 1884.

of cancer of the uterus observed at Schröder's clinic. Of this number 236 cases involved the portio vaginalis, 181 the cervix, and 28 the body of the uterus. 367 cases could not be classified.

FIG. 44.—CANCER OF THE CERVIX UTERI AND VAGINA, WITH EXTENSION TO DOUGLAS'S POUCH. (Specimen of *Dr. Wyder.*)

This corresponds with what has been recognized from time immemorial by all close observers, namely, that cancer of the uterus in the great majority of cases, not only commences as a localized affection of the cervix, but also retains its local character up to the very end; the rarity with

which epithelioma, in any part of the body, becomes generalized, has long since been recognized. Instances of epithelioma of the portio vaginalis, with disseminated deposits in distant organs, so-called metastases, undoubtedly occur, but they are exceedingly rare. Those cases of cancer of the uterus which have been found associated with metastases elsewhere, were in all probability cases of carcinoma of the body of the uterus, in the above-defined sense of the term. Both forms of cancer extend by simple continuity to the neighboring tissues and organs. Beginning at the portio vaginalis, the affection very soon passes the internal os and attacks the body of the uterus. (In 93 cases Blau, l. c., found that in 87 the disease unquestionably began in the cervix uteri, being confined to

FIG. 45.—CANCER OF THE PORTIO VAGINALIS OF THE CERVIX. Stenosis of Cervical Canal. Hydrometra. (Specimen of *Dr. Wyder.*)

this situation in 48, and extending beyond the internal os in 31 cases.) While then in epithelioma the invasion of the neighboring organs occurs in the guise of an ulcerative process, in carcinoma the affection advances as a more or less continuous series of deposits in the pelvic connective tissue, transforming this rapidly into a firm, rigid and nodulated mass.

Epitheliomatous ulceration and cancerous infiltration almost always extend to the vagina, whenever the destruction of the vaginal portion has progressed to any considerable extent. Wagner (l. c.), whose observations were based almost exclusively on *post-mortem* examinations, found that this was almost invariably the case. Blau (l. c.) states that this occurrence was noted in 75 out of 93 cases recorded in the journal of the Pathological Institute of Berlin.

Infiltration of the peri-uterine cellular tissue within the pelvis leads to

cancerous involvement of the pelvic lymphatic glands (in 30 out of 93, according to Blau) and of the ureters. Epitheliomatous destruction in particular very often attacks the bladder. Thus, in a total of 218 cases, Wagner observed cancer of the bladder in 83 instances, that is in 38 per cent.; in 28 of these fistulæ were present. Blau met with cancer of the bladder in 45 out of his 93 patients. Similar figures hold good as regards the extension of the disease to the rectum. This complication was observed by Blau and Wagner in fifty-three out of two hundred and eighty-two cases, fistulæ having been produced in twenty-four cases.

FIG. 46.—EPITHELIOMA OF THE PORTIO VAGINALIS OF THE CERVIX, WITH DESTRUCTION OF THE POSTERIOR FORNIX VAGINÆ. (From the Collection of the Pathological Institute at Strasburg.)

The affection also generally spreads directly to the ovaries; this was noted forty-nine times in the above total of two hundred and eighty-three cases. In Blau's ninety-three cases the lumbar glands were involved in twenty-four, the soft tissues of the pelvis in twenty-three, and the retro-peritoneal lymphatic glands in fifteen cases.

Direct extension of cancer to the peritoneum is decidedly more rare, probably because the growth becomes encapsulated and separated from the peritoneal cavity by newly formed connective-tissue, usually at a very early date. This complication was observed in only eighteen out of 264

cases. It is still more rare to find cancer of the uterus extending directly to the pelvic muscles and bones, or to the urethra and external genitals.

The following figures will serve to convey an idea of the frequency with which metastases occur. In 283 cases of cancer of the uterus, metastatic deposits were found 22 times in the liver and as often in the lungs. In 166 cases collected by Kiwisch (73) and Blau (93) secondary deposits were found six times each in the bones and pleura; five times each in the inguinal glands, stomach, bronchial glands and kidneys; three times each in the thyroid gland, mediastinal lymphatic glands and heart; twice each in the brain, supra-renal capsules, mesenteric glands, jejunum, lumbar vertebræ and cutis; once each in the gall-bladder, dura mater, external genital organs, muscular system and mamma.

When we consider the extraordinary frequency of primary carcinoma of the uterus, it is very striking how seldom metastases occur in the uterus, in general carcinosis, originating in other organs. Wagner found only five cases of the kind. Klebs substantiates the same fact, adding that when the uterus is secondarily affected the disease is usually situated in the peritoneal investment of the organ, very rarely in the mucous membrane.

In cancer of the different organs of the pelvis the disease more often spreads by continuity to the uterus, a point to which we will again refer in discussing carcinoma of the fundus uteri.

## Etiology.

Before discussing the causes of the local disposition of the uterus to cancerous disease, it is necessary to determine the frequency of cancer in general. Statistics show that carcinoma of the uterus is an exceedingly common affection, particularly in Europe.[1]

According to the thirty-second annual report of the registrar-general of England (Tanner, l. c.), the population of that country in 1860 was estimated at 19,902,918; the mortality in the same year was 422,721, *i.e.*, 215,238 men and 207,433 women. Of these deaths 6827 were put down as due to "cancer," 2100 occurring in males and 4727 in females, the latter sex, therefore, showing a preponderance of 2627. Another table issued by Hirsch[2] yields similar results. Thus in the year 1855 the population of England was 18,787,000, 9,427,000 being males, and 9,360,000 females. Of this number 6016 died of cancer, 1825 being men

[1] Histor. geograph. Pathol., II., p. 378.

[2] According to numerous statements, cancer of the uterus as well as of other organs is a much less common disease in Asia, Africa and North America than it is in Europe. Comp. Picot: Les grands processus morbides, Paris, 1878, II., p. 1187.

and 4191 women, an excess of 2366 in favor of the latter. The mortality resulting from cancerous disease was 0.32 in 1000 people, 0.19 in 1000 males and 0.44 in 1000 females. On comparing still larger statistics it will be found that twice as many women as men die of cancer. According to the registrar-general[1] 87,348 people died of cancer in England, between the years 1847 and 1861; of these 61,715 were women, 25,633 men. The intimate connection between the above great preponderance of mortality in the female sex, and cancer of the genital apparatus (including malignant affections of the mamma), is shown by the fact that cancer befalls boys and girls in about the same ratio up to the age of fifteen, while from this time on, that is coincidently with the commencement of puberty, the percentage augments very rapidly to the detriment of the female sex. This is more clearly demonstrated by the following table of 91,058 deaths from cancer (England and Scotland) which I have copied from Simpson (l. c.)

| | Males. | Females. |
|---|---|---|
| Under 10 years, | 617 | 626 |
| 10 to 15 " | 134 | 147 |
| 15 " 25 " | 562 | 659 |
| 25 " 35 " | 1244 | 3176 |
| 35 " 45 " | 2717 | 9975 |
| 45 " 55 " | 4973 | 16,668 |
| 55 " 65 " | 7220 | 15,813 |
| 65 " 75 " | 6286 | 11,840 |
| 75 " 85 " | 2637 | 4616 |
| 85 " 95 " | 364 | 689 |
| Over 95 " | 20 | 39 |

This disproportion is rendered still more conspicuous by the frequency of carcinomatous disease of the uterus and mamma, if we examine more closely the statistics relating to the development of malignant tumors of the various organs in both sexes.

Schröder gives a compilation according to which, of 19,666 women who died of cancer, 6548 succumbed to carcinoma of the uterus. The statistics tabulated by M. d'Espine and Virchow,[2] show the relative frequency of cancer in various organs still more precisely. In these cancer of the uterus ranks second, constituting 15 per cent., while cancer of the stomach constitute 45 per cent. of all cases of the disease. Virchow sets the percentage of cancer of the stomach at 34.9, and that of cancer of the uterus at 18.5. The tables arranged by Picot (l. c., p. 1183) yield substantially the same figures, as follows:

[1] Simpson, Clinical Lectures on the Diseases of Women, Edinb. 1872, p. 140.
[2] Lehrbuch der Frauenkrankheiten, p. 257.

| | Parisian Hospitals. | | Middlesex Hospital. | |
|---|---|---|---|---|
| | Women. | Men. | Women. | Men. |
| Genital organs | 765 | 20 | 171 | 12 |
| Mammary glands | 242 | 1 | 191 | 1 |
| Stomach | 262 | 379 | 3 | 6 |
| Liver | 91 | 100 | 2 | — |
| Intestine | 26 | 29 | 2 | 3 |
| Rectum | 19 | 18 | 7 | 4 |
| Lungs | 2 | 5 | | 2 |
| Pancreas | 3 | 3 | — | — |
| Urinary bladder | 2 | 2 | — | — |
| Œsophagus | — | 2 | — | 2 |
| | 1412 | 559 | 376 | 30 |

That is, of every 100 cases of cancer observed in the hospitals of Paris, 51 were located in the uterus and mamma. The statistical examinations of Sibley and others show the same relation. The absolute frequency of cancer of the uterus is most strikingly demonstrated by the tables compiled by E. Wagner from the records of 5122 *post-mortem* examinations in Vienna, Prague and Leipsic. Cancer was the cause of death in 441 cases, the uterus being the seat of the disease in 113 instances. That is, of the total mortality 8.6 per cent. was due to cancer in general, and 2.2 per cent. to cancer of the uterus.

The explanation of this great prevalence of cancer is, however, very unsatisfactory. Before entering into the etiology of carcinoma of the uterus, it will be advisable to first refer to two factors which are always alluded to in the etiology of cancerous diseases in general. These are age and heredity. As regards the former, it may be stated that all investigators agree in the assertion that cancer is essentially a disease of mature years. Thus, out of a total of 3385 cases of carcinoma uteri collected by Lever, Kiwisch, Chiari, Scanzoni, Säxinger (Seyfert's clinic), Tanner, Hough, Blau, Dittrich, Lothar Meyer, Lebert, Glatter, Beigel, Schröder, Schatz, Winckel, Champneys and myself, we find

| | | |
|---|---|---|
| At 17 years, | 1 case | (Glatter.) |
| " 19 " | 1 " | (Beigel.) |
| Between 20 to 30 years, | 114 cases. | |
| " 30 " 40 " | 770 " | |
| " 40 " 50 " | 1169 " | |
| " 50 " 60 " | 856 " | |
| " 60 " 70 " | 340 " | |
| Over 70 years | 193 " | |

That is, with but two exceptions, cancer of the uterus scarcely ever occurs before the twentieth year of age, at any rate not before puberty, and not even in the first few years after this period. Between the ages

of thirty and fifty the frequency of the affection increases with great rapidity, subsides slowly between fifty and sixty, and decreases quickly after this age. One might from this conclude that the period of mature sexual development is most disposed to the occurrence of cancerous disease of the uterus, but a closer inspection of the above table shows, on the contrary, that the greatest susceptibility exists between the ages of forty and fifty, and almost as great a one between fifty and sixty, that is, just in the climacteric years. This last conclusion is substantiated by the statistical investigations of Glatter,[1] who found that the proportion of living women rapidly diminished with each successive year after forty-five years of age. For example, of every 1000 females living in Vienna in the year 1864, 193 were between forty-one and fifty years of age, 122 between fifty and sixty, while there were 336 between twenty-one and thirty, and 249 between thirty and forty years of age. The mortality from cancer of the uterus was, according to the same authority, of all deaths occurring in females:

| | |
|---|---|
| Between 21 to 30 years, | 1.15% |
| " 31 " 40 " | 5.09% |
| " 41 " 50 " | 11.35% |
| " 51 " 60 " | 9.05% |
| " 61 " 70 " | 4.04% |

It will now be our province to investigate whether it is to age solely that the predisposition to cancer is to be attributed, and this may seem at the first glance to be a valid conclusion when it is remembered that the same prevalence is observed in the male sex between the ages of forty and sixty (compare Picot, l. c., p. 1184), or whether it is the menopause which exercises this influence. Not wishing to enter more fully just now into the etiology of carcinomatous disease in general, I will only point out that the influence of advanced age in general has been explained on the hypothesis of a diminished power of resistance of the various tissues.

Now, while it will have been recognized from the above remarks that age undoubtedly plays an important *rôle* in the etiology of carcinoma uteri, it will be shown that the second factor, namely heredity, does not possess an importance to the extent that has been assigned to it. Although authentic observations are not wanting to show the influence exerted by a hereditary taint upon the development of cancer of various organs, yet the number of such observations, as far as concerns carcinoma of the uterus, is by no means so large as has been generally supposed. Whether this depends upon the nature of epithelioma of the uterus, that is, its more localized development and corresponding course, or whether it is due to imperfect observation, must remain undecided. At all events

[1] Einige Bemerkungen über Medicinalstatistik u. s. w. Deutsche Vierteljahrsschrift für öffentliche Gesundheitspflege von Reclam, 1870, p. 161.

it is certain that most investigations have been very deficient in this direction, on the one hand because the necessary researches have not been sufficiently painstaking, and on the other hand because these investigations, even when conducted on a large scale, as is possible in hospitals, so often yield only meagre results from the ignorance of the ordinary hospital patients regarding the medical histories of their parents and relatives. We can only expect to derive information on this point from the records of private practice, among the more cultivated and intelligent classes.

Out of 1203 cases of this description (published by Tanner, Lever, Lebert, Scanzoni, L. Meyer, Sibley, Barker, Winckel and myself) there were but 90 or 7.8 per cent. in which it was stated that cancer had occurred among the more immediate relatives of the patients. Picot found an inherited predisposition in 13 per cent. of 978 cases of carcinoma of various organs collected by himself. According to these figures, hereditary taint would seem to possess less significance in the etiology of uterine cancer than in the same disease affecting other organs of the body.

Other factors, to which etiological importance has sometimes been attached, such as the constitution, the temperament, the occupation, etc., of the individual, deserve only passing mention here, as neither my own experience nor the literature of the subject furnishes anything more than mere conjecture in this regard. The same is true of the etiological significance of previously existing disease. E. Martin's[1] assertion that infectious diseases of the genital organs transmitted by intercourse from husband to wife excite a predisposition to the development of epithelioma of the uterus, must be regarded, for the present, as entirely without foundation, not even an attempt having been made to substantiate it by facts.

Diverse local affections of the cervix uteri seem to be of greater significance as predisposing agents to cancerous degeneration. Persistent catarrh of the cervical mucous membrane, with the formation of erosions, has long been regarded as a precursor of malignant disease. Many have called attention to the fact that there is but a short step, anatomically speaking, between a papillary erosion and a true papilloma on the one hand, and between a papilloma and an epithelioma on the other. In fact the latter transformation has been shown to have taken place.

More recently Ruge and Veit have shown that a causal relation exists between certain types of so-called erosions and ectropionic changes of the os uteri, and a neoplastic development of gland tissue, and they have also pointed out that these conditions were to be regarded as the forerunners of epithelioma.

Breisky[2] has also published some observations tending to show

[1] Zur Ætiologie und Therapie des Gebärmutterkrebses, Berl. Klin. Wochenschrift, 1873, No. 28.

[2] Ueber Beziehung des Narbenectropium am Muttermund zum Carcinoma uteri, Prager Med. Wochenschrift, 1877, No. 28.

that eversion of the mucous membrane of the cervix uteri, after laceration of the os (cicatricial ectropium of Emmet), may, in consequence of the long-continued irritation to which it is necessarily subjected, become the starting-point of a cancerous growth. Now while this and similar observations are most valuable, from a therapeutic aspect, they throw but an obscure light upon the etiology of these processes.

