

occurring as a complication of suppurative conjunctivitis.

The patient relieved by rupture.

No sooner is the cornea destroyed by any one of the processes above noticed, than the patient experiences the greatest relief; the intra-ocular pressure being removed, the pain at once abates, the discharge becomes less, and the patient believes that all is going on well, whereas, as Mr. Dixon remarks, the surgeon knows but too surely that his patient's sight is lost for ever. But, as he further observes, "as long as any portion of the cornea retains its vitality, the case must not be abandoned in despair; for if only a small portion, less than a quarter of one cornea, can be saved from destruction, and its transparency retained, useful sight may be eventually gained by the operation of making an artificial pupil."\* I am, however, able to offer even more substantial consolation than this, and to affirm that, even in the worst cases of purulent conjunctivitis, destruction of the cornea but rarely occurs, if the treatment I shall presently describe be carefully carried out; provided the patient is in pretty good health, and is brought under our notice at an early period of the disease.

Condition almost hopeless.

Prevention.

*Subjective Symptoms.*—At the commencement of the attack, the patient will complain of the affected eye itching a good deal, as if sand or dust had got into it; but this symptom is of a very transient nature, corresponding to the first stage of the affection, which, as I have before remarked, seldom lasts more than thirty-six hours.

Pain severe in the second stage.

In the second stage the chemosis and swelling of the lids are often considerable, and the pain is frequently very acute, but by no means constantly in proportion to the swelling of the parts; it depends to a great extent upon the degree to which the deeper structures of the eye are involved, and upon the temperament of the patient. In all instances, pain in the eye, extending to the temple, is a constant symptom of severe purulent conjunctivitis, and one which the patient is sure to bring prominently to our notice. The pain usually increases towards bed-time, and by no means disappears when the suppurative stage comes on. In

\* "A Guide to the Practical Study of Diseases of the Eye," by J. Dixon, p. 49.

some instances there is a sudden cessation of pain about the tenth day of the disease, but this frequently depends upon perforation of the cornea and the evacuation of the contents of the eyeball; the moment the intra-ocular pressure is removed, the patient experiencing relief.

Ceases on rupture of the cornea.

The pain of purulent conjunctivitis, however, varies according to the intensity of the disease: where the affection is comparatively mild, it may be almost absent, the patient simply complaining of a pricking, aching sensation in the eyelids, especially the upper one. In such cases the external inflammatory action has not been sufficiently severe to affect the circulation in the choroid, and consequently there is none of that implication of the ciliary nerves and intense pain in the eye, which is a marked feature of the more severe form of the disease.\*

Varies with severity of disease.

As a general rule, the constitutional disturbance which occurs in cases of suppurative conjunctivitis is of a very trivial character; there may be some amount of fever present, but it is not a noticeable feature of the disease, as it is in diphtheritic conjunctivitis. The patient complains of restlessness and want of sleep, but this is often occasioned by the anxiety of mind and the pain from which he suffers.

Constitutional symptoms trifling.

In severe cases there is always marked intolerance of light; and although the lids may be so much swollen that the patient cannot open them, he still prefers being in a dark room, and the moment he is brought towards the light there is a gush of tears from between the lids, and an instantaneous increase of pain in the eye. In less severe cases the patient does not experience any great uneasiness from a short exposure to the light, but always prefers a dark room and the exclusion of as much light as possible from his eyes. In fact, the physiognomy of a person suffering from a bad attack of purulent conjunctivitis, in its second stage, is characteristic of the disease; his face is usually pale, and his countenance indicates pain and distress; he is led into your presence by a companion, being unable to see; the eyelids are more or less red and swollen, their free margins being usually of a scarlet colour, and pus is seen oozing from between

Intolerance of light.

Physiognomy characteristic.

\* Middlemore, "Treatise on Diseases of the Eye," vol. i. p. 116.

them; the patient holds a handkerchief or his hands before his eyes, so as to screen them from the light as much as possible. It does not follow that both eyes are affected; but the sound one is usually kept closed, as exposure to light at once induces pain in the diseased organ.

Prognosis from the state of the cornea.

*Prognosis.*—In endeavouring to estimate the probable issue of a case of this kind, the condition of the cornea must chiefly engage our attention; if it is bright and clear, and no ulceration is going on at its circumference, the patient's health at the time being good, our prognosis may safely be a favourable one. If, on the other hand, ulceration has commenced, our opinion must be very guarded; and if sloughing of the cornea has begun, we can give the patient no reasonable hope of recovery; he may regain some amount of sight in the diseased eye, but at best it will be very imperfect.

