

Two cases of epibulbar carcinoma, from the surgical clinic in Bonn / by C. Heyder ; translated by J.H. Shorter.

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TWO CASES OF EPIBULBAR CARCINOMA,
FROM THE SURGICAL CLINIC
IN BONN.

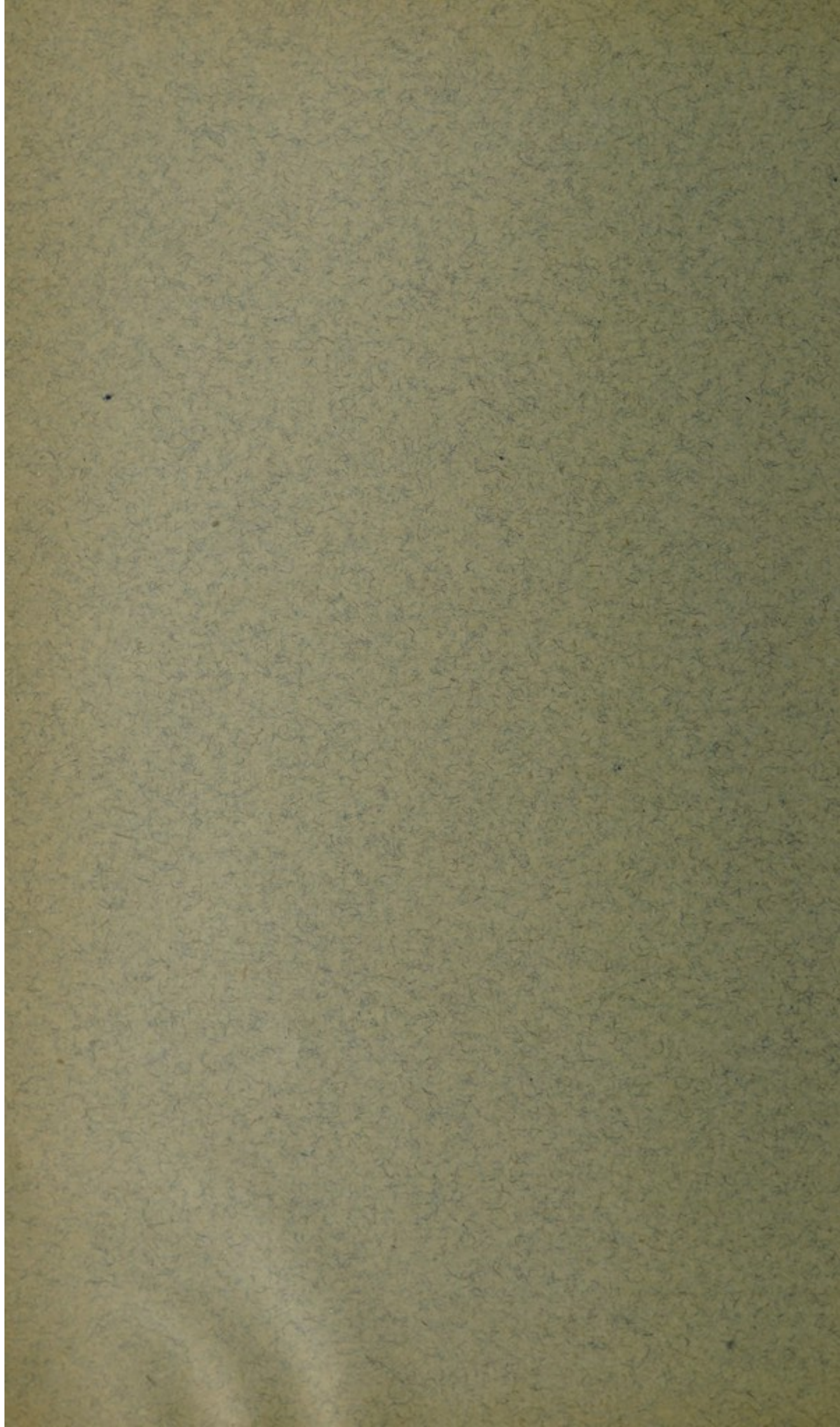
BY

DR. C. HEYDER, OF MUNICH

and Leipzig

Translated by Dr. J. H. SHORTER

Reprinted from the ARCHIVES OF OPHTHALMOLOGY, Vol. xvii., No. 4, 1888]



TWO CASES OF EPIBULBAR CARCINOMA, FROM THE SURGICAL CLINIC IN BONN.

BY DR. C. HEYDER, OF MUNICH.

(*With three illustrations.*)

Translated by Dr. J. H. SHORTER.

IN the present paper are reported two cases of pure epibulbar carcinoma, which, early in 1884 and in January, 1886, respectively, came under observation at the surgical clinic in Bonn, the reporting of which was kindly entrusted to me by Prof. Frendelenburg.

As cases of epibulbar carcinoma have been only rarely observed (as will be seen later the entire literature embraces only some thirty cases), the two here reported are deserving of special interest, from the fact that in none of the other cases described did the tumor attain to such a size as in these two.

As, furthermore, both of these cases were operated on, and the macroscopical as well as histological conditions thoroughly examined, an opportunity was afforded of going carefully into the subject, making a comparison with those hitherto reported not without interest.

The first case has been already used in my inaugural dissertation.¹

Case 1.—Anna Maria V., unmarried, fifty-two years old, from Heidgen, near Witlirschlick, was admitted to the surgical

¹ On Enucleation of the Globe on Account of Epibulbar or Palpebral Carcinoma.—Bonn, 1885.

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clinic, on July 14, 1884, for the extirpation of a large tumor, which sprung from the globe of the right eye.

The patient made the following statement as to previous affections :

Sight had begun to weaken in both eyes at the age of ten. Twenty-five years ago the patient was ill with variola, which raged in her native village at that time. She still retains marks of the disease quite distinctly. Whether the eyes were affected by the variola could not be ascertained from the history. In 1863 she was treated at the ophthalmic clinic for granular conjunctivitis of both eyes. When she came under observation in 1884, it was found that the function of the remaining eye, the left, was considerably reduced through pannus and keratoconus.

In the spring of 1879, so she stated, the right half of the face, especially in region of the eye, was attacked with erysipelas. In May, 1883, the patient first noticed a small elevation on the right eyeball. The exact spot occupied, whether the sclero-corneal margin or only the corneal region, could not be ascertained. The patient, however, claimed that for a long while before there had been a white spot at the point first attacked, which was caused by one of the eye diseases. Whether this spot had been a scar, the result of one of the eye affections, we cannot at present decide. This tumor soon increased to the size of a pin-head ; by September it was about as large as a walnut, and from that time it grew more and more rapidly. At the same time the tumor became the seat of severe, spontaneous pain, which greatly increased on touch. The patient also states that the tumor now commenced to bleed at the slightest provocation, and a considerable quantity of purulent fluid was discharged from its surface. When the woman was admitted to the clinic, the region of the right eye was found to be occupied by a nodular tumor the size of a hen's egg, which on all sides overhung the orbital margin. Of a general globular shape, it presented a many-fissured surface, on which here and there could be recognized traces of recent hemorrhages. The tumor protruded from the orbit like a large mushroom. The eyelids could not be recognized either from in front or from the side ; in order to bring them into view it was necessary to draw forward the upper and lower borders of the tumor. Then it was seen that unfolded they rested upon the convex surface of the tumor. No part of the globe could be made visible, as it was completely covered by the mass ; but its existence could

be presumed from the fact that all movements of the other eye were accompanied by similar coincident excursions of this mass, until restricted by contact with the edges of the orbit.