It remains to investigate what connection there is, if any, between the ordinary functions of the uterus and cancerous metamorphosis. In individuals affected with cancer of the womb, the derangements of menstruation that may have been present in previous years have usually been of so trifling a nature that they cannot be said to stand in any causal relation to the existing affection. The statements that have been advanced upon this subject, are so contradictory, and are based upon so small a number of cases, that they do not deserve especial mention.[1]

It has previously been pointed out that there seems to be a peculiar predisposition to the development of cancer in the climacteric period. Additional weight is lent to this observation by the statements of Rocque,[2] who among fifty cases found but eight in which the affection manifested itself before the advent of the menopause.

The current opinion that local mechanical or chemical irritation (traumatism) is the chief exciting cause of the development of local tumors, has also been strenuously advocated in explanation of the occurrence of cancerous degeneration of the cervix uteri. Particular stress has been laid upon two points, on the one hand the frequency, or according to others (Téallier and Scanzoni) the intensity with which sexual intercourse has been practised, together with the emotional excitement accompanying this act, and on the other hand the number of confinements. Without wishing to closely scrutinize here the value of the so-called "irritation theory," it may suffice to state with reference to the above-mentioned causes, that as far as the first is concerned, the local irritation of the os uteri during intercourse is not a very intense one, and with reference to the second, that the severer forms of injury caused by the parturient act, occur relatively but very seldom, and even then are separated by long intervals.

Furthermore, when it is asserted that excessive emotional excitement is causally connected with the presence of malignant disease of the uterus, it is rather more probable that the former is but a symptom of the early stage of the latter. It is well known that pruritus of the external genitals is not infrequently dependent upon carcinoma of the uterus. If the opinions entertained by Wernich and others were correct, namely, that the portio vaginalis undergoes peculiar changes of configuration, a kind

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[1] L. Meyer: Beiträge zur Geburtshülfe u. s. w. Berlin, 1874, III., p. 7.

[2] Picot: Les grands processus morbides, II., p. 1186.

of erection witn increased downward protrusion into the vagina, in individuals who possess hyper-sensitive sexual organizations, we could not deny that excessive sexual excitement is capable of inducing anatomical changes, and yet this would not in any manner serve to explain the importance of this influence upon the malady now under consideration.

In estimating the significance of sexual intercourse, nothing of moment, for evident reasons, is to be gained by determining whether cancer of the cervix occurs more frequently among the married than among the unmarried. It has, therefore, been proposed to ascertain whether the affection is especially frequent in prostitutes. As far as my knowledge goes, the attempt has not been made, and I doubt whether it can ever be carried out with the required precision. For the malady, as we have already seen, usually manifests itself at an age when prostitutes have already long withdrawn themselves from official supervision. Parent Duchâtelet[1] states that he has observed carcinoma of the uterus in prostitutes much more rarely than he had expected; this statement is corroborated by Téallier, Collineau, Cullivier and Behrendt. Of 365 females who died in Vienna of cancer of the womb, Glatter (l. c.) found that 91, or almost 25 per cent. were classed as seamstresses (Handarbeiterinnen), and as it is customary for the majority of the Viennese prostitutes to designate themselves by this term, he concludes that this class of women furnish a relatively large contingent of cases of uterine cancer.

The relations existing between cancerous disease and frequent confinements are more easily determined. In the first place it is remarkable that the disease rarely attacks sterile women. Thus but 121 out of 1540 cases collected by Tanner, West, Scanzoni, Seyfert, Beigel, Schröder, Winckel and myself had not had any offspring.

It is more difficult to decide what influence the number of births exerts upon the development of carcinoma, since precise and accurate statements as to the number of premature births can but rarely be obtained, and yet these are of just as much consequence as full term deliveries, if one inclines to the opinion that the processes of pregnancy and the expulsion of the ovum are factors of moment in the production of cancer of the uterus.

West computes that every patient affected with this malady has had on an average 5.6 deliveries at full term, and 1.2 premature births, or a total of 6.8 births in all. Scanzoni's estimate is 7.01, Tanner's 6.5, Sibley's 5.2, Lebeck's 3.9, Beigel's 5.9, Lever's 5.75, Lothar Meyer's 5.5, Winckel's 5.6, Schröder's 5.02, and my own 4.5. It has been found that in Prussia every married woman has on an average 4.6 children, in England 4.2, and in France 3.4. Assuming the correctness of these figures it is undeniable that those women who become at some future date the sub-

[1] De la prostitution dans la ville de Paris, Paris, 1836, pp. 253–257. Cited by Lothar Meyer.

jects of carcinoma, are more fruitful than other women. We arrive at the same conclusion when we compare statistics on a larger scale than those given singly by the above-mentioned authors. Thus, the grand total of children brought into the world by 580 patients (of West, Tanner, Scanzoni, Lever, Beigel, Lothar Meyer, and myself) was 3025, an average of 5.1 children to each woman, which certainly exceeds that of the average married women as estimated above.

Winckel[1] has more particularly laid stress on the difference existing in this respect between primiparous and multiparous women.

In 130 cases of cancer he found

| | |
|---|---|
| 13 I-paræ or . . . . . | 10 % |
| 53 II to V-paræ or . . . . . | 40.8% |
| 64 VI to XXVI-paræ or . . . . . | 49.2% |

Nevertheless it is an open question whether these facts stand in any causal relation with the development of cancer in the cervix uteri. Assuming the existence of such relation, we may safely leave it to the scientific convictions of each individual to decide whether he will accept it as evidence of the truth of the theory, concerning the origin of cancer from local irritation, or of the more recent doctrine of the development of malignant disease from pre-existing, embryonal disease germs. For my own part I do not see that the assertion of the greater fertility of cancerous individuals lends weight to either theory.

Many investigators believe that the disease not infrequently developes immediately after delivery. West observed this in 11.3 per cent. of his cases. Of 48 cases of cancer recently seen by me there were 9 in which the first symptoms of the malady were observed within one year after the last childbirth, the interval varying from a few weeks to eleven months, and two in which exactly one year had elapsed. H. Chiari[2] describes these cases of cancer of the fundus uteri, in which the disease developed immediately following the lying-in period, and ended fatally in from three to six months. The patients were between twenty-three and twenty-four years of age. The cancers had originated at the placental site.

W. A. Freund[3] has described several cases of the propagation of cancerous growths, from the rectum or bladder to the uterus, through the pelvic cellular tissues.

Now since it is well established that secondary cancer of the womb is very rare, and since, in the cases of such an occurrence cited by Freund, the idea of local irritation from sexual intercourse or parturition, was with tolerable certainly excluded (the majority of them being virgins), the author sees therein an indirect proof that primary cancer of the portio vaginalis uteri usually does arise from local irritation.

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[1] Pathol. der Weibl. Sexualorgane. p. 165.

[2] Wien. Med. Jahrbuch., 1877. [3] Virchow's Archiv., vol. LXIV., p. 1.

### Symptomatology and Course.

As long as cancer of the uterus is restricted to the portio vaginalis, and as long as disintegration has not occurred to the extent of causing ulceration, so long may all symptoms of the disease remain totally in abeyance. This dictum is a necessary preliminary to a thorough comprehension of the course of cancer of the uterus in each and every instance. Perhaps one or more of those symptoms, the description of which will shortly follow, may have been present for but a few weeks or months, while the general condition of the affected individual may be excellent, and yet when we proceed to make an examination, we are often astonished to find widespread cancerous destruction of the cervix and fornix vaginæ. This explains how it is that the malady runs so rapid a course, once subjective symptoms have declared themselves, and also shows why an affection, so pre-eminently local as cancer of the cervix is, should so seldom be amenable to local treatment.

Cancerous degeneration gives rise to no symptoms until ulceration has set in—none of the previously described forms and varieties of cancer of the cervix are exceptions to this rule. At most it may now and then happen that the deeply seated form, that which we have agreed to call carcinoma, may spread to the pelvic connective tissue and form nodular masses in Douglas's *cul-de-sac*, which may excite pain from pressure some time before the primary infiltration disintegrates. But this is not the rule.

On the w..ole it may be asserted that all or at least the chief symptoms of cancer of the uterus are coincidental in their appearance with ulceration in the vaginal portion. Before the development of these ulcers even obscure symptoms will but rarely have been present. The clinical features usually vary distinctly with the anatomical characters of the ulcers, as previously described. Thus, the symptoms accompanying the "flat epithelioma" (Klebs) are rather those of a simple ulceration of the vaginal portion, penetrating more deeply than is ordinarily the case; they consist in a moderately profuse, sero-purulent, inodorous discharge, profuse menstruation, and, exceptionally, irregular hemorrhages.

When we have to do with a papillary epithelioma, however, or with the more deeply seated carcinoma, ulceration occurs only in consequence of superficial gangrene and decomposition, and the symptoms are therefore of a corresponding nature, irregular hemorrhages, and the discharge of fetid, purulent and sphacelous masses.

It will be seen from the foregoing that the most constant indication of a disintegrating cancerous mass is hemorrhage. This is usually also the first symptom, being preceded by a somewhat profuse discharge, or by pain in exceptional instances only. It was the first symptom in about fifty out of every sixty cases of far-advanced cancerous ulceration observed by myself.

This preponderance, of course, may be explained on the assumption, that a bloody discharge is far more likely to attract the attention of the patient and to be fixed in her memory than would other more obscure and indefinite symptoms.

The nature of the hemorrhage varies. In women who still menstruate the first thing that is generally noticed is a more or less profuse flooding at each menstrual epoch, which the patients as a rule attribute to impending change of life. It soon becomes evident, however, that the menstrual flow has lost its normally intermittent character and a more or less continuous discharge is established of a sanguineous fluid, which the patients liken to the juice of raw meat. In other cases severe hemorrhages often recur at irregular intervals, and this is usually the first symptom which attracts attention in women who have passed the menopause; it is then apt to be regarded merely as the reappearance of the menses.

While the destructive metamorphosis of cancerous masses, then, is generally ushered in and accompanied by free hemorrhage, there are not a few cases, especially flat epitheliomata, where there is only a constant discharge of fluid of a reddish tinge, now and then containing a few streaks of blood. In these cases genuine hemorrhage scarcely ever or very rarely occurs. In other cases, particularly in the incipient stages of papillary epithelioma, an insignificant hemorrhage takes place only after traumatism, most often at first after sexual intercourse, or as the result of physical over-exertion, violent straining at stool, and the like. The more rapidly the cancerous masses break down, with the correspondingly luxuriant reformation of the papillary excrescences, (these two processes go hand in hand, as is well known), the more frequently and profusely does hemorrhage recur, so that extreme anæmia is rapidly induced. Later on, the more extensive the area of sloughing and gangrene, the more rapid is the destruction of the cancerous infiltration, and therefore the sooner do the profuse hemorrhages cease, to give way to a serosanguinolent discharge. In this stage we see only now and then a rather free loss of blood, as when a large vessel is perforated.

This is the reason why in so many instances hemorrhages cease entirely towards the close of the malady. It is nevertheless remarkable that one scarcely ever hears of a death from hemorrhage in these cases.

Although, as we have just seen, hemorrhage is an occurrence seldom absent in cancerous ulceration, there is one symptom which is, if possible, still more constant, namely a discharge from the vagina. Like hemorrhage this sometimes manifests itself before the neoplasm begins to break down, and it then either closely resembles an ordinary leucorrhœa or is more watery (in epithelioma). As soon, however, as a proliferating epithelioma gives rise to hemorrhage, the discharge generally approaches more to the nature of blood-serum, and becomes quite free, without having any particularly penetrating odor.

Flat ulcerating epitheliomata excite a somewhat similar, but more purulent and certainly less abundant sero-sanguinolent discharge.

As soon, however, as gangrene attacks either of the various forms of cancer of the cervix, the discharge acquires a more or less pronounced and disgustingly fetid odor, and, while still possessing a very thin consistence, becomes of a dirty brown color in consequence of the admixture of fragments of sphacelated tissue.

The two symptoms that have just been described comprise all that is characteristic of the cancerous ulcer. Although very few cases of cancer of the uterus run their course without occasioning pain, yet the latter is by no means an essential symptom, inseparable from the existence of the disease as such. On the contrary as long as a cancerous ulcer is restricted to the portio vaginalis it in most cases neither excites pain nor is it sensitive on manipulation. In those cases in which at an early period pain is complained of in the pelvis, abdomen, or back, there certainly exists some inflammatory irritation in the vicinity of the original focus of disease.

The typical, violent pains that have been designated as cancer-pains chiefly depend on the other hand on an extensive implication of the surrounding tissues in the morbid process. Thus when cancerous infiltration spreads to the body of the uterus, pain results probably from lesions of the terminal nerve filaments in the substance of the uterus. In the same way, when the infiltration becomes diffused throughout the connective tissue of the pelvis, the coincident mechanical irritation and stretching of the numerous nerve ramifications of this region may excite constant pain of a tearing and lancinating character, the large nerve trunks, however, being generally exempt. For the same reasons both the normal distension and the evacuation of the bladder and rectum become painful. The less widely cancerous infiltration extends into the surrounding pelvic cellular tissue, the less complaint is there of pain This most readily explains a frequently observed fact, namely, that widespread epitheliomatous destruction sometimes occasions no suffering worth mention, or at most, perhaps, only trivial pressure symptoms, rapid sloughing keeping pace with infiltration. Moreover, we often find that intense pain due to cancer of the connective tissue between the uterus, bladder and vagina ceases abruptly as soon as gangrene leads to the formation of a vesico-vaginal fistula.

Now while the so-called cancer pains are often mitigated when the cancerous masses are attacked by sloughing, the latter process not infrequently gives rise to pain of another kind, namely from irritation of the peritoneum in the vicinity of the cancerous ulceration. In addition to distinct attacks of peritonitis which not very rarely complicate the affection under consideration, a certain degree of pain or rather of sensitiveness on pressure of the pelvic peritoneum is always present. We sometimes find,

also, an increased tension of the muscles of the abdominal parietes (Schröder).

While, then, hemorrhage, discharge, and the above-described varieties of pain are almost inseparable attendants of cancer of the uterus, at least from the time that the neoplasm begins to break down, there are in addition to these some other, more rare conditions, the dependence of which upon the disease in question is not quite so clear. This is particularly true of pruritus of the external genitals, which is by no means so frequent as some would lead us to believe, excluding of course that form dependent upon cutaneous affections of the external genitals due to the constant trickling away of urine through a fistulous opening.

Certain other so-called "consensual" phenomena, such as mastodynia, as portrayed by Simpson, West and others, are still more rarely observed. On the other hand we quite often meet with gastric symptoms such as anorexia, nausea, and vomiting, which sometimes make their appearance in so early a stage that they must in truth be classified as "consensual" phenomena, while the gastric symptoms that occur during the later stages are caused by anæmia, peri-uterine irritation, uræmia, etc.

All the remaining disorders of carcinoma uteri are dependent upon the further progress and course of the disease. Before I proceed to give a short description of the different forms of this course it is scarcely necessary to mention that the various occurrences that I am about to portray, may manifest themselves simultaneously or in varying succession in the same patient, and that the picture of the disease is usually, therefore, much more diversified than would seem from the following. It has previously been stated that carcinomatous ulceration very quickly spreads to the corpus uteri, and that the lumen of the uterus, and sometimes even the whole organ, becomes converted into a cavity filled with a decomposing, fetid, pulpy mass, into which the individual cancer nodules project. In this manner destruction may proceed until only a small remnant of the fundus is left; sometimes even this melts away, leaving no trace of the viscus. These are the cases that have sometimes been strangely described[1] as expulsion of the diseased uterus

These processes are almost invariably associated with adhesive inflammation of the fold of the peritoneum lining the *cul-de-sac* of Douglas, and give rise to the ordinary signs of this condition, and to interference with the functions of the pelvic viscera. This perimetritis in rare instances leads to acute peritonitis, which is rapidly fatal; more often it is the starting-point of a chronic peritonitis. On the other hand I have encountered acute peritonitis following the rupture into the peritoneal cavity of a collection of decomposing detritus in the walls of the uterus, or of an abscess in the newly-formed adhesions, and sometimes also in

[1] Case of Gallard in 1844, L'Union Médicale, 1873.†

consequence of the escape of broken-down masses through a Fallopian tube into the abdominal cavity.