Frequency of relapses.

In forming our prognosis, also, we must constantly bear in mind the fact that purulent conjunctivitis is very apt to relapse. A patient may apparently be on the high road to recovery, when suddenly a return of all the worst symptoms takes place, and his prospects of ultimate improvement become very much impaired. Even in apparently trivial cases I have seen relapses of this kind occurring, which, in spite of my best efforts, have terminated in serious damage to the eye.

Causes.

*The Causes of Purulent Conjunctivitis.*—This form of the disease is due, in by far the majority of cases, to contagion; infecting purulent matter from the eyes of another person, gonorrhœal matter, or the unhealthy secretions from the vagina, are capable among other similar agents of inducing purulent conjunctivitis.

Inoculation.

Other reputed causes doubtful.

It has been supposed that the disease may be propagated by means of dried purulent matter floating in the air, and becoming deposited on the conjunctiva. Insects no doubt may be one means of conveying the matter from the source of infection to the healthy eye.

Treatment.

*Treatment of Purulent Conjunctivitis.*—In purulent conjunctivitis our main efforts must be directed towards the preservation of the cornea. If the conjunctivitis were not the cause of ulceration of the cornea, we might very well leave it to itself, but as it is, unless we can reduce the inflammation going on in

the mucous membrane, no amount of care and skill on our part can insure the safety of the cornea. In considering the treatment, therefore, of purulent conjunctivitis, I would divide the cases into two classes: the first to include the milder ones, in which the cornea is unaffected; the second, the more severe cases, in which ulceration of the cornea has already begun.\*

Cases divided into two classes.

1. In the first class of cases, discarding all consideration as to the cause of the disease (unless in instances arising from the presence of a foreign body in the eye), or whether the patient be an infant or an aged person, but distinctly bearing in mind the fact that we are now discussing those cases which are not complicated with ulceration of the cornea, we should at once order a strong solution of nitrate of silver (one drachm to three of water) to be painted over the skin of the eyelids. Another, weaker solution (two grains to the ounce) should also be prepared, some of which may be dropped into the eye every second hour. These drops should be continued for twenty-four hours, and it will then be advisable to repaint the eyelids with the strong solution of nitrate of silver, and to continue the drops until the congestion of the conjunctiva has subsided, and the purulent discharge become thinner, and less profuse.

1. Where the cornea is free.

Paint the lids with arg. nit.

Drops of the same for eye.

In the majority of cases, it will probably be unnecessary to apply the solution of nitrate of silver over the skin of the eyelids more than twice, but the instillation of the drops into the eye should probably be continued for a week or ten days; by that time the active symptoms of the disease will almost invariably have disappeared (provided the patient has come under our treatment at the commencement of the attack), and a solution of two grains of sulphate of zinc to an ounce of water, to be dropped into the eyes two or three times a day, may be substituted for the nitrate of silver lotion. It is seldom necessary, however, to use the nitrate of silver drops every second hour, as above directed, for more than two or three days; after that we may generally order it to be dropped into the patient's eye every six hours, and subsequently twice a day.

The latter to be used for a week or so.

In cases of this kind the patient does not usually

\* Tyrrell "On Diseases of the Eye," vol. i. p. 62.

Fomentations.

suffer from much pain in the eye, and the poppy-head fomentation with extract of belladonna smeared over the temple will probably relieve any pain that may exist; in some cases, however, especially if the patient complains of considerable pain in the eye, a few leeches applied about an inch from the outer canthus are very beneficial. The state of the bowels should be attended to, and, as a general rule, a generous dietary allowed. Quinine, and a moderate amount of stimulants, are as often called for as antiphlogistics; but the state of the pulse must be our guide in this matter.

Management of infants.

The chief difficulty with which we have to contend, in treating the purulent conjunctivitis of infants and young children, arises from their resisting our attempts to drop the solution of nitrate of silver into the eyes. The child's head must be firmly secured, and the lids gently drawn apart, and the lotion having been dropped into the eye, the lids may be allowed to close. This proceeding should be repeated three or four times, and the eyelids then bathed with tepid water, and the child allowed to rest for two or three hours, when the lotion will have to be used again in precisely the same way, the application being continued night and day, until the purulent discharge almost ceases. If it should be found more convenient to apply the lotion by a small syringe, by all means let an instrument of the kind be employed. What we must insist on is, that the nitrate of silver lotion is thoroughly well brought into contact with the inflamed surface of the conjunctiva.

