manner through the stroma. The latter has been pushed into the background. Careful examination of those ducts which are capable of secretion will convince us that their lumen is dilated twofold or threefold, and that their dimensions have increased by increase of the lining epithelium, but that this stands in no relation to the size of the tumor. Observation shows that this is due to the increase in the newly developed tubuli and those in process of development.

As a rule, sweat gland adenomata pursue a favorable course, and usually give rise to no disturbances except those produced locally by their size. In one case reported by Hoggan, it became necessary to extirpate the growth on account of the severe and persistent pains produced by pressure on the adjacent nerves.

The tumors very rarely undergo degeneration spontaneously, but more frequently as the result of injury. Before this occurs, the previously normal tegumentary covering of the tumor is traversed by dilated vessels, assumes a livid red color and gradually grows thinner. Finally a small perforation occurs at the point of least resistance, and the escaping serous, very slightly purulent secretion dries into a crust. If the process continues, the spot of degeneration becomes larger, the secretion purulent and an ulcer is produced with undermined edges and uneven base. This ulcer presents little tendency to recovery, on account of its epithelioidal structure or rather its insufficiency in blood supply. The ulceration, therefore, lasts a long time, but eventually heals and only rarely is it converted into a malignant neoplasm.

Among the numerous forms of retrogressive change undergone by these adenomata, the development of cysts deserves mention on account of its frequency.

In this process the epithelial lining of the glandular tubuli is converted into a mucoid fluid, which is retained and dilates the surrounding walls. The tumors may exist unchanged for years, and, as a rule, are only discovered by accident.

The diagnosis of this variety of adenoma is attended occasionally with considerable difficulty, and I think this is the cause of the differences in their description, and of the fact that they are mistaken for other kinds of tumors. Thus Fuehrer's descriptions and figures show that his cases were really examples of epithelioma molluscum (molluscum contagiosum, Bateman). Lotzbeck's description would lead us to infer that his case was one of nævus vasculosus.

But the greatest caution must be exercised in differentiating this growth from carcinoma; the liability to mistake is so much greater because the same tissue elements are present in each disease.

In a case reported by Domec as adenoma sudoripar., a tumor developed, as the result of a blow, upon the back of a girl sixteen years old, and within a month attained the size of a fist. After several unsuccessful attempts to remove it without operation, the growth was extirpated, but returned and attained the size of a child's head at the end of several months; after being again removed, it resulted in death from cachexia due to metastasis.

In order to avoid such errors, we should not alone take into careful consideration all the clinical factors, but should also direct our attention, in the microscopical examination, to the most recently developed parts of the tumor as well as to the central parts which have formed its starting-point. Offshoots of the sweat-glands may be readily mistaken for carcinoma, especially as the pearly globules, which were formerly considered characteristic of carcinoma, may also be found in adenoma; often, also, only isolated parts of the microscopical preparation reveal the malignant character of the growth by the absence of the membrana propria, the atypical proliferation of the elements, etc.

The same considerations hold good concerning treatment as have been laid down with regard to sebaceous adenoma.

Epithelioma Molluscum (*Virchow*).

Bateman appears to have been the first to describe this disease. In his "Delineations of Cutaneous Diseases" (London, 1817), he recognizes a molluscum pendulum and molluscum contagiosum. He states that the latter is distinguished from other molluscum excrescences by its contagious character and by the escape of milky fluid from an imperceptible opening.

As the clinical appearances differ according to the various stages, some authors have concluded that the molluscum contagiosum of Bateman is a generic term for various forms of anomalies of the skin. The tumor has been regarded as a cystic degeneration either of the hair follicles (Rayer, Virchow) or of the sebacous glands (Hebra, Wilson, Bärensprung), and also as an hypertrophy of the sebaceous glands, the papillary bodies, etc.

The confusion has thus become so great that some writers deny the existence of molluscum as a special morbid entity.

