

On keratitis / by W.S. Watson.

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ON

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KERATITIS.

BY

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ON KERATITIS.

By W. SPENCER WATSON, F.R.C.S., Eng.

THE principal object proposed in the following pages is an inquiry into the influence exerted by constitutional and local conditions respectively in the production of inflammatory affections of the cornea, and the consequent modifications of treatment which the results of such an inquiry must involve. That some cases of inflammation of the cornea, such as those arising from injuries, inverted eyelashes, and granular lids, are immediately the effects of the local conditions of the parts, and independent of any constitutional disease, will not, I suppose, be disputed; but there are others of a more doubtful nature, of which it is often difficult to determine the exciting or predisposing causes, or whether, in fact, local conditions as well as constitutional disease may not be combined in the production of the local effect—and as instances of such I may adduce the strumous ophthalmia and the secondary ophthalmia after small-pox, in both of which there is at the same time a discharge of sero-purulent or purulent matter from the conjunctiva sufficiently irritating to cause great local disturbance, and a constitutional dyscrasia calculated to interfere with the nutrition of the parts.

It will, however, be convenient to divide all cases of keratitis into three classes, and subsequently consider how far such a classification is in accordance with pathology, or useful as a guide in treatment.

Division 1. *Keratitis* from *mechanical causes* or *local conditions*.

- a. Injuries by foreign bodies.
- β. Inverted eyelashes, entropium, granular lids.
- γ. Irritating discharges, *e. g.* Purulent ophthalmia, measles, mucocoele, &c.
- δ. Palsy of the lids from lesion of the 7th pair of nerves, or anæsthesia of the lids from lesion of the 5th.
- ε. Proptosis, as in exophthalmic goître and ectropium.

ζ. Possibly Sclerochoroiditis Posterior, as seen in progressive Myopia.

Division 2. *Keratitis* from local and constitutional causes combined.

α. Ophthalmia of the Scrofulous.

β. Catarrho-rheumatic Ophthalmia and Catarrhal Ophthalmia.

γ. Secondary Variolous Ophthalmia.

Division 3. *Keratitis* from *constitutional causes only*.

α. Hereditary Syphilis.

β. Primary Variolous Ophthalmia.

γ. Rheumatism.

δ. Septicæmia or Pyæmia.

ε. Typhus, Scarlatina, Diphtheria, or deficient nitrogenous food.

ζ. Aquo-capsulitis, Choroidoiritis, and Sclerotitis.

Of the 1st division, perhaps, some may object to the placing of the group γ under this head, especially with respect to the ophthalmia following measles, and I am willing to allow that possibly many cases of this form would be not inaptly placed in the second division, but the majority are of so trifling a nature when uncomplicated, and yield so readily to merely local treatment, that I am inclined to place the great bulk of them in the same group with purulent ophthalmia. Of this latter disease, as it is seen in infants and also in the gonorrhœal form, the effect of local treatment alone, is so marked, and the absence of constitutional symptoms so general, that it is impossible to avoid the conclusion that the irritating discharge is often the main cause of disease extending to the cornea. But my attention has been lately directed to a form of purulent ophthalmia in infants which is evidently connected with a syphilitic taint, and which is usually very destructive to the cornea, either causing sloughing and staphyloma, or a state of Xeroma, in either case completely destroying vision. These exceptional cases, therefore, would come into the second division, or possibly the third. In gonorrhœal ophthalmia again the marked effect of merely local treatment, and especially of powerful astringent lotions and injections, sufficiently indicate the local nature of the disease in the majority of instances, but I am not prepared to say that in some there may not be some more deep-seated inflammation which requires constitutional remedies; and Mr. Wordsworth has called attention to this fact, and has published cases illustrating this somewhat rare form of disease.

Of the group δ in the first division, the following case well illustrates the cause of its being placed there, and the treatment best adapted to such a form of disease.

