

sionally spring from the conjunctiva. Several cases of the kind are recorded by M. Wecker.*

DISEASES
OF THE
CARUNCLE.

DISEASES OF THE CARUNCLE.—The caruncula lachrymalis is a small, reddish, conical body, situated at the inner canthus of the eye. It is composed of a mass of Meibomian glands, and is covered by a continuation of the conjunctiva. A few fine hairs grow from its surface.

Hyper-
trophy.

The caruncle participates in all the affections to which the conjunctiva is subject, and in some few cases it becomes chronically enlarged, looking like a small mass of florid granulations springing from the inner angle of the eye. Under these circumstances it may extend itself behind the upper and lower lids, and if touched is apt to bleed.

Apply tinct.
opii, or
cup. sulph.

Tincture of opium applied to the enlarged gland every day, by means of a camel's-hair pencil, usually effects a cure in such cases; or it may be necessary to smear it with sulphate of copper. It is not advisable if it can be avoided to excise the superfluous growth, because, should the caruncle subsequently become atrophied, the lachrymal puncta are displaced inwards, and troublesome epiphora, with its consequences, occurs.

Must not be
excised.

A polypus springing from the caruncle should be snipped off with a pair of scissors, and the surface from which it grew touched with caustic; a little bleeding is apt to occur after this operation, but a sponge pressed firmly over the corner of the eye for a few minutes will stop the hæmorrhage.

* "Maladies des Yeux," tom. i. p. 199. See also a case in "Handy-Book of Ophthalmic Surgery," by J. Z. Laurence and R. C. Moon, p. 60.

CHAPTER VIII.

DISEASES OF THE CORNEA.

General pathology—Vascular opacity—Keratitis—Keratitis punctata—Acute suppurative keratitis—Subacute—Ulceration—Hernia—Staphyloma—Fistula—Opacities—Conical cornea—Spherical, pellucid protrusion of cornea—Injuries of the cornea—Abrasions—Contusions—Penetrating wounds—Foreign bodies—Arcus senilis—Tumours.

BEFORE commencing the consideration of the various diseases of the cornea, it will be well to take a general view of the pathological changes to which it is liable. GENERAL PATHOLOGY.

The cornea we know to be a non-vascular structure; and formerly, when hyperæmia was regarded as the first and most essential step in inflammation, it was difficult to see how the cornea could be the seat of it. But now that we have learned to look rather to the elements of a tissue as the point of departure for inflammatory changes, and to regard vascularity and hyperæmia, however important, as accessory phenomena, the cornea becomes one of the most appropriate tissues for the study and illustration of the modern doctrines of cellular pathology.

Inflammatory changes, then, begin in the cornea, as in other parts, with a rapid multiplication of the cellular elements of the tissue, and the migration of leucocytes from the neighbouring vessels. In slighter cases this process may be superficial, and limited to the epithelial layers; but in severer ones the corpuscles of the proper corneal tissue, beneath the anterior elastic lamina, take part in the proliferation. This multiplication of cellular elements, either in the epi- Nature of inflammatory changes.

Causes of opacity.

thelial or deeper layers, or both together with corresponding changes in the intercellular material, are the principal causes of the opacity which marks the early stages of what we must still call inflammation of the cornea. This opacity may amount either to a superficial haziness from a ground-glass surface, or it may be of a deeper interstitial kind. The new, dense, opaque formations of "pannus" or vascular opacity of the cornea, are referable to the development from cellular elements of a kind of connective tissue.

Formation of vessels,

In all cases the formation of vessels is secondary, and takes place chiefly by extension from the vascular textures around. It has been traced to the transformation of fusiform cells near the margin of the cornea, and their coalescence with similar structures in the conjunctiva.

and pus.

Lastly, the formation of pus, as in suppuration elsewhere, is due to a rapid production of cells of a lower grade, and the degeneration and deliquescence of the intercellular substance, together with the appearance of numerous leucocytes from the surrounding blood-vessels; these cellular elements may escape from the surface, as in ulceration, or be confined between the corneal lamellæ, and constitute an abscess.

VASCULAR OPACITY OF CORNEA.