Improvement rapid.

In most cases, if this plan be strictly followed out, a very considerable improvement will be quickly noticed in the state of the child's eyes. Within forty-eight hours the little patient will begin to open them, and bear exposure to the light; the swelling of the lids and congestion of the conjunctiva diminish; and we may then substitute a solution of sulphate of zinc (one grain to an ounce of water), for the nitrate of silver, the lotion being used three times a day. We should bear in mind the fact, that a relapse is just as likely to occur in this as in any other form of the disease, and not entirely discontinue the use of the sulphate of zinc lotion until the child has perfectly recovered; and should a relapse occur at any time, and the discharge become purulent, we must resume the

Relapses may occur.

nitrate of silver solution, which is almost a specific in cases of this kind if properly applied.

As an illustration of the plan of treatment here recommended, in cases of purulent conjunctivitis in which the cornea is unaffected, I may quote the following history from my case-book:—

October 11th: K., aged twenty-five, a healthy-looking woman, states that up to within the last four days she had been in perfect health, and has never had anything the matter with her eyes. The present attack came on some four days ago; the right eye commenced watering and itching a good deal, and the following morning it was red, painful, and swollen; in fact, in much the same state as it is now.

Towards the evening of the second day from the commencement of the affection, she came to the hospital for relief. I found the eyelids, especially the upper ones, considerably swollen; their margins were covered with pus, which was oozing from the inner corners of the eyes. On everting the eyelids, the conjunctiva in either eye was found to be of a uniformly deep scarlet colour and swollen, the villi prominent, and looking like granulations. There were numerous spots of ecchymosis on the surface of the conjunctiva, it was also chemosed, and slightly overlapping the margin of the cornea; the cornea, however, in both eyes was healthy, with the exception of a narrow rim of superficial ulceration near the superior margin of the right one.

The patient complained of pain in the eyes, which increased towards morning; it extended to her temples, but was not sufficiently severe to keep her awake during the night. She had no fever or constitutional symptoms: bowels regular; appetite good. It appeared certain that she had not been suffering from gonorrhœa, nor, as far as we could ascertain, had she been exposed to the influence of any contagious matter.

Ordered, at 7 A.M., to bathe the eyes constantly in tepid water; a strong solution of nitrate of silver in water to be painted over both eyelids, and a solution of three grains of nitrate of silver to the ounce of water to be dropped into the eye every second hour. Full diet.

These orders were strictly carried out, and on the

CASE.  
Acute  
accession.Redness  
and  
swelling.Purulent  
discharge.Com-  
mencing  
ulceration.

Pain.

Arg. nit.  
to the eye-  
lids and  
conjunc-  
tiva.

following day, the 13th of October, I found the swelling of the eyelids much reduced, the conjunctiva apparently in the same condition; but as the eyes had been kept perfectly clean, I was unable to judge of the amount of purulent secretion. The lids were again painted over with the strong nitrate of silver solution, and in fact the treatment of the previous day was continued.

Rapid improvement under treatment.

On the 14th I found a marked improvement in the eyes; the swelling of the lids was much diminished, the patient could open them, and did not suffer from intolerance of light; the chemosis was almost gone, and the narrow ulcer in the upper part of the right cornea was covered with vessels. I ordered the lotion to be applied every six hours, the nitrate of silver to the lids to be discontinued. On the following day, the improvement continuing, I diminished the strength of the drops to one grain of nitrate of silver to an ounce of water, and it was employed less frequently. The patient recovered without a relapse, and was pronounced cured twenty days after she first came to the hospital.

In some cases, circumstances may render it impossible for us to depend on the nitrate of silver lotion being regularly and effectually dropped into the eye, and we may then order four grains of the sulphate of alum to an ounce of water to be injected between the eyelids with a small glass syringe, every thirty minutes during the day, and two to three times during the night.

2. Cases where the cornea is involved.

Apply caustic to conjunctiva of lids.

2. I now proceed to consider the treatment of the second class of cases—that is, those in which the cornea has become implicated, either during, or prior to the commencement of our attendance on the patient. It consists in applying caustic to the surface of the palpebral conjunctiva and semilunar folds: there is no necessity for touching the orbital mucous membrane.

The "dilute pencil."