Case.—A woman, 59 years of age, applied at Moorfields Ophthalmic Hospital on Nov. 4, 1863, with a perforation of the right cornea and a prolapsed iris, associated with which were the following conditions:—The right side of the face and anterior half of the right side of the head and the right half of the tongue were completely anæsthetic. The right temporal region was hollowed from wasting of the temporal muscle, and the mouth was drawn a little to the right side. She had a certain amount of muscular power over both sides of the face, and could close both eyes partially, but could not tell by her own sensations when the right eye was shut. The movements of the affected eyeball were somewhat limited in the outward, upward, and downward directions.

These symptoms had commenced four years previously with severe neuralgic pains in the right side of the head—the defective sight, and probably also the ulceration, had existed only two or three months before her admission. These phenomena evidently pointed to lesion of the 5th pair on the right side, partial palsy of the muscles of expression on both sides, but more so on the left, and lesions of the 3rd and 6th pair on the right side.

The treatment adopted consisted simply of keeping the lids closed by sticking plaister and a light compress, and under this plan the ulcer soon cicatrized.

I must refer to the last number of the Ophthalmic Hospital Reports for the account of three cases of paralysis of the fifth nerve related by Mr. Hutchinson. In one of these cases, though the anæsthesia had existed six weeks, the eyeball was not inflamed, and treatment directed to the cure of the constitutional mischief was so successful, that sensation on the affected side was completely restored. In a second case, rapidly destructive disease of the cornea, necessitating removal of the eyeball, was the result of the anæsthetic condition; and in the third, the ulceration which had commenced was arrested by the same means as had been adopted in the case I have related above.

From these cases I conclude that external irritation is the exciting cause of the ulcerative process, but that when once set up the defective nutrition of the part favours its continuance, and that the phenomena are analogous to the sloughing bedsores so commonly associated with paralysis of the lower limbs.

The groups ϵ and ζ comprise cases of considerable rarity. I have myself never seen inflammation of the cornea as the result of proptosis or exophthalmic goître, but a very remarkable case was reported from the practice of Mr. Tatum, in

the "Medical Times and Gazette" of January 23, 1864, in which sloughing of the cornea occurred from the exposure consequent on the protrusion of the eyeball, and from the enormously-increased intra-ocular pressure.

I have seen only one instance of keratitis associated with ectropium, and in that case, the lower lid being the one affected, and great distress being occasioned by the overflow of the tears, I slit up the canaliculus, and by this means allowed the tears to escape freely into the nose. The result quite answered my expectations, as the ulcer now rapidly healed, and the condition of the lower lid correspondingly improved.

In placing strumous ophthalmia in the same division with the catarrho-rheumatic and secondary variolous ophthalmiæ, I had regard to the fact that in each of these diseases there is a marked cachexia, at the same time that there is almost always a local source of irritation; and though I am not quite satisfied that the catarrhal form should also be placed in this division, yet I am quite sure that I have seen many cases of this disease in which merely local treatment appeared to be of little avail without administering tonics and aperients at the same time.

The *keratitis of struma* may appear under a variety of aspects. Of 36 cases of which I have notes, of ages varying from $1\frac{1}{2}$ years up to 25 years, 8 were 4 years of age and under, 13 were between the ages of 4 and 12 years, 10 between the ages of 12 and 20 years, and 5 were over the age of 20. In 18 only of these cases was there a marked strumous aspect, or disease, usually said to be of a scrofulous nature, associated with the affection of the cornea, such as enlargement of the cervical glands, discharges from the ears or nose, or tinea of the lids. The remaining 18 cases were placed in the same category, chiefly from the fact that the inflammatory affection of the cornea could not be attributed to any other cause than the strumous diathesis.

In three of these 36 cases there was some suspicion of hereditary syphilitic taint, either from the history or the aspect of the patient, and two of these were very obstinate and difficult to treat, but in neither of these three was there the peculiar interstitial deposit peculiar to keratitis of inherited syphilis.