Diffuse cancer of the peritoneum in the form of very numerous disseminated, miliary deposits is a comparatively very rare occurrence.

Cancerous ulceration of the cervix very often also spreads to the vagina, and then gives rise to similar conditions as when the extension occurs upwards into the uterine cavity. We find wide-spread destruction of the vaginal walls, associated with active inflammation of the remaining relatively healthy parts of the canal.

At first the surrounding pelvic connective tissue takes on a condition of simple inflammatory swelling and infiltration, but it soon becomes invaded by the disease proper, and before long the functions of the bladder and rectum are interfered with, and this too before these organs become diseased. Defæcation becomes difficult and painful, and quite often large hemorrhoids develop. Micturition also becomes painful, and patients are tormented by an incessant desire to pass water. Vesical catarrh is very prone to occur. As a rule the destructive process sooner or later invades the bladder and rectum, especially the former. In 311 cases of cancer of the uterus, the bladder underwent cancerous infiltration in 128 instances, in 56 of which vesico-vaginal fistulæ resulted. The disease generally travels in a direct line from the vagina through the pelvic cellular tissue to the bladder, and therefore the posterior wall of this viscus and more especially the trigonum are the parts that are almost invariably attacked in the first instance. Isolated metastatic deposits in other portions of the bladder are extraordinarily rare. The above accidents are always complicated with vesical catarrh, and not infrequently also with diphtheritic inflammation and ulceration of the mucous membrane. It is, therefore, not surprising that septic poisoning should now and then develop, as is illustrated by a case of Eppinger's.[1]

Pyelonephritis is a relatively more frequent, but still rather exceptional complication of the affection under consideration.

It was observed by Blau in ten out of the ninety-three cases recorded in the transactions of the Pathological Institute of Berlin. A participation of the ureters in the diseased process is a matter of great consequence. In his ninety-three cases of cancer of the uterus Blau noted fifty-seven instances of dilatation of one or both ureters with consecutive hydronephrosis. While this complication is of but little moment when one ureter only is involved, the contrary is true when both tubes are occluded, as then hydronephrosis, with all the symptoms of acute or chronic uræmia, rapidly develops. The constriction or the total obliteration of the lumina of the ureters is only exceptionally dependent upon cancerous infiltration in the walls of the ducts; the latter are usually compressed at their points

[1] Prager Med. Wochenschrift, 1876, p. 210.

of entrance into the bladder. This pressure may be due either to dense cicatricial thickening or, what is more often the case, to cancerous infiltration of the pelvic cellular tissue. Again we not very infrequently find the cause of the obstruction to consist in cancerous infiltration of the vesical mucous membrane in the region of the trigonum. This explains how it is that patients who have suffered for a short time from almost absolute anuria, and who have already begun to manifest symptoms of uræmia, are quite suddenly relieved by the formation of a vesico-vaginal fistula.

Among the other changes that may affect the parenchyma of the kidneys we may mention parenchymatous nephritis (observed by Blau four times), atrophy of the kidney (seven times), and amyloid degeneration (four times). In two of Blau's ninety-three cases there was "cloudy swelling of the epithelium of the urinary tubules;" metastatic deposits were found in three instances.

The rectum much more rarely participates directly in the cancerous degeneration than does the urinopoietic apparatus. In two hundred and eighty-two cases, the rectum was invaded fifty-three times, and in thirty-seven of these a recto-vesical fistula resulted. Moreover, associated inflammatory states of the mucous membrane of the rectum occur much less frequently than is the case with the vesical mucous membrane.

Another, and also not infrequent result of infiltration of the cellular tissue of the pelvis is a thrombosis from pressure of the large veins of the pelvis such as the internal iliac, the common iliac, etc., with consecutive tense œdema of one or both lower extremities. It need scarcely be stated that pyæmia also may arise from this cause.

The various modifications and disturbances of function of the digestive tract have previously been cursorily alluded to. It is necessary, however, to again direct attention to them, because of the marked influence which they exert upon the whole course of the disease. Together with obstinate constipation there is almost invariably present, even from the beginning, loss of appetite, sometimes with disgust for all food, especially meat. In addition to this, more or less obstinate vomiting often sets in at quite an early period. This is very seldom due to cancer of the stomach, which affection rarely occurs simultaneously with cancer of the uterus. Somewhat oftener but still quite rarely it is attributable to cancer of the liver or peritoneum. Incessant vomiting may also be dependent on chronic peritonitis, that frequent complication of cancer of the uterus, or more often on uræmia. In most cases, however, the symptom is simply the result of an ordinary chronic gastric catarrh, such as usually develops quickly from habitual constipation or anæmia. Another factor is undoubtedly the atmosphere in which these patients live, in spite of the most rigid cleanliness.

Discharge, hemorrhages, vomiting and anorexia very soon induce

marked emaciation, with anæmia and hydræmia. Various regions of the body become œdematous, the skin assumes an anæmic discolored hue; in short we very soon observe all those signs and symptoms which go to make up the alas! too well known, and yet not easily described cancerous cachexia. The latter condition and the aspect of profound suffering are particularly aggravated when incessant pain allows not even momentary repose by day or night to the harassed and tormented individual.

As regards the final result of the disease it may be stated that death is in most instances due to marasmus, to a gradual wasting away and exhaustion. In these cases it cannot be at all accurately prognosticated when the end may occur; it may seem imminent and yet be postponed for days and weeks. In Blau's ninety-three cases this mode of death was observed forty-eight times. Venous thrombosis, dysentery, diphtheritic inflammation of the bladder or of the rectum, and bed-sores, frequently enough hasten the final issue. In a large proportion of other cases the immediate cause of death is, as has already been stated, peritonitis in its various forms (38 times in 155 cases); sometimes it is a general purulent peritonitis (30 times), or it may result from perforation (8 times), or from direct extension (17 out of 155 cases).

Blau also gives as the causa mortis pneumonia eleven times, pleuritis three times, and as often embolism of the pulmonary artery; once each pyelonephritis, fatty degeneration of the heart, pulmonary gangrene, and pyelophlebitis from a putrid clot in the portal vein. In the sixty-two cases mentioned in Seyfert's [1] Klinik the following causes of death are recorded: pyæmia, nine times, amyloid degeneration of the abdominal glands, five times, œdema of the lungs, three times, dysentery, three times, and uræmia, twenty-eight times. The last-mentioned affection is in my experience also one of the most common causes of death; its mode of development has previously been described.

The chronic is, perhaps, the somewhat more frequent form; still, very acute cases with profound sopor and general convulsions are not at all rare.

The rarity with which septicæmia and pyæmia occur in cases of carcinoma of the cervix uteri must always have attracted the attention of investigators. *A priori* one would imagine that in an affection in which local gangrene develops at so early a period, especially in a situation in which under other circumstances absorption goes on so rapidly, and that when, as is here the case, numerous vessels are directly and constantly bathed in putrid fluids, one would imagine, I repeat, that under these conditions septic infection would very often be encountered.

As far as I remember, Barnes[2] is the only one who considers that the

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[1] Säxinger, Prager Med. Vierteljahrsschrift, 1867, I., p. 103.
[2] Diseases of Women, London, 1873, p. 830.

phenomena that constitute the cachexia which accompanies cancer of the uterus are but consequences of septic intoxication. Yet even this author concedes that genuine septicæmia or pyæmia, as defined by their anatomical and clinical features, is very rarely observed. Eppinger (l. c.), whose investigations are based upon the abundant material collected in the Anatomical Institute of Prague, has recently substantiated this fact. He describes two cases of septicæmia dependent on cancer of the uterus, in one of which the infection was propagated from the broad ligament, just as happens in puerperal pyæmia. The reason why septic infection is so seldom observed under conditions which would appear to be especially disposed to its development is, in my opinion, one in which Eppinger concurs in the main, that the tissues in the vicinity of the cancerous ulceration are in such a condition of cancerous infiltration and reactive inflammation that absorption is all but suspended. My own experience coincides with this view, for the only two cases of fatal pyæmia which I have met with in a very large number of cases of cancer of the uterus, were observed after operative measures had been undertaken. I had scraped away some epitheliomatous masses, leaving relatively clean wounds behind, which were scarcely or not at all separated by a wall of infiltration from the adjoining healthy tissues; in this way the absorption of decomposing matter was facilitated.

It is very difficult, indeed well-nigh impossible, to determine the duration of cancer of the uterus, because, as I have already repeatedly stated, the malady has almost without exception existed quite a long time before symptoms of such gravity have manifested themselves as seem to require professional advice. We can, therefore, only state approximately the length of time that usually elapses between the onset of the first symptoms and the fatal issue. Now, while this may vary in individual cases, especially since appropriate therapeutic measures quite often retard the further progress of the disease, yet it may be stated in general that carcinoma of the uterus usually ends fatally after a duration of from one to one and a half years, reckoning from the appearance of the initial symptoms.

The average duration of the disease in West's cases was seventeen months, in Lever's twenty, and in Lebert's sixteen. Seyfert found the average duration to be from three to four years in "epithelial carcinoma," while it was only one and a half years in the "medullary" form. In twenty-four cases, in which positive statements could be made, Tanner found the shortest time to be six months, the longest four and a half years, while in twenty-four other cases, in which the information was less reliable, the duration varied between five weeks and twenty-one months.

In twenty-two of my own cases I found the duration of the disease

to be once 36 months, twice 24 months, three times from 12 to 20 months, 12 times from 9 to 11 months, once 8½ months, once 6 months, and twice 4 months, or an average of exactly twelve months.

Now while the gangrenous process in carcinoma of the uterus may be considered as a step in the direction of cure, in so far as cancerous masses are thereby being continually destroyed, yet we can by no means accept as reliable those few statements in the literature of the subject which claim that uterine cancer may undergo spontaneous cure. The evidence adduced up to the present time, in support of these assertions is not sufficiently convincing; the cases of Gallard and Barnes (l. c.) at any rate can lay no claim to be accepted as decisive.

## Diagnosis.

A study of the symptoms of carcinoma of the portio vaginalis shows sufficiently clearly that the diagnosis of cancerous ulceration is comparatively easy. One readily recognizes, on digital exploration, the luxuriating and ulcerating masses, the destruction of the vaginal tissues, the infiltration of the pelvic connective tissue. The examination is generally followed by more or less hemorrhage. The fœtid discharge, the general condition of the patient, all render the recognition of the disease an easy one. On examining with the speculum one sees proliferating masses sprouting from a deeply ulcerated base, and covered with black, necrotic shreds. In short I certainly do not assert too much when I say that it requires only an approximatively careful examination to diagnose a degenerating cancer of the vaginal portion. It is true, as I have pointed out on a previous occasion, that ulcerating fibromata in this situation have been mistaken for the affection which we are discussing; our doubts will speedily and easily be dispelled by paying attention to the condition of the os externum, and by examining a piece of the decomposing mass.

Carcinomatous masses crumble away at the lightest touch, and present minute tissue fragments, while in degenerating myoma the connective tissue and the muscular elements are removable with much greater difficulty, and show a fibrous structure both to the touch and to the naked eye. The nature of the disease is of course definitely settled by microscopical examination. The same is true in distinguishing ulcerating polypi; indeed these could in any event only be confounded with those exceptional forms of epithelioma which are actually or only apparently attached by a pedicle to the portio vaginalis, and which in England and in France are designated respectively as "mushroom" and "champignon" epithelioma. It is more difficult to understand how Richet[1] could have

[1] L'Ecole de Médecin, No. 1, 1874.

mistaken an epithelioma of the cervix for a piece of retained placenta. An error of this nature should, it seems to me, exclude itself, when we remember the seat of the disease, and would seem possible only in connection with an isolated carcinoma of the corpus uteri, a subject which we have yet to discuss.

The diagnosis of cervical carcinoma may sometimes be rendered difficult by reason of reactive inflammation, at any point of the vagina below the focus of disease, with the subsequent formation of a stenosis, sufficiently close to permit only of the escape of small quantities of blood and putrid fluid. On the other hand, it must not be forgotten that similar stenoses are sometimes encountered in the vagina, especially in its upper third, of old individuals, who are free from any cancerous affection.

If catarrhal conditions are present in these cases, the secretions which escape through the aperture of the stricture may assume a fœtid character in consequence of stagnation above the seat of constriction. If in such cases a positive diagnosis cannot be made by rectal examination, we must by some means open up the strictured portion of the vagina.

It has been stated on a previous occasion that Liebmann[1] observed some cases of "flat epithelioma" commencing in the upper part of the mucous membrane of the cervix, the vaginal portion seeming externally to be perfectly healthy. In these cases the diagnosis wavered between simple cervical endometritis and epithelioma. What argued in favor of the latter was not only the fœtid odor and sanious tinge of the discharge, circumstances which are certainly rare in endometritis, but above all, the fact that the discharge was entirely devoid of any slimy consistency. Moreover, we can easily recognize an enlargement of the cervical canal through deep ulceration. We have here touched on a point which is at once the most difficult and the most important in the diagnosis of cancer of the uterus, namely, the recognition of the initial stage of the disease.

In the same measure as the diagnosis of an ulcerated carcinoma of the portio vaginalis is easy, so is it difficult to detect incipient epithelioma and cancerous infiltration of the cervix underneath the, as yet, healthy mucous membrane. And yet it would be, as we shall see, of really invaluable consequence to us from a therapeutic aspect, could we recognize the first stages of the disease at a period early enough to allow us to readily and radically extirpate the degenerated tissues.

Epithelioma of the os uteri always manifests itself at first in the form of the so-called erosion. It may sometimes be differentiated from the ordinary benign follicular erosion of the mucous membrane lining the cervix and that covering its vaginal surface, by the fact that the former is more deeply and evenly excavated and possesses more infiltrated borders. The papillæ springing from the base of the ulcer are often markedly

[1] London Obstetr. Transact., XVIII., p. 66.

hypertrophic, bleed very readily, and often exude at any early period the previously described fluid resembling meat juice, which is rarely the case when we have to do with the so-called papillary erosions. Still, some writers regard these very papillary erosions as the initial stage of epithelioma, while others such as Ruge and J. Veit[1] consider them to be the commencement of true carcinoma, so that even an anatomical differentiation is not always easy, to say nothing of the differential diagnosis during life. The latter may sometimes be established by the observation that in simple erosions (ectropium of the os) the cervical mucous membrane is swollen, relaxed and soft, while in incipient epithelioma it presents a distinct ulcer and seems more than ordinarily adherent to the subjacent parenchyma. If in addition we notice on the floor of the ulcer large, scattered, hypertrophic excrescences, which bleed freely on the slightest manipulation, our suspicions of incipient epithelioma are strengthened, and if some of these excrescences admit of easy removal by simple scraping with a dull instrument or the finger-nail, the ill-omened diagnosis is established almost to a certainty.

The diagnosis can not always be absolutely verified by removing with the scissors or knife small fragments of a suspicious erosion, as has been proposed by Ruge and Veit, since it is a well-known fact that it is often difficult to determine beyond a doubt the nature of a tumor as a whole, by microscopical examination of small particles of the growth.[2]

I have always considered it justifiable, as I shall endeavor to prove when discussing the subject of treatment, to amputate the entire vaginal portion in these doubtful cases, even at the risk of having now and then performed the operation unnecessarily. We should never neglect to attempt the cure of a suspicious ulceration, by the ordinary remedies and procedures, and if it show a tendency to heal, to cicatrize from the edges, we may be sure that it is not a commencing cancer of the uterus.

Now, while it is not easy to detect the initial stage of epithelioma, it is even more difficult to recognize carcinoma at its very beginning, when the deep-seated cancerous infiltration is hidden from view by overlying healthy mucous membrane. It is comparatively easy when the disease commences in the form of a few hard, isolated prominences situated beneath the mucous membrane. These can often be seen, even through a speculum, as little protuberances of a peculiar, deep bluish-red color. When the vaginal portion, however, is uniformly enlarged, and is smooth, hard and greatly swollen, it is impossible to decide whether we have to do with a simple hypertrophy and chronic induration or with incipient carcinomatous disease. The diagnosis can only be cleared up by amputation and microscopical examination. If one is satisfied to make an absolute diagnosis from the study of the symptoms alone, as was done towards

[1] Zeitschrift für Gynaekologie, II., p. 416.

[2] See Friedländer's Mikroskop. Technik, 1882, p. 120.

the middle of this century by Duparque, Lisfranc, Ashwell, Montgomery and others, why then of course we shall find that cancer of the uterus has in numerous instances been cured by amputation of the cervix.

Now, as we should so far as possible avoid undertaking this operation, by no means an insignificant one, without well-founded diagnostic reasons, we ought to welcome any criteria which would enable us to differentiate the commencement of carcinomatous disease from simple induration. Spiegelberg[1] claims that the former is characterized, in the first place, by the density and immobility of the mucous membrane overlying the deep-seated carcinomatous tissues, and further that the affected parts are not susceptible of dilatation by sponge-tents or other similar agents, their natural elasticity having been destroyed by infiltration with cancer elements. Unfortunately the hopes born of Spiegelberg's statements are justified neither by my own experience, nor, as it seems, by that of other physicians.

A correct diagnosis may undoubtedly be established by the use of these methods, when the mucous membrane slides freely on the underlying tissues, and a sponge-tent readily succeeds in dilating the cervical canal, but when these conditions do not obtain, we are not yet justified in making a diagnosis of cancer of the cervix uteri. The normal degree of mobility of the mucous membrane of the vaginal portion is so variable, and is so difficult of determination, that it would be improper to base a diagnosis of such far-reaching importance on so insecure, I am almost tempted to say so purely subjective, a foundation. And as regards the dilatability of the cervical canal by sponge tents or laminaria bougies, it seems to me that this also varies so exceedingly, leaving entirely out of consideration the fact that the different tents exhibit such varying powers of distension, that it has never aided me in reaching a decision in doubtful cases. Dense fibrous indurations often require a considerable time, and repeated introduction of sponge tents, before they exhibit any noteworthy degree of dilatation, and, on the other hand, I have not seldom succeeded in dilating the os with surprising facility by the above means, in cases of well-marked carcinomatous disease. Now while anatomical reasons would lead us to expect that tissues that have undergone cancerous degeneration, would, as a rule, soon lose their elasticity to a great extent, yet clinical observation teaches us that normal labor through an evenly dilated os, not very infrequently takes place in cases of advanced cancerous disease of the lower segment of the uterus; in other words, that cancer does not always entail a diminished dilatability of the cervix, or, at any rate, not to a degree that is always readily appreciable.

In those doubtful cases of the above description it is important to make a careful examination of the pelvic connective tissues surrounding the

[1] Archiv für Gynäkologie, III., p. 233.

uterus. By so doing we are not infrequently able to detect at an early stage infiltration of these tissues, with more or less immobility of the uterus, and dense indurations, sufficient grounds for establishing a presumptive diagnosis of malignant disease of the vaginal portion.

Bi-manual exploration, preferably during narcosis, should not be omitted in all those cases in which operative interference is contemplated. Special attention must be paid to infiltration of the broad as well as the sacro-uterine ligaments. The mobility of the uterus, more particularly in a downward direction, must be ascertained, where total extirpation is thought of. In this connection it is well to remember that, so far as the technical difficulty of such an operation is concerned, it makes little difference whether fixation of the uterus is due to cancerous infiltration or merely to perimetritic adhesions. It is at times quite possible to differentiate between cancerous and inflammatory infiltrations by the above method of examination.

## Treatment.

The now-a-days almost universally accepted view that cancer of the lower segment of the uterus is pre-eminently a local affection, which in but very few instances, and then only after a long period of existence, gives rise to metastatic deposits in distant organs, is in full accord with the experience of all times, according to which there exists no internal remedy and no medicinal procedure which is, or ever was, capable of curing cancer of the uterus. It is not necessary to adduce special evidence in support of the truth of this assertion.

Since epithelioma of the vaginal portion continues during so long a period of its existence as a mere local affection, we have reason to hope for a radical cure after removal of the morbid tissues. Therapeutists have, therefore, been constantly engaged in the study of the best ways and means for extirpating the diseased portio vaginalis as completely as possible. If we are able to entirely remove the degenerated masses, or, in a word, to operate within healthy tissues, it would afford the possibility of a complete and permanent cure. And, indeed, experience teaches that this has been done.

Until very recently recourse was had again and again to caustics and to similar procedures, in the attempt to accomplish the complete destruction of the neoplastic deposits. Cures have been recorded of all of these methods, including electrolysis,[1] cauterizations with sulphate of zinc (Simpson), with chloride of zinc, and similar agents.

Routh[2] claims to have cured epithelioma of the uterus by cauterizations with solutions of bromine, others by injecting gastric juice into the sub-

[1] Noeggerath, Obstet. Journal, April, 1878, p. 61. Neftel, etc.

[2] Obstetr. Journal, I., p. 347; Obstetr. Transactions, London, VIII., p. 290.

stance of the growths. Not one, however, of these and numerous other procedures, exhibits results which can withstand the test of strict and rigorous criticism, and I will, therefore, only mention them further on, in so far as they have any value as palliative measures.

Actual, unquestionable cures can be and have been observed only when the attempt is successful to completely remove through healthy tissues the degenerated masses in the beginning of the disease. The following comprises all the cases that I have been able to collect of radical cure after amputation of a cancerous vaginal portion. One of J. Simpson's[1] patients was well fifteen years after the operation, and had given birth to five children during the interval. The cancerous nature of the extirpated masses was verified by Goodsir.[2] A second patient died four years after the operation of cancer of the peritoneum; this case may perhaps be classed as cured, in so far, at least, as there was no recurrence of the disease *in loco*. A third patient succumbed also four years after operation, to dysentery.

Mikschik,[3] removed the diseased lower segment of the uterus, the patient dying ten years later of cancer of the stomach. Ziemssen's[4] patient died of pulmonary tuberculosis seventeen years after the removal of an epithelioma of the anterior lip of the os. Other cases are recorded by C. Mayer, Martin,[5] and Grünewaldt.[6] The last-mentioned states that he saw his patients alive and free from any recurrence of the disease five, ten, and twelve years respectively after the operation. C. Braun alludes to a case operated upon by Schuh, where twenty years later no return of the disease was seen. Hegar's[7] patient was in good health three and a half years after amputation. Scharlau[8] amputated the cervix with the *écraseur* for epithelioma, and some time afterwards destroyed two local recurrences with chromic acid. Four years later the patient was seen in perfect health, having given birth to a living child in the interim.

Other similar reports may be found recorded in literature, but they do not deserve as much credence as the foregoing, partly because the period of observation after operation was too short, and partly because the diagnosis does not appear to have been above doubt. The latter is particularly true of the cases of Osiander, Lisfranc, Dupuytren and

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[1] Diseases of Women, Edinburgh, 1872, p. 169.

[2] Compare also a case published in the Dublin Quart. Journal, 1846, p. 355, and Edinburgh Med. & Surg. Journal, 1841.

[3] Zeitschrift der Gesellschaft der Wiener Aerzte, 1856, p. 52.

[4] Virchow's Archiv, vol. XVII., p. 333.

[5] Monatsschrift für Geburtskunde, XVIII., p. 12.

[6] Archiv für Gynäkologie, XI., p. 501.

[7] Operative Gynäkologie, p. 239.

[8] Beiträge zur Geburtshülfe, etc., Berlin, II., p. 23.

others, who, as is well known, not infrequently mistook simple hypertrophy of the portio vaginalis for carcinoma.[1]

C. Braun[2] has very frequently performed this operation. Pawlick[3] states that Braun operated upon 136 cases, of which number 10 died and 16 received no benefit. Of the 110 immediate recoveries, 32 died afterwards (but only 16 of actual recurrence of the disease), and concerning 22 there is no subsequent history. In 22 others the disease returned (once after nineteen months, and once after six years). Thirty-three patients remained well for from one to nineteen and a half years. In thirty-nine of these cases Douglas's pouch was opened during the operation. None of the women gave birth to a viable child after the operation. When pregnancy occurred, it was invariably followed by abortion.

Winckel[4] removed the anterior lip in a case of epitheliomatous papilloma. Three years later a similar growth appeared on the posterior lip.

Schröder[5] amputated the cervix in thirteen cases, using the knife followed by the application of the actual cautery.

One of these cases succumbed to trismus. Of the twelve patients who recovered, five remained well for two years, *i.e.*, 42 per cent., and four had a return of the growth within that period of time, *i.e.*, 32 per cent.

Many similar operations have been done by others, but the reported cases are few in number.

In view of what has been previously said on this topic it is not surprising that such a relatively small number of recoveries is noted after amputation of the cervix for cancer. We have seen that, by the time the first symptoms have been noticed the affection is almost invariably so far advanced as to make it seem impossible to operate through sound tissues; either the vault of the vagina is diseased, or the infiltration has already invaded the cellular tissue of the pelvis, or, finally, cancerous ulceration in the cervical canal has already progressed beyond the internal os, the surface of cervix as seen in the vagina still remaining intact. Finally there is not a small number of cases in which nothing of the preceding description is present, and in which the diseased parts seem to be surrounded on all sides by healthy tissue, and yet either microscopical examination or the further course of the disease after operation very soon reveals that the apparently healthy tissue was already permeated with cancer elements. Let me repeat once more that our chances of securing more favorable and more reliable results in the treatment of cancer of

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[1] Compare Pauly, Maladies de l'utérus d'après les leçons de M. Lisfranc, Paris, 1836.

[2] Lehrbuch, etc., p. 494.

[3] Behandlung der Uteruscarcinome, Wien, 1882.

[4] Centralb. f. Gynäkol., 1882, No. 7.

[5] Krankheiten d. weibl. Sexualorgane, 1884, p. 296; and Hofmeier, Zeitschr. f. Geb. u. Gynäkol., vol. X.

the uterus than have hitherto been obtained, depend entirely upon whether we shall succeed in detecting with certainty the disease in its incipiency, or, at any rate, at a much earlier stage than has been the case up to the present time.

It is nevertheless the duty of the physician in every case of cancer of the lower segment of the uterus, in which there seems to be a possibility of amputating beyond the limits of the disease, to do so without delay. The operation is usually not a dangerous one and the hemorrhage can be readily controlled; in short the disadvantages involved are insignificant in comparison with the uncertain chances of a cure, by any other methods, of an affection of such gravity as cancer of the uterus. Besides, in those cases in which perfect recovery has not followed the extirpation, the growth having recurred, the course of the disease is certainly changed for the better by the operation, as I shall show later on.

The operation is done as follows: Under antiseptic precautions the uterus is to be grasped, and dragged downwards, when the diseased portions are removed with the knife or scissors.

When the disease extends up to the internal os, it is advisable to perform a funnel-shaped excision, as particularly recommended by Hegar.[1] The hemorrhage is often very profuse, and is the more grave according to the degree of anæmia previously existing. It is, therefore, advisable to complete the operation as quickly as possible, and then to employ at once the actual cautery, or other styptics, such as chromic acid, chloride of zinc, bromine, etc. The hemorrhage can be securely arrested by drawing together and uniting the cut edges of the mucous membrane over the stump, but the procedure not only takes up a good deal of time, during which of course more blood is lost, but above all exposes the patient to greater chances of recurrence. If any cancerous foci have been left behind in the apparently healthy tissues they will not only continue to extend, but may also inoculate the healthy mucous membrane with which they are brought in contact. But if the hemorrhage have been arrested by the energetic application of caustics, long-continued suppuration sets in, in the course of which any remnant of the neoplasm may possibly be destroyed. Moreover, small recurrent growths can be much more easily detected on the ulcerating surface, and then admit of easy removal.

If the wound does not gradually cicatrize it may be taken for granted that the amputation has not been performed through sound tissues; on the other hand the stump quite often cicatrizes and heals over in a comparatively short space of time, and yet a recurrence follows shortly, in which event it is probable that deeply seated islets of cancer tissue, that have escaped the surgeon's knife, have sprouted outwards to the surface.

For a time the employment of the *écraseur* in its various modifications

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[1] Hegar and Kaltenbach, Operative Gynäkologie, p. 229.

(chain and wire *écraseur*) was highly recommended in order to prevent free hemorrhage during the operation. But apart from its uncertain action in this respect, the instrument should be discarded because of the other well-recognized dangers that attend its application. Even in operations in which the utmost care has been exercised, and in which the uterus has not been dislocated from its normal position, the walls of the vagina and bladder and the peritoneum have in many instances been dragged into the loop and have been injured. Quite recently Atthill[1] reported a case of amputation with the *écraseur* of a cancerous cervix, the instrument also laying open Douglas's *cul-de-sac*. One of the chief disadvantages of the method in the operation which we are now discussing consists in the fact that it by no means permits of the removal of a diseased part within well-defined limits; the wide chain or the smooth wire can never be carried so accurately along the narrow line that separates diseased from healthy tissue as can the knife, the direction of which may be varied at any moment, at the will of the operator.

The same disadvantage, although to a lesser degree, attends the employment of the galvano-caustic snare, which von Grünewaldt,[2] Spiegelberg,[3] Léon Labbé,[4] C. Braun, and others have so often used with success in amputating diseased cervix. This method entails little if any hemorrhage, and is therefore sometimes indispensable. Thus in some cases of cauliflower excrescence of the cervix, that form of cancer that offers relatively the best chances for radical cure after amputation, the patients have been reduced to so great a degree of anæmia by repeated hemorrhages that any bloody operation is entirely out of the question.

Another advantage offered by this method is the cauterization of the field of operation The disadvantages are, in the first place, want of precision in severing the tissues on the boundary line between health and disease, and, in the second place, the laboriousness attending its use, at least in private practice and in the smaller hospitals.

Since it seldom happens, in epithelioma of the intra-vaginal portion of the cervix, that amputation of the latter can be performed through sound tissues, attempts have repeatedly been made to thoroughly extirpate the diseased parts even when the affection extends still higher. Funnel-shaped excision, after Hegar's method, sometimes suffices, as previously mentioned, for those cases in which the mucous membrane lining the cervix is diseased up to the internal os.

Schröder[5] has recently devised and successfully performed a new opera-

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[1] Dublin Journal of Medical Science, Feb. 1877.

[2] St. Petersburg Med. Zeitschrift, 1864, II., 1–31; Archiv. für Gynäk., XI., p. 501.

[3] Arch. für Gynäkologie, V., p. 411.

[4] Annales de Gynécologie, I., p. 165.

[5] Verein der Aerzte d. Charité zu Berlin. Sitzung vom 25 April, 1878; Berlin

tion for those cases in which the disease has already invaded the fundus of the vagina to a slight extent, while the pelvic cellular tissue is still intact. Two strong sutures (these are not always required, according to Schröder's latest statements) are passed through the lateral walls of the fornix vaginæ near the diseased parts so as to fix the latter firmly. The knife is now carried around the vagina as far as is required to sever the cancerous from the healthy tissues, cutting just deeply enough to expose the loose cellular tissue of Douglas's *cul-de-sac*, and of the space between the bladder and uterus. This tissue is now torn through with blunt instruments until as much as seems necessary of the lower segment of the uterus is laid bare, which is then cut away. It is then advisable, in order to prevent hemorrhage into the surrounding connective tissue, to pass all the sutures through the stump of the uterus.

This so-called "high amputation" unquestionably constitutes a decided advance in the treatment of cancer involving the lower uterine segment. The method has been widely accepted, although but little has been published concerning it.