With regard to the caustic to be used in cases of this kind, solid nitrate of silver should never be employed, but a pencil, composed of equal parts of nitrate of silver and nitrate of potash, or of one of nitrate of silver and two of nitrate of potash. A pencil of this kind is easily prepared by fusing the proper proportions of the salts together, and allowing the fluid mix-

ture to run into a fine glass tube: it solidifies immediately, and is then fit for use. The reason why we employ a dilute caustic pencil in these cases is, that our object is simply to destroy the epithelial layers of the conjunctiva, and not to cause sloughing of its connective tissue, which pure nitrate of silver might do, and thus lead to the formation of a conjunctival cicatrix, and very probably contraction of the mucous membrane. The rough surface thus formed would be likely to keep up irritation in the part, and by constantly rubbing against the cornea, ultimately induce opacity. The cornea, however, is hardly likely to escape immediate destruction if solid nitrate of silver is applied to its surface.

Its advantages.

Many patients suffering from purulent conjunctivitis become nervous and irritable; they cannot and will not bear much increased pain, and under these circumstances it is sometimes advisable to let them inhale a little ether before applying caustic to the surface of the conjunctiva; under any circumstances the patient should be seated or laid on his back before a window, so that the inflamed eye may be thoroughly illuminated; the lower lid is then to be carefully and fully everted, the conjunctiva being wiped dry with a bit of linen rag, and the caustic pencil is to be applied over the entire surface of the palpebral mucous membrane, particularly over the tarso-orbital fold. The instant the caustic has been applied, a white film forms over the part, and as soon as this appears, an assistant should drop a little cold water over the everted lid, so as to decompose and wash away any excess of nitrate of silver that may be present. The lower lid may then be returned to its normal position, and the upper one treated in precisely the same way. When the latter is much swollen, we shall experience considerable difficulty in smearing the upper tarso-orbital fold of the conjunctiva; it is absolutely necessary, however, that the whole of this portion of the mucous membrane, as well as the semilunar folds, should be brought in contact with the caustic pencil.

Method of using the caustic.

Application must be thorough.

A pencil of nitrate of silver, applied in the way above described to the surface of the conjunctiva, at once destroys its epithelial layers, from which the purulent discharge is produced; so that, until the epithelium has re-formed, the discharge from the in-

Discharge lessened by the caustic.

Rules for  
re-applying  
it.

flamed eye will diminish very perceptibly. The length of time necessary for completing these changes varies under different circumstances, but, as a general rule, new layers of cells will have replaced those we have destroyed in about twenty-four hours, and with their growth the purulent discharge from the eye will return.

This will be the sign for the necessity of a re-application of the caustic; in fact, as soon as the pus again appears after our first application, whether it be in twelve, twenty-four, or thirty-six hours, so soon must we re-apply the caustic, in precisely the same way as I have just described; but a somewhat weaker pencil, composed of one part of nitrate of silver, and three of nitrate of potash, will, as a general rule, be sufficiently strong after the first application. It may be necessary to continue this treatment for five or six days, before the excessive action going on in the inflamed conjunctiva will have been overcome, and the purulent discharge cease; but, as a general rule, after each application of the caustic, the pus will take a longer time to form, and will ultimately disappear altogether.

Operation  
promoted  
by cold  
compresses.

M. Wecker's explanation of the action of the caustic is, that the hyper-action going on in the part is caused by the sluggish circulation of the blood through the vessels of the inflamed tissue; the application of nitrate of silver by altering this abnormal action causes the stream of blood to pass more rapidly through the part, and thus improves the circumstances of the tissues so far as their nutrition is concerned. To keep up this action of the caustic, he advises the application of cold compresses to the eyelids immediately after the cauterization. The compresses should be continued, if possible, without intermission, for they not only prevent the vessels from again dilating, but they wash away the abnormal secretion, and thus keep the eye perfectly clean—a most important point to attend to in such cases. The cold compress may be made by taking pledgets of lint sufficiently large to cover the eyelids, which should be laid on a lump of ice until quite cold, they must then be placed on the lid, and changed when they become in the least warm. Pledgets of this kind should be kept on the ice in rotation, so as to maintain a constant cold surface to the inflamed eyelid. The congestion being thus temporarily overcome, a more rapid circu-

Clean-  
liness  
important.

lation of blood takes place through the vessels, the nutrition of the parts is re-established, and the vessels are then more likely to retain their normal calibre, the healthy blood acting as a stimulant to their contractile tissue.