I should remark that all the cases of which notes were taken were such as I considered likely to terminate by some amount of permanent impairment of vision, or else such as presented some features of peculiar interest. Many trifling cases were passed over, and with them possibly some of serious import.

I find from the analysis of these cases of ophthalmia in scrofulous patients in which the cornea was undoubtedly and strikingly affected, that the most common form of inflammation in this region was that of ulceration, the ulcers being for the most part small, superficial, sometimes round, but sometimes having the appearance of an irregular abrasion, and that they generally occupied the central region of the cornea. Next to this the most frequent form was that of a superficial cloudy condition of the epithelial layer. I am inclined, however, to the opinion that in reality this latter form is more frequent than any other, but that from various causes I have not been able to take notes of these cases. Both of these forms, viz., the superficial ulcer or abrasion and the cloudy opacity without ulceration, may run a very tedious and protracted course, but leave very little permanent damage to the cornea. They are generally associated with tinea of the lids, and more or less conjunctival inflammation and discharge.

The more serious forms of strumous keratitis are those in which pus is formed either in the layers of the cornea itself, or in the anterior chamber, or both, and these commonly occur in badly-fed children, and almost always terminate by sloughing of part of the cornea, prolapse of the iris, staphyloma corneæ, or shrinking of the eyeball. In these cases there is considerable conjunctivitis and a purulent discharge. Out of 36 cases there were three of this description, two of which terminated in the destruction of the eye and staphyloma, and one was saved by a timely paracentesis of the anterior chamber.

Another intractable and distressing variety is that accompanied by phlyctenules or vesicles of lymph on the margin or centre of the cornea. I believe I have seen this go on to penetrating ulcers in two instances, and in three others the phlyctenule has left behind it a vascular and highly irritable form of ulcer. Four out of the 36 cases were of the phlyctenular variety, associated with great irritation of the bowels and diarrhoea, and followed in three out of the four instances by vascular ulcers. In two other cases vascular ulcers were present, but whether preceded by this particular form of keratitis it was not possible to determine, owing to the late period of the attack at which the patient applied. These cases are generally associated with great irritability and intolerance of light, and require a peculiar treatment, to which allusion will be made subsequently.

In cases of long standing, and associated with a granular condition of the conjunctiva of the lids, inverted eyelashes, or entropium, it is not uncommon to find a rough vascular

state of the cornea, a state of things most difficult to deal with.

In all but four of the cases noted, *photophobia* was a prominent symptom. Of the four exceptions, two were only under observation for about a month, and another was a case of somewhat doubtful nature with regard to the strumous or hereditary syphilitic diathesis. I think that intolerance of light is all but a universal symptom in keratitis as it occurs in strumous patients—when the keratitis has been subdued and the disease is only manifesting itself by conjunctivitis or ulcerations of the margins of the lids, it is very common for all intolerance of light to disappear.

Special allusion will be made in a subsequent page to the treatment of vascular ulcers, granular lids, and to the best method of relieving intolerance of light.

Catarrho-rheumatic Keratitis.—A second form of corneal inflammation, depending partly upon local and partly upon constitutional causes. It is contrasted with strumous keratitis by selecting the middle-aged or aged for its victims, and generally the most debilitated people suffer from this form of disease. I do not think that it is necessarily connected with a rheumatic diathesis, but is always associated with a low, enfeebled state of general health. Out of 140 cases of keratitis, of which I have notes, nine were affected by this form of the affection. It commences as a severe catarrhal inflammation, accompanied by scleritis, with mucopurulent discharge from the lids, and racking circumorbital pain, which is aggravated at night. The cornea may be affected by ulceration, which takes the form of a large, ragged, irregular excavation, sometimes perfectly transparent, or by effusion of pus between the layers, and probably in the anterior chamber at the same time.

There is decided tendency for catarrho-rheumatic ophthalmia to recur and (where the pupil has become closed by adhesions) to a glaucomatous condition being induced. Several instances of this kind have come under my observation, in which after the subsidence of the first attack, probably with a dense leucoma of the cornea, or of part of it, there has been a return of pain, the eyeball has become tense and injected, and this state of things has either persisted in spite of treatment, or has subsided only to recur again and again. In such instances iridectomy affords the best prospect of a successful cure, or at any rate of relief of the pain and tension.

Nine cases of *Secondary Variolous Ophthalmia* occurred in 140 of the noted cases of Keratitis. These cases were published in the "Medical Times and Gazette," of April 2nd, 1864.

The period that elapses between the eruption of pustules on the body and the appearance of the corneal inflammation is sometimes as long as seven or eight weeks, during which time, however, there may be, and generally is, a copious conjunctival discharge. The most frequent period is about three weeks from the commencement of the small-pox fever, at the time when the crusts are ready to fall from the body, and when the process of elimination of the variolous poison might have been supposed to be complete. However that may be, it is certain that in a given proportion of cases the cornea becomes very violently inflamed, and the remarkable condition termed onyx, a circumscribed deposit of pus in the layers of the corneal tissue, is very apt to be induced.

Of the varying results of treatment in such instances, the following three cases are good illustrations:—

I.—A man, 40 years of age, a farm labourer, and apparently in robust health, had a large onyx and deposit of pus in the anterior chamber, after a very slight attack of small-pox. Ten months after he was just able to pick out letters of the largest type (No. 20 Jaeger's Test Types), and there was a double pterygium encroaching on the cornea.

II.—A little girl, $4\frac{1}{2}$ years of age, two months after having gone through the measles, took small-pox, with which she was marked when I saw her four months afterwards. She then had a staphyloma, occupying part of the cornea, which was nearly opaque in the rest of its area. She was under treatment for three months, and at the end of that time could still only just see the shadow of my hand between her and the window.

III.—A working engineer, 31 years of age, noticed his left eye became inflamed a week or ten days after the small-pox had come out. An onyx formed, which, after treatment of three or four months, left only a faint nebula, and allowed him to read small print (No. 2 Jaeger).

Occasionally patients present themselves with severe keratitis after measles, in which the symptoms are very similar to those in the group just described, viz., a deposit of pus in the layers of the cornea, hypopyon, great pain and intolerance of light, and sometimes increased tension of the eyeball. When such a train of symptoms occurs, it is generally in strumous children, and such as have suffered from severe debilitating influences, such as scarlatina, followed by measles. These cases, therefore, will most fitly come in the same division as strumous and secondary variolous ophthalmia, and will be found amenable to very similar treatment. Compared, however, with the secondary variolous ophthalmia, the cases in which such severe symptoms occur after measles, are ex-

tremely rare. I have notes of one case only, though I am aware that several others have recently passed under my observation, of which I have not had opportunities of getting any detailed account.

In the third division, viz., that including all cases of Keratitis, depending entirely on constitutional causes, I have placed the group of *Hereditary Syphilitic Keratitis* first, as being at the same time the most characteristic of this division, and the most interesting on account of its having recently been described and distinguished from Strumous Ophthalmia. The description given of the disease by Mr. Jonathan Hutchinson is extremely accurate, and having taken notes of twenty-four cases, of most of which I have carefully watched the progress, I believe that the confirmation which I can thus give to his observations is of considerable value. Seventeen of these twenty-four were over the age of 9 years at the time of the commencement of treatment, and therefore afforded an opportunity of observing any peculiarity of the upper incisor permanent teeth, and in *three only* was there no indication of a syphilitic taint afforded by them; in the remainder there was either a notching or peg-shape of these teeth, or the two characters combined. In those cases in which neither the teeth nor the physiognomy afforded any information, there was a history of a conclusive character in some, and actual disease in others; but I have ventured to include in the same group two cases in which there was no indication afforded from any of these sources; in which the teeth were good, the physiognomy and complexion good, and in which no history could be obtained at all leading to the supposition of an inherited taint. My reason for including these two cases, was the fact that the disease ran precisely the same course as in the others, and exhibited precisely the same phenomena. One of these cases was sufficiently characteristic in the succession and nature of the symptoms to induce me to relate it.

Case.—A boy $13\frac{1}{2}$ years of age, of fresh complexion, and tolerably well nourished, applied at Moorfields on April 14th, 1864, with interstitial keratitis of both eyes.

He is an orphan, but has a sister 10 years of age, who is in good health. His teeth are well-formed and close-set, and there is nothing peculiar about the form of the face or nose. His aunt states, that as an infant, he had erysipelas in the head, and was ailing for two years. For two or three months past he has been restless at night and subject to nocturnal headaches, and about a month ago his right eye became inflamed, a few days after his left also became affected. On admission, both corneæ presented a ground-glass appearance, the opacity lying evidently in the substance of the corneal

tissue, and being arranged in the form of a ring so as to leave a somewhat clearer space in the centre, and a circle of transparent cornea at the margin. The upper and lower segments of the right cornea were highly vascular, and this had also occurred to some extent in the left. He complained of pain of a stabbing kind occasionally, and had some photophobia. The treatment consisted in giving a combination of syrup of the iodide of iron and cod-liver oil internally, and applying lead lotion externally, with occasional atropine drops. The vascularity extended in both eyes until nearly the whole surface of each cornea was covered; but leaving a clear space at the inner and outer sides, so that the vascular space assumed an hour-glass form. On May 11th, there was some improvement; on May 18th the vascularity had nearly disappeared; on June 1st there was slight vascularity of the right cornea, and in the left only a central nebula, and there was some bulging of both in the central regions; June 15th, he is able to pick out letters in No. 20, with either eye, and the opacities are much diminished; June 29th, reads No. 19, nebula becoming fainter. This result, though far from brilliant, is satisfactory compared with what is frequently seen, and considering the time, during which he was under observation, only extended over about $2\frac{1}{2}$ months, I have no doubt that the improvement will continue. It is very common to see cases of this disease in which vision is so seriously impaired, that the patient can only just guide himself about, and in which an artificial pupil affords a somewhat doubtful prospect of more useful vision.

Of the remaining groups of the third division I shall content myself with a merely passing notice.

The cornea is so very rarely affected in the eruptive stage of small-pox, that the existence of the *primary variolous ophthalmia* has been denied, but I think one or two cases have come under my notice in which it seemed impossible to avoid the conclusion that a genuine variolous pustule had formed on the cornea.

In *rheumatism* I have seen the cornea secondarily affected in one or two cases, but as no special treatment apart from that of the original disease is necessary, I need not dwell upon the subject.

The cornea becomes affected only in common with the other tissues of the eyeball in *septicæmia* and *pyæmia*, and in low states of the system, such as *diphtheria*, and in all such cases there is a tendency to sloughing coming on very rapidly, and to the rapid destruction of the eyeball.

Aquo-capsulitis is the term applied to a form of iritis, in which there is a dotted opacity on the posterior elastic

lamina of the cornea. It is yet disputed whether this disease depends upon a syphilitic taint or not.

In two cases, which I have seen, I was unable to satisfy myself that there was constitutional syphilis, though in both there was good reason for suspecting it. In both mercury was used with decided benefit.

In the advanced stages of chronic *choroido-iritis* the cornea becomes sometimes involved, but usually the original disease has by this time gone on too far to be within the reach of remedies, and therefore offers few features of interest.

Scleritis and *episcleritis* often extend their seat of inflammatory exudation beyond the limits of the tissues first affected, and the cornea may become partially or entirely covered by patches of exudation with numerous minute vessels ramifying in their substance. Such a condition is extremely difficult to deal with. It is generally associated with a gouty diathesis, and requires the remedies appropriate to that disease.

The *Diagnosis* of the various forms of keratitis will be materially aided in most instances by considerations relative to the age, condition, diathesis and other circumstances connected with the patient; but I shall only point out the appearances of the cornea itself which are sufficiently characteristic to be of use in distinguishing some of the diseases enumerated in this paper from one another.

Those of the first division, in which the inflammation has been set up by mechanical irritation, bear in most cases the cause of the disease conspicuously before them, and only require a careful search and a good light for its discovery. The rough vascular cornea occupying the upper half or two-thirds of its area, is an almost infallible sign that the lids are lined by granulations; if, on the other hand, the vascular condition occupy the outer part or the inner part of the cornea, the remainder being clear and transparent, the probability is that inverted eyelashes are the offending cause. In any case it is a good rule to evert the upper lid, and make a careful search in this locality, as by this means the cause of the mischief will often be discovered.

There does not appear to be any distinctive character peculiar to the *cphthalmia of scrofula*, but certain kinds of keratitis are more common in this disease than in other varieties, and perhaps the phlyctenules or vesicles filled with lymph of the size of a pin's head or millet-seed, are more commonly seen in scrofulous keratitis than in any other.

This phlyctenule is generally followed by an ulcer, the base of which is highly vascular, and is connected to the conjunctival vessels by a lash of newly-formed vessels.

The *catarrho-rheumatic* is only distinguishable, as a rule, by the constitutional symptoms with which it is associated, but the transparent ulcer, not uncommonly seen in this disease, is quite peculiar. It appears as though a portion of the cornea had been cleanly scooped out, without interfering with its transparency, and there is a singular absence of vascularity in the surrounding parts. The healing of this ulcer sometimes goes on without in any way altering its appearance, excepting that its depth diminishes as the newly formed granulations are deposited, till at length its base reaches the level of the surrounding surface.

In the *secondary variolous ophthalmia* a circumscribed deposit of pus in the corneal layers is almost always seen, but this must not be looked upon as a certain diagnostic sign, as the same thing may occur in traumatic, scrofulous, catarrho-rheumatic, and even morbillous ophthalmia.

The *keratitis of inherited syphilis* is marked by the absence of ulceration and by the interstitial position of the opacity; as also by the peculiar course through which it runs. In a typical case seen at the commencement, the cornea has a steamy appearance principally in the centre, and at first in one eye only. The vascularity of the sclerotic is little or not at all increased. Soon the centre of the cornea becomes thicker, and assumes an appearance resembling ground glass, the surface, however, being perfectly smooth and polished in the great majority of instances; the margin still remains comparatively transparent; at a later period the upper part of the cornea becomes highly vascular, the vessels often terminating by a distinct horizontal line; a similar vascular state of the lower half soon makes its appearance, and the two planes of vessels at length meet in the centre. In some cases the blood-vessels are so closely arranged and so full of blood that the appearance to superficial observation is that of a drop of bright arterial blood lying in the substance of the cornea. Meanwhile the surface remains unaffected, and generally the outer and inner margins continue transparent. Under favourable circumstances the vascularity subsides and the opacity gradually diminishes, generally leaving a considerable protrusion of the central region. These phenomena are so peculiar, and the regularity of the sequence is so marked, that it is impossible to confound this disease with any of the others enumerated. For a more detailed account of this affection I must refer to Mr. Jonathan Hutchinson's papers in the Ophthalmic Hospital Reports, vols. i. and ii., in which the whole subject is treated in a masterly and most exhaustive style.

With regard to the diagnosis of the varieties of inflam-

matory affections of the cornea comprising the remainder of the third division, those, viz., dependent upon different blood-poisons, and generally associated with other and deeper lesions of the eyeball, I think that the remarks already made are sufficient. I would especially call attention to the short descriptions given of aquo-capulitis and episcleritis as affording a guide in diagnosis in each.

Treatment.—Few general rules can be laid down on the subject of treatment of diseases so diverse in their etiology and pathology, as those included in the preceding pages. It is obvious that in most cases general principles will be the best guide in the treatment; but at the same time, I believe, it will be found that in the majority of instances in which the cornea is inflamed, there are certain principles applicable to all, irrespective of the origin or extent of the morbid process. Thus, as a rule, depletion either locally or from the system, is not well borne unless, in addition to the keratitis, there is iritis or deeper mischief. Excessive pain sometimes seems to indicate the withdrawal of blood from the neighbourhood of the inflamed organ, but, I believe, in most cases this symptom is much more effectually relieved by other means.

Mercury, again, is contra-indicated in all cases of pure keratitis, unless, perhaps, in alterative doses.

Sedatives and tonics are nearly always useful.

But while we may regret that so little can be done in the way of laying down rules applicable to a large number of different diseases, we may at the same time congratulate ourselves that in many special cases, special points of practice have been found to be very efficacious, not only in counter-acting symptoms, but frequently in bringing about a cure of the disease.

I shall not, therefore, attempt to give a detailed account of the treatment adapted to each particular kind of keratitis, but shall content myself with pointing out what are those points of practice which I have found to be most useful, or which have been favourably spoken of by the best authorities on this subject.

In the treatment of cases belonging to the first and second divisions, in which there is a purulent discharge from the conjunctiva, it is of the utmost importance to check this by astringent applications, as quickly as possible. In purulent ophthalmia, whether gonorrhoeal or in infants, the main point in the treatment consists in the frequent washing away of the discharge, and the astringent applications. It is not sufficient merely to drop an alum or nitrate of silver collyrium into the eyes; but the discharge must before each application

be thoroughly washed away by means of a syringe, and it is better to use a syringe for the purpose of injecting the astringent. Hot applications and poultices are positively injurious in such cases. They keep the parts unduly heated and prevent the proper escape of the discharge, which is the great desideratum.

Granular lids and the associated rough *vascular cornea* must be treated by different methods in different stages of the affection. In the less severe forms, I have found great benefit result from everting the lids, and applying a strong solution of nitrate of silver (a scruple to the ounce of distilled water) with a camel's-hair brush, and then while the lids are still everted, washing away the superfluous nitrate with clear water. This is repeated twice a week, and most patients on whom this has been tried, have derived great benefit from it.

If the granulations are very large and fleshy, the solid stick of nitrate of silver may be applied, taking care to wash the everted lids immediately afterwards. Under similar circumstances, the finely powdered acetate of lead dusted over the surface and rubbed well into the granulations, and washed off with clear water, has answered well in my hands.

When the cornea is completely covered by a vascular opacity, associated with granular lids, I think it quite justifiable to treat the case by inoculation, as has been done so successfully by Dr. Bader, or by combining the method of inoculation with a previous excision of the portion of conjunctiva immediately surrounding the cornea, as has been recently done successfully by Mr. Lawson. It must be borne in mind that such treatment is liable to be followed by sloughing of the cornea, and consequently by destruction of the eye, and it should, therefore, only be employed in cases in which there is *complete pannus*. Some of the worst cases have been followed by the best results.

Treatment of *Photophobia* in *Scrofulous Keratitis* and other ophthalmiæ.—The obstinate intolerance of light in keratitis has been treated on various plans. Some have kept their patients in a darkened room, but this is objectionable on the ground that the general health must suffer from the confinement, and this is particularly the case with strumous and weakly children, who require all the air they can get, and on whom the direct rays of the sun exert a remarkably restorative effect. The same objection cannot be urged against the use of a shade, and the best form of shade is one made of stiff brown paper, large enough to shade both eyes, and allowed to stand well out from the forehead. Atropine and belladonna, however, are most valuable remedies in this dis-

order; the sulphate of atropine dissolved in water (4 grs. to the fl. oz.) may be dropped in once or twice a day; or the embrocation of belladonna and glycerine may be smeared on the temples and brows; or the atropine papers or atropised gelatine may be used for the same purpose.

Where there is much lacrymation, the belladonna embrocation is preferable to the other plans. In two cases I have injected a few drops of solution of atropine under the skin of the temple with very rapid relief of the intolerance. When ascarides or intestinal irritation of any kind is present, no local application will avail until a brisk purgative has removed the irritation of the bowel. This is a frequent source of photophobia in children, even when there is no affection of the cornea.

Failing other remedies, counter-irritation should be had recourse to either by blisters behind the ears, by setons in the temples, or by the application of caustic to the mucous membrane of the nose.

Blisters are objectionable in very young children, and not often required in such patients. Setons in the temples are more particularly serviceable in that peculiar variety termed phlyctenular, especially if it has gone on to the condition of vascular ulcer. The application of caustic to the nostrils seems indicated when there has been previously a discharge from the mucous membrane of the nose which has been checked suddenly. Nauseating doses of antimony have been used of late by my friend Dr. William Price, of Margate, with great success in this troublesome affection. I have had no personal experience of this remedy, and fear that patients in London would not bear it so well as those who have the advantage of the air of the sea coast, and the bracing influence of sea-bathing. This latter remedy must still be looked upon as *the remedy par excellence* for strumous ophthalmia, as for other strumous affections, taking care, however, that the patient is not exposed to the glare of the reflection of the sun's rays from the surface of the water.

In the *onyx* or deposit of pus in the substance of the cornea, which is not unfrequent in the course of severe keratitis, and generally associated with a deposit resembling pus in the anterior chamber, it becomes a question whether there is any prospect of benefitting the patient by operative interference; and if so, what are the indications for the choice of operations and the cases most suited to such a plan of treatment. The cases most likely to require any operation, are those of kerato-iritis, resulting from injuries, in which, besides the presence of pus in the substance of the cornea, and in the anterior chamber, there is increased tension of the eyeball,

and great pain in the eye and surrounding bones. In such a case, possibly a mere puncture of the cornea at the margin may have the effect of relieving the symptoms; but if not, it may be repeated several times; or iridectomy may be performed, and if after the first puncture the relief is of very short duration, it will be better to proceed at once to remove a portion of the iris, especially if the patient happen to be an elderly person or subject to rheumatism. But I do not agree with those surgeons who deny the propriety of performing paracentesis of the cornea unless there be increased tension. The only necessary symptom, in my opinion, is constant and extremely severe pain; and I am quite sure that this operation is appropriate in many more cases than it is usually employed in, and that many eyes have been lost in consequence of its being delayed or neglected.

In cases of *sloughing ulcer* from any cause, and especially in the course of catarrho-rheumatic ophthalmia, I have seen great benefit result from a well-timed iridectomy. The effect in some cases has been marvellous from its rapidity and its completeness.

The treatment of *interstitial keratitis of hereditary syphilis* is still a matter *sub judice*. According to Mr. Jonathan Hutchinson, it should be treated by mild specifics, *i.e.* by mercurial inunction to the temples, and iodide of potassium internally. Other surgeons, and myself among the number, are in favour of a more simple plan. I believe that in many cases mercury is not well borne by the subjects of this disease, and as far as my experience goes, treatment by syrup of the iodide of iron and cod-liver oil is quite as successful as any other plan; but I am quite ready to allow the experience I have had is limited. For a detailed account of some of the cases of this affection under my observation at Moorfields, and at King's College Hospital, I must refer to the coming number of the Ophthalmic Hospital Reports.

NOTE.—For the opportunity of observing and taking notes of cases at Moorfields Ophthalmic Hospital, I have to tender my acknowledgments to Mr. Wordsworth and Mr. Hulke, who have most kindly placed at my disposal a large number of cases of inflammatory affections of the cornea.