PANNUS, OR VASCULAR OPACITY OF THE CORNEA.—Although pannus may be the result of keratitis, the distinction between these two affections of the cornea is obvious enough, for in pannus the cornea is usually uniformly opaque, as though covered with an adventitious coating, and the vessels branching over it are large, tortuous, and distinct from one another, the sclerotic and conjunctiva being only slightly congested. In keratitis, on the other hand, the opacity of the cornea is partial and of a ground-glass appearance, obviously from changes in the corneal tissue itself; the cornea is surrounded, to a greater or less extent, by a zone of very minute vessels, which advance only a slight distance from its margin towards the centre. The sclerotic zone of vessels is also well marked in the active stage of the disease, and the conjunctiva is more or less congested.

Contrasted with keratitis,

Sometimes follows it.

In some few cases of keratitis, large tortuous vessels extend themselves over the cornea, but in these instances the invasion is generally rapid, by vessels extending from the conjunctiva; the patient

complains of considerable pain in the eye, and ciliary neurosis, and the cornea is uniformly hazy. As the disease becomes chronic, the pain subsides, and the congestion of the sclerotic and conjunctiva disappears, but the cornea remains opaque and vascular—in fact, pannus may then be said to exist.

Ulceration of the cornea may give rise to pannus; in almost all instances of healing ulcers, a vascular band can be traced from one or more points of the circumference of the cornea, extending towards the ulcer; and if the parts remain in a state of chronic irritation for some time, the vascularity of the cornea may continue, especially if that portion of it formerly occupied by the ulcer remains uneven, and therefore a source of irritation.

May arise from ulceration;

But inflammation and ulceration of the corneal tissue are by no means the most frequent causes of pannus; vascular opacity of the cornea more often arises from the effects of chronic granular conjunctivitis, the palpebral surface of the conjunctiva having been rendered uneven from the cicatricial tissue which has formed, and being a source of constant irritation as it traverses the cornea in the movements of the parts. Under these circumstances, the superficial layers of the cornea often become opaque, and large tortuous vessels gradually extend themselves over its surface. The thickness of this vascular layer will of course vary in different cases; in some instances it is so dense that even the outline of the cornea cannot be distinguished from the sclerotic, while in others, the iris and pupil may be dimly visible through the semi-opaque and vascular cornea.

more often from granular lids.

Density of vascular layer.

Pannus sometimes occurs as a sequence of suppurative or diphtheritic conjunctivitis, depending, as in the last case, on the destructive changes which have taken place in the palpebral conjunctiva. The same result may follow the prolonged action of any other mechanical irritant—as, for example, inverted eyelashes, whether arising from trichiasis or entropium.

Other causes.

The Treatment of vascular opacity of the cornea will naturally depend very much upon the cause of the disease; for instance, if arising from trichiasis, or entropium, the inverted cilia or margin of the lids must be either removed, or restored to their normal position, before we can hope to overcome the disease;

Treatment.

Remove the cause.

and if we can only succeed in getting rid of the source of irritation, we shall have every reason to expect that the state of the cornea will rapidly improve of itself.

If lids contracted,

In many instances of pannus, consequent on granular or diphtheritic conjunctivitis, the contraction of the cicatricial tissue following these affections of the eye shortens the lids from side to side, so that they press unduly and irregularly against the eyeball; this, together with the roughness of their surfaces, makes them act somewhat like a rasp against the cornea during the movements of the eyelids. Under these circumstances we must endeavour, in the first place, to correct this shortening of the eyelids, and for this purpose it will be necessary to divide the external commissure as described at p. 108. By this proceeding we not only elongate the palpebral fissure, and directly relieve the pressure exerted by the contracted eyelid on the cornea, but having divided some of the fibres of the orbicularis muscle, we weaken its action, and this again tends to lessen the pressure of the lids on the eye. Provided we can, by this simple proceeding, sufficiently relieve the friction of the palpebral conjunctiva against the diseased cornea, the pannus will probably disappear to a very great extent without further treatment; this desirable result is, however, frequently materially hastened if tannin be dusted freely over the cornea every morning, until the opacity of the cornea diminishes, when the tannin may be used every three or four days.

elongate palpebral fissure.

Excite purulent inflammation.

Supposing, however, that no favourable results follow this treatment, or that the condition is due to some other cause than contraction of the eyelids, we may still hope to improve the state of the cornea, by inducing purulent inflammation in the diseased eye. The more vascular the cornea, the less danger is there of the suppurative inflammation being followed by ulceration.

Precaution as to health.