The question of contagion has also added to the confusion. Since the time of Bateman, J. Thomson and Carswell, it was laid down as an axiom that this molluscum is contagious. But other pathologists have found that the growth does not possess this property, and as they did not venture to dispute the original statements, molluscum has been divided into molluscum contagiosum, and then sebaceum, variegatum, atheromatosum, etc. Kaposi proposed that 1. the term molluscum atheromatosum be applied to Bateman's form of sebaceous tumor, atheroma, etc., and 2. the term molluscum verrucosum to the wart-like form.

The original view has not been discarded, however, chiefly on account of the bodies which were discovered by Patterson and Henderson in Bateman's molluscum. It is now recognized that bodies of similiar constitution may also be found in other localities, but never in such quantities that they constitute the main part of the tumor.

Observation has shown that these bodies are not foreign to the organism and consequently are not zooparasites or phytoparasites, but that they take their origin in the place where they are found. Investigations have shown also that, in the numbers in which they are present in Bateman's molluscum, they are never found in the root sheaths or the sebaceous glands; and finally that they are due to a hyaline change and atypical cornification of the cells of the hyperplastic, interpapillary rete. As the assumption of its contagious character is thus disposed of, we think that we may accept the term epithelioma molluscum proposed by Virchow, especially as this takes into consideration both its anatomical constituents and its clinical characteristics.

Symptoms, Course, and Termination.—Epithelioma molluscum presents a different appearance according to its stage of development. The most recent tumors are small elevations not entirely unlike lichen pilaris, and escape notice so much the more readily as their color is very like that of the normal skin. If these little tumors are observed more closely, a light, punctate mass is distinctly noticeable at the most elevated portion, and in the larger ones this has increased in size to such an extent that it not alone extends above the surface, but also spreads to the lateral portions. The surface thus presents a deposit which is sometimes thinner, sometimes thicker in comparison with the size of the tumor, becomes uneven, is traversed by yellowish white streaks. It is not

always easy to detach the deposit from its base. For, inasmuch as it is connected with the projections which extend into the interior of the tumor, forms slowly and becomes dry and brittle from contact with the air, it often becomes very difficult to detach little pieces. When present in greater amount it has a pultaceous crumbly consistence, and can be readily removed or is detached spontaneously. In this stage, the surface of epithelioma molluscum may contain a single, trough-shaped depression, attaining the size of a pea at times, with sharp, irregular edges; it is often situated centrally and has been regarded by some as the lumen of a sebaceous gland. Or it possesses several openings, which look as if produced by the point of a needle, and appear to correspond to prolongations that have dropped out. Upon observing the borders of a tumor of medium size, we readily detect an aggregation of individual little nodules like those described above, so that the impression is gained that the increase of the tumor is due not alone to the increase of the elements in the original site, but in part to the addition of new individuals. In this way the shape of the growth changes constantly but, on the average, the fully developed nodules are rounded, moderately retracted at the base, and present, upon the surface, an umbilication which has been formed in the manner described above. The nodules have a pale rose color from the vessels which shine through the walls, and are somewhat shining on account of the tension of the epidermis covering them.

With regard to the size of this growth, I may state that in my case of general epithelioma molluscum, a growth on the penis measured 1.5 cm. in width, 1.8 cm. in length, and 0.5 cm. in height, and weighed 0.5 gm. immediately after removal. But such large growths are exceptional and, as a rule, they do not exceed the size of a pea.

Epithelioma molluscum of the hairy parts of the body deserves special consideration. In the majority of cases hairs are present only on the extreme periphery of the nodule-like neoplasms, so that a casual glance conveys the impression as if the nodules had selected sites between the hairs. But this is not the case; the hairs do not disappear until the proliferation has obtained the upper hand; they persist if the walls of the follicles are protected from its inroads.

After the tumors have reached the height of their development, they may remain in this condition for a long period (a few months to one or two years). When involution occurs, the tubercle becomes flaccid and retracted, and upon exercising lateral pressure, the pulpy contents are no longer extruded, but the readily bleeding papillary body comes into view. Such growths usually drop off upon the slightest mechanical violence.

Another termination consists of inflammation, ulceration, and finally destruction of the growth. In the beginning of the inflammatory stage, nothing is noticeable externally; but pressure causes a milky fluid or consistent pap to exude from the umbilicati on At a later stage the tumor is bright red, œdematous, and warmer to the feel. Pressure discharges a sanguinolent, sero-purulent fluid, containing blood, pus, and molluscum corpuscles. Then losses of substance occur, and gradually increase until the tumor is entirely destroyed, leaving a small, irregular, quite superficial cicatrix.

Differential diagnosis.—Epithelioma molluscum is readily recognized; it might only be mistaken for lichen pilaris (which is not persistent), condyloma acuminatum, and molluscum fibrosum. Epithelioma molluscum will only be mistaken for condyloma when the former is devoid of its external deposit and the base of the umbilication has an uneven appearance. It is not difficult to distinguish it from molluscum fibrosum if we remember that its surface is even and its consistence increased. But the most positive

diagnostic evidence is found in the fact that lateral pressure always expresses pap-like contents which contain molluscum corpuscles.

Anatomy.—Even to the naked eye a transverse section of epithelioma molluscum discloses a whitish shining, lobulated substance imbedded in a connective tissue stroma. Thin sections of parts in the initial stage of the disease demonstrate that, with the exception of infiltration cells which are scattered through the connective tissue, the principal changes affect the interpapillary rete.

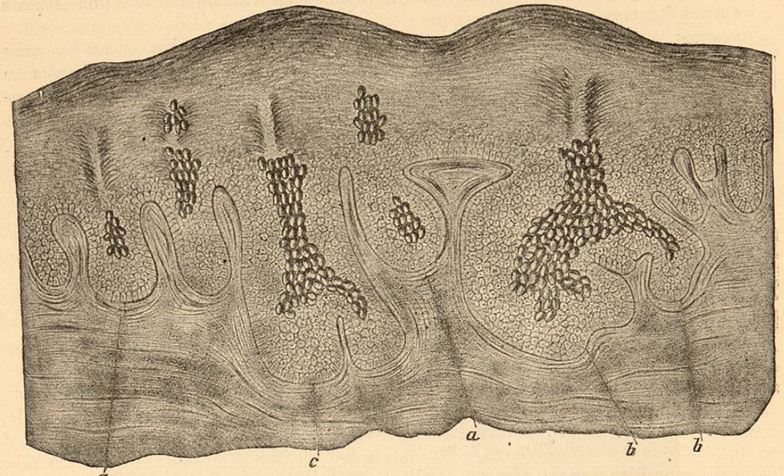

FIG. 78.—Vertical section through an epithelioma molluscum in process of development.

In the beginning its papillæ are increased in all dimensions on account of the enlargement and proliferation of their elements (Fig. 78, *a*). At a later stage, the rete cones send off offshoots (*b*). On account of this formation of offshoots on the one hand and the enlarged size of the individual parts on the other hand, it is often almost impossible to distinguish the starting points of the proliferation (Fig. 79). We may justly conclude, therefore, that the lobular structure of the growth is due to the peculiar manner of proliferation and not to a falsely assumed glandular structure.

The cells of all the layers of the changed rete prolongations are found to have proliferated and increased in size, and to a certain extent arrive prematurely at maturity. In addition molluscum corpuscles are present, and these are often found to begin even in the lowest layer of cylindrical cells. In the lowermost part of the rete they are more or less granular, and may contain a nucleus in the centre or, more frequently, at one side. In the upper prickle-cell layer, they have a compact, homogeneous appearance, and a partly fatty, partly mother-of-pearl gloss. In the horny layer, they are more transparent and their contents more delicate.

Virchow, Klebs, Thin, and others, have regarded the molluscum corpuscles as parasitic in origin, but the majority of observers believe them to be of purely epithelioid origin. But while Rokitansky, Hebra, Kaposi interpret them as parts of the sebaceous

glands, Virchow and Thin regard them as derivatives of the root sheaths, Lukomsky, of the wandering cells, and Bizzozero, C. Boeck, etc., as products of the altered rete cells. I have no doubt that the latter view is correct, and at the present time, the question is, in what manner are the rete cells converted into molluscum corpuscles? Bärensprung believes that they develop from the cells by means of an imbibition of albuminoid fluid. Auspitz thinks they are due to amyloid degeneration, and E. Vidal assumes a colloid degeneration.

Some years ago, Renaut expressed the opinion that the molluscum corpuscles arise from atypical cornification of the rete cells. During his microscopical examinations he noticed that a process of stratification of the protoplasm occurs, starting from the peri-

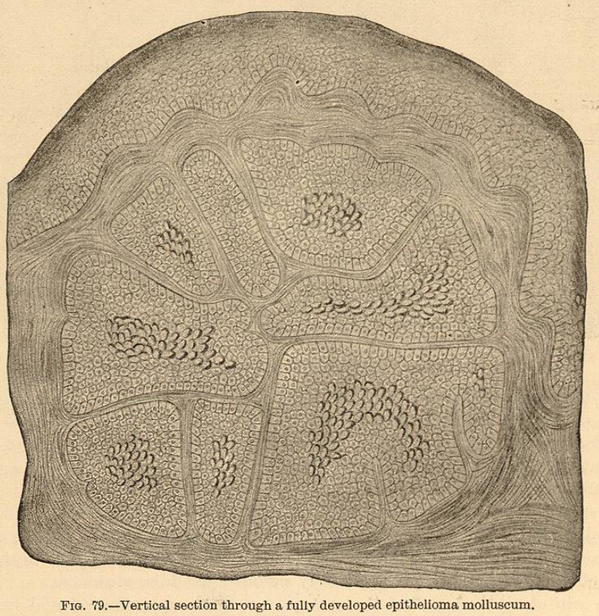

Fig. 79.—Vertical section through a fully developed epithelioma molluscum.

nucleolar parts of the rete cells. Renaut found that in the beginning of the process an eleidin-like substance is formed, which first changes into a hyaline metamorphosis of the cell body and finally into complete cornification.

My own microchemical investigations have not led to the same results. I have become convinced that the larger number of the altered rete cells pass directly and uninterruptedly into the condition of cornification, and that a smaller number are converted into molluscum corpuscles, after their cloudy, granular contents have changed into a homogeneous, transparent, hyaline substance. Only a narrow zone of the external part of the body of the cell undergoes cornification. The fully developed molluscum corpuscles consist, therefore, of two substances, viz., a central hyaline and a peripheral keratoid substance.

Etiology.—In view of the fact that among seven cases observed by Bateman, three were children of the same family, and two were servants in this family, and that the mother of a child suffering from molluscum also acquired the disease in the face from contact, this writer concluded that the affection was contagious. Similar cases were also reported by Carswell and J. Thomson. At a later period, the assumption of the contagious character of the growth fell into discredit, but again received corroboration after clinical observations of infection and successful inoculation experiments had been reported, and the molluscum corpuscles were regarded as foreign bodies or phytoparasites. I will now adduce those reasons which have led me, with the large majority of dermatologists, to deny the contagious nature of epithelioma molluscum.

In the first place, I consider as insufficient the proofs which have been brought forward of the genuineness of the results of inoculation. Thus, Retzius narrates that no result had been obtained two months after inoculation, and that this did not occur until at least three months later, in the form of a comedo which gradually assumed more and more the peculiar appearance of molluscum; its contents were found to contain molluscum corpuscles. This single authentic observation, which can be explained in accordance with our views, is opposed by a large number of negative results.