There is no necessity for syringing out the eye in order that we may keep it clean: it is quite sufficient to evert the lids slightly, and allow a little cold water to trickle into the eye, from time to time.

Syringing  
needless.

M. Wecker insists upon the importance of attending to the foregoing rules with regard to the use of nitrate of silver, which I shall therefore briefly recapitulate. It should never be employed until suppuration has commenced, otherwise it may do positive harm. Having applied it, wait before using it again, till the whole of the deposit which it has formed on the surface of the conjunctiva has disappeared, and suppuration has been re-established; if this is not done, we shall apply the caustic to the denuded basement membrane, which will be likely to damage this delicate structure, and the connective tissue beneath it, and would be followed by the formation of cicatrices, and a permanently rough state of the conjunctiva. As I before observed, our only guide as to the frequency with which the cauterization should be employed is the appearance of the mucous membrane: as soon as pus re-forms we may be sure that the epithelium has been reproduced, and may therefore with safety resume the use of the diluted pencil. If these rules are attended to, there is no fear of our cauterizing an eye affected with diphtheritic conjunctivitis in its early stages, or of any other of those mishaps taking place, a combination of which has thrown even this sovereign remedy into disrepute with some surgeons.

Recapitula-  
tion.

With regard to the management of the orbital conjunctiva, which has been left untouched by the nitrate of silver, but which is swollen and probably overlapping the cornea, it is advisable to make four or five incisions through the mucous membrane, radiating from its chemosed portion, which overlaps the cornea, outwards as far as the eyelids.\* I would make at least

The or-  
bital con-  
junctiva  
should be  
deeply  
incised.

\* Lectures "On Diseases of the Eye," by J. Morgan. 2d edit. p. 72.

Value of incisions.

four such deep incisions down to the sclerotic: they should be made with a cataract knife, or some such sharp-edged instrument, so as not to lacerate the tissues. There can, I think, be no doubt that, by cutting through the swollen conjunctiva in this way, we relieve the pressure which the chemosis exerts upon the deeper layer of vessels, and thus give the cornea a chance of receiving sufficient nourishment to keep it alive. The only objection advanced against these deep incisions is, that in healing four cicatrices must be left in the conjunctiva. I do not, however, regard this objection as of any moment, when placed in opposition to the fact, that by this means we may do much towards preserving the integrity of the cornea, which is probably threatened with immediate destruction.

Objections.

Encourage bleeding.

I am no advocate, however, for repeated and numerous incisions through the chemosed conjunctiva; the operation should be performed as I have described, and as it is our object to relieve the congested vessels, we must encourage the bleeding from the wounds which we have made by keeping the lids open, and bathing the parts with warm water for ten minutes or so. If we allow the lids to close immediately after the conjunctiva has been incised, clots of blood form beneath them, and the pressure which these exert on the vessels stops the hæmorrhage, and defeats the principal object which we had in view in making the incisions. These clots must therefore be prevented from forming for the space of about ten minutes; the lids may then be closed, and the cold water compress applied.

Superficial incisions may be repeated.

It will seldom be advisable to repeat these *deep* incisions into the mucous membrane, but after the palpebral conjunctiva has been smeared over with the caustic pencil, we may perhaps scarify the chemosed orbital mucous membrane, making *superficial* incisions in all directions, and then endeavour to excite hæmorrhage from the divided vessels, by the application of warm fomentations.

Treatment of corneal complications.

With regard to the state of the cornea and its treatment, we must in the first place make a thorough examination of the part, and its condition cannot be too carefully considered; for upon this inspection, and upon the treatment it suggests, the patient's sight in many cases depends.

The danger which we have to fear, if perforation of the cornea takes place, is that opacity will ensue, or a staphyloma of the iris occur, the elastic structures behind the iris pushing it through the opening in the cornea, and when in this position, preventing its return to its normal situation in the anterior chamber.

Danger of perforation.

In cases where a portion of the cornea is so far destroyed by ulceration, that its posterior elastic lamina alone remains intact, it may happen, at any moment, that this delicate structure will be burst open by the distending force behind it; we should therefore relieve the intra-ocular pressure by puncturing the cornea with a needle, and allowing the aqueous to escape. This little operation of paracentesis of the cornea, under these circumstances, is often attended with the happiest results: it not only prevents the formation of a staphyloma, but, by diminishing the intra-ocular pressure, it relieves the tension of the eyeball, and hence also the ciliary neurosis from which the patient often suffers to an intense degree. I believe I am tolