

and if no symptoms of sympathetic irritation arise in the other, the collapsed globe will form an admirable support on which to rest an artificial eye.

## TUMOURS.

TUMOURS OF THE SCLEROTIC.—Morbid growths, whether cancerous or otherwise, rarely commence in the sclerotic, though doubtless this structure is frequently involved in tumours springing from the choroid within, or from the tissues contained in the orbit without. Mackenzie mentions several cases of sarcomatous tumours growing from the sclerotic; he says they most commonly occur amongst scrofulous subjects. The tumours are sometimes single, sometimes in clusters; they may be soft or hard, vascular or non-vascular. The tendency of these morbid growths is to disappear by progressive ulceration; but the morbid process is apt to result in perforation of the sclerotic, and the eye then becomes atrophied and destroyed.

Mackenzie says these fibro-plastic tumours present themselves most frequently on the temporal side of the eyeball, and at first are of a whitish colour. Their disposition is to spread and involve the parts around them as they ulcerate.\*

## Melanotic.

A few rare cases are on record in which melanosis has attacked the sclerotic, springing from its external surface, and not involving, at least for some time, the other structures contained within the orbit.†

\* Mackenzie "On Diseases of the Eye," 4th edit. p. 703.

† Mr. Poland on Protrusion of the Eyeball: *Ophthalmic Hospital Reports*, vol. i. p. 171, where two such cases are referred to.

## CHAPTER VII.

## DISEASES OF THE CONJUNCTIVA.

*Hyperæmic—Muco-purulent—Purulent—Diphtheritic—Granular—Pustular Conjunctivitis—Injuries of the conjunctiva—Hypertrophy and Atrophy—Pterygium—Relaxation—Serous and bloody effusions into the conjunctiva—Tumours of the conjunctiva—Diseases of the caruncle.*

## CONJUNCTIVITIS.

WE may now proceed to study the diseases of the conjunctiva, and as they will constitute the larger portion of the "eye cases" we shall meet with in practice, they demand a careful consideration. I propose describing the various forms of conjunctivitis (ophthalmia) under the following heads:—Hyperæmia, Muco-purulent, Purulent, Diphtheritic, Granular, and Pustular Conjunctivitis.\*

It is difficult, in the first three of these affections, to draw a line of demarcation between the commencement of one form of disease and the termination of that preceding it; thus, muco-purulent conjunctivitis is always preceded by hyperæmia, and purulent conjunctivitis by both hyperæmia, and muco-purulent conjunctivitis; yet, practically, the distinction will be found both natural and useful. The symptoms of diphtheritic, granular, and pustular conjunctivitis are sufficiently well marked to distinguish them from one another,

\* It seems to me hardly wise to retain the word *ophthalmia* to designate diseases of the conjunctiva; we employ the terms *iritis*, *choroiditis*, and so on, to signify inflammation of the iris and choroid; why not, therefore, conjunctivitis in analogous diseases of the conjunctiva?

and also from the first named affections of the conjunctiva.

Purulent discharge contagious.

The discharge from the eye of a patient suffering from purulent conjunctivitis will, in the great majority of cases, if inoculated into the healthy conjunctiva, induce a like form of disease; still, this sequence is not so invariable as is generally supposed; for instance, the pus from the eye of a patient affected with purulent conjunctivitis may excite the diphtheritic form of disease, if introduced into the eye of a person already predisposed to diphtheria.\* It is consequently impossible to predict, with absolute certainty, the form of conjunctivitis from which a patient may suffer, although exposed to a specific contagion; and it behoves us, therefore, to watch the invasion of the disease in each instance; for upon an accurate diagnosis, and a well-selected plan of treatment at this stage, the issue of the case often depends, and the remedies to be employed in one set of cases are often absolutely injurious in another, as, for example, in purulent and diphtheritic conjunctivitis.

"Healthy" pus innocuous.

I need hardly remark, that "healthy pus" as it is called, that, for instance, which is generated during the repair of a wound, or from a simple abscess, although the conjunctiva be carefully inoculated with it, cannot excite inflammation. The nature of healthy pus, as distinguished from that which is capable of propagating disease by contagion, is one of the many pathological problems yet to be solved; but the spread of the various forms of conjunctivitis by this means, is an established fact, and the contagious nature of all forms of conjunctivitis, attended with a purulent discharge, should lead us to separate the affected from the healthy portion of the community.

Egyptian ophthalmia.

A remarkable instance of the melancholy results which follow a neglect of this rule, is to be found in the case of the purulent form of the disease, which is seen in Egypt at the present day; this affection of the eye being there endemic, and propagated from one individual to another, and from generation to generation. It is commonly asserted that the glare of the sun, and the presence of numerous particles of sand in the atmosphere, are concomitant, if not the principal causes

Glare of sun not the essential cause.

\* "Maladies des Yeux," par M. Wecker, vol. i. p. 32.

of the disease among the lower classes in Egypt; but this theory can hardly hold good, for in parts of India the people are subject to the same influences, and yet they do not suffer like the Egyptians from purulent conjunctivitis.

With regard to the diphtheritic form of the disease, it is rare to meet with a case among the natives of India, or in fact among the inhabitants of any part of the world, except those of Belgium and certain parts of Germany.

Diphtheritic conjunctivitis.

As to the much disputed question of the pathology of granular conjunctivitis, I may here remark that the disease consists essentially in neoplastic formations, and arises from the proliferation of the connective-tissue corpuscles of the conjunctiva; and that the swollen and hypertrophied state of the villi of the mucous membrane, generally met with, but by no means characteristic of this form of disease, is an incidental and comparatively unimportant feature. The enlarged papillæ are to be carefully distinguished from the neoplastic growths, which induce the phenomena characteristic of granular conjunctivitis. No doubt the word "granular" has given rise to a confusion of ideas; for, in the first place, mere hypertrophy of the papillary tissue, which is common to various forms of conjunctivitis, occasions a *granular appearance*; and secondly, the term is suggestive of "granulations;" but, as I shall subsequently explain, the neoplastic growths of granular conjunctivitis are more nearly allied to tubercle than to granulations.

Granular conjunctivitis.

I shall give no special description of the purulent conjunctivitis of infants, or of gonorrhœal conjunctivitis; these may well be included under the general head of purulent conjunctivitis; and it seems to me simply complicating a rather difficult subject, to split it up into unnecessary subdivisions. And so again with regard to the exanthematous forms of the disease—those, namely, which are often met with during the progress of measles, scarlatina, or small-pox—they are to be treated upon exactly the same principles as ordinary hyperæmia, or muco-purulent conjunctivitis. The so-called *catarrhal* conjunctivitis, in its milder forms, is described under the heading of hyperæmia of the conjunctiva; in more severe cases the disease assumes the characters of muco-purulent conjunctivitis.

Other forms.

HYPERÆMIA.

Appear-  
ance of the  
parts.Meibomian  
glands  
hidden.Palpebral  
part red  
and rough.Villi  
turgid,  
glands  
large.Conjuncti-  
val and  
scleral hy-  
peræmia  
distin-  
guished.

HYPERÆMIA OF THE CONJUNCTIVA, simple conjunctivitis, may be recognised by the following appearances of the parts, and by the symptoms to which they give rise.

I have already described the healthy orbital conjunctiva as a transparent tissue, through which the white and glistening sclerotic may be seen; on everting either the upper or lower lid, a number of small reddish streaks may be traced beneath the conjunctiva, extending perpendicularly backwards from the margin of the lids; they mark the position of the Meibomian glands, and as they are situated beneath the mucous membrane, it follows that if the conjunctiva is congested, these reddish streaks will be more or less concealed.

In hyperæmia we shall notice, on everting the lids, that the palpebral conjunctiva is not only injected, but that its surface is no longer smooth. (Fig. 1, Plate II.) This arises from two causes,—first, that its villi become prominent from the turgid state of the vessels which they contain; and secondly, its glands are thrown into increased activity, and become enlarged; these, together with the swollen villi, give the mucous membrane a rough appearance, particularly on the tarso-orbital fold, which is also somewhat swollen from the serous effusion poured out into its loose cellular tissue. The eyelids, caruncle, and semilunar folds are also somewhat swollen. The orbital conjunctiva is only slightly affected in simple hyperæmia; it may be that its superficial vessels are congested, in which case they are seen coursing over the sclerotic in a reticulate manner towards the cornea.

As people advance in life, their conjunctivas become somewhat hyperæmic, nor is this condition, under the circumstances, to be considered in itself as an indication of disease.

*Diagnosis.*—The student should make himself familiar with the distinctive features of hyperæmia of the conjunctiva, as compared with that of the subconjunctival tissue—a distinction which is of considerable importance; because, while the former indicates a comparatively superficial congestion, the presence of the latter is a sign that the deeper textures of the eye are more or less involved.

Congestion of the orbital conjunctiva can hardly be mistaken for that of the subconjunctival tissue, if the following points be kept in view:—In the former, the enlarged vessels may be readily made to glide over the surface of the sclerotic by gently pressing upon, and moving the mucous membrane under the point of the finger; the vessels of the congested conjunctiva again are most marked towards its palpebral fold, and generally decrease in number and size as they approach the cornea; the larger vessels, moreover, are separate and distinct from one another, and are of a bright scarlet or vermilion colour. On the other hand, hyperæmia of the subconjunctival tissue is always most marked immediately around the margin of the cornea, the vessels being of so minute a size, that they cannot be distinguished from one another; the part appears as though it had been stained of a delicate violet or pink, the intensity of the colour decreasing about two lines from the margin of the cornea, and being gradually lost in the normal whiteness of the sclerotic (compare Fig. 1, Plate II. and Fig. 2, Plate III.). We do not often meet with cases of hyperæmia of the subconjunctival tissue without the conjunctiva being also somewhat congested, so that in the majority of instances the contrast between the two is sufficiently marked to attract the attention of even a casual observer.

*Subjective Symptoms.*—The amount of uneasiness, or even pain to which hyperæmia of the conjunctiva gives rise, depends very much upon the idiosyncrasy of the patient. Some people feel pain much more acutely than others; but the most sensitive individual, suffering from simple hyperæmia, seldom complains of anything beyond a sensation as if sand or grit had fallen into the eye, which is caused by the constant rubbing of the congested vessels of the mucous membrane against the surface of the cornea. This symptom is apt to vary with the age of the patient, being less marked in old persons than in the young, on account of the muscular fibres of the orbicularis losing their contractile power, and pressing the lids less firmly against the eyeball in the case of elderly people. The adipose tissue also, contained in the cavity of the orbit, is gradually absorbed as we advance in life, and the eyeball sinks into its socket, and thus recedes to some

Diagnosis.

Pain not  
great.Sensation  
of grit.Less in the  
aged.

extent from the lids, which then hang loosely over it. Under these circumstances, considerable hyperæmia of the conjunctiva may exist, without the patient feeling any inconvenience whatever from it, because the lax state of the parts admits of considerable vascular engorgement, without any equivalent increase of the mutual pressure between the lids and the globe. These circumstances must be taken into consideration, when judging of the sensations experienced by those suffering from the milder forms of conjunctivitis.

In cases of hyperæmia, if the patient is exposed to the glare of the sun or lamplight, it causes a feeling of weariness and irritation in the eye; this symptom is augmented if the eyes are used for any length of time, so that the patient is often prevented from pursuing his usual calling for more than a few hours together.

The secretions from the lachrymal and conjunctival glands are increased in quantity, but are not altered in character; the disease is consequently non-contagious, but the patient complains of his eyes watering a good deal. This symptom, like the last mentioned, is increased by overwork, or exposure to a bright light; it is due to irritation of the conjunctival and lachrymal glands; added to this, the slightly swollen and congested state of the mucous membrane of the lids extends to the lining membrane of the puncta and canaliculi, and the natural passage of the tears into the nose being plugged up, they collect in the inner corner of the eye, and overflowing, induce the lachrymation complained of. On the other hand, in many cases of hyperæmia of the conjunctiva, the diseased action extends in the opposite direction—irritation of the mucous membrane of the nares, spreading through the lachrymal passages to the eyelids—as frequently happens in a common cold, the so-called catarrhal ophthalmia being often thus induced.

*The Causes of Hyperæmia of the Conjunctiva* are numerous: in the tropics the glare of the sun to which people are exposed for nine months out of the twelve, combined with the state of the atmosphere, which is often loaded with dust out-of-doors, and within, among the lower order of natives, with the smoke from the wood-fires, over which they cook their food, together with miasmatic influences, the fumes of ammoniacal

Bright  
light dis-  
tressing.

Secretions  
increased.

Puncta  
closed.

Lachryma-  
tion.

Causes.  
Glare.

Smoke.

gases, exhalations from open cesspools, and all manner of putrescent filth—all these are constant sources of irritation and hyperæmia. In colder climates no more common cause for simple conjunctivitis exists than sudden changes in the temperature of the atmosphere inducing a "cold" and ophthalmia.

The presence of a foreign body on the conjunctiva may also give rise to congestion of the mucous membrane. Under this head we should place those cases in which an inverted eyelash, by brushing against the eye, keeps up persistent irritation and hyperæmia.

Disease of the retina may, by reflex action, cause congestion of the conjunctiva; and among hypermetropies, the accommodating power of the eye is overstrained, in order that the necessary convexity of the anterior surface of the lens may be maintained, and hyperæmia of the conjunctiva is the result.

Lastly, congestion of this membrane may arise from a faulty state of the digestive and secreting organs; thus the dyspeptic and gouty, those that suffer from portal congestion and disorder of the kidneys, from suppressed catamenia and other similar conditions, are very prone to attacks of conjunctival hyperæmia, and the moist and blood-shot eyes of the gluttonous and intemperate are but too familiar.

*The Treatment* of this affection should, as far as practicable, be directed towards the removal of the cause of the disease; for instance, the eye may be protected from the glare of the sun, or from dust, by neutral tint, or blue glasses. This is a very simple means of relieving hyperæmia arising from over-exposure, but it is unfortunately beyond the resources of the poorer classes, and quite incompatible with their occupation.

Astringent lotions, composed of one to two grains of sulphate of zinc to an ounce of water, are very beneficial in hyperæmia. Acetate of lead (one grain to the ounce) is probably preferable to the sulphate of zinc. Direct the patient to have some of the lotion poured into the angle between the eye and the nose, while his head is thrown back, and then, by opening the lids and everting the lower one, to allow the fluid to run into the eye. This should be repeated two or three times during the day; it tends to constrict the dilated vessels of the conjunctiva, and thus accelerates the

Exhalations.

Foreign  
bodies.

Disease of  
retina.

Hyper-  
metropia.

Disordered  
digestion  
and  
secretion.

*Treatment.*

Remove  
cause.

Protect the  
eye.

Astringent  
lotions.

Directions  
for use.

Ointment.

stream of blood passing through them, inducing a more healthy action in the part. At night the patient should be directed to smear an ointment along the free edges of the affected eyelids:—Ung. hydr. ox. rubri dil. ℥ss; cacao butter, ℥ij.

Atropine often useful.

Astringent lotions in some cases excite irritation and even pain in the eye; under these circumstances it is not advisable to persist in their use, but a weak solution of Atropine gr.  $\frac{1}{2}$  to the ℥j of water, dropped into the eye once a day will often be very beneficial, in combination with the red ointment.

Cold douche and compresses.

The pathological changes being confined in simple hyperæmia, to dilatation of the vessels, either through defective nervous influences or a faulty interchange between the blood and the tissues, we may rely upon the simple treatment above indicated to restore the parts to a healthy state; and, on the same principle, we may order the patient to use the cold-water douche to the closed eyelids, for ten minutes, night and morning. Cold compresses are also most refreshing, and may be applied over the closed lids with advantage for fifteen minutes at a time, especially after a day's work. A lotion to bathe the eyelids with, as follows, is useful in cases of this kind. Sp. æther. nit.; sp. æther. sulp. āā ℥j, sp. rosmar. ℥vj.

Rest.

When the hyperæmia depends on overstraining the eye, our first care must be to protect the organ by rest, and ordinarily fair usage; our eyes cannot stand with impunity all the wear and tear that we, of this restless age, are apt to force upon them.

Alteratives.

Abstinence.

Tonics.

Where the affection is associated with visceral disorder, we may often have to attack the congested conjunctiva through a judicious use of alteratives, and similar remedies, rather than by local applications. Frequently abstinence, as regards tobacco and alcohol, must be enjoined, overloading the stomach with food must be prevented, and a dose of blue pill and black draught administered. These means are as often required in one class of cases as tonics are in another. As an example of the latter, we may take the case of growing youths (students for instance), who, in addition to more or less general debility, suffer from hyperæmia of the conjunctiva. Although the use of astringents, and restriction as to the amount of reading and writing they perform, are doubtless called for in these cases,

still a generous dietary, exercise, and iron must be prescribed, together with the cold-water douche, if we would effect a permanent cure.

It is almost superfluous to remark that, if hyperæmia depends on the presence of a foreign body in the eye, the offending substance must be removed: if an inverted eyelash, for instance, it must be carefully extracted. In examining an eye, never forget to glance at the cilia, particularly at those growing near the inner or outer angle of the eye: a single hair may be sufficient to keep up such an amount of hyperæmia, as to render a patient unfit for ordinary work, and unless the offending object is removed, the disease will certainly persist. Hyperæmia of the conjunctiva, depending on hypermetropia, may be cured by a judicious selection of convex glasses, adapted to relieve the overstrained muscular apparatus of the eye: but as this subject, as well as that of congestion depending on retinitis, will be more fully treated of in a subsequent chapter, I shall leave it for the present.

MUCO-PURULENT, OR CATARRHAL CONJUNCTIVITIS, may be considered as an aggravated form of hyperæmia, with this difference, however, that the discharge from the conjunctiva, though still consisting chiefly of a watery fluid, contains albumen and shreds of mucopurulent matter; and further, that the mucopurulent matter possesses *contagious* properties; in this respect, therefore, the disease we are considering differs essentially from simple hyperæmia.

*Pathology and Appearances.*—In the early stages of mucopurulent conjunctivitis, we shall find that the vessels of the palpebral conjunctiva are principally affected, so that the position of the Meibomian glands is speedily concealed by the congested mucous membrane covering them; the inner surface of the lids appears of a uniformly red colour, the conjunctiva being slightly swollen, especially at the tarso-orbital fold; the semilunar fold and caruncle are also in a similar condition, and, as a general rule, both eyes are equally affected. In consequence of this turgid state of the vessels of the conjunctiva, the villi are more prominent than in health; the loop of vessels contained in the papilla being not only congested, but serous effusion having taken place into its connective tissue, the basement

Remove foreign body.

Glasses for hypermetropia.

CATARRHAL CONJUNCTIVITIS.

Contagious.

Palpebral portion red and swollen.

Villi turgid.

membrane covering the villus is distended, in the same way that a glove might be by the fingers of the wearer.

The vessels of the orbital conjunctiva are occasionally affected to such an extent, that the sclerotic is entirely hidden by the uniformly red and congested mucous membrane covering it. Under these circumstances there is generally a good deal of *chemosis*, as it is called—a term employed exclusively of the conjunctiva, to indicate an œdematous condition depending on serous infiltration of the sub-mucous connective tissue. In the majority of instances, however, the vessels of the orbital conjunctiva are not so deeply injected as above described, but many large and separate vessels may be seen coursing over the sclerotic in a reticulate manner, from the palpebral conjunctiva towards the cornea.

The amount of chemosis present varies very much in different cases; it is always most marked in the tarso-orbital and semilunar folds; in some cases it bulges the conjunctiva forwards, and causes it slightly to overlap the margin of the cornea. To the same cause—viz., over-distension of the vessels, we must attribute the patches of ecchymosis seen on both the palpebral and orbital conjunctiva, in cases of muco-purulent conjunctivitis; the hæmorrhagic spots are usually small but numerous, and doubtless depend upon rupture and extravasation of blood from some of the minute vessels of the mucous membrane.

As a general rule the patient's eyelids are slightly swollen and red, particularly at their edges.

The secretion from the lachrymal and conjunctival glands varies in character during the different stages of the disease; at the commencement it is augmented in quantity, but is normal in quality. As the congestion increases, the circulation through the vessels is impeded, and the first effect of this, observed in the secretion, is the presence in it of albumen; afterwards, as increased cell-formation is established in the epithelial layers of the conjunctival and conglomerate glands, we find a vast number of epithelial, together with mucous cells, mixed up with the serous fluid which escapes from the eyelids. The mucous appear to result from increased action of the conjunctival epithelial cells. I have frequently observed the mucous cells being formed in, and then extruded from the epithelium; while the viscous character of the secretion is referrible to the deliques-

Orbital  
portion  
injected.

Chemosis.

Ecchy-  
mosis.

Eyelids  
swollen.

Secretion  
aug-  
mented;

becomes  
albumi-  
nous.

Afterwards  
muco-  
purulent.

cence of the intercellular basis. This muco-purulent matter usually collects in whitish flakes, which may generally be seen floating about in the tears, not mixing with them; and when the lower lid is everted, the latter escape, and the flakes of mucus generally become deposited on the surface of the conjunctiva, especially on the tarso-orbital fold.

The diseased action is not confined to the conjunctiva and lachrymal apparatus; after a time, the lining membrane of the Meibomian glands also participates in the irritation going on in their immediate vicinity; their secretion becomes altered in character, as well as increased in quantity, and accumulating on the margin of the lids during sleep, it dries and gums them together, so that on waking, the patient has often considerable difficulty in opening his eyes, until they have been washed, and the concretions removed.

*Subjective Symptoms.*—Bearing in mind the fact that muco-purulent conjunctivitis is an advanced stage of hyperæmia, we should naturally expect the patient to complain of an augmentation of the symptoms characteristic of that affection. The conjunctival vessels being more intensely congested than in hyperæmia, the patient complains more urgently of a sensation as if grit or sand had fallen into his eye, and it is often difficult to persuade him that this symptom does not depend upon a foreign body lodged beneath the lids; the affected eye itches a good deal, and the upper lid feels to the patient as if it were stiff and heavy, especially after work or exposure to the glare of the sun or candle-light. The lachrymal secretion being increased, and the puncta more or less occluded by the swollen condition of the mucous membrane, the eye waters much, and a tear is apt to collect between the lids, and hanging in front of the cornea to cause some impairment of vision, until the patient wipes it away. These symptoms increase towards evening, and in the morning the patient awakes and finds his eyelids stuck together, by the dried secretion from the Meibomian glands.\*

\* A difficulty of another kind is sometimes experienced in opening the lids, especially in the earlier and drier stages of the complaint, and in chronic cases; this depends on the roughness of the opposed conjunctival surfaces, and a diminution of the secretion by which they are ordinarily lubricated.

Meibo-  
mian  
glands  
affected.

Lids  
cohere.

Sensation  
of grit in  
the eye.

Stiffness  
of the lids.

Lachryma-  
tion.

**Pupil active.** The cornea remains bright and clear, and the pupil responds to the stimulus of light, indicating the fact that neither of these structures is involved.

A person suffering from muco-purulent conjunctivitis does not experience any actual pain in the eye or supra-orbital region, nor is there usually much intolerance of light, so that he often comes to consult us with his eyes wide open, and presenting those appearances of the parts which I have above described.

**General aspect.**

**Prognosis.**

An attack of conjunctivitis of this kind usually disappears in the course of a few days, unless its exciting cause should continue in operation; under which circumstances it may pass on into the purulent, or other forms of inflammation, or it may degenerate into a state of chronic hyperæmia.

**Causes.**

**Atmospheric influences.**

The Causes which induce muco-purulent conjunctivitis are numerous, but in the majority of cases it may be traced to atmospheric influences, such as cold or damp, or sudden changes of temperature. These are, however, not always sufficient to account for the sudden outbreaks of this complaint, which often has an epidemic prevalence, and that even in the summer months; but under these circumstances we must remember that contagion plays an important part in the propagation of the disease, and it often spreads in this way through a school, a regiment, or a community. Miasma, foul air from overcrowding, putrescent and irritating exhalations from drains and cess-pools, are also sources of this form of conjunctivitis, and greatly aggravate its progress.

**Contagion,**

**and miasma.**

**Foreign bodies.**

Foreign bodies lodged on the conjunctiva may give rise to muco-purulent conjunctivitis; for instance, it is not a very uncommon circumstance for an insect to find its way into the eye, and becoming impacted in the folds of the conjunctiva, to induce muco-purulent inflammation. Lastly, a muco-purulent conjunctivitis is apt to occur in the course of the various exanthemata.

**Treatment.**

**Remove the cause.**

*Treatment.*—The first object to be kept in view, in the treatment of muco-purulent conjunctivitis, is to remove, if possible, the cause of the disease. As a general rule there can be no difficulty in accomplishing this, should the inflammatory action depend on the presence of a foreign body; but if it be induced, as it too frequently is, from the prolonged action of

dust, foul air, over exposure to the sun, or other irritating causes, it may be difficult, especially among the lower classes, to protect them from these deleterious influences.

In treating these cases, we should never overlook the fact that the affection is a contagious one, and therefore it is our duty to isolate patients suffering from it, as far as possible. The state of the patient's general health must be taken into consideration; the secreting organs will frequently be found at fault, and a little judicious starving in some cases, together with a blue pill, black draught, and colchicum, will

**Segregation.**

do wonders, particularly if the individual is the subject of a rheumatic or gouty diathesis. There can be no greater mistake, than to order a patient astringent lotions to drop into the eye simply because he is suffering from muco-purulent conjunctivitis; applications of this kind do far more harm than good in many of these cases. If the patient suffers from ciliary pains and irritability of the eye, it is advisable to keep him in a dark room, and apply the extract of belladonna freely over the eyelids. A weak solution of sulphate of atropine may be advantageously dropped into the eyes in cases of this description. Hot poppy-head fomentations are often most grateful to the patient, and may be employed three or four times a day, the belladonna being smeared over the lids after the use of the fomentations.

**Alteratives.**

**Belladonna.**

So soon as the irritation has subsided, and the discharge from the eye is of a muco-purulent nature, astringents may be substituted for the atropine drops. A lotion composed of zinc chloride, or of nitrate of silver, grain  $\text{j}$  to the  $\text{ʒj}$  of water, should be applied to the surface of the conjunctiva three times a day. In cases where astringents of this kind seem to irritate the eye, a solution of tannin, gr.  $\text{xx}$  to the  $\text{ʒj}$  of water may be substituted, the extract of belladonna being smeared over the skin of the eyelids and temple at bedtime.

Should the discharge from the eye be copious when we first see the patient, or become so after treatment such as I have above indicated, we must employ a rather stronger solution of nitrate of silver, containing three or four grains to the  $\text{ʒj}$ , to the eye every six hours, in combination with atropine. Cold compresses

should be kept over the closed eyelids for some time after each application of the astringent lotion.

Ointment to the lids.

It is advisable, under any circumstances, to order the patient to smear the glycerine and starch ointment, or a little cold cream, along the free margin of the lids at bedtime, so as to prevent them from sticking together during sleep; or an ounce of simple ointment, in combination with ten grains of the red precipitate, may be employed in the same way.

Alum lotion.

As the acute symptoms pass off, a lotion composed of acetate of alum, two grains to an ounce of water, may be substituted for the nitrate of silver. I need hardly add that, if practicable, the patient should abstain from work, and keep away from bright sunshine; neutral tint glasses, or a gauze shade, should be worn when he is exposed to glare or dust, and he should be cautioned against working by lamp or candle-light. If the eyes are overstrained, it is almost impossible to cure the conjunctivitis; they must have rest as well as medicine.

Rest and protection.

PURULENT CONJUNCTIVITIS,

varies in severity.

PURULENT CONJUNCTIVITIS.—This formidable disease varies much in intensity in different individuals and in different places; it is most destructive among the poor and ill fed, and those whose constitutions have been impaired by disease; but under any circumstances it too frequently ends in sloughing of the cornea, and partial, if not total destruction of sight.

*Pathology and Symptoms.*—It is impossible, as I have before remarked, to draw a line of demarcation between the termination of muco-purulent and the commencement of suppurative conjunctivitis, the latter being simply a more intense form of disease than the former. In all cases of purulent conjunctivitis in its early stages, hyperæmia of the mucous membrane exists, which rapidly passes on into the muco-purulent form of the disease; but in its first stage it would be impossible, in any given case, to say positively if the inflammation would advance to suppuration or not, although in the majority of instances all doubts on the subject will be cleared away in the course of a few hours. In fact, in cases arising from the inoculation of gonorrhœal or other contagious matter into the eye, symptoms of intense inflammation declare themselves very rapidly, and leave us no room for doubt as to the

Hyperæmia at first.

Passing into acute inflammation.

formidable nature of the disease with which we have to cope.

Intimately connected with the stagnation of blood in the conjunctival vessels of an eye affected with purulent inflammation, are certain active changes set up in the part, resulting in increased cell-formation; the congestion, moreover, occasions a considerable amount of serous infiltration into the loose connective tissue of the lids, and from these combined causes the swelling and œdema of the parts arise. These pathological changes are similar in kind, but more deeply seated and intense, than those we have already described as taking place in the catarrhal form of conjunctivitis. The serous infiltration is deeper, there is a more rapid proliferation of cells, which are consequently less perfect, and tend to fatty degeneration. Hence the cell elements in the secretion are more abundant, the inter-cellular basis less consistent; there are more pus and fewer mucous cells; the flakes disappear, while the secretion becomes less viscous, and mixes more readily with the tears.

Nature of the changes in the conjunctiva.

Cell proliferation.

The extent to which the eyelids are swollen in cases of this kind is not a safe criterion of the intensity of the disease. I have met with instances in which the eyelids were only slightly swollen, and yet sloughing of the cornea had supervened very rapidly; but whether the patient's eyelids be greatly swollen or not, they feel soft and doughy to the touch, and not, as in diphtheritic conjunctivitis, of brawny hardness. It is a mistake, however, to suppose that we can evert the lids, especially the upper one, in cases of purulent conjunctivitis, without giving the patient pain; in many instances the eyelids are much swollen, and it then causes the patient very considerable suffering to evert them.\* I mention this fact, because authors speak of turning up the lids, and smearing caustic over the palpebral conjunctiva in cases of the kind, as though the proceeding were almost a matter of indifference to the patient. My experience leads me to a very opposite conclusion. I find that few adults can undergo this treatment, on account of the suffering it causes, and I have never seen a child sufficiently heroic to allow the application to be repeated.

Swelling of the lids variable,

soft and doughy.

Difficulty of everting them.

\* "Augenheilkunde," von K. Stellwag v. Carion, p. 354.



Conjunctiva of lids and globe thick and red.

Villi turgid.

Chemosis.

Acute ectropium.

Risk of sloughing.

Closed puncta.

Lachrymation.

Ecchymosis.

The congestion of the conjunctival vessels is great, and comes on very rapidly in this form of disease. Both the palpebral and orbital portions of the conjunctiva are of a uniformly deep scarlet colour (Pl. II. Fig. 2); the former is thickly covered with engorged villi, which produce the velvet-like appearance above noticed; in some cases the villi are flattened and rounded from pressure against the eyeball.

In cases where the serous effusion into the connective tissue of the conjunctiva is excessive, this membrane becomes so much swollen that the lids are thrust away from the eyeball; but the fibres of the orbicularis, contracting firmly, prevent the lids from being everted for some time. The distending force from within may, however, ultimately gain the ascendancy, and the lid will then be turned backwards on itself, in exactly the same manner as it is when we evert it in making an examination of the parts, acute ectropium in fact, resulting. This accident is more liable to occur in young children than in adults; ignorant attendants are apt, especially at night, to evert the swollen lids, in the attempt to apply drops or lotion to the eye. The accident may not be noticed till some hours afterwards, and in the meantime the fibres of the orbicularis at the line of eversion form a constricting band, which presses firmly on the part, and impedes the circulation of blood through the vessels of the everted portion of the lid; and unless the ectropium is speedily reduced, and the parts returned to their normal position, the conjunctiva is very likely to slough, and irrecoverable injury may be done to the eye.

Another symptom, consequent on the swollen state of the conjunctiva, is that the puncta, at an early stage of the disease, are closed and thrust away from the eyeball, so that the tears cannot pass through them; this, combined with the hypersecretion of fluid from the lachrymal gland, causes a stream of tears to be constantly overflowing from the inner corner of the eye and running down over the cheek.

When speaking of muco-purulent conjunctivitis, I mentioned that small spots of ecchymosis are generally to be seen in the conjunctiva; in the purulent form of the disease these hæmorrhagic effusions are not only numerous, but often of considerable size, as we might expect from the more intense congestion of the vessels

which exists in the suppurative variety: but this ecchymosis is a matter of very small importance, as the effused blood becomes rapidly absorbed as soon as the inflammatory action subsides.

The nature of the secretion from the conjunctiva varies with the progress and character of the disease; at first it is watery, then it contains muco-purulent matter, and lastly it will be found to consist of pus often tinged with blood. In many cases the quantity of pus formed is by no means great, and we must not always expect a stream of purulent fluid to gush out from between the patient's eyelids the moment we separate them, although in many instances this is the case.

A tolerably accurate index of the intensity of the changes going on in the conjunctiva in purulent conjunctivitis is afforded us by the increased temperature of the eyelids, which may be measured with the thermometer, and which will be found to range several degrees above the normal temperature of the skin; in the muco-purulent and milder forms of conjunctivitis, there is no perceptible increase in the temperature of the lids.

In purulent conjunctivitis, as I have before mentioned, suppuration generally commences within forty-eight hours from the beginning of the attack, so that the first stage of the disease is of short duration; and this is one of the diagnostic symptoms between it and diphtheritic conjunctivitis. In the latter, suppuration does not come on until the fibrinous exudation has begun to degenerate and become disintegrated, a period usually exceeding five days, and until this time has elapsed there is no purulent discharge from the surface of the mucous membrane.

There can be no doubt as to the contagious nature of the pus in purulent conjunctivitis; this is the reason why both eyes are usually affected, the matter finding its way from the diseased into the sound eye, unless the strictest precautions are taken to prevent this accident.

*Corneal Complications.*—In severe cases of purulent conjunctivitis, the circulation in the part is impeded, on account of the blood stasis due to the inflammatory action. In addition to this, the swollen conjunctiva overlaps the margin of the cornea, and in many in-

Secretion varies with progress of disease.

Increased temperature.

Suppuration begins early.

Pus infectious.

The cornea deprived of blood.

stances the chemosis is so great, that the cornea appears buried in the crimson folds of the mucous membrane. This effusion into the conjunctiva tends to augment the impediments to the circulation through its deeper layer of vessels; and these combined causes materially interfere with the passage of blood to the margin of the cornea, cutting off its supply of nutrient material, and frequently leading to rapidly advancing ulceration and necrosis of that important structure.\*

Consequent ulceration.

A careful examination must be made.

Chloroform should be given.

Caution.

We cannot, therefore, be too careful in examining the eye of a patient suffering from purulent conjunctivitis, to ascertain the condition of the cornea beneath the chemosed mucous membrane. Considerable difficulty, however, is often experienced in opening the lids in cases of this kind, for not only are they frequently much swollen, particularly the upper one, but the individual involuntarily resists our attempts to admit light into the eye. Under these circumstances, we should not hesitate for a moment to administer chloroform, particularly in the case of children. The patient's sight may depend upon the care with which we make our first examination; and any pulling or pressure on the lids is to be avoided, as deep ulceration of the cornea may exist; and if it does, the surgeon may unawares put a finishing stroke to the matter by pressing on the eyeball and causing the ulcer to give way. Irreparable damage would thus be done to the eye, which might well be avoided, if only five minutes were employed in administering chloroform before commencing the examination.

I cannot insist too strongly on the point, that the principal danger of purulent conjunctivitis consists in the destructive effects it so often exerts upon the cornea, and that to this structure our attention must be mainly directed.

The commencement of this disorganizing process is sometimes seen in a general haze of the cornea, but more commonly as a patch or patches of grey infiltra-

\* Professor Stellwag seems to regard the contact of the purulent virus as an accessory cause of the ulcerative process. "It is probable," he observes, "that this ulcerative process has a near causal connexion with the true purulent secretion, and that its effect on the corneal substance may be excited, or at least favoured by a sort of decomposing action."

tion, usually situated at the periphery. The ulceration follows at the margin of the cornea, beneath the chemosed conjunctiva, and unless the swollen mucous membrane be pressed backwards, the destruction progressing beneath it may not be recognised; the diseased action, however, advances, the cornea is perforated, and prolapse of the iris occurs, the centre of the cornea, it may be, looking bright and clear to the last.

Ulceration concealed by chemosis.

Centre clear.

In other cases, the ulcer spreading completely round the margin of the cornea, the nutrition of its central portion is cut off; it becomes hazy, necrosis occurs, followed by a rupture of the cornea, and probably the evacuation of the greater part of the contents of the eyeball. These changes apparently take place very rapidly, so that a cornea, which in the morning perhaps looked bright and clear, in the evening is hazy, and on the following day may have sloughed away; not that the process absolutely occupies so short a time, for in all probability, had the chemosed conjunctiva been pressed backwards, and the margin of the cornea examined, we should have found its circumference deeply ulcerated, as above described.

Circular ulceration.

Rapid sloughing of the cornea.

In other instances of purulent conjunctivitis, suppurative keratitis sets in from an early stage of the disease: the cornea assumes the well-known and much-to-be-dreaded "moist wash-leather appearance"—a most hopeless condition of the parts, which has only to be seen once to be recognised again.

"Wash-leather" cornea.

Lastly, in a few instances, the cornea appears as though it had been stained with a solution of carbonate of lead, being of a pinkish white colour and semi-transparent. These changes seem to depend on fatty degeneration of the fibrous elements of the cornea, which consequently lose their tenacity, and become unable to resist the intra-ocular pressure; the cornea then gradually gives way, and bulges forward, particularly towards the centre, which may ultimately burst like an over-distended bladder, and through the rent thus made, a large hernia of the iris occurs. This particular class of cases is seldom marked by very acute symptoms, the chemosis is not a prominent feature of the disease, nor is there much purulent discharge from the eye; but these degenerative changes, gradually advancing in the fibrous structure of the cornea, indicate a most dangerous state of things when

Fatty disorganization.

Rupture.

Hernia of the iris.