It has also been regarded as proof of contagion that several children of the same family and those individuals who live in close contact, are often affected with the disease. I will go even further and mention that public women often present these tumors on corresponding parts of the body.

With regard to the first point I will recall that children were almost always attacked when several cases occurred in one family. But we know with regard to the integument of the young that it not alone reacts more vigorously to irritants, but that, on account of the remains of the fœtal condition, it is predisposed to proliferations of the horny substance and accordingly of the epidermis. In my opinion, therefore, the fact that several children of the same family are attacked by epithelioma molluscum is due mainly to the tendency in them of the integument to epidermoidal formations.

The following statistics have been gathered by me in a year and a half: Among 576 men I observed the molluscum 21 times, among 313 women 36 times. If those females are excluded who had no genital affection, there were 20 cases of molluscum among 190 women. If, among the latter, we consider only the professional prostitutes, there were 19 cases among 116 females (16.5%). Among men the percentage was only 3.8. It is scarcely probable that this great disproportion would exist, were epithelioma molluscum contagious.

Facts like these have led me to believe that the disease develops preferably upon irritated portions of the skin. Hebra reports a case of prurigo in a boy, whose body presented several molluscum growths as large as a hazel-nut. Cazenave and Schedel describe a number of the growths upon a patient suffering from prurigo senilis (?). Cases of similar import have been observed by Kaposi and myself.

From all these various considerations we must conclude that the cause of epithelioma molluscum is not found in contagion, but in a predisposition of the rete cells to proliferation, and that in a considerable number of cases local irritants act as exciting causes.

Prognosis.—The disease has no serious significance for the individual, unless numerous growths develop upon visible parts of the body.

Treatment.—It is unnecessary to use any strong local or general remedial agent.

The best means of treatment is the lateral application of pressure to the tumor in order to discharge its contents and thus cause it to dwindle away.

CANCER OF THE SKIN (CARCINOMA CUTIS).

Historical.—The existence of carcinoma had been recognized as early as the time of Hippocrates. Celsus and Galen also give descriptions of the disease. Boerhave, discarding the old view that the bile constituted the materia peccans of the disease, believed that the lymph gave rise to cancer by means of fermentation. Albert Haller, one of Boerhave's pupils, by his experiments and numerous anatomo-physiological labors, first pointed out the way for the investigation of the growth and development of carcinoma.

In 1816 Laennec divided neoplasms into two categories, the first including those which have an analogue in the natural tissues, tumeurs homologues, as distinguished from tumeurs heterologues. The latter included carcinoma, which was distinguished from scirrhus by the primary difference in the elementary constituents.

But it was shown that scirrhus and carcinoma are often found in the same individual and not infrequently in the same organ or tissue. To harmonize this apparent contradiction, Cruveilhier proposed that attention should be directed to the most primary elements, *i. e.*, to the presence of the cancer juice. But this led necessarily to the false conclusion that tumors should not be regarded as cancerous when the intercellular fluid mentioned was absent. Clinicians therefore restricted themselves to a clinical view of the disease and regarded it as a tissue degeneration.

Pathologists, on the other hand, pursued a different course. According to Johann Mueller, carcinoma is neither a heteromorphous nor a heterologous structure; its fundamental histological character is found in the fact that the germinal cells do not arise from previously developed fibres, but from a true seminium morbi, which forms between the cells of the tissue. Cancer is therefore a constitutional disease.

Some pathologists wished to retain the terms homologous and heterologous, not in Laennec's sense with regard to the tissue, but with regard to the formed elements, so that homologous became identical with benign and heterologous with malignant. Lebert goes even further and divides all tumors into homœomorphous and heteromorphous, the latter consisting exclusively of cancer since this contains elements which have no analogue in the human organism. Adolph Hannover has been the most aggressive in favor of the existence of a peculiar variety of cells (so-called cancer-cell).

But the existence of a specific cancer-cell was not generally admitted. Microscopical examinations showed that tumors, whose clinical characteristics were undoubtedly those of cancer, may consist in great part of epithelium, and are thus equivalent in their elementary constituents to Lebert's cancroid and Hannover's epithelioma. It was also generally believed that carcinoma possesses a definite structure, and that the cells with their small amount of intercellular fluid are free in cavities formed by the vascular connective tissue (stroma), analogous to the alveoli of the lungs (Rokitansky, Virchow, Foerster). It remained a matter of dispute whether the cells originated from a specific blastema (Rokitansky, Virchow) or were produced from epithelial germs which had strayed even into places possessing absolutely no epithelium. Virchow and Foerster also gave a more precise definition of cancroid, the characteristic of which they believed to consist in localized accumulations of epidermoidal cells within alveoli of the diseased tissue.

A change of opinion followed in 1855, when Virchow proved that the epidermoid cells of cancroid developed from the connective tissue, and stated that carcinoma in general is a sharply defined form of tumor distinguished by its epithelial character.

But both opinions were not long undisputed. Although cases of primary cancer are observed in situations in which normally no epithelium exists, the followers of Remak and His' exclusive theory of the germinal layers found sufficient support for the view that the elements of such a carcinoma developed from pre-existing epithelium, in the belief that epithelium cells may have wandered or lain stationary in such situations since the embryonic period.

A compromise between these extreme views was made by a number of pathologists and clinicians, who asserted that the cells of carcinoma may be of desmoidal as well as epithelioidal origin (E. Neumann, Perls, E. Wagner, Langhans, etc.).

Many clinicians were dissatisfied with the results of histological examinations, and relied chiefly on the course of the disease. But there are such characteristic differences in the histological relations of desmoidal and epithelioidal tumors (for these are the ones which, for the most part, are mistaken for one another) that we must believe in the validity of the distinction made by Virchow. In tumors of the connective tissue type, we never find such a distinct separation of the cells (round or spindle cells) from the fibrous tissue. Even in endothelioma, in which the cells form veritable plates, and in alveolar sarcoma—in which the roundish cells are often epithelium-like, compressed against one another—thin, brushed sections show that delicate fibrillæ traverse the space left by the removal of the cells. Epithelial proliferations in a connective tissue stroma present an entirely different appearance, and constitute a foreign colony which flourishes at the expense of surrounding parts.

If the clinical phenomena of cancer furnished absolute distinctions, we might dispense with the aid of the microscope, but this is not the case. Among all the symptoms of cancer, there is not a single one, much less a group of symptoms, which is pathognomonic. I do not hesitate to admit, however, that the well-known subjective and objective symptoms are often sufficient to enable us to form a diagnosis.

Definition.—I believe, therefore, that we must regard carcinoma as an atypical, epithelioidal neoplasm with a predominantly malignant course, which develops as the result of local disturbances; when the disease spreads, it produces a change in surrounding tissues comparable to inflammation, secondary infiltration of the adjacent lymphatic glands, metastatic nodules in the most various organs and tissues, and finally produces a cachexia as the result of all these changes.

Etiology.—If we were in a position to produce carcinoma experimentally as we do inflammation, nothing would be easier than to arrive at satisfactory conclusions regarding its origin. But the observation of its initial stage and progressive spread is attended with great difficulty, as the cancerous process is a chronic and very gradual one.

Clinicians, particularly surgeons, were long since struck by the often multiple occurrence, the great tendency to recurrence, even after early and careful extirpation, and the heredity of carcinoma. These features were explained, accordingly, by a cancerous dyscrasia, a specific blastema. Only in cases in which local irritants were demonstrable as immediate predecessors of the new growth, the thereby resulting hyperæmia was supposed to have caused the exudation of the cystoblastema (J. Vogel).

In opposition to this view, the large majority of pathologists and a no small proportion of German clinicians regard cancer as originally a local affection. In the first place, neither local nor general recurrence of the disease nor its hereditary nature involves the