The state of the patient's general health should be attended to before submitting him to this plan of treatment, for if he happens to be in a weak condition, sloughing of the cornea is more apt to occur.

Inoculation.

There is seldom any difficulty in exciting purulent inflammation in the diseased eye; but in some few instances the conjunctiva has been so completely

altered in character, after long-continued granular conjunctivitis, that I have been obliged to inoculate it with pus on several occasions before I could succeed in establishing purulent inflammation.

The pus employed for inoculation may be taken from the eye of another person, suffering from purulent conjunctivitis, or gonorrhoeal matter may be used. It should be placed on the everted lower lid, and a few slight punctures in the conjunctiva be made with the point of the lancet, so as to insure the grafting of the matter. In the course of thirty-six hours the contagion begins to grow rapidly, causing first irritation and inflammation, followed by purulent discharge.

So long as the cornea remains free from ulceration we may allow the inflammatory process to run its course, simply keeping the eye scrupulously clean. If ulceration of the cornea supervenes during the progress of the disease, we must resort to the use of the dilute caustic pencil, strictly following out the treatment recommended in cases of purulent conjunctivitis. It is interesting to watch the effects of the inflammatory process on old-standing vascular opacities of the cornea; they often improve remarkably as the suppurative action subsides, and ultimately the patient may regain some amount of vision.

Let inflammation run its course.

After the inflammation has entirely passed away, Chlorine chlorine water may with advantage be dropped into the eye three or four times a day: it appears to act as a mild stimulant, and is certainly a useful remedy in cases of this kind.

Chlorine lotion.

M. Wecker recommends the application for two hours, morning and evening, of hot compresses to an eye affected with pannus; the inflammatory action thus induced, being, in his opinion, usually sufficient to destroy the pannus. Doubtless we can better control the suppurative action when excited in this way, than if produced by purulent matter; but the latter is nevertheless the preferable plan to adopt when the patient is in tolerably good health, and the cornea is covered by a considerable number of vessels. Among weak and sickly people, and when the pannus is not particularly vascular, it may be advisable to employ the hot compresses, or to smear the conjunctiva over with a crystal of sulphate of copper every other day, in this way exciting a mild and manageable form of

Hot compresses.

Preferable to inoculation in ill-health.

Cup. sulph.

suppuration. Powdered sulphate of soda, sprinkled over the surface of the cornea every day, has not been followed by the improvement we were led to expect from its use, at least among the patients under my care; but, as I have before remarked, tannin used in this way has in my hands often proved of service.

Syndec-
tomy.

Another plan recommended for the cure of vascular opacity of the cornea, is to excise a band of conjunctiva and subconjunctival tissue about the eighth of an inch broad, extending entirely round the circumference of the cornea, so as to cut off the communication between the vessels of the conjunctiva and those covering the cornea.* This treatment is not to be relied on alone; it is useful when combined with purulent inoculation, but will not suffice of itself to improve a case of pannus. Formerly, it was the practice, after incising the conjunctiva as above described, to smear the wound over with nitrate of silver, but this plan of treatment has not, as a general rule, been found successful, and its results are not to be compared to those obtained by purulent inoculation.†

An adjunct
to inocula-
tion.

Resumé of
treatment.

To sum up then: as a general rule, among robust and healthy patients suffering from pannus, after every mechanical cause of irritation, such as contraction of the lids, trichiasis, or entropium, has been removed, the diseased eye should be inoculated with purulent matter. In debilitated subjects, or when the pannus is not very vascular, instead of inoculation, hot compresses must be applied to the eyes for two hours, night and morning; or sulphate of copper may be smeared over the conjunctiva until suppurative inflammation has been excited. The disease may then be allowed to run its course, care being necessary, however, to prevent it advancing to such an extent as to endanger the vitality of the cornea.

KERATITIS.
Pathology.

KERATITIS, DIFFUSE CORNEITIS, OR INFLAMMATION OF THE CORNEA, appears to arise, either from a primary perversion in the cellular elements of the tissue, or else

* *Ophthalmic Hospital Reports*, vol. iv. p. 23; Bader on Syndectomy.

† *Ophthalmic Hospital Reports*, vol. iv. p. 65: Case of Vascular Cornea and Granular Lids, by Mr. G. Lawson. One eye treated by inoculation, and the other by peritomy.

from some defect in the supply of nutrient materials by the blood. However this may be, we find that in keratitis the transparent structure of the cornea is partially converted, by molecular and fatty degeneration of its elementary structures, into a semi-opaque material. The nature of these changes has already been referred to in the introductory remarks at the commencement of this chapter. As a general rule, keratitis affects both eyes, it may be at the same time, or consecutively.

Symptoms.—The characteristic features of the affection are briefly these: the cornea presents an opaque appearance, either throughout its whole extent, or in parts; the remainder being transparent. Under any circumstances, the disease is usually more advanced in one part of the cornea than another. It generally commences towards the circumference and spreads inwards, but as it advances, the part first attacked may become transparent, while the centre of the cornea grows hazy. The diseased portion of the cornea is not only opaque, but its surface is no longer smooth, it resembles in appearance a piece of ground glass. This uneven condition of the anterior layer of the cornea is best seen by the lateral method of illumination, and in fact, unless examined in this way, may be overlooked. The immediate effect of these structural changes is to render the patient more or less blind, by interfering with the transmission of light to the retina.

Opacity,
mostly
partial.

Ground-
glass sur-
face.

In the active stages of the disease, a part, if not the whole circumference of the cornea, is surrounded by a zone of injected subconjunctival vessels, similar to that seen in iritis. In addition to the "sclerotic zone," in very many cases of keratitis, numerous minute vessels appear in the cornea, forming a semicircle at the circumference of its upper or lower section, or it may be forming an entire circle round the cornea. The vessels run from the margin, for about the eighth of an inch inwards, towards the centre of the cornea. By the unaided eye, these small vessels cannot be distinguished from one another, and the part appears as if it had been stained with a narrow band of vermilion, or smeared with blood.* In some few cases, this plexus of vessels is prolonged further inwards towards the centre of the

Sclerotic
zone.

Vessels ex-
tend into
cornea.

"Diseases of the Eye," by Dixon, 3rd edition, p. 88.

cornea, in which case the patient usually complains much of intolerance of light and supra-orbital pain.

Vascularity varies with the type.

The amount of vascularity of the subconjunctival tissue and cornea, will vary with the intensity and progress of the keratitis. In subacute and chronic cases these symptoms may be wholly wanting; nevertheless the cornea presents the peculiar ground-glass appearance of keratitis; this condition of the parts is particularly noticeable in instances of inherited syphilitic keratitis. In the more acute cases the orbital conjunctiva is congested.

Dimness of vision.

The patient may complain of lachrymation, and some intolerance of light, but he is most solicitous about the haziness of vision, of which he becomes painfully conscious if the opacity extend to the centre of the cornea. It is surprising what a complete impediment to useful sight, even a slightly nebulous state of the cornea may prove, if situated directly in the axis of vision; and the alarm of the patient, so long as the dimness of vision continues, though groundless, is very natural.

Photophobia and pain rare.

Intolerance of light and lachrymation are not prominent features in keratitis, so long as the epithelial layer of the cornea is but slightly affected; if these cells become entirely destroyed, and the peripheral distribution of the nerves exposed, not only does the patient suffer from photophobia, but complains also of considerable pain in the eye, and ciliary neurosis. These, however, are exceptional cases: keratitis, as a general rule, is not characterized by pain or great intolerance of light, but chiefly by dimness of vision occasioned by the hazy state of the cornea.

Prognosis.

The natural tendency of keratitis is to terminate in recovery, although the process is frequently a very tedious one, extending over a period of several months, the disorder often attacking first one eye and then the other before it finally subsides, and we should warn our patients of this before undertaking the charge of the case; nor can we overlook the fact that in neglected instances of keratitis the iris may become involved, and the danger be only discovered after the cornea has cleared. We may suspect danger of this description, or even the extension of the disease to the choroid, if during an attack of apparent keratitis the patient complains of much ciliary neuralgia, pain

on pressure over the ciliary body, and photophobia. Our prognosis will of course be far from favourable under such circumstances; but unless in complicated cases, the greater number of instances of the form of keratitis we are now considering make good recoveries.

The disease is met with among people of all ages and classes, but the majority of cases occur among young and sickly children: I shall subsequently refer more particularly to instances arising from inherited syphilis. Keratitis may, however, come on quite independently of any specific influences, and it is often difficult to assign any positive cause for its appearance; occasionally it is a consequence of irritation by a foreign body or wound of the cornea.

Causes.

Treatment.—Bearing in mind the fact, that the tendency of keratitis is to get well of itself, we need not be over-anxious to effect a cure. This remark of course applies only to uncomplicated cases, if other structures besides the cornea are involved, the case must be treated upon principles discussed under the headings of iritis, irido-choroiditis, and so on.

Treatment.

Counter-irritation in the form of an issue opened in the skin of the temple, or a succession of blisters established in this situation, are doubtless frequently most serviceable, and hasten the reparative process in keratitis. Indeed, I hardly know of any disease of the eye which appears to be so much benefited by counter-irritation, and it should almost invariably form a part of our treatment.

Counter-irritation.

It is a good plan to drop a weak solution of atropine into the affected eye, so as to keep the pupil dilated; by this means we diminish the secretion of aqueous, and preserve the iris at rest—both desirable objects in the treatment of these cases. If the eye is irritable I usually order my patients to keep it closed by means of a pad and bandage, applied over the eyelids, to be worn during the day, but discontinued at night. No further local treatment is necessary.

Atropine.

Rest.

The patient's general health must be carefully attended to; tonics, a generous dietary, fresh air, exercise, and often stimulants are demanded; leeches and antiphlogistics I simply mention, in order that I may condemn their use in cases of keratitis.

Improve the general health.

In instances arising from the presence of a foreign

Remove irritation.

body in the eye, the offending substance should of course be removed. If, after an injury, there should be much irritation and pain in the eye, cold compresses may be kept constantly applied, and opium is often serviceable in allaying irritation.

SYPHILITIC KERATITIS.

SYPHILITIC KERATITIS, NON-VASCULAR DIFFUSE CORNETITIS.—I have still to make a few remarks upon a special variety of the disease, described as inherited syphilitic keratitis. We are indebted to Mr. Hutchinson for the thorough investigation of this and some other forms of syphilitic affection of the eye. From a large collection of clinical material he has been enabled to show, that the majority of the cases, formerly described as "strumous" and "interstitial" corneitis, are of syphilitic origin.* The following case affords a good illustration of the origin and progress of this affection:—

Case.

Jogender Nath Dey, aged sixteen, was brought to the Ophthalmic Hospital by his father, on the 2nd of September, suffering from syphilitic keratitis. The man informed me he had had five children, and that seventeen years ago, after the birth of his eldest son, he contracted syphilis. There seemed no reason to doubt that he then had chancre, which was followed by enlargement of the glands of the groins, and secondary symptoms. Jogender was born a year afterwards, and inherited the disease from which his father was suffering. I had an opportunity of examining his elder brother; he was perfectly free from any trace of the syphilitic taint; but my patient, who is the second son, and his two younger brothers, bore evidence of the existence of the disease in the state of their incisor teeth.

Keratitis in child.

Jogender was a well-grown and remarkably intelligent lad; he stated that, as far as he could remember, he had enjoyed uninterrupted good health up to the present time, and that the affection of the eye from which he was suffering commenced about six weeks prior to his coming to the hospital. In the first instance, he noticed that objects held before his left eye presented a hazy appearance; ultimately, the sight of the right eye grew dim also, so that he is now nearly

* *Ophthalmic Hospital Reports*, vol. i. pp. 191 and 226; and vol. ii. pp. 54 and 258.

blind. During this time he suffered no pain or inconvenience beyond the gradual loss of vision.

I found both eyes in much the same condition, the sclerotic and conjunctiva being perfectly normal, but the cornea presenting the ground-glass appearance of keratitis, with the characteristic zone of vessels round its margin: and, in addition to this, flocculent-looking spots, of a whiter hue than the rest of the hazy cornea, were scattered throughout its substance.

On examining this boy's teeth, the superior incisors were found to be widely separated from each other and club-shaped, their thin cutting edges being notched in the manner described by Mr. Hutchinson as pathognomonic of inherited syphilis, and plainly indicating the primary cause of the disease from which he was suffering. The following mixture was prescribed:—

Hydrarg. bichlor.	gr. j.
Potas. iodid.	ʒi.
Aquæ	ʒviij.

Half an ounce to be taken twice a day after meals. He was also ordered to rub a drachm of mercurial and belladonna ointment over the forehead and eyebrows for twenty minutes every night; blisters were applied to the temples; and lastly, I directed him to take regular exercise, and a full and varied diet.

The medicines were used perseveringly; and on the 20th September, the report states that the left cornea was decidedly less opaque than at the commencement of the month. The mercurial ointment was now discontinued, but the mixture was repeated. On the 15th of October his eyes were very much better, and the iodide of iron was substituted for the bichloride of mercury. A month later both cornea were perfectly transparent, no vestige of the keratitis remaining.

It is hardly necessary for me to mention, that when either parent has been affected with primary or secondary syphilis, their offspring are very likely to inherit the disease. The family history, the health both of parents and offspring, the particulars of previous illnesses, as well as the general appearance and physiognomy of the patient, will furnish materials on which to ground our diagnosis in suspected cases.

In a series of instances of keratitis and iritis occur-

Ground-glass cornea.

Characteristic teeth.

Treatment.

Recovery perfect.

Diagnosis by history.

By syphilitic teeth.

Notched and peggy incisors.

Characteristic patchy opacity.

Ulceration rare.

ring under these circumstances, Mr. Hutchinson noticed a peculiar formation of the incisor teeth, which ultimately led him to the conclusion, that their condition might be relied upon as an important test of the existence of inherited syphilis. A few delicate prominences are noticed on the edges of the central incisors: these gradually wear away after the child has used them for a time, and the free border of the tooth then becomes curved. A very common appearance of the syphilitic incisors is where some are notched and others conical or peggy. These are the permanent teeth; in the case of the temporary set, although often misshapen, irregular, and decaying, these characteristic forms are not apparent.

Jogender Nath Dey's teeth were notched and irregular, and so were his younger brothers'; but it was rather the condition of my patient's eyes which led me at once to suspect that the keratitis from which he was suffering was syphilitic. In non-specific inflammation of the cornea, it is by no means an uncommon thing to see a portion of its laminated structure remaining transparent, while other parts present a ground-glass appearance. This is also the case in syphilitic keratitis; but in this form of disease the hazy cornea is always dotted over with patches of a denser opacity than that of the rest of the inflamed tissue, unless the case be near recovery, when the white spots gradually disappear, and the cornea ultimately resumes its usual transparency.*

The average duration of syphilitic keratitis, if brought early under treatment, does not exceed three or four months, and sometimes it may disappear in even a shorter period. Unless in neglected cases, among poor and ill-fed people, ulceration of the cornea is by no means a common sequence of keratitis. The majority of cases certainly recover (unless complicated with iritis or irido-choroiditis), although if the process of cure be left entirely to Nature, it may take a very long time before the diseased action subsides; on the other hand, if assisted by appropriate treatment, a comparatively speedy recovery may be expected.

* *Ophthalmic Hospital Reports*, vol. i. p. 232: Mr. Hutchinson on Syphilitic Inflammation of Cornea.

It is rare to meet with an instance of inherited syphilitic keratitis occurring in a child under four years of age; opacities of the vitreous and lens from the same cause seldom make their appearance before the adult period of life. Inherited syphilitic iritis, on the other hand, generally commences when the infant is a few months old.

The Treatment of syphilitic keratitis should consist principally in attending to the patient's general health, and keeping his system in good working order, by simple, but at the same time, nourishing food, with plenty of fresh air and exercise. The affected eye should be kept at rest by a light pad of cotton wool and a bandage.

With regard to drugs, I believe that mercury may be judiciously used for the alleviation of this disease. The best mode of applying it in these cases is by inunction, the mercurial ointment being rubbed into the thighs and armpits twice a week for twenty minutes at a time. I never prescribe mercury internally for children, nor do I find it necessary to push the treatment so far as to affect the gums. In robust and healthy patients, therefore, suffering from syphilitic keratitis, begin at once with a course of mercury, and carry it on for four or five months, whether the disease of the eye be cured or not. Sickly children, however, cannot undergo this treatment, and cod-liver oil and iodide of iron, with occasional doses of hydrarg. c. creta, quinine, and soda, must be substituted for mercury.

If there be no congestion of the vessels of the sclerotic or conjunctiva, a solution, consisting of two grains of iodide to an ounce of water, may with advantage be dropped into the eye twice a day. In almost all cases, an issue opened in the skin of the temple will prove serviceable. A bit of the integument being nipped up between the finger and thumb, a needle with a few threads of silk is passed through the fold; the thread is then tied in a knot, and left in this way for three weeks or a month. If the patient or friends object to an issue, we must apply a series of small blisters over the skin of the temples, but they are not so efficacious as the seton.