Schröder[1] has recorded 105 cases of this kind. Thirteen of this number died. Of the ninety-two who recovered, twenty-seven within six months showed a recurrence of the disease that proved fatal after a shorter or longer period. Concerning twenty-seven patients nothing could be learned. Thirty-eight remained well six months after the operation. Twenty-seven of this number were still well after one year, twenty-two after eighteen months. Of this number eighteen were well after two years, fifteen were still in good health after 2½ years, and twelve after three years. Five certainly remained well four years after the operation. All the others were either lost sight of, or suffered a return of the disease.

Wallace[2] has reported ten cases of high amputation of the cervix for cancer, with two deaths. In two cases the disease returned within one year.

Of thirty-three cases of my own, of which I have accurate notes, three died of "sepsis" in consequence of the operation. One patient was well one year, another two years after the operation.

Total extirpation of the uterus was formerly sometimes performed after a similar plan, or at any rate operations similar to Schröder's have been thus styled. It would be superfluous for me, on this occasion, to sift all the published cases of total extirpation of the uterus for cancer. The reader will find in West's treatise[3] a record of twenty-five operations, of which twenty-two were fatal.

Klin. Wochenschrift, 1878, No. 27: Ueber die theilweise und vollständige Ausschneidung der carcinomatösen Gebärmutter, Zeitschrift für Geburtshülfe und Gynäkologie, vol. VI., p. 217; Krankh. d. weibl. Sexualorgane, etc.

[1] Krankh. d. weibl. Sexualorgane, 1884, p. 2, and Hofmeier, l.c.

[2] British Med. Journal, Sept. 15, 1883.

[3] Frauenkrankheiten, Göttingen 1860, p. 476.

At that time no definite plan was pursued. The uterus was sometimes "peeled out" from the pelvic connective tissue, by way of the vagina; at other times the organ was first dislocated by force, or the operation was performed on uteri that were in a condition of spontaneous prolapse. Laparotomy was sometimes practised, but the method of extirpation that has so often been pursued with success for fibroid tumors, could not of course be employed in carcinoma of the uterus, for in the former case the line of division passes at the level of the internal os between the body and the cervix, the latter part being left behind. Besides the want of any satisfactory method, there remains the fact that in not a small number of the older reports there exist well-founded doubts as to the correctness of the diagnosis; in short it seemed as if total extirpation of the uterus, for carcinoma affecting the lower segment, would have to be forever excluded from the list of debatable operations.

In 1878, however, W. A. Freund[1] devised a method ingenious in conception and daring in execution. As originally described it is as follows: After cutting through the anterior wall of the abdomen, and fixing the body of the uterus firmly with a loop, each broad ligament is separated into three portions by three ligatures, the last of which transfixes the vault of the vagina and the lower part of the broad ligament. After the uterus has in this manner been severed from its lateral connections in the pelvis the anterior and posterior parts of the fornix are dissected off from the uterus and are then cut through from within outwards. Through the large gap between vagina and pelvis, which results after the uterus is removed, the ligatures are then passed so as to let their ends hang into the vagina. In this way a funnel-shaped opening is left, in which the peritoneal investments of the pelvis are in contact with one another, after which the margins of the opening are closely approximated by sutures so as to form a barrier between the vagina and the abdominal cavity. For the details and the various modifications of the operation I must refer to the previously mentioned paper of Freund and to the publications of numerous other operators.

The results of an extended trial of the operation show that it is scarcely a justifiable procedure, and can be of value only in a small minority of cases of cancer of the uterus. It soon became evident from the publications of Schink[2], Linkenheld[3], Baum,[4] Schröder,[5] Mikulicz,[6] Ahlfeld,[7]

[1] Eine neue Methode der Exstirpation des ganzen Uterus. Volkmann's Clinical Lectures, 1878, No. 133. Also "Zu meiner Methode der totalen Uterusexstirpation," Centralblatt für Gynäkologie, 1878, No. 12.

[2] Inaug. Dissertation, Berlin, 1879.

[3] Centralblatt für Gynäkologie, 1881, No. 8.

[4] Berliner Klin. Wochenschrift, 1880, No. 46.

[5] Zeitschrift für Geburtshülfe and Gynäkologie, vol. VI.

[6] Wiener Med. Wochenschrift, 1880, No. 47.

[7] Deutsche Med. Wochenschrift, 1880, No. 1.

Czerny,[1] Kleinwächter,[2] Ohlshausen[3], Bardenheuer[4] and others that the operation was an extraordinarily dangerous one. According to Ahlfeld it resulted fatally forty-nine out of sixty-six, respectively sixty-nine times, according to Kleinwächter seventy out of ninety-four times, and according to Kaltenbach[5] fifty-eight out of eighty-eight times.

Hegar and Kaltenbach[6] have published a table of ninety-three cases with sixty-three deaths, a mortality of seventy-one per cent. Duncan[7] collected 137 cases showing a mortality of seventy-two per cent.

I have myself collected (including three unpublished cases of my own) 148 cases, with 106 deaths, a mortality of 71.6 per cent.

Now this high mortality rate would scarcely weigh in the balance, and the operation would remain one of the most brilliant achievements of operative medicine, if the few who survived its immediate effects were radically cured of their disease. Unfortunately, however, the malady recurred in all the cases that have been reported, and terminated fatally in a more or less short space of time (Linkenfeld).

If the only benefits that accrue from the operation are simply a short prolongation of life, and a brief interval of freedom from suffering, then the operation is too perilous, and we cannot justify ourselves in the fatal cases by stating that we have put an end to the suffering of the patient or have contributed to procure euthanasia. Pain may be alleviated and the end may be delayed by more innocent means. In spite of incessant torture many of these patients are content to linger along until they have arranged those duties which seem incumbent on them towards their families and others.

It requires but little reflexion to recognize the incorrectness of a statement formulated by modern surgery (Bardenheuer[8]), that the old style of treatment (amputation of the cervix, curetting, cauterization) "is more pleasing in its execution" to the physician. Every one who still feels it his duty to practise these old procedures knows how depressing and how laborious it is, how it most severely taxes the patience of the physician to adhere to it when contrasted with an interesting, technically difficult operation, in which at least a passing glow of satisfaction is experienced at the recollection of the numerous difficulties successfully overcome. I shall leave it to the impartial reader to decide which of the two is the more "discreditable" to medical skill, the old style of treatment, as

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[1] Wiener Med. Wochenschrift, 1879, Nos. 45–49.
[2] Wiener Med. Presse, 1881, Nos. 3 and 4.
[3] Berlin Klin. Wochenschrift, 1881, No. 35.
[4] Die Drainirung der Peritonealhöhle, Stuttgart, 1881.
[5] Deutsche Med. Wochenschrift, 1881.
[6] Operative Gynäkol., 1881, p. 408.
[7] Obstetrical Society, London, 1885.
[8] Die Drainirung der Peritonealhöhle, Stuttgart, 1881, p. 38.

Bardenheuer thinks, or the delirious joy of a patient who has been told, after extirpation of her cancerous uterus, that she is cured (l. c., p. 39), and who finds after the lapse of a few months that the fell disease has reappeared.

The situation would of course be entirely different if total extirpation of the uterus offered the possibility of a radical cure of the disease, or if the operation were less dangerous. In the latter respect much better results are warranted by the vaginal method of extirpation of the uterus, as first proposed, or, rather, as re-introduced by Billroth and Czerny. (The operation was first done by Sauter 1822, Blundel 1828, Récamier 1829, and others).

According to a table prepared by Hahn [1] in 1882, out of forty-eight cases of total extirpation per vaginam, 14 (*i.e.* 29.1 per cent.) died. Hegar and Kaltenbach[2] mention eight deaths in twenty-nine cases, a mortality of twenty-five per cent. Czerny [3] found twenty-six deaths in eighty-one operations, a mortality of thirty-two per cent. Duncan (l. c.) has collected 276 cases, showing a mortality of 28.6 per cent. Sänger [4] found a similar mortality rate in 133 cases. I have myself found records of 253 cases of this kind (including six cases of my own not yet published, with one death) with fifty-nine deaths, *i.e.* a mortality rate of only 23.3 per cent.

These figures show that the vaginal method of extirpation of the uterus is not only far less dangerous than the operation of Freund, but also that the mortality has decreased with the increasing number of operations. This fact is made particularly noticeable from the figures published by Pfannenstiel,[5] who found that in 154 operations done up to 1882 the mortality rate was twenty-three per cent., whereas in thirty-six operations performed since then it had fallen to 8.3 per cent.

As a palliative procedure the operation has, therefore, a high value. Whether it is destined to afford radical relief cannot at present be decided. It would certainly seem that the majority of patients succumb sooner or later to a recurrence of the neoplasm.

Even if this operation gives results only as good as are observed in the removal of cancers elsewhere in the body, we must nevertheless welcome it as a justifiable, and possibly beneficent surgical interference.

The chief condition favorable to the performance of this operation, consists in the absence of cancerous infiltration of the vaginal walls, and the pelvic connective tissue, as well as downward mobility of the uterus.

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[1] Berlin Klin. Woch., 1882, No. 24.

[2] Loc. cit., p. 409.

[3] Berlin Klin. Woch., 1882, Nos. 46 and 47.

[4] Arch. f. Gynäkol., vol. XXI., 98.

[5] Inaug. Dissert., Berlin, 1885.

Views still differ quite widely as to the best method of performing the operation under discussion.

Under antiseptic precautions the uterus is to be dragged down, after as much of the cancerous masses as possible has been removed, destroyed or disinfected. It is advisable to pass a stout double ligature through the cervix. This affords a good purchase on the womb, and prevents contact of the diseased tissues with the fresh wounds. The vault of the vagina is then incised, behind and in front of the cervix, and without the use of cutting instruments the uterus is severed from its anterior and posterior connections. It is then pulled downwards and the broad ligaments are step by step ligated and cut (Schröder). The ligatures of the broad ligaments are passed outwards through the incision into the fornix of the vagine. This is closed by sutures, a drainage tube is inserted, and iodoform tampons placed in the vagina. It is not necessary to discuss here the various modifications of this procedure that have been suggested by different authors.

Views also differ as to the advisability of complete closure of the vaginal wound, or of allowing the incisions to remain open. A middle course is probably the best, *i.e.*, incomplete closure, with thorough drainage. It is very difficult to decide which one of the various operations described is indicated in a given case. If the cancerous disease has extended as far as, or beyond, the internal os, without, however, involving the pelvic areolar tissue, then the vaginal extirpation of the uterus is called for. Should the body of the uterus be so large that it is not feasible to pass it through the pelvis, Freund's operation may have to be done. But it seems advisable in all such cases to first sever the anterior and posterior connections of the uterus per vaginam, and then to remove the organ by laparotomy.

In view of the great gravity of Freund's operation, it will always have to be seriously considered, whether the uterus, even if enlarged, cannot be removed per vaginam, by cutting the broad ligaments from below with the womb *in situ*.

What method to choose when the cancer is still confined to the portio vaginalis cannot in the present state of our knowledge be strictly formulated. Intra-vaginal amputation, or total extirpation are, of course, to be weighed in the balance as to their relative dangers and possible advantages. In a general way I favor extirpation, because it is so often hard to say how far cancerous infiltration may have crept upwards in the mucous membrane of the uterus, and because the probability of recurrence should be less in the more radical operation.

Thus, while there are but few cases of cancer of the uterus in which there is a good prospect of cure by surgical interference, and still fewer where this prospect is realized, there are many in which we are able to retard the progress of the disease and to abate some of the most painful

symptoms for a long time. In all cases of epithelioma, in which the ulceration is not very extensive, and has not penetrated the vault of the vagina as far as the peritoneum, nor caused perforation, the actual cautery should be employed to destroy the luxuriating masses as far as possible. In order to make the application thorough, it is always necessary to previously remove as much as possible of these masses either by the knife and scissors, or, when the proliferating tissue is soft, by Simon's sharp scoop. The cutting and scraping must be done under the guidance of the hand, after which a series of large cautery-irons is to be rapidly applied to the wound, and pressed in forcibly, so as to insure deep and thorough cauterization. This procedure is of course entirely unsuited in the more deep-seated, true carcinomata, especially as long as these have not broken down and become ulcerated; they would, in fact, bring about the very conditions that are most to be feared in carcinoma of the uterus, namely, ulceration and decomposition, and are, indeed, not at all indicated in cases of spontaneous putrid liquefaction in dense and deeply-seated carcinomata, nor in flat cancerous ulcers.

When limited, however, to their proper sphere, namely, epithelioma with crumbling papillary excrescences, the results obtained are often wonderful. Hemorrhage, discharge and not seldom pain, at all events all the symptoms consequent upon breaking down and ulceration of the epithelioma, often cease for a long time. In fact many patients think themselves cured, and it happens not infrequently that the entire operation-wound cicatrizes. From ten to twelve months may elapse before any symptoms due to a recurrence of the disease appear, the length of the interval usually depending upon how much it has been possible to scrape away and to destroy with the cautery. When the application has been thorough, its effects last on an average from one to six months, and the operation may be repeated several times with suitable intervals. The procedure simply anticipates as it were the natural course of the disease, inasmuch as the tissues, which would slowly slough away with repeated attacks of hemorrhage if the affection were let alone, are rapidly destroyed and removed, leaving a comparatively clean ulcer behind. Instead of allowing the proliferating cancer masses to undergo slow destruction, with symptoms which rapidly consume the strength of the patient, we secure to the latter a period of relief from the most agonizing symptoms.

The dangers of the operation are exceedingly slight. I have had but two deaths from pyæmia in the very numerous instances that have come under my personal observation. Nor have I ever had the misfortune to wound the peritoneum, for whenever I have been able to feel the peritoneal investment of Douglas's *cul-de-sac*, while engaged in scraping out the vault of the vagina, I have desisted from applying the actual cautery, and no noteworthy reaction ever set in.

The vagina and the surrounding parts are best protected, as far as my experience goes, by the double-walled speculum of Matthieu, which I have used to the exclusion of all others since 1867, since which date I have not observed any burns. The speculum is made of metal and con-

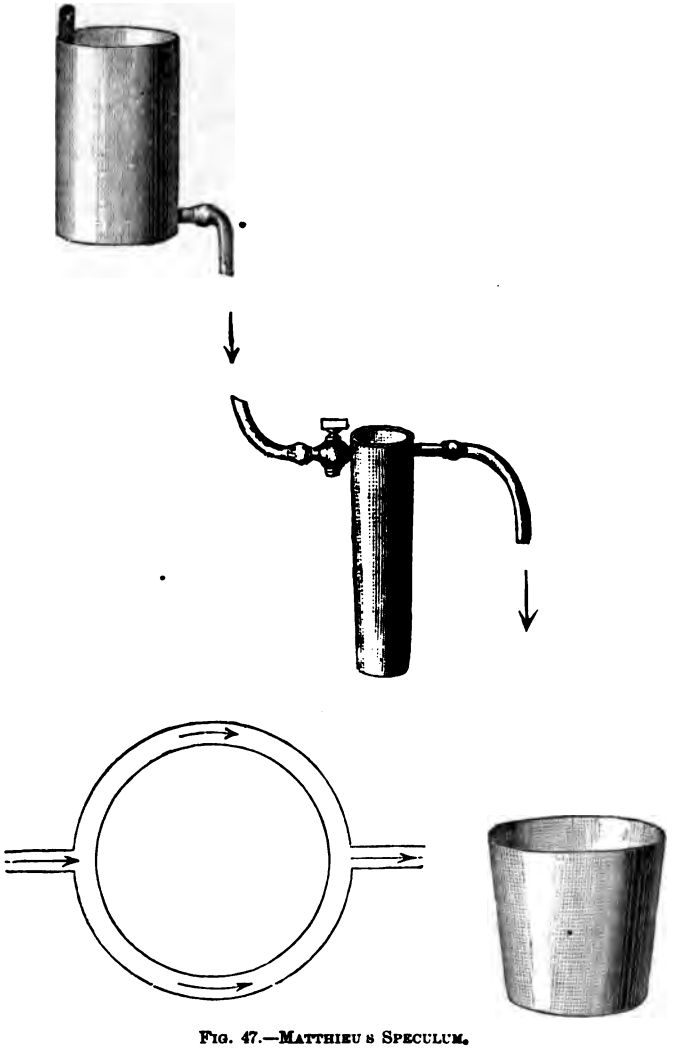

FIG. 47.—MATTHIEU'S SPECULUM.

sists of two concentrically arranged cylinders, closed at both ends, and provided on each side with a short projecting tube, to each of which a piece of rubber tubing is attached. Through one of the latter ice-water is conducted into the space between the cylinders, and passes off by the tube on the opposed side.

The operation itself is so insignificant and gives rise to so little pain that anæsthesia is unnecessary, although it is often used to prevent the shock experienced by timid patients at the sight of the incandescent cautery-irons. The galvano-caustic apparatus is not capable of developing the necessary degree of heat. At first it seemed as if Pacquelin's thermo-cautery would prove an excellent substitute for the ferrum candens, but after an extended trial of the former, I have found it best to return to the actual cautery. Charred blood and tissue-fragments quickly adhere to the plate of the thermo-cautery, forming a thick, porous layer, which is constantly becoming covered by fresh deposits of coagulated blood, and thus prevents the heat rays from coming into direct contact with the diseased masses. The same deposit occurs of course on a cautery iron, but when one is rendered unfit for use, it may be removed at once, the vagina washed out, and a second, already heated, applied. When the thermo-cautery is removed it requires quite a time before the deposit can be burned off by bringing the blade to a white heat, and even this does not always succeed fully; while even when a second instrument is at hand, the heat cannot be so uninterruptedly applied as with a series of cautery-irons.

In those cases in which the actual cautery seems no longer available or suitable, we can improve the condition of the cancerous ulcer, and temporarily arrest its growth by other caustics, such as I have already referred to. The chief of these are chloride of zinc, Vienna paste, solid caustic potash, and fuming nitric acid. Recently Routh,[1] Schröder[2] and others have spoken highly of applications of one part of bromine in five of alcohol; the parts that it is not intended to cauterize must be protected by linen rags dipped in a solution of bicarbonate of soda.

Marion Sims (Annales de Gynécol. 1880) claims to have seen good results from the following procedure. The diseased masses are removed, and a tampon soaked in liq. ferri sesquichlorati is introduced into the vagina. Four days later tampons saturated with chloride of zinc (1:2 water) are used, the vagina being protected by tampons dipped in bicarb sod. Cicatrization is said to be developed in from ten to fourteen days.

I have never been able to procure by means of the above or similar agents anything like the results obtainable by the red-hot iron, applied in the manner previously described, and I therefore look upon them, one and all, merely as adjuvants in those cases in which the actual cautery can no longer be resorted to.

The treatment of the individual symptoms in epithelioma of the cervix uteri is as difficult as it is uncertain. Simple astringent vaginal injections often suffice to moderate a discharge which is mostly muco-purulent, or is slightly tinged with blood. We may employ for this purpose cold

[1] Transactions of the Obstetrical Society, London, VIII., p. 290.

[2] Henneberg: Ueber Behandlung der Carcinome des Cervix uteri mit alkoholischer Bromsolution, Inaugural Dissertation, Erlangen, 1874.

solution of sulphate of zinc, sulphate of copper, alum, tannin, pyrolignous acid, etc., of different strengths. When the discharge assumes a more fœtid and putrid character, the injections should consist of solutions of substances which possess more pronounced antiseptic properties, such as chloride of lime, chlorine, permanganate of potash, tar, carbolic acid, creosote and salicylic acid.

Powdered charcoal suspended in water makes quite an efficient injection, but is rather uncleanly when used for any length of time. It is always advisable to use different solutions from time to time. Substances applied pure, or nearly pure, to a sloughing cancerous ulcer, arrest or diminish a putrid discharge with more certainty. In this respect I have had very excellent results from tampons saturated with absolute alcohol, applied in the manner first introduced in my clinic by Professor Zweifel. They seldom cause any considerable pain, and their disinfectant action upon the ulcer is usually energetic. Stuffing the vagina with small bags filled with powdered charcoal and carbonate of lime is a tedious and uncleanly procedure, although it deprives the discharge to a great extent of its odor.

But of all substances iodoform is the most useful as well as safest. Iodoform tampons lessen the discharge, and have the additional advantage of being safely left in the vagina for several days.

In all cases the external genitals must be kept thoroughly clean, and should from the beginning be kept smeared with a bland ointment, in order to prevent the putrid discharge from giving rise to excoriations, which readily assume a bad condition, and also cause the patients much torment in other respects.

If there be much hemorrhage, use injections of tannin or liq. ferri sesquichlorati dissolved in ice-water, and if these do not suffice, tampons moistened with liq. ferri sesquichl. of full strength.

Pain is on the whole the one symptom of cancer of the uterus which we are least able to control. If it is more of a perimetritic character, due to reactive inflammation in the vicinity of a cancerous ulcer, it can sometimes be assuaged by covering the abdomen with moist compresses, or poultices. In all other cases, in which we have to do with the true "cancer pains" of various kinds and degrees of intensity, our last resource will always be opium and its preparations, especially morphine. Commence as a rule with the smallest efficient dose, and employ the drug at first as seldom as possible. Having once begun the use of these remedies, it is almost invariably necessary to continue them in constantly increasing doses until the death of the patient. It is well also to vary, from time to time, the method of administration of the narcotic, giving it at one time in its different preparations by the mouth, at other times by subcutaneous injection, or in the form of vaginal or rectal suppositories made up with cacao-butter. Small enemata, containing a little aqueous

extract of opium or something similar, are sometimes excellent. All the other procedures that have been recommended, such as the inflation of the vagina with carbonic acid gas, the introduction of bits of ice into the vagina, cutaneous inunctions of chloroform, the administration of chloral in various forms, and so forth, may be suitable and useful at times, but are much inferior to opium and morphine.

Demarquay[1] recommends suppositories of a half to one gramme of iodoform as having both an anæsthetic and a cauterizing effect. Lawrence[2] gives ergot in doses of two grammes every six hours, with good results in violent, throbbing pain due to carcinoma of the uterus. The same writer also recommends croton chloral hydrate internally, and carbolic acid locally applied. Wagner also advises the last mentioned. It is not possible to mention here the innumerable remedies that have been recommended from all parts of the globe, suffice it to say that their very multiplicity but demonstrates how few drugs we possess that can be relied on for overcoming the pain arising from cancer of the uterus, and also shows how great a *rôle* the merely subjective opinions of the individual physician play in this regard.

It is as easy to point out the further indications of symptomatic treatment as it is difficult to accomplish anything with the agents prescribed therefor. In this connection I can only repeat that which I have already written in No. 18 of Volkmann's Clinical Lectures.

Almost all sufferers from cancer of the uterus become dyspeptic at an early date, and take scarcely any nourishment. Whenever this is the case the diet should be appetizing, and at the same time nutritious and easily digestible. In place of regular meals it is often advisable that patients take a small quantity of food every hour, and take most of it cold. It becomes still more difficult for patients to take sufficient nourishment after they have once been attacked by uncontrollable vomiting and choking sensations, that so often occur in this disease; whether these symptoms be caused by the fœtid odor of a putrid vaginal discharge, or be simply an aggravated condition of previously existing dyspepsia, the vagina should as often as possible be washed out with strong disinfectants, the apartments of the patient should be well aired, or should often be changed, and particular care should be taken to ensure good ventilation at night. I have often seen much benefit accrue in these cases from having the patients covered with a rubber sheet from the false ribs downwards; to a great extent this keeps away the odor from the patient and those around her, if the most scrupulous cleanliness be exercised at the same time.

As useful in controlling the vomiting may be mentioned ice, water-ices, cold champagne, iced punch, cold milk and strong cold tea, but always

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[1] Bulletin thérapeutique, LXXII., 1867, pp. 369–406.
[2] Med. Times, 1877, p. 310.

in very small quantities at a time. The bowels should also be carefully regulated in these cases, even though the patients prefer to have a movement but once in many days, because of the severe pain attending the act. If the vomiting be uræmic, it may often be checked in an astonishingly short time, even if only temporarily, by stimulating the secretion of the kidneys. For this purpose copious draughts of Vichy or similar mineral waters, and the administration of digitalis, acetate of potash, iodide of potassium, etc., are useful.

## Pregnancy, Parturition and Childbed in Cancer of the Uterus.

In cases of carcinoma uteri pregnancy occurs most readily during the initial stage of the disease, where the carcinomatous infiltration is confined to the deeper layers of the mucous membrane, or where the affection presents as slight papillary excrescences. When the diseased parts have once begun to break down, not only is cohabitation more seldom practised, but the contact of semen with the ovum is impeded by various obstacles.

*Per contra*, the literature of the subject abounds in examples of pregnancy in cases of far-advanced sloughing cancer of the cervix uteri (compare Bagli and Cazel, Chantreuil, l. c., p. 6).

In 127 cases Cohnstein[1] found twenty-one ... which the disease had been detected quite a time, as much as a year, before the inception of pregnancy. When, however, Cohnstein attempts from this collection of cases to draw the conclusion that cancer of the cervix uteri actually favors conception, he is contradicted not only by most authors, but also by the fact that the complication of cancer of the cervix with pregnancy is, in general, exceedingly rarely observed. At the same time, it is quite remarkable that in fifty-eight cases of this description Cohnstein found sixteen between twenty-seven and thirty-three, nineteen between thirty-four and thirty-seven, and twenty-three between thirty-eight and forty-nine years of age. Carcinoma of the cervix uteri occurs infrequently before the age of thirty, while parturition also occurs infrequently after the thirty-eighth year. At all events the above small figures are not sufficient to prove that carcinoma of the cervix favors conception.

The course of pregnancy seems to depend essentially upon the location, or, to speak more precisely, upon the extent of the disease. The more the degeneration is restricted to the external os, especially if but one lip be involved, the less likelihood is there of pregnancy being interfered with; while in proportion as the affection extends higher up into the cervix,

[1] Ueber die Complikation der Schwangerschaft und Geburt mit Gebärmutterkrebs, Archiv für Gynäkologie, V., p. 366.

and particularly when it has penetrated up to or beyond the internal os, the greater is the probability of an abortion or a premature birth, probably as a consequence of diminished capability of development of the lower segment of the uterus. In other cases the interruption of pregnancy is due to a succession of severe hemorrhages, for which reason it may be said that epithelioma is more likely to cause a miscarriage than is true carcinoma.

Lewes states that forty per cent. of 120 women affected with cancer of the cervix aborted (cited by Chantreuil, l. c., p. 14). Cohnstein found that the proportion of premature births was lower. Thus, in 107 cases delivery took place eighty-eight times at full term, while abortion occurred fifteen times, and in two instances the duration of pregnancy was longer than normal.

The last-mentioned occurrence, so-called "missed labor," has been observed in several cases of cancer of the cervix uteri, and is certainly a remarkable phenomenon. The best-known example of the kind is that of Menzies.[1] In this instance, after pregnancy had already lasted seventeen months, the woman died undelivered; the fœtus was flattened out, and showed no trace of decomposition, while the amniotic fluid had been entirely absorbed. Judging solely from the report of the case, as given by Chantreuil, it seems to me not improbable that it was a case of extra-uterine fœtation, complicated with epithelioma of the uterus. Depaul-Schmidt's[2] case cannot be reckoned with certainty as one of missed labor, for while it is stated that the patient was affected with carcinoma of the lower segment of the uterus, and was somewhere in the tenth or eleventh month of pregnancy, it was not possible to determine the exact duration, and the pains were lasting and energetic, although not powerful enough to accomplish the delivery of the child.

The only undoubted cases of missed labor, caused by carcinoma of the cervix, are the following. Miller's[3] patient died some time after the normal end of pregnancy, without having been delivered; mild pains had occurred on several occasions, but had not led to the initiation of labor. Playfair[4] reported an instance of cancer of the uterus, in which violent hemorrhage led to the death of the fœtus in the sixth month of pregnancy; this was followed by labor pains, not strong enough, however, to accomplish the delivery of the fœtus. The product of conception underwent decomposition, and was expelled in fragments at long intervals.

Beigel[5] mentions a similar case. In all of these instances it is presuma-

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[1] Glasgow Journal, July, 1843, p. 229,† reported in full by Chantreuil, l. c., p. 16.

[2] Archives de Tocologie, III., p. 111.

[3] Simpson, Obstet. Works, 1867, p. 498, and London & Edinburgh Monthly Journal for Medical Science, 1844, p. 279.

Transact. of the London Obstet. Soc., X., p. 58.

[5] Lehrbuch der Frauenkrankheiten, p. 522.

ble that labor pains had occurred either at or before the usual time, but being unable to overcome the resistance offered by the hard and infiltrated cervix, had subsided.

Cohnstein relates that seven patients died from spontaneous or artificially induced abortion, five after, and two before delivery was accomplished, and in premature labor one died before and ten after delivery.

As regards the influence of pregnancy upon the course of the cancerous affection, several instances have been reported where the disease made no progress at all during pregnancy, remaining *in statu quo.* (Spiegelberg.[1])


FIG. 48.—CARCINOMA OF THE BODY OF THE UTERUS. Case of total extirpation of the Uterus. *a*, External Os.

Cohnstein, indeed, found in cases in which carcinoma of the uterus had existed for rather a long time before conception occurred, that the latter seemed to react comparatively favorably upon the local affection; thus, in thirteen cases of this kind, the disease was plainly accelerated in three, made no noteworthy progress in six, and came to a complete halt in four instances. I will, however, venture to remind those who are inclined to draw the same deduction from these small figures, that it is controverted by a large number of observations showing that the symptoms of the disease first manifested themselves after conception, and that from that time on they speedily grew worse, under a rapid extension of the degeneration.

[1] Lehrbuch der Geburtshülfe, 1878, p. 295.

Typical instances of this have been recorded by Depaul,[1] Pfannkuch,[2] Galabin,[3] Benicke[4] and numerous other writers, and from my own limited experience also I am forced to maintain that, not only do the symptoms of cancerous disease quite often first develop during pregnancy, but they quickly become intensified, corresponding to an astonishingly rapid growth of the neoplasm.

It was formerly thought that the artificial induction of abortion or premature labor was the proper treatment in these cases, and Lee was perhaps the strongest advocate of this plan, but of late the practice has been almost universally abandoned. The reasons therefore will be most appropriately discussed when we reach the consideration of the phenomena of labor in carcinoma of the uterus.

Starting out with the assumption that in cases of pregnancy complicated with cancer of the cervix, the chief task of the physician consists beyond a doubt in preserving the existence of the fœtus, one is tempted to denounce local treatment in these cases. Now while it is certainly true that energetic local treatment, such as amputation of the vaginal portions the removal of the diseased masses, or the application of strong caustic, may bring on abortion or premature labor, yet experience has gradually taught us that these accidents do not necessarily follow those procedures, but that, on the contrary, the latter may favorably modify the course of the disease and lighten the burthen of the patient's existence, and may even influence the conduct of delivery, contributing thereby directly to the preservation of the life of the child.

There can be no question that abortion has occurred after amputation of a diseased portio vaginalis. Instances of this have been reported by Cohnstein, Benicke[5] and many others. I have myself seen several.

On the other hand a large number of cases of this kind, some of older date, but most of them of recent occurrence, have been reported, in which the operation or a similar procedure did not interrupt pregnancy, delivery occurring at the normal time, and terminating more or less favorably. Instances of this have been communicated by Schatz,[6] Schröder and Benicke.[7] Rutledge states that in eight operations of this description, gravidity was interrupted but three times. Galabin[8] amputated a diseased cervix in the first month of pregnancy with the galvano-caustic wire,

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[1] Archives de Tocologie, I., p. 442.

[2] Arch. für Gynäkologie, VII., p. 169.

[3] Obstet. Transactions, London, XVIII., p. 286.

[4] Zeitschrift für Geburtskunde und Gynäkol., I., p. 337.

[5] Zeitschrift für Geburtshülfe und Gynäkologie, I., p. 337.

[6] Arch. für Gynäkologie, V., p. 161.

[7] Loc. citat., p. 337; Archiv f. Gynäk., X., p. 405. Schröder, Lehrbuch, etc., p. 392.

[8] Obstet. Journal, IV., p. 539.

abortion not occurring, and delivery being accomplished at full term. Godson Savory[1] removed an epithelioma of the external os with the *écraseur* in the seventh month of pregnancy, and a living child was born at the end of the tenth month. Although a recurrence took place, the patient shortly afterwards conceived again, and miscarried in the seventh month, the child being born alive, but dying immediately afterwards, and the mother dying thirteen days later.

Wiener[2] amputated the cervix for cancer, and three days after the operation childbirth followed.

C. Braun[3] advises the removal of all vaginal masses during pregnancy. If the cancer is confined to the uterus, he favors premature delivery, followed by total extirpation of the uterus. Where this is not practicable it may be well to wait until full term and then perform Cæsarean section, in order to save the child.

Spencer Wells[4] successfully performed Freund's operation in a woman six months pregnant. Bischoff[5] did a similar operation in the eighth month of pregnancy. The mother died but the child was saved.

In another case of small cervical cancer Bischoff induced premature delivery. Eight days after the birth of a living child, he removed the diseased cervix by amputation. The woman recovered and 2½ years later gave birth to a living child.

In view of the above facts it seems to me that it is the duty of the physician to remove as thoroughly as possible the diseased parts, even when gravidity is present, whenever there is a reasonable hope of being able to operate through sound tissues, and of either curing the disease radically, or of arresting its further progress for a lengthy period. If the area of the disease is so large as to render an operation of this kind no longer feasible, we are not justified in scraping or cauterizing the affected parts during the existence of pregnancy, unless the disease is making rapid progress and hemorrrhage and sloughing threaten the life of the patient. If this is not the case, and if the degeneration is not extending at all or but very slowly, all operative measures are contra-indicated as liable to endanger the existence of the fœtus.

Whether delivery takes place before the normal end of pregnancy, or at full term, in cases of cancer of the lower segment of the uterus, its course depends altogether on the extent of the disease at the time. If only one lip of the os be affected, even a mature and fully developed infant may be easily and quickly born, either the diseased part participating in the dilatation of the os, or the sound lip alone stretching sufficiently

[1] Obstet. Journal, III., p. 47; Obstet. Transactions, London, XVII., p. 82.
[2] Breslauer ärztl. Zeitschrift, 1880, Nos. 4 and 5.
[3] Felsenreich : Wiener Med. Presse, 1883.
[4] Med. Chirurg. Trans., 1882.
[5] Correspb. Schweizer Aerzt., No. 4, 1881.

to permit of the passage of the head. Cases of this kind have been recorded by Cazeau, Chantreuil, Spiegelberg and others. Judging from Cohnstein's series of cases it appears to make a difference whether it is the posterior or the anterior lip that is affected. When the posterior lip alone was diseased spontaneous delivery always terminated favorably for mother and child alike, but when the degeneration was confined to the anterior lip the result was favorable for the mother in 87.5 per cent. and for the child in 83.3 per cent. of the cases. If this difference is not a mere coincidence, it may be attributed to the greater importance in general of the anterior lip of the os during childbirth.

When both lips of the os, or the greater part of the vaginal portion is diseased, the resistance offered to delivery is so great that the latter very rarely terminates spontaneously. The pains are very seldom capable of dilating the infiltrated and unyielding lower segment of the uterus; and when delivery occurs spontaneously it is usually only after severe and deep lacerations of the diseased parts, which may extend into the cavity of the peritoneum, or after the degenerated tissue has been squeezed and crushed to a pulp. Under these circumstances profuse hemorrhage with subsequent rapid decomposition of the crushed parts, peritonitis, and septicæmia quickly lead to the death of the mother. Almost all the infants perish in these cases from the tedious course of birth, which, moreover, usually requires artificial aid for its completion.

Depaul[1] describes a case of cancerous tumor involving the whole of the cervix, in which a six months' fœtus was born spontaneously, although delivery proceeded very slowly. Other cases have been reported, chiefly by Chantreuil, and also by Levret, Löenhardtt, d'Outrepont, Kilian, Nägele, and Pédelaborde (loc. citat. pp. 25 to 28). Martel[2] also witnessed the birth of a dead fœtus after a labor lasting forty-five hours, the mother recovering. Cohnstein found that spontaneous delivery terminated favorably for the mother in 37.5 per cent., and for the child in 33.3 per cent. of these cases. When the disease involved the entire cervix the percentage of recoveries was only 34.7 for the mothers, and 25.0 for the children. In one hundred and twenty-eight cases of unassisted labor at the normal end of pregnancy there were twelve fatal cases of rupture of the uterus, and five instances of laceration of the cervix, in three of which the death of the patient resulted. Of Herman's (l. c.) 180 cases, fifty-one were delivered normally at full term, and sixteen of the women died.

In the more aggravated cases of cancerous disease which involve the whole of the cervix up to or beyond the internal os, and which are associated, as so often happens, with infiltration and degeneration of the surrounding cellular tissue, it may be asserted that spontaneous delivery is impossible. The dense, infiltrated parts offer an insuperable resistance,

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[1] Arch. de Tocologie, I., p. 442. [2] *Ibid.*, IV., p. 745.

and the pains are not powerful enough to crush the intervening tissues. If timely operative assistance be not afforded the patients die undelivered from rupture of the uterus, hemorrhage, or septicæmia originating generally in decomposition of the fœtus, or exhaustion. Such cases have been described by Depaul,[1] Churchill,[2] Oldham,[3] Simpson,[4] and Pfannkuch.[5]

The character of the subsequent period of childbed in these cases depends chiefly upon the gravity of the labor. If the latter have occurred spontaneously and without much difficulty, the women often make wonderfully quick recoveries, and sometimes even become pregnant once more (Savory-Godson, l. c.), only to succumb to their disease after a longer or shorter time. In most instances, however, and even after a comparatively easy confinement, the disintegration of the cancerous tissue acquires a fresh impetus, and the patients rapidly sink under the exhausting influence of childbed. The more difficult the labor, the more frequently and the more rapidly does childbed run this course; the larger the mass of cancerous tissue destroyed, and the deeper the coincident lacerations, the more quickly does necrosis extend in all directions, to be followed by fatal peritonitis, pyæmia, thrombosis, etc. Heywood Smith[6] lost a patient affected with epithelioma, from *post-partum* hemorrhage, four days after spontaneous expulsion of a five months' fœtus. In Edis'[7] and Depaul's cases death was due to pyæmia and septicæmia.

The diagnosis of cancerous disease of the lower segment of the uterus during pregnancy or parturition can only be difficult when the affection is in its incipiency. I have already discussed the possible sources of error, and will now only repeat that mistakes may occasionally be committed in spite of the utmost care. Imperfect or delayed dilatation of the os in parturient females may be a guide to a certain extent, but even here it is necessary to guard against error. Newman's[8] case is very instructive in this connection. The os not dilating and the cervix being extremely hard and infiltrated, carcinoma was diagnosed, and Cæsarean section performed, from which, fortunately, the patient recovered. Becoming pregnant again six years later, the woman was easily delivered with the forceps of a mature child. Two years afterwards she died of a strangulated ventral hernia (the result of the Cæsarean section), and no trace of cancerous disease was discoverable on *post-mortem* examination. This case would scarcely be classed as one of spontaneous cure of cancer of the uterus.

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[1] Chantreuil, l. c., p. 43.
[2] *Ibid.*, p. 48; and Maladies des Femmes, Paris, 1866, p. 397.
[3] *Ibid.*, p. 51.
[4] Obstetrical Works, I., p. 648.
[5] Arch. für Gynäkologie, VII., p. 169.
[6] Transactions of the Obstet. Soc., London, XIV., p. 67.
[7] Obstetrical Transactions, London, XVII., p. 344.
[8] *Ibid.*, VIII. and XVII., p. 213.

Among other errors, the degenerated parts have been mistaken at the commencement of labor for the placenta (Lachapelle, Lecorché-Colombat, Chantreuil, l. c. p. 56), for fœtal hands and feet (Depaul, Cazeaux[1]), for the child's head (Boivin and Dugès), and for the breech (Chantreuil, l. c. page 56). But in all of these cases careful and repeated examinations soon cleared up the diagnosis.

It is evident from the foregoing that the prognosis of carcinoma of the uterus during pregnancy and at the time of parturition depends mainly upon the extent of the disease. The greater it is, the more difficult will confinement be. A second weighty factor is the general condition of the patient. If but slight indications of cachexia are present the patient's chances of surviving labor and childbed are better than if a high degree of anæmia and cachexia already exist. In Chantreuil's collection of sixty cases, twenty died during or immediately after confinement, the remainder passing through this ordeal safely, but eventually succumbing to the disease. Of these twenty-five patients, six perished in consequence of rupture of the uterus, nine from peritonitis, and seven after grave operative measures, including multiple incisions, version, craniotomy, embryotomy, and excision of the tumor: the cause of death is not mentioned in three instances. Of the children twenty-nine were born dead, and twenty-eight alive, while nothing is stated of the fate of three others.

Cohnstein found that of one hundred and twenty-six mothers fifty-four, or 42.9 per cent., survived childbed, the remainder dying during or after labor. Of one hundred and sixteen children, concerning whom information was obtainable, forty-two, or 36.2 per cent., were born alive, and seventy-four, or 63.8 per cent., were still-born. Of the latter class seven were killed by perforation or embryotomy, one, a six months' fœtus, was delivered by Cæsarean section, fourteen died in consequence of the death of the mothers before delivery was accomplished, and six perished during tedious labors, or after version, etc.

By eliminating these deaths, as being consequences of treatment and not of the disease itself, Cohnstein finds that the mortality of the children in cases of cancer of the uterus is only 38.8 per cent. This elimination, however, is not entirely justifiable, inasmuch as the method of treatment, whether appropriate or not in the individual cases, was prompted mainly by the complicating disease.

From Herman's figures we learn that out of 180 cases, the mothers succumbed in seventy-two. Eleven times death was due to rupture of the uterus. In thirteen women death took place before delivery. Of 114 children, fifty-eight were born alive.

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[1] Traité d'accouchement, Paris, 1867, p. 718.

## TREATMENT.

When an epithelioma is restricted to one lip of the cervix there is eason to hope, for reasons above-stated, that labor will be accomplished spontaneously, and treatment should, therefore, for the time being be merely expectant. In all other cases, however, active interference is imperatively required, as soon as it is noticed that the diseased os is dilating imperfectly and slowly, in spite of regular pains. Delay in these cases is always fatal to the fœtus, and since the mother's disease is incurable, our efforts should be directed to saving the life of the child.

Treatment must also be prompt in those cases in which a partial degeneration of one lip prevents dilatation from taking place regularly. Only two methods of dilatation are available in these cases, either the application of Barnes's dilators, (laminaria and sponge-tents not being sufficiently active,) or incisions into the affected tissues. At the same time both procedures are efficient only when the pains are powerful and the area of the disease is so small that we may at least hope that nature will be able to complete delivery. In other cases the above-mentioned procedure may render possible the employment of other operative measures. Thus Savory [1] dilated the os with Barnes's dilators only sufficiently to allow him to turn a seven months' fœtus. The latter, however, died during the operation, and the mother succumbed on the thirteenth day of childbed. A. Edis [2] dilated the os with the same instruments until he was able to apply the forceps, and succeeded in extracting a fully developed, living child. The mother died of pyæmia two weeks later.

Spiegelberg [3] was more fortunate: after incising the os he delivered a living child with the forceps, while the mother passed safely through childbed. Other favorable cases have been reported by Guéniot and de Natale,[4] the latter after dilatation of the os with sponge tents, and subsequent application of the forceps. On the other hand it not seldom happens that incisions do not suffice to allow delivery to be accomplished quickly, and both mother and child perish. (Malgaigne, Chantreuil, l. c., p. 75.)

Cohnstein collected nine cases in which incisions had been made, one of them without any additional operative interference. Fifty per cent. of the mothers survived labor, and 62.5 per cent. of the children were born alive. Naturally the incisions easily lead to further crushing and laceration of the diseased lower segment of the uterus, and cannot, therefore, act as sure preventives of rupture of the uterus or of peritonitis.

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[1] Obstetrical Transactions, XVII., p. 82.
[2] *Ibid.*, XVII., p. 344.
[3] Monatsschrift f. Geburtsk., XI., p. 18.
[4] Chantreuil, loc. citat., pp. 80 and 87.

When incisions into the os do not suffice to bring about the desired result, it is advisable to remove with the scoop or scissors as much as possible of the cancerous masses, and to follow this up by delivery with forceps or by turning. Bischoff[1] practised this method in four cases, saving all the mothers as well as their offspring. C. Braun[2] also favors this procedure, particularly as it permits a more radical operation after delivery.

The forceps will be very serviceable in all cases in which the os is sufficiently dilated to render its application feasible, and the fœtal head has descended low enough into the pelvis to allow of extraction. Although the use of the instrument may be attended with extensive lacerations of the maternal tissue, the thereby induced abridgement of labor certainly inures to the benefit of the child.

Herman (l. c.) states that out of nine cases of this kind the mothers died four times.

Version and extraction ought, I think, to be restricted to those cases in which they are indicated by a malposition of the child, such as transverse or breech presentations. (Danyau, Depaul.) The prognosis is always very bad for the child in these cases on account of the difficulty of freeing the head and arms, and it does not, therefore, seem appropriate to perform version when the head presents, as has been recommended by Simpson, although the latter in one instance executed it with a favorable result for both mother and child. It was also successful in the hands of Galabin.[3] A similar case of Godson's[4] terminated very unfavorably. Cohnstein found that, in eleven cases of the operation but 18.1 per cent. of the mothers and 12.5 per cent. of the children survived.

Craniotomy and embryotomy offer scarcely any advantage in cancerous disease of the lower segment of the uterus, for the fœtus must, of course, be sacrificed, while the result for the mother is unfavorable. According to Cohnstein four mothers died in six operations of this kind, two of rupture of the uterus, one undelivered, and one during childbed. Chantreuil records three instances of craniotomy, in two of which the mothers died, and two instances of embryotomy, in one of which the mother expired during the operation. Galabin[5] reports a case in which he performed cephalotripsy through an os which admitted only three fingers, and then, not succeeding in extracting the child during the next three hours, he was compelled to resort to version before delivery could be effected. Valenta[6] lost a patient from the same operation from a laceration extending to the peritoneum. Freund[7] had a somewhat similar experience.

[1] Gönner: Zeitschrift f. Gynäkologie, vol. X., 1884.
[2] Felsenreich, l. c.
[3] Obstet. Journal, IV., p. 139.
[4] British Medical Journal, 1877, p. 231.
[5] Obstetrical Journal, IV., p. 539.
[6] Archiv für Gynäkologie, X., p. 405.
[7] Ernst: Inaug. Dissert. Strasburg, 1882.

Now, although induced abortion offers a better prognosis for the mother than does labor at full term, yet the opinion is universally accepted that in view of the undeniably incurable disease of the mother, the former operation should be rejected, in order to save, if possible, the life of the infant. It has already been demonstrated that abortion is not to be feared in those cases in which there is a prospect of cure, or of long-continued improvement for the mother. When, however, the disease is so far advanced as to forbid this hope, the induction of premature labor is entirely out of the question, since it does not guarantee any noteworthy benefit to the mother, while it materially impairs the prognosis as far as the child is concerned.

Cæsarean section offers better prospects, and it is our only resource whenever the pelvic cellular tissue is affected, and the degeneration has extended beyond the internal os. If performed at the proper time, it ensures the preservation of the child, and does not even, as experience proves, always entail the death of the mother, although the latter, of course, succumbs eventually to the disease. For these reasons Cæsarean section should be resorted to in those cases also in which delivery is possible in other ways, but which at the same time, however, offer only slight prospects of saving the life of the child.

The following comprises all the cases of Cæsarean section for carcinoma of the uterus, that I have been able to collect. Bartholinus[1] performed the operation for rupture of the uterus, the fœtus being dead at the time, and the mother expiring on the following day.

Oldham[2] saved both mother and child. In Greenhalgh's[3] case the patient died eighteen months later: nothing is stated as to the fate of the child. Galabin[4] performed the operation upon a woman who was in labor in the eighth month of pregnancy, and who was already in a desperate condition. The fœtal heart sounds were no longer audible,—in fact the child was dead, and the mother died shortly after the operation. Zweifel[5] was more fortunate: the mother died five days after the operation, but the child was saved. Schröder[6] saved a child by doing Cæsarean section, the mother dying on the third day. The cases of Bischoff and Spencer Wells have already been mentioned. Herman records twelve cases of this operation, with death of the mother in eight. Two of the children were extracted dead. Newman's[7] case does not belong in this category, as the patient was not affected with cancer of the uterus, as already pointed out.

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[1] Cited by Cohnstein, l. c., p. 381.

[2] Guy's Hospital Reports, 1851, XI., p. 426.

[3] Obstetrical Transactions, IX , p. 241.

[4] *Ibid.*, XVIII., p. 286.

[5] Bechmann, Berliner Klin. Wochenschrift, 1877, No. 21.

[6] Frommel, l. c.

[7] Obstetrical Transactions, VIII. and XVII., p. 213.

If the tumor appears susceptible of removal before or during labor, as much of it should be extirpated as is feasible, in order to allow of the child being delivered alive if possible. Cohnstein reports six cases of this kind, four of the children being extracted in a living condition, but two of them dying shortly afterwards; in the two remaining cases, one child was decomposed, while nothing is mentioned regarding the other. Of the mothers, four lived through childbed, and two died during that period.

The question will always arise, after successful delivery, whether a radical operation should be done in the interest of the mother, either at once, or after the lying-in period has terminated.

# CHAPTER XIII.

## CANCER OF THE BODY OF THE UTERUS.

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### ANATOMY.

ISOLATED carcinoma of the corpus and fundus uteri was, until recently, a rare and imperfectly understood affection. Pichot collected, mainly from French and English sources, forty-four cases, the analysis of which furnishes the basis of his above-mentioned monograph. Until 1878 there were reported, in addition to that number, thirty-six others, in all eighty cases. Since then a much larger number of cases has been placed on record, so that I have found 122 cases, including three unpublished ones of my own.

A certain number of these must be deducted as being true sarcomata of the uterus. In the literature of older date disintegrating and sloughing fibromata have not infrequently been mistaken for carcinomata of the fundus, but these cases have also been excluded by Pichot. Of course we exclude all those cases of cancer of the body of the uterus in which the affection is merely secondary to primary carcinoma of some other organ. Thus Oswald observed the propagation of the disease from an ovary, and Credé from the rectum to the uterus.

As an illustration of the rarity of isolated cancer of the body and fundus of the uterus, Szukits met with but one instance of it in 420 cases of

cancer of the uterus. Schröder[1] estimates that there were 28 cases of cancer of the fundus in 812 cases of carcinoma of the uterus, that is 3.4 per cent. According to Pichot's statements there would appear to be 6 cases of carcinoma of the corpus uteri in 100 of cancer of the uterus. Schatz[2] found the body of the uterus affected twice in 80 cases of cancer of the womb.

Just as in cancer of the cervix, we may divide carcinoma of the corpus uteri into two great classes. The parenchymatous or infiltrated variety (following Kleb's[3] nomenclature) seems to occur most frequently. This form is made up of more or less numerous, isolated, roundish deposits, which consist of soft, succulent masses (encephaloid cancer) containing polymorphous and sometimes cylindrical epithelial cells imbedded in a sparse interstitial tissue. In this manner large, spheroidal tumors form in the substance of the uterus, distending it just as fibromata do, but always presenting a smooth surface, as they are not made up of single protuberances, like some myomata. These cancer-nodes, moreover, seldom break through the enclosing muscular tissue of the uterus, to project into the uterine or peritoneal cavity. As seldom do they undergo purulent disintegration and ulceration. Klebs also points out correctly, that a large number of these cases have probably been mixed tumors, carcino-sarcomata. It certainly militates for, rather than against this opinion, that this variey of neoplasm not very infrequently gives rise to multiple metastases.

The second variety of cancer of the corpus uteri begins in the mucous membrane, probably in the glandular tissue, and either presents as a widespread infiltration of the mucous membrane, extending into the deeper layers, or beyond them into the muscular substance, or it manifests itself in the shape of isolated, polypoid excrescences which project into the cavity of the uterus. In either case necrosis and ulceration set in, apparently very early.

In regard to both forms of this rightly-named mucous cancer (Schleimhautkrebs) of the body of the uterus, recent investigations seem to show the possibility, to say the least, of their origin from newly-formed glands. Breisky[4] detected in a patient suffering from uterine hemorrhages, numerous diffuse, polypoid excrescences attached by broad bases to the uterine mucous membrane, the cervix being healthy. On scraping away some of these growths as a therapeutic measure, and submitting them afterwards to microscopic examinations, Eppinger found that they possessed a typical adenomatous structure, consisting of hypertrophic utricular glands, lined with cylindrical epithelium. A succession of hemor-

[1] Hofmeier: Zeitschrift f. Geb. u. Gynäkol., vol. X.
[2] Archiv f. Gynäkol., vol. XXI
[3] Handbuch der Pathologischen Anatomie, 1876, p. 867.
[4] Prager Med. Wochenschrift, II., 1877, p. 78.

rhages recurring about four months later, more excrescences, similar to the previous ones, were scraped away, which were, however, softer and more friable, and possessed, even microscopically, a greater resemblance to cancer. On microscopical examination it was seen that the previously empty tubules were now choked up with cells, and even that tubules which were invested with cylindrical epithelium at their periphery contained pavement epithelium and cancerous plugs in their centres. I am

FIG. 49.—ADENOMA OF THE MUCOUS MEMBRANE OF THE UTERUS. (After *Breisky*.)

indebted to Professor Breisky for his kindness in allowing me to reproduce his illustrations of these specimens in this place.

J. Veit[1] describes a polypoid excrescence, growing from the mucous membrane of the body of the uterus, which was expelled spontaneously after dilatation of the os. The growth was found to contain gland tubules, plugged up with epithelial elements.

According to Ruge-Veit (l. c.) cancer of the body of the uterus invariably arises in the mucous membrane. They distinguish a diffuse infiltration from a polypoid form, the latter occurring in the shape of broadly-attached excrescences. Both varieties are characterized by their

[1] Zeitschrift f. Geburtshülfe und Gynäkol., I., p. 437

tendency to disintegration, so that we rarely encounter large growths. But the adjoining organs often suffer early from extension of the disease.

FIG. 50.—TRANSITION OF ADENOMA TO CANCER. (From *Breisky's* case, fig. 49.)

FIG. 51.—TRANSITION OF ADENOMA TO CARCINOMA. (From the same specimen as figs. 49 and 50.)

The papillary form of cancer, *i.e.*, epithelioma, does not occur on the mucous membrane of the uterus.

### ÉTIOLOGY.

It would be superfluous to repeat in this situation all the factors which enter into the causation of cancer in general, and which have been fully discussed in the chapter on Carcinoma of the Cervix. The disposition to carcinoma of the corpus uteri seems to develop at a more advanced age than is the case with carcinoma of the inferior segment of the uterus. In seventy-four cases, thirty-four of which are borrowed from Pichot, and the remainder from the sources mentioned at the head of this chapter, the distribution as to age was as follows:

| | |
|---|---|
| From 20 to 30 years, | 7 cases |
| " 30 " 40 " | 3 " |
| " 40 " 50 " | 12 " |
| " 50 " 60 " | 38 " |
| " 60 " 70 " | 13 " |
| Over 70 years, | 1 case. |

This table shows a marked predisposition to the disease between the ages of fifty and sixty years, while in cancer of the cervix the greatest number of cases occur between the fortieth and the fiftieth year.

Schröder[1] calls attention to the fact that cancer of the body of the uterus occurs with remarkable frequency in nulliparous women. Hofmeier[2] found six nulliparæ in twenty-eight cases of this kind, *i.e.*, 21 per cent., whereas of all other cases of cancer observed at the clinic of Schröder, only 2.5 per cent. had not given birth to children. Chiari's three patients, on the contrary, were confined within six months of the fatal termination, the disease making its appearance immediately after childbed and seeming to originate at the placental site.

### SYMPTOMATOLOGY AND COURSE.

The symptoms occasioned by malignant tumors of the body of the uterus resemble those of fibromata, especially in the incipient stages of the affection, and before purulent liquefaction has set in. Even after the development of the latter condition, they are often very similar to those of a sloughing myoma. This is particularly true of that form of carcinoma which occurs in the shape of knots and knobs. In all cases very intense, agonizing pain at an early stage is the most prominent symptom. Being caused by the rapid growth of the tumor it is much more violent and more constant than in cases of fibromata, where a sense of pressure predominates. When the tumors are spheroidal the pains often resemble labor pains, just as in cases of sub-mucous fibromata. In that variety of

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Handbuch der Krankheiten d. weibl. Geschechtsorgane, Leipzig, 1874, p. 280

Zeitschrift f. Geb. u. Gynäkol., vol. X.

carcinoma which begins in the superficial layers of the mucous membrane, suffering is complained of only after the disease has penetrated to the deeper layers, and attacks the nerve ends in the uterine substance, just as when cancerous destruction of the cervix spreads upwards and into the substance of the organ.

At all events much more intense pain is felt, for above-mentioned reasons, in the early stages of carcinoma of the body of the uterus, than in the corresponding stage of ordinary epithelioma or carcinoma of the vaginal portion. But while the latter affections soon give rise to severe perimetritic and parametric symptoms by extension to the cellular tissue of the pelvis, this happens much more infrequently in cancer of the corpus uteri. Symptoms of pressure on the bladder and rectum are also very rarely observed, for the same reasons, and only develop in exceptional instances when these viscera are in contact with large cancerous growths, or when they participate in the disease.

The second prominent symptom, hemorrhage, is even more constant, and thus again helps to simulate certain forms of myoma. While in cancer of the cervix, hemorrhages usually occur only after the tumor has begun to break down, in cancer of the corpus uteri they appear at first in the guise of profuse menstruation, and at a very early period, because the uterine mucous membrane is either actually diseased, or has, at least, undergone changes similar to those which take place in cases of interstitial fibromata. Very soon, however, an abundant, watery, serous discharge sets in, followed by profuse hemorrhages, as soon as the diseased tissues have commenced to ulcerate.

Simultaneously with the latter, the discharge becomes either ichorous or purulent, and gives off a fetid odor, which is, however, seldom as intense as in cancer of the cervix, probably because the atmospheric air has not such free access to the ulcerating parts.

These two symptoms, pain and hemorrhage, are the only distinctive symptoms of the disease. All further symptoms and signs depend upon how extensively or how soon the peritoneum participates in the morbid process, whether the cancerous infiltration spreads to the neighboring organs, and whether or where metastatic deposits occur. As neither of these events is quite common, death rarely takes place very quickly. Playfair mentions an instance, however, in which the tumor perforated into the abdominal cavity, with a rapidly fatal result. As ichorous disintegration usually sets in late in the course of the disease, and with but moderate intensity, cachexia develops very slowly. All these facts help to explain why it is that cancerous affections of the body of the uterus run a much slower course than cancer of the cervix. Pichot found that only in four out of twenty-five cases was the duration of the disease less than a year, while in four it was more than four years. The average duration according to the same author, is thirty one months.

## DIAGNOSIS.

The differential diagnosis from cancer of the vaginal portion is very readily made, for the simple reason that in isolated cancer of the corpus uteri the cervix is perfectly healthy, both to the touch and on examination with the speculum. It usually possesses the same shape and consistency that is found in healthy uteri; more rarely it is shortened, the os being fully dilated. The latter is usually the case when cancerous polypoid tumors project into the cavity of the uterus, and dilate its lower segment either mechanically or by exciting pains like those of labor. A similar condition, or at least a partial patency of the os may result when the diffuse affection of the mucous membrane extends far downwards and transforms the uterine walls into unyielding, dense, infiltrated masses. As for the rest, the uterus is generally symmetrically enlarged and hard; but isolated, sensitive and exceedingly soft tumors can sometimes be detected as projections on its external surface. The enlarged and heavy uterus is as a rule freely movable, because there is usually no infiltration of the surrounding cellular tissue. Immobility of the organ when present, is generally caused by perimetritic adhesions.

Another important diagnostic point is the discharge from the cervical canal, although sloughing fibromata occasion a similar discharge; but neither the microscopical examination of this fluid, nor the introduction of a sound into the uterus will suffice to establish the diagnosis with certainty. Yet the diminution in depth of the cavity of the uterus, and the infiltrated condition of its walls, are very striking when contrasted with the symmetrical enlargement of the organ as ascertained by external palpation.

In order to arrive at a certain diagnosis it is first necessary to dilate the canal of the cervix and the internal os sufficiently to permit of the introduction of the finger into the uterus, when the infiltration of its walls, the hypertrophy of the mucous membrane, and the protuberant tumor masses can be distinctly felt. If a portion of the tumor be then removed and submitted to microscopical examination, we shall be able to determine whether it is a carcinoma, a sarcoma, or a softened myoma with which we have to deal. The smaller the particle of the tumor the more difficulty and uncertainty will there be in establishing an exact anatomical diagnosis.

## TREATMENT.

In the treatment of these conditions, it is clear, after what has been already said in connection with malignant disease of the cervix, that removal of the affected organ is alone to be thought of. Of course this

applies only to those cases where surgical interference is still feasible, owing to the fact that the neoplasm is confined to the uterus.

Now, although quite a large number of operations have been reported, it is difficult, at present, to decide which method should be employed. Amputation of the body of the uterus after laparotomy has been repeatedly practiced. But it is not always easy to decide how far the disease may have encroached upon the cervix. In several cases recurrence from the cervix, which was allowed to remain, has been observed. Hence total extirpation of the uterus is after all the safest procedure. From what has been already said concerning this operation, it appears that the vaginal method of total extirpation is to be preferred. When this is impracticable the operation of Freund is called for. I have collected the following instances of operations of this kind: Fifteen cases of amputation of the uterus following laparotomy (thirteen of these cases belong to Schröder), with four deaths, *i.e.*, 26 per cent. Three total extirpations after the method of Freund, with two deaths. Ten total extirpations per vaginam, with one death.

As regards recurrence of the cancer after these operations, we learn from Schröder (Hofmeier, l. c.) that three of his patients died therefrom within one year. Four of his patients remained well more than two years, and one over five years.

If a radical operation can not be done, the diseased masses are to be removed by the curette or scoop as thoroughly as possible. Care must be taken not to perforate with the instrument the infiltrated walls of the uterus (case of Spiegelberg, l. c.).

In addition to these measures we must employ the various caustics, in order to limit growth as far as possible, and to moderate hemorrhage and discharge. A detailed account of these measures has already been given in discussing sarcoma of the uterus.

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