FIG. 1.

The visual power was ultimately destroyed, the patient being no longer able to distinguish between light and dark. The frontal nerve seemed to be also indirectly implicated, as the patient described the feeling of formication in the parts of the skin supplied by that nerve.

Swelling of the glands was not demonstrable anywhere, and the general condition was likewise fairly good. The tumor was extirpated, along with the globe, on January 22, 1884, incision being made directly on the orbital margin. The entire contents of the orbit were removed, and no attempt was made to cover the defect by a plastic operation. The bleeding cavity was tamponed with

iodoform gauze, over which was applied a bandage. Later some indifferent applications were brought into use. By this treatment the course of healing was undisturbed; neither fever nor any local inflammatory reaction was observed. As early as the 11th of February, the patient was allowed to go home, with the wound well granulating, into which on all sides the skin was being drawn. On her departure the granulating surface was only 2 *cm* long by $\frac{1}{2}$ *cm* wide.

On May 29th the patient presented herself at the clinic again. The healing had made very good progress. There remained a granulating spot twice the size of a hemp seed, corresponding to the centre of the original wound. No relapse.

On December 5th the patient was again in the clinic; the healing had been perfect for a long while. The orbital cavity seemed diminished, and the eyebrow was somewhat pulled down, so that it was partly below the supraorbital margin. There was still no trace of any recurrence or of any enlargement of the lymph glands to be observed.

REPORT ON THE MACROSCOPICAL CONDITION OF THE TUMOR.

The extirpated growth, viewed externally, appears like an irregular nodular projection of about the size of hen's egg, separated by shallow depressions into several portions. The surface is rough; everywhere papillæ, some small, fine, others thicker, are discernible. Along the whole under surface, hidden from view, lay the lower lid completely everted. The upper eyelid is less well preserved, the conjunctiva especially being drawn over into the surface of the tumor, so that the free margin of the lid rests directly on the latter.

The globe, in sagittal section, seemed to be quite well preserved both as to shape and size. The tumor covered it as if it had been poured over the eye, in front covering the cornea completely and extending backward upon the sclera beyond the equator (see fig. 2). The measurements are as follows: The greatest thickness downwards is 16 *mm*, and forwards 12 *mm*; above, the thickness varied between 11 and 17 *mm*. See fig. 2, which represents a diagrammatic section of the tumor, in order to show its relative shape and size.)

The globe must therefore evidently have been drawn forward with considerable elongation of the muscle and optic nerve, as the posterior border of the neoplasm rested above and below against the orbital margin. The globe must likewise have been turned downwards, as the tumor extended above farther back than it did below. To a point beyond the equator, the tumor not only lay close on the sclera, but seemed also united so fast to the latter that it was only by violence possible to separate one from the other. The structure of the sclera, however, was unchanged so far as this could be determined macroscopically.

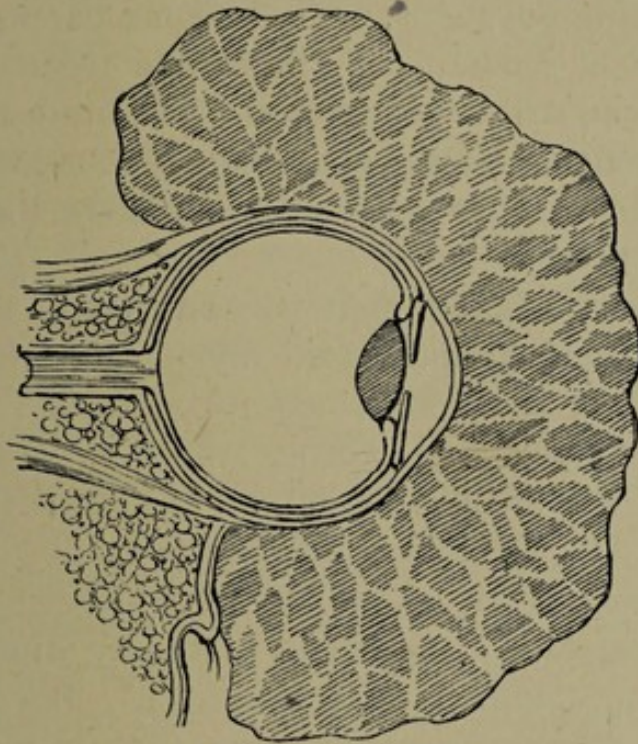


FIG. 2.

The cornea was nowhere perforated, though in the upper half it seemed strikingly thin; in the lower it was of normal thickness. In the centre the tissue of the tumor passed directly into that of the cornea, so that here the dividing line between normal and pathological tissue could no longer be recognized; the posterior surface of the cornea, however, was perfectly smooth. The tumor itself showed a radiate arrangement, and in the deep parts adjacent to the globe was more compact, but externally of a delicate, cauliflower-like structure. Iris, retina, and choroid, as well as the optic nerve and the muscles, presented nothing peculiar.

MICROSCOPICAL CONDITION.

Section perpendicularly through the entire thickness of the tumor and through the corneo-scleral junction.

The sclera is essentially unaltered, well supplied with blood-vessels, partly of a capillary character, partly showing clearly the structure of the arteries and veins. Lying upon it is found a tolerably thick connective-tissue layer, isolated spots in which appear strongly infiltrated with round cells. Then follows the tumor, the papillary structure of which, recognizable even macroscopically, now becomes very apparent. The epithelial masses, arranged like palisades, open outward, pushing outwards, while in some parts of the elongated papillæ a remnant of connective tissue containing blood-vessels can still be recognized. The more external the more the epithelial masses predominate, and are more closely found together, so that only here and there a cleft can be seen between the papillæ.

The cornea is relaxed, that is, abnormally wide spaces are found between the individual layers; this disruption is especially distinct at the sclero-corneal margin. Interposed between the tumor and cornea there is a connective-tissue layer of a scar-like character and of like thickness as the cornea itself. It is a continuation from the loosened connective-tissue layer, which has been described as lying without the sclera. It extends, gradually diminishing in thickness, over a fourth of the cornea. Beyond it the epithelial masses are directly on the slightly loosened cornea, the structure of which is but little altered, while spurs penetrate here and there into its tissue.

In the external layers of the tumor the epithelial new formations present in general a papillary arrangement; the individual strands, however, are stouter, in part club-shaped, leaving larger interstices in the perforation.

Some quite large blood-vessels course through the connective-tissue processes, which lie in the interspaces, and which also in part push into the base of the papillæ. These processes show likewise very strongly marked round-cell infiltration. In general, however, the gross structure of the tumor mass retains a radiate arrangement.

The picture of transverse and oblique sections through the tumor is an extraordinary irregular one. Large masses of epithelial cells, traversed by bands of connective tissue, are chiefly to be seen; especially in the latter numerous blood-vessels are visible, in part arterial with thin walls, in part quite broad capillary loops.

The epithelia themselves are relatively small, but distinctly recognizable by the large nucleus with glistening nucleolus; they vary in shape, although chiefly oblong, their edges being directed inwards and outwards.

The anatomical diagnosis, therefore, would be—epibulbar carcinoma. It was impossible, from the size of the tumor, to determine, from the anatomical examination, the point of origin.

Case 2. This was that of a peasant, Johann H., fifty-five years of age, from Ketting, near Neuwied.

The vision in the left eye was said to have been almost entirely lost ten years previously, through a disease which was not very painful, concerning the nature of which nothing could be learned. The patient stated that "a film" came over the eye, which constantly increased in density. Later, about two years ago, a bulging of the cornea developed, occasionally burst, and, after evacuation of the fluids, became smaller. Furthermore, in the meantime, a small tumor appeared at the place where the cornea perforated spontaneously. At that time the patient had already been advised by a physician to have an operation performed, but as he still regarded the affection as not important, the operation was not undertaken.

In the last two months the tumor has grown very rapidly, and occasioned the patient severe pain, which caused him, on January 4, 1886, to seek aid at the surgical clinic.

The appearance which the region of the left eye presented at the time of his reception was about as follows:

The eyelids (especially the under one) are pushed forwards and stretched; they enclose an immense palpebral fissure, which remained constantly open, the patient not being able to completely close it. The skin of the eyelid is livid in color, somewhat œdematous, and traversed by large, engorged veins. The surface shows some unevenness, which, as shown by palpation, is occasioned by the corresponding irregularities of the parts lying below.

The lids are movable over the subjacent tumor, except that along the palpebral fissure the lower lid is for its entire length bound fast to the tumor, whereas the border of the upper is only in connection with the tumor for a small space at the inner canthus. The consistency of the tumor is somewhat dense.

In the palpebral fissure nothing can be recognized of the globe, being filled with the tumor masses, which constantly secrete a small quantity of puriform fluid.

The part of the visible surface belonging to the lower portion of the tumor is smooth throughout, only here and there interrupted in continuity by a large cleft. The upper parts situated in the palpebral space are, however, much fissured, especially towards the inner canthus, so that they present a delicate, cauliflower-like appearance.

The pain extended beyond the limits of the tumor into the region of the supra-orbital nerve ; pressure on the spot where the nerve issues from the supra-orbital notch was extraordinarily painful.

The operation was performed on January 9th. As the skin of the upper lid was unaffected it was preserved, in order, later on, to cover part of the defect ; only at the inner canthus, where it had become involved in the growth, a small part had to be removed. The conjunctiva of the upper lid was divided by a cut in the neighborhood of the fornix, and detached from the parts below.

Then a cut was made around the lower part of the tumor, from the inner to the outer angle of the orbit, preserving only a narrow strip of skin of the lid. Next the entire contents of the orbital cavity were evacuated, the tumor and with it the globe being shelled out, and finally the optic nerve was divided from the outer side with the scissors.

At the operation the tumor was found to be nowhere adherent to the adjacent bony parts, neither did it fill the entire posterior part of the orbit. Chisel and hammer were therefore not required to remove the bony wall.

The hemorrhage was not very considerable ; ligation of two arteries checked it.

After the completion of the operation, the portion of the skin which was retained was utilized as a partial covering for the defect which had been occasioned. A few stitches were inserted at each angle, for uniting the upper with the lower lid, so that the

raw surface still remaining was not very large. Even this could have been corrected by transplantation of a flap from the skin of the adjacent parts, but having the experience of the first case in view, this was abstained from. Finally the wound was aseptically cleansed and dressed, and a bandage applied covering all.

The course of the healing was entirely without fever. At the first change of bandage, six days after the operation there was moderate suppuration. A few days later the bandage was changed again. The surface of the wound was covered with good granulations; very little suppuration. On the 22d of January, at his urgent request, the patient was discharged. Three months later he informed us that the healing process had gone on undisturbed and that the wound was entirely closed. No sign of any relapse as yet. With the exception of the neuralgia previously mentioned, which occasionally returned, the condition of the patient is excellent.

REPORT OF THE MACROSCOPICAL EXAMINATION.

The extirpated tumor was of about the size of a hen's egg. Looked at from in front the greater part of the growth was seen to be covered with the skin of the lower lid, which is clearly recognizable by the eyelashes. Above is seen that part of the tumor already described as lying in the palpebral fissure; and uppermost of all, the exposed part of the growth, divided by coarse and fine fissures into small nodules and papillæ. A small portion of the growth in this region is covered by the small piece of skin which was removed during the operation.

Description of a sagittal section as shown in Fig. 3.

The globe seems atrophied and very much changed in shape, having become of an oval form through pressure of the masses of neoplasm above and below. Evidently these changes were due to the resistance offered to the growth forward of the tumor by the skin which stretched over it. The tumor lay closely attached to the globe as far back as the equator; above, however, an obtuse border projected back and beyond this zone. The large portion of the tumor appeared as a consistent homogeneous mass, only here and there divided by intervening spaces into lobes.

One large fissure was especially striking, leading from the palpebral opening downwards and backwards into the tumor and dividing it into two not exactly equal parts.

The measurements of the tumor are as follows: The total width of the growth amounts to 53 *mm*; the width on the sagittal section, at a point lying opposite the optic nerve, is 9 *mm*; of the portion covered by the lower eyelid, 30 *mm*. The greatest projection of the growth upwards, measured from the upper wall of the globe, amounts to 12 *mm*, and that downwards, reckoned from the lower wall, to 39 *mm*.

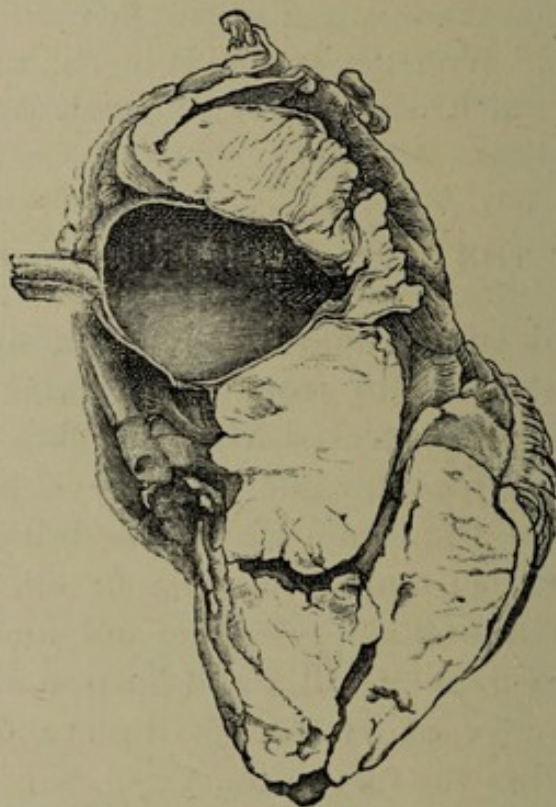


FIG. 3.

The sclera does not seem to have undergone any changes in its structure, but the cornea is ruptured and gapes; there is no anterior chamber. The masses of neoplasm which have insinuated themselves between the gaping halves of the cornea, and embrace them from within and without, have not, however, produced atrophy of the corneal tissue. The outlines of the cornea can be clearly traced deep into the tumor (see fig. 3).

The arrangement of the tumor can be distinctly recog-

nized, even macroscopically, as a radiate one, the centre lying at the point of rupture of the cornea.

The iris lies unchanged in the cavity of the globe, nor can any changes be perceived macroscopically in the other coats of the eyeball.

MICROSCOPIC EXAMINATION OF THE EXTIRPATED TUMOR.

Section made in a sagittal direction through the growth and the globe at the spot where the continuity of the cornea is interrupted.

On the outer side of the cornea, which stretches into the tumor mass, lie broad bands of long epithelial cells, which are placed close together broadside on to one another, with no tissue whatever between them. Some of these bands extend a short distance parallel to the cornea, and then bending out radiate into the growth. The others, especially those belonging to the anterior portions of the cornea, go directly in a straight line from the cornea. In their further course, after ramification, they disappear in the growth, and thus effectuate the radiate arrangement of the remaining tumor masses.

In the section through the globe, both halves of the cornea, which diminish gradually in thickness the deeper they penetrate into the growth, so that they cannot be followed to their termination, present a peculiar appearance under the microscope. In the posterior portion, towards the globe, the cornea has preserved its normal thickness, having yielded to the pressure of the tumor and been pushed into the cavity of the anterior chamber, there being no counter-pressure at this point against the inner surface of the cornea. In the central portion, on the contrary, the cornea has become thinner, but its structure has become more compact. This behavior is very easily explained by the fact that, whilst the growing tumor exerted pressure on the surface of the cornea externally, the latter was prevented from bulging or otherwise yielding to such pressure, by reason of the presence of masses of the tumor between the two halves of the cornea, which kept them apart.

The more anterior the further the cornea departs from its

normal shape. Here the cells, having proliferated most luxuriantly towards the torn ends, split the cornea into lamellæ, between which they insinuate themselves. Whilst further back this cleavage is single, it becomes more and more numerous towards the ends, the individual lamellæ becoming constantly thinner, until finally they disappear in the tumor, ramifying in every direction in layers of various breadth.

The portions of the tumor which are found between the halves of the cornea are shown under the microscope to have had their origin in the anterior parts of the cornea. The rows of cells here turned inwards are in close contact with those coming from the other side, and thereby have pushed apart the gaping cornea.

The tumor itself proved to consist chiefly of epithelial cells. In the neighborhood of the cornea, the said cells are closely crowded together; in the external parts of the growth they become larger and irregularly shaped, and show distinctly, in addition to the large nucleus, a glistening nucleolus. Larger masses of cells are traversed by connective-tissue bands, and enclosed in them. There can be also recognized in the connective tissue, cross and longitudinal sections through blood-vessels. There are no changes in the remaining portions of the globe.

Remembering that there was a division of the cornea, and that, furthermore, changes were first noticed at the point where this division had occurred, it naturally suggests itself to the mind that just here the development and spread of the growth had its origin. Observation of the tumor on the sagittal section, which was made right through the affected part of the cornea, confirms this opinion, as a radiate arrangement of the grosser parts of the tumor, proceeding from the lacerated cornea as a centre, is distinctly recognizable, even with the naked eye.

This behavior becomes still more apparent from the microscopical examination, as above mentioned.

In this latter case we have one of very great rarity to deal with, so far as concerns the origin of the growth. In the majority of cases mentioned in the literature of the

subject, no etiological factor could be pointed out, whereas in this one the carcinoma undoubtedly originated from a scar.

Besides this, almost all known cases are distinguishable by the seat of the tumor, which is specified as in the highest degree characteristic of corneal tumors.

It is, for example, generally specified by authors that the tumor was located at the sclero-corneal margin, when speaking of a small growth; when describing a larger one, that it extended over the sclera and cornea, but showed a firm attachment only with the sclero-corneal border, whilst everywhere else it could be easily lifted up. Our case has, in common with the other, the fact that the changes in the corneal substance itself were inconsiderable; there was also no tendency towards proliferation into the interior of the globe, notwithstanding that there already existed an opening in the cornea.

From these experiences it seems that epibulbar carcinomata have very little tendency towards invasion of the neighboring parts, a fact which naturally carries great weight in the question of an operation. Furthermore, a relapse does not easily occur after an evacuation of the orbit on account of such growths, as is shown by our first case. The second cannot be very well cited as proof of the fact, as the time which has elapsed since the operation is too brief.

In looking over the literature one is struck with the fact that the authors, almost without exception, are silent as to the question whether, after evacuation of the orbit, a plastic covering should be made or not. Genzmer is in favor of a secondary transplantation of a skin graft upon the granulating defect. Whilst Prof. Trendelenburg formerly (following the precedent of v. Langenbeck) always formed a compensation flap out of the surrounding skin, he has, in recent times, performed the operation without attempting any plastic covering. The excellent result obtained in both the above-mentioned cases, as also after extirpation of the globe for other indications, is demonstration of the correctness of this procedure. Also where both eyelids must be

removed and the entrance into the orbit remains exposed, the surrounding skin is drawn so strongly towards the orbit that, when the cavity is filled with granulations, a complete covering of skin exists over the funnel-shaped opening. There remains a shallow trough, covered at the borders with skin, in the centre with a scar, which is relatively only slight disfigurement, and the patient is spared the large scar on the forehead which remains after the plastic operation.

As supplement to this paper, I may be allowed to present a short sketch of the most important facts which have thus far become known regarding epibulbar carcinoma. Such a collection is not without interest, as some of the authors have made reports as to the macroscopical and histological conditions observed, as well as in regard to the therapeutics employed and their results.

In the ARCHIVES OF OPHTHALMOLOGY AND OTOTOLOGY, 1878, vol. vi., p. 291, there is an article by E. S. Holmes, of Chicago, on thirteen cases of ocular tumors, one tumor of the optic nerve, and one case of panophthalmitis with a coagulum, which was mistaken for a tumor.

The writer first presents a short survey of the different forms of tumors of the eye which he had an opportunity of collecting in his own practice, comprising 20,000 eye patients. Among the great mass of material he found only two cases of epithelial cancer of the sclera and cornea. One of these cases the author briefly reports as follows :

M. H. C. H., forty years of age, noticed, two and a half years before the removal of the eye, and first at the margin of the cornea, a small, painless elevation, which grew rapidly. In the course of a year and a half it was twice removed and frequently cauterized with nitrate of silver. But as relapses constantly followed, enucleation was performed. The tumor was of a round shape, $\frac{1}{8}$ " in diameter, $1\frac{1}{2}$ " high, with sharp borders and yellowish and ragged surface.

The vision had remained almost entirely unaltered, as the growth hardly reached the pupillary margin.

The microscopical examination showed that the tumor was firmly united to the cornea and sclero-corneal margin ; a part of

it, however, simply lay over the sclera. The growth consisted simply of epithelial cells lying piled upon one another. The greater portion of the cornea was destroyed by the epithelial proliferation or already permeated with epithelial cells.

Steffan, in *Zehender's Klinische Monatsblätter*, 1864, vol. ii., p. 81, publishes the following case of medullary carcinoma of the cornea :

H. F., fifty-two years of age, presented himself in 1862. In the lower outer quadrant of the left eye the cornea was covered by a partially brown pigmented growth. The consistency of the tumor was soft, its surface uneven ; the height was 1'''. It was furthermore not movable in the cornea, and ended in sharp borders about 1''' from the pupil. The conjunctiva showed here and there brownish pigment plaques.

For six months the tumor remained the size of a pin-head, without causing any annoyance. Six months later the patient presented himself for operation, the tumor in the meantime having increased in height to 3-4'''.

On removal of the growth it was seen to be in intimate connection with the sclera and cornea only at the border ; otherwise it was easily lifted up.

The microscope showed a mass of cells almost without stroma. The cells were round and contained one or two shining nuclei.

In the same periodical for the year 1869 Keyser describes an operation for removal of a cancerous growth from the surface of the eyeball :

The patient, a young man of nineteen, had noticed for two years a red spot on the corneo-scleral margin. The significance of this spot was mistaken by his physician, and treated as a pterygium with astringent washes and caustics, which treatment, however, seemed to stimulate the growth.

There is now present a reddish tumor, which reaches about to the pupillary border and extends over the sclera. It is 7 mm in length and 6 mm in width. It is firmly united to the cornea and sclera. The pain caused by it is bearable. A small cancerous tumor had been previously removed from the nose. The vision of the diseased eye was intact ; the other eye was blind from an injury. The growth was carefully extirpated, and healing followed by first intention. Two years later there had been no relapse.

As to the results of the histological examination the author gives no details, but contents himself with the statement that the tumor showed a cancerous structure.

In vol. vii., p. 51, *l.c.*, Colsman reports a case of epithelioma of the cornea :

A man, sixty-seven years of age, had in the right eye a round tumor of about $2\frac{1}{2}$ ''' diameter and white color. Through a hand lens many small elevated points of a papillary nature were seen.

The tumor began a line below the border of the cornea and projected up not quite to the lower margin of the pupil. It had abrupt borders and an elevation of $\frac{3}{8}$ '''.

One year later the patient showed himself again. During this time the tumor had grown and now reached to the middle of the pupil. The man refused an operation.

Finally from vol. xviii., p. 178, we take a case of cancer of the sclera-corneal margin, described by Knies :

Mrs. R. F. had at the inner corneal margin of the right eye a reddish-yellow uneven growth, which had existed for a long time and was painless ; its shape was that of an isosceles triangle, the base of which, corresponding to the corneal margin, measured 3 *mm* and the altitude 4 *mm*.

The growth was extirpated and examined microscopically. There was found an enormous proliferation of epithelial cells, with manifold excrescences into the conjunctival tissue. Even beyond the borders of the tumor the conjunctival tissue was infiltrated with round cells in the shape of so-called epithelial nests.

The tumor cells were more than double the size of those of the normal epithelium of the cornea and conjunctiva. The line of demarcation separating them from the normal epithelium was very distinct. In the sections which had been stained with hæmatoxyline the nuclei of the tumor cells were much more deeply tinged than those of the normal epithelium.

The seat of the tumor was in the cornea and in fact outside of Bowman's membrane. Whilst in isolated places the portions of tumor resting on Bowman's membrane had displaced the normal epithelium, there were, on the other hand, places where the corneal epithelium had been lifted up and served as a covering of the growth.

In *Nagel's Jahresberichte* are found several cases—1870,

p. 290 ff. Lebrun: Tumeur épithéliale du globe oculaire (*Annal. d'Oculist.*, vol. lxiv., p. 132):

Within the space of 7 or 8 weeks a tumor had made its appearance in a man, sixty-three years of age, which grew to half the size of a hazelnut. The greater part was seated on the sclera, about $\frac{2}{3}$ of it on the cornea, in two lobes, one of which was deeply pigmented. The vision remained perfect. The treatment consisted in its extirpation, from which according to all appearances a radical cure resulted. The microscopical examination showed an exceedingly vascular connective tissue, containing a quantity of epithelial cells. Pigment was likewise found.

Thos. Reid: On Epithelioma of the Eye (*Glasgow Med. Journal*, vol. ii., 2, p. 147).

As this case was only mentioned cursorily and I have not said journal at command, there is nothing special to report about it.

A. Closson: A Case of Cancroid of the Cornea and Sclera (*Arch. f. Path. Anat.*, vol. l., p. 56).

After citing a series of cases the author reports one observed by himself, but remarks at the outset, in opposition to Berthold (*Arch. f. Opth.*, vol. xiv., 3, p. 149), who agrees with the opinion of Thiersch and Waldeyer, that he, for his part, could not accept these views, but, on the contrary, had arrived at different results as derived from his own observations. The patient, a herdsman, fifty-three years old, had noticed, so he stated, for some years a nodule, which, in the latter months, had increased in size, become painful, and had been in various ways removed by physicians and cauterized. The tumor then rapidly increased in size, while at the same time in the left side of the head severe pain had developed.

Situated at the upper left corneal margin was a pale reddish growth with rough surfaces, of the size of a hazel-nut when the eyeball was removed. It extended 6 mm over the sclera, terminating in an abrupt border; towards the cornea it became gradually flatter and extended outwards over the centre of the pupil; height, 4 mm.

The following lengthy explanation of the result of the

histological examination is intended to show that in the neighborhood of the blood-vessels the first, and, in fact, the larger, masses of tumor cells appeared. Closson then summarizes in the four following sentences the results arrived at :

1. The development of a carcinoma is preceded by a profuse development of blood-vessels in the neighboring tissues.

2. The development of the cancer cells is traceable to the blood-vessels.

3. The future of the cells depends essentially upon the conditions to which their surroundings expose them, and not, or at least not essentially, upon their origin.

4. The destructive effects of the carcinoma are based on the fact that the cells, through proliferation or distention, split the tissues apart, just as a skull may be burst open with soaked peas.

In conclusion the author seeks to bring further proof in favor of his assertions, in connection with which he offers many interesting remarks, to enter upon which, however, would overstep the limits of this paper.

Langhaus publishes a paper in *Virchow's Archives*, vol. xlix., p. 117, in which he endeavors to demonstrate that all pigment in melanotic tumors arises from metamorphosis of red blood corpuscles. He noticed distinctly that the pigment granules were always found enclosed in cells; that the numerous large pigment granules had the shape perfectly of the red corpuscles of human blood; they were disc-shaped, appearing round when looked at from in front, and rod-like from the side; in fact, even the central depression, or biscuit shape, could be recognized in many of the corpuscles which stood on edge.

The case of melanoma of the cornea reported in connection with the above-mentioned studies, was a fourth relapse, locally, in a man forty years old. It sat like a mushroom on the cornea, with a narrow base at the sclero-corneal margin, but did not extend beyond the corneal border, nor did it involve the ocular conjunctiva. The surface of the tumor was smooth, and of light-gray color. The lowest

layers were deeply pigmented. The tumor had also invaded the tissue of the cornea, but more in the superficial than deep parts. As far as the growth had made progress the corneal corpuscles were more or less destroyed. As the author does not go further into details as to the results of the microscopical examination, we cannot be certain whether this case was one of a carcinoma or of a sarcoma.

Still other and numerous cases are reported in *Nagel's Jahr.-Ber.*, for instance, 1874, p. 314, by J. J. Chisholm, Ophthalmic and Aural Surgery Reports (*Richmond and Louisville Med. Journal*, Jan., 1873). This case was one of melanotic carcinoma, in the shape of three small, dark, round tumors at the limbus of the cornea, the largest of which was of the size of a millet-seed. As a relapse appeared an enucleation was performed. Nothing is mentioned as to the histological examination.

Id., p. 317. P. D. Keyser: Clinical Contributions to Ophthalmology (*Med. and Surg. Reporter*):

The patient, fifty-nine years old, had four years previously noticed the beginning of the larger tumor. Now there are two cancroids at the scleral border of the cornea. The larger tumor is 5 mm in width; the other is somewhat smaller; the color of both is reddish. Occasionally the patient suffers extreme pain; the vision is perfectly normal; an excision was performed. Six months later no relapse could be noticed.

Id., 1875, p. 241. W. Goldzieher: On a Case of Cancroid of the Cornea (*Pesther med.-chirurg. Presse*, No. 42, p. 658):

The present tumor developed in the patient (fifty-eight years old) within five years from a small wart. The growth juts out from the palpebral fissure like a mushroom, completely filling it and covering the entire cornea.

It is of a hard consistency, the surface uneven, and bleeds easily. After the enucleation Bowman's membrane was found to be completely intact. The result of the histological examination showed a tubular framework containing cells of an epithelial character.

Id., 1876, p. 278. Schiess describes a tumor of the conjunctiva and cornea (Basel, 12, *Jahresbericht*, p. 29). Pro-

ceeding from the cornea, connective-tissue septa of palisade-shape extended into the growth. Between these septa, which have a radiate arrangement, large epitheloid cells have grouped themselves. Schiess regarded the growth as partly carcinoma, partly sarcoma.

Manfredi: Contribuzione alla genesi dell'epitelioma della cornea (*Rivista clinica*, 1870, p. 35):

The disease affected the right eye of a man, fifty-three years old. According to the statement, a little nodule appeared on the outer side of the cornea, following a slight blow from the bough of a tree, which remained stationary for twelve years. Then, as within a few months it reached the size of a pea, it was removed.

Three months later there was already a relapse of half the size of a raspberry, whereupon an enucleation was performed.

The histological examination showed a mass of cells with nuclei and nucleoli, cylindrical epithelium, pavement epithelium, and prickle cells. The tumor was situated on the limbus conjunctivæ; its height was 5 mm, and breadth 8 mm. A section through the cornea, conjunctiva, and sclera showed cylindrical projections and vascular loops.

The growth consisted entirely of cells. The growth of the tumor had its origin from the corneal epithelium, whilst the conjunctiva was unchanged.

Van Münster reported a case in his inaugural dissertation: Contribution to the Knowledge of Precorneal and Conjunctival Melanotic Neoplasms:

When Mrs. F., forty years of age, was convalescing from typhoid fever she noticed at the outer margin of the cornea of the left eye a pale flesh-colored spot, which became gradually a somewhat elevated growth. It was smooth, shining, extending somewhat over the cornea, and occasioned no pain. From August, 1871, a rapid increase of growth took place, set up, so it was stated, by the irritation of a foreign body. From that time dated the commencement of a brown pigmentation. A slight lancinating pain also was felt.

In January, 1872, the patient came under treatment. There was an oval tumor, the lesser portion of which covered the sclera, while the greater projected over the cornea to the centre of the pupil. The centre was blackish-brown, the periphery pinkish,

and the surface smooth. The vision was normal, but, on the other hand, the movement of the lid was somewhat restricted. The growth was extirpated. Five months later no relapse was apparent.

The diameters of the tumor are $1\frac{1}{4}$ and $\frac{3}{4}$ cm ; the thickness, 2 mm. The epithelium of the cornea and conjunctive pass over it. In the tumor there are partly large round cells, partly polygonal cells, large nuclei and nucleoli ; the protoplasm is darkly granular ; many cells contain a quantity of pigment. The cells resemble epithelium. Narrow bands of fibrillated connective tissue are also visible.

In *Virchow's Archives*, 1870, vol. li., 515, Hirschberg describes a case of pre-corneal melano-carcinoma polyposum.

In the left eye of a peasant, fifty years old, a polypoid neoplasm made its appearance, having a dark color, projecting from between the lids, and bleeding easily. It was situated on the cornea, and had a broad base. At the corneo-scleral junction it sent roots into the tissue lying below it, but otherwise penetrated nowhere. The globe was intact. The tumor had at the base a length of 12 and a width of 10 mm. In front of the palpebral fissure it was 18 mm broad and 8 mm high. On the ocular conjunctiva there were two other black spots and a black point at the fold. The growth was extirpated ; irregular polyhedral cells were especially numerous (round ones of flat shape). Besides other cell forms there was much pigment.

In the *Lancet* of July 13, 1872, is the following case of Julian Chisholm : Cancer of the Cornea Necessitating the Removal of an Eye in Which there was still Good Vision.

Mrs. B., forty-nine years of age, presented herself, in December, 1871, on account of a painful growth on the outer corneal margin of the left eye. It consisted of three parts, the middle and largest of which presented the size and appearance of a split pea ; the others were of the size of a millet-seed.

A very similar growth had been extirpated and cauterized one year previously ; six months after a relapse appeared, for which the same operation was performed. The operation is now performed for the third time. A good recovery followed, but already a few weeks later, a relapse appeared. After such unfavorable results of conservative procedure, an enucleation was performed. "A

microscopic examination exhibited all the indications of malignancy, with cancer elements throughout the corneal parenchyma, upon which the tumor had established itself."

Henry D. Noyes, M.D., New York: A Case of Melanotic Epithelial Cancer on the Surface of the Eye; Extirpation of the Growth with Preservation of the Globe as well as of the Vision (ARCH. OF OPHTHALMOLOGY, vol. viii., p. 145, 1878). The observation was made in October, 1878.

Mr. W. S. O., forty-eight years old, first noticed on the outer side of the left eye a black spot, which hardly increased in size for twelve years. But within recent years, and especially in the last couple of months, a rapid increase took place.

The tumor was 10 mm long, $5\frac{1}{2}$ mm wide, and 4 mm thick. It extended beyond the outer edge of the pupil; the sclero-corneal portion was a deep black, the corneal a dark brown. The surface of the tumor was ragged, moist, and of a doughy consistence. It lay close on the cornea. The vision remained normal, only somewhat distorted by the copious conjunctival secretion. The interior of the eye was also normal. The growth was extirpated, and the microscopic examination showed epithelial cells which were arranged concentrically.¹

The author made the interesting statement that among 70,809 patients, who, in course of ten years, had been treated at the New York Eye and Ear Infirmary, only three cases of corneal tumor of a malignant nature had been observed, the best proof of the rarity of this disease.

At the conclusion of his article Noyes reported another case, which was observed in the Brooklyn Eye and Ear Hospital.

B. L., fifty-two years old, noticed a small red spot on the sclera

¹ Dr. Noyes has been kind enough to send the following note on the further history of the case:

"The case of Mr. Ogden, with epibulbar tumor, was under my notice until February, 1883, that is about $4\frac{1}{2}$ years. A deposit of pigment specks had taken place on the inner side of the cornea, making a very faint cloud; the bulbar conjunctiva below the cornea was blackened or of a brown color, over a considerable extent, but not so far as the cul de sac. One speck of pigment was upon the caruncle, and a little spot was on the inner surface of the upper lid near the ciliary edge. Besides increase of pigmentation of the conjunctiva and the minute pigment specks in the cornea, nothing abnormal had taken place. There was no thickening of tissue nor any tumor. The corneal locality from which the tumor was taken remained free."

H. K.

near the cornea, which grew slowly until equal to one third the circumference of the cornea, $\frac{1}{4}$ " broad, 1" high. From this time on commenced a more rapid growth. The tumor was extirpated, after which the cornea was found intact. The result of the histological examination showed an epithelioma. As eight months thereafter a relapse took place, the globe was enucleated.

Other cases to be added to these are found in the *Arch. für Ophth.* In vol. viii., 1, p. 314, is one reported by Hed-dæus : Melanotic Tumor on the Corneal Margin.

P. K., fifty-four years old, had on the right eye a black-brown mulberry-like tumor of the thickness of four peas, and of doughy consistency. It covered the outer third of the cornea and the same expanse of the sclera.

The tumor caused no pain, but was inclined to bleed very easily, and had been growing for three years. Vision remained intact. On extirpation of the growth it was seen to be easily separable from the sclera and cornea, and had become attached only in the region of the limbus corneæ and corpus ciliare for a space 6 mm long and 1 to 2 mm broad. After recovery a yellowish-brown coloration remained at this point.

Two years later the condition of the eye was seen to be still normal.

The microscope revealed epithelial cells with and without pigment, detritus, free pigment, and numerous large round cells, with large nuclei and nucleoli.

In vol. xiv., 3, p. 149, Berthold : Report of Cases of Carcinoma and Sarcoma Occurring at the Corneal Border.

The first case in which the diagnosis of carcinoma of the iris and cornea had been made, proved, on microscopic examination, to be a net-cell sarcoma.

The second case was that of a landed proprietor, fifty-five years old, who had at the outer scleral part of the right eye a tumor which invaded the cornea for $1\frac{1}{2}$ ", and was of a bright-red color and very soft consistency. Its diameter was 4", and the height $1\frac{1}{2}$ ". At the borders it could be partially lifted from the conjunctiva. It had been growing for eight months, but its development had been especially rapid during the last eight weeks. At the operation the growth was found to be so friable that the forceps pushed

through, and it had to be removed with the scissors. The tumor was not grown to the cornea, but was glued to it so firmly that the epithelium of the anterior surface was torn away. The anatomical examination indicated carcinoma.

The third case occurred in a patient fifty-eight years old, who had on the right globe a mushroom growth half the size of a hazel-nut. It extended 2''' on the sclera, 1''' on the cornea, and adhered tightly everywhere. The upper surface was whitish, sprinkled with red. The lids could be conveniently closed.

A year before, the patient experienced some pressure at this point; eight weeks before, the tumor was as large as a pin-head, and had since then grown rapidly, but without pain.

The microscopical appearance of this tumor was the same as that of the previous one. A relapse appeared almost immediately at the old spot, and besides this, about 2''' farther to the outer side, still another and a third nodule, all of which grew rapidly and, histologically, presented the same appearance.

The author then specifies some points as to making the differential diagnosis between carcinoma and sarcoma.

1. The connection of carcinoma with the cornea is more intimate, on account of the more considerable thickness of the epithelial layer. The membrane of Bowman remains long intact in both.

2. The borders of the sarcoma rise abruptly from the cornea and sclera. As the carcinoma is seated like a mushroom on the cornea and sclera, the elevation of the borders is gradual.

3. The tissue of the carcinoma is extraordinarily soft and friable; that of sarcoma is of a firmer consistency.

It appears to us, however, that these points cannot be regarded as generally to be depended upon, so that the diagnosis can be established by them with certainty; in the cases mentioned the authors often enough reported opposite experience. In conclusion he cites the views of Thiersch, Waldeyer, and others: Carcinoma develops through proliferation of epithelium, with increase of the

connective tissue through stimulation thereof. The epithelium does not necessarily originate in glandular substance, but can also develop from the external integument.

Id., vol. xvii., 2, p. 204. Manz: A Melanotic Tumor of the Cornea:

Mrs. G., sixty-five years old, presented herself in December, 1869, with a tumor of the left eye. Her statements were unsatisfactory. She could only say as to the commencement, that the trouble began, two years before, as a streak which extended towards the pupil. The patient saw well up to six months ago. For two months a more rapid growth had been noticed, and now and then hemorrhage had taken place. There was seldom pain, which was confined to the left frontal region. The tumor jutted beyond the palpebral fissure, and was half the size of a nut, 23 *mm* wide. It consisted of four nodules of a grayish-black color and had an uneven, ulcerated surface. The cornea was overlapped on all sides, but they were sharply separated from it. The borders of the tumor could be easily raised. There was smooth healing after enucleation, and up to October, 1870, there had been no relapse.

Microscopical appearance: Between columns of large, wide, spindle cells, spread out like a tree, and containing oval nuclei, are heaped up epithelial nuclei and nucleoli. Other cells were also present which were round, smaller, and contained two to six nuclei. An abundance of blood-vessels; irregular distribution of pigment.

A similar growth, likewise a melanotic tumor, was seen in a man forty-six years old. It was only stated of this tumor that it was located at the corneal margin, reappeared two years after its extirpation, and within eight weeks had grown so rapidly as to cover the upper third of the cornea. After being again removed recovery ensued.

Schneider, in vol. xxii., 3, p. 209, furnishes a contribution to the therapeutics of epithelioma on the sclero-corneal junction.

The right eye of D., a working woman, sixty-eight years old, was inflamed, in May, 1875, to a high degree. Day and night she had severe pains in the entire right side of the head. When she presented herself there was a pear-shaped tumor, the larger portion

of which was situated on the sclera, the smaller on the cornea. The greatest diameters were 9 and 7 mm. The surface of the tumor was fissured, warty, and grayish-white in color, the consistency hard and dense. It was not movable over the subjacent parts. The tumor was said to have been the result of a trauma. It began as a small red nodule and caused no annoyance. The diagnosis of epithelioma was made and confirmed through the demonstration of cancrioid nests and cones. The treatment consisted in the removal of the tumor; a relapse followed, but after a second removal a cure resulted.

In *von Graefe's Arch. f. Ophth.*, vol. vii., 2, p. 9, there is an article by the editor: Cases of Tumor—Two Cases of Cancroid on the Surface of the Globe.

The first case was that of an officer of middle age, who had been treated by an oculist for a particularly obstinate phlyctenular ophthalmia. A later examination showed a fascicular injection stretching from the periphery to the outer margin of the cornea, at which place there was a swelling 1 line in extent; the height was $\frac{1}{2}$ ". The borders were steep; the surface, looked at with a lens, irregular, somewhat papillary, not ulcerated, and completely dry.

After removal, healing followed in a few days. The above-mentioned injection disappeared at the same time. The examination by Virchow showed the scant connective tissue penetrated in its entire thickness by closely packed epithelial cones. A year later there was no relapse.

The other case was that of a woman, fifty-seven years old. Two years before, she noticed a redness at the outer angle of the right eye, which slowly approached the corneal border and produced a swelling there. Six months later the case came for examination. There was a flat growth which covered over one fourth of the cornea, was $\frac{3}{4}$ " high, and had sharp, almost perpendicular borders. It hardly extended over the sclera, but continued as a part of the conjunctiva permeated with veins. The color was brownish-gray.

In removing the tumor it was seen to be in intimate connection with the cornea for a space of 1" square, but otherwise lay loose upon it. The conjunctival injection disap-

peared, and a week and a half later the eye again presented a good appearance. This growth was also examined by Virchow and pronounced cancrioid. Before the end of a year a relapse appeared.

In *v. Graefe's Arch.*, vol. viii., Althoff describes a case of cancrioid of the ocular conjunctiva in a man, which covered almost the entire cornea. He stated that $3\frac{1}{2}$ years before, after taking a cold, he noticed a nodule at the outer border of the cornea. After enucleation of the eye the growth was examined. It was 4 mm in height, $19\frac{1}{2}$ mm long, and $14\frac{1}{2}$ mm broad. The surface was fissured, of a cauliflower nature, and dirty-gray color. The surface of the section presented a dendritical appearance, like an arbor vitæ. Excepting a place (1 mm square in extent) where it was united with the substantia propria to its centre, it could be easily pulled off. The cornea was thinned, but the individual layers were normal. The histological examination showed a firm fibrous framework, large blood-vessels, cells of all shapes, large, round or sharp-cornered, club- or spindle-shaped, with one or more nuclei, and often full of fat granules. The cells lay, heaped up in clumps, on the fibres of the network. The neighboring mucous membrane had to be in part removed with it. As it was greatly involved, the danger of recurrence of the disease was so much the greater. The interior of the eye was normal. Seven months later there was no sign of a relapse.

Schmid: Contribution to the Knowledge of Corneal Tumors (*Graefe's Arch.*, vol. xviii., 2, p. 120).

The author mentions four cases; in the three last, however, he only gives the result of examination of the tumors. Of the first case we get also, briefly, the clinical history.

In the first case (that of a Russian peasant) there was a large growth on the left eye, which projected beyond the lids and partly overlapped the latter in its growth. It is ragged, lobulated, of a dark-brown color, and bleeds easily. According to his statements the cause was an injury received a few months previously.

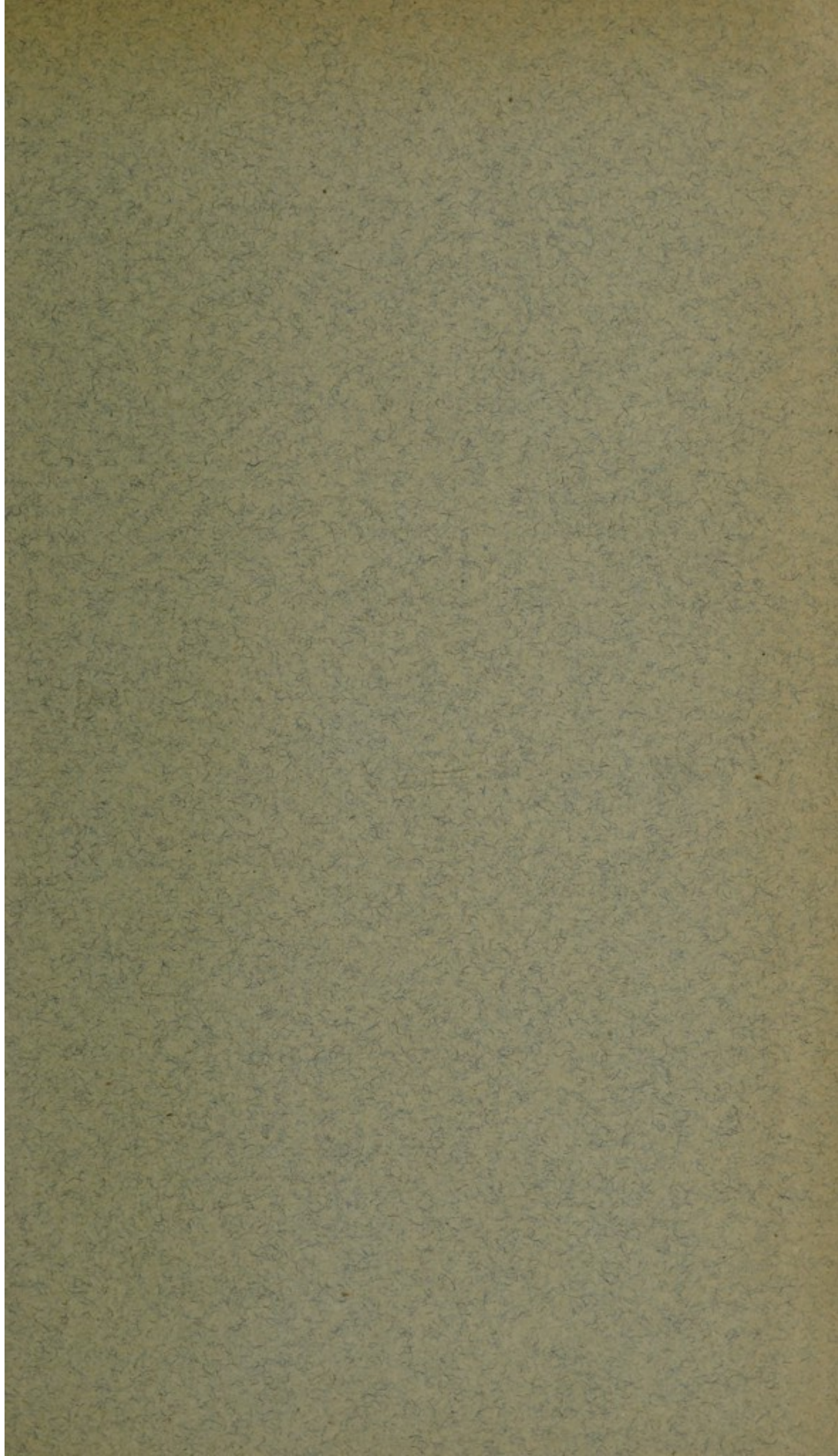
The anterior segment of the globe was removed with the tumor, but as a new growth appeared in the same year,

enucleation was performed. The base of the tumor was 12 *mm* broad, of which 4 or 5 *mm* belonged to the cornea.

Histological examination: In the neighborhood of the tumor, granulation tissue had proliferated into the sclera and substantia propria of the cornea. The growth itself possessed a compact fibrous, arborescently ramifying stroma, rich in blood-vessels. Besides the small cells of the granulation tissue, there were large round ones, with two or more nuclei, belonging to the tumor mass. Besides these, there was pavement epithelium, partly in rows, partly in heaps, which contained a black to light-brown pigment. The second tumor showed exactly the same conditions as the preceding, only that the nucleated round cells predominated over the granulative and epithelial cells. Here also, however, the diagnosis of "carcimona melanodes" was made. The third tumor also showed granulation tissue. An epithelial layer spread out over the entire periphery of the tumor; at the same time the epithelial layer of the cornea had increased. At the angle where the tumor was seated on the cornea, a large epithelial offset penetrated horizontally into the growth.

This offset showed a covering of cylindrical epithelium in the centre; on the contrary there was pavement epithelium. In addition to this, great quantities of large pavement epithelial cells were found in the growth. The surface showed an uninterrupted stratum of epithelial cells 2 *mm* thick. The anterior elastic lamina could be followed almost to the sclera. The substantia propria and the lamina elastica posterior were normal. The diagnosis was likewise melanotic carcinoma.

The fourth case was one of a pigmented, lobulated tumor, which rested for the greater part on the sclera. On the scleral side the tumor rose abruptly. There had been proliferation of epithelium on the cornea. The lamina elastica anterior could be traced to a point, where an epithelial cone of round and epithelial cells had penetrated into the substantia propria itself. The surface of the growth consisted entirely of pavement epithelium. The lamina elastica posterior was not affected.



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