KERATITIS PUNCTATA, KERATITE PONCTUÉE, DOTTED KERATITIS, are terms employed by M. Wecker and

Age of patients.

Treatment. Attend to general health.

Mercury with discretion.

Cod-liver oil, &c.

Iodine lotion.

Issues very efficacious.

Blisters.

Degeneration of posterior epithelium.

Aqueous turbid,

not in excess.

Cornea weakened, and yielding.

No pain.
Dim vision.

Congestion.

Dotted opacity.

Muddy aqueous.

other writers to describe an affection in many respects analogous to "Aquo-capsulitis" of other authors. Dotted keratitis is by no means a common form of disease; it is characterized by the presence of a number of small white spots, scattered over the posterior elastic lamina of the cornea, consisting of patches of degenerated epithelium. This condition of the cells of the posterior elastic lamina is usually complicated with some amount of general haziness of the cornea, which, by interfering with the passage of light to the retina, renders the patient's sight very imperfect. The opaque epithelial cells are shed from time to time, and may sometimes be seen floating about in the aqueous, which becomes, in consequence, more or less turbid.

Although the natural convexity of the cornea may be somewhat augmented, it does not appear that the aqueous is secreted in abnormal quantity, the altered curvature being due to structural impairment of the cornea; the tough posterior elastic lamina, and probably the laminated tissue, opposing less resistance to the distending force of the aqueous when affected with this form of disease. This view is further confirmed by the fact, that the tension of the eyeball is not increased in an uncomplicated instance of dotted keratitis, which would be the case if there were an excessive secretion of aqueous humour.

The symptoms to which keratitis punctata gives rise are seldom of an active kind—that is, the patient suffers from only slight pain in the affected eye, and dimness of vision caused by the opaque condition of the cornea.

On examining the eye, we notice, during the active stage of the disease, a zone of congested subconjunctival vessels surrounding the cornea, and usually there is a considerable amount of conjunctival congestion. There will generally be no difficulty in detecting the presence of the opaque patches of fatty epithelium on the posterior surface of the cornea; they are, however, best seen by means of transmitted light, and when the opacities are very faint, it may only be possible to make them apparent in this way. The aqueous will appear somewhat muddy, and flakes of degenerated epithelium are occasionally seen floating about in it; some of these may be deposited on the iris, giving it a speckled appearance.

From the connexions of the posterior elastic lamina, it is evident that disease of this structure is likely to spread to the iris and ciliary body, and in practice we find that such is occasionally the case. Under these circumstances we have, superadded to the abnormal state of the cornea, symptoms indicative of disease of the deeper structures of the eye, such as increased tension of the globe, pain in the eye, and ciliary neurosis, intolerance of light, and inability on the part of the iris to respond to its natural stimulus, or to the action of mydriatics; but in uncomplicated cases of keratitis punctata, none of these symptoms are present.

Keratitis punctata is most frequently met with among children, particularly those suffering from a syphilitic or scrofulous diathesis.* It generally attacks both eyes, sometimes simultaneously, but more often consecutively.

The ordinary course of this form of keratitis is towards recovery, unless complications arise as above indicated; the cure, however, is always a very prolonged one, and we should be careful not to give a favourable prognosis until we are quite sure that the deep structures of the eye are unaffected.

The Treatment of this form of disease resolves itself into the use of very much the same means as those recommended in cases of ordinary keratitis. It is generally advisable to have the affected eye closed with a pad and bandage, and atropine should be applied as to keep the pupil dilated. In syphilitic cases, cod-liver oil, iodide of potassium, and mild mercurial preparations should be employed. In the majority of instances of non-specific origin, iron and quinine, and a tonic plan of treatment, will probably hasten the recovery; and in all instances of this disease counter-irritation is most valuable, in the form of either an issue or a series of blisters to the temple. complications arise, such as iritis or irido-choroiditis,

* On Syphilitic Inflammation of the Eye, by J. Hutchinson, who has ably elucidated the syphilitic history of that form of the affection in which the iris participates, and which is more correctly designated as kerato-iritis: *Ophthalmic Hospital Reports*, vol. i. p. 192, and vol. ii. p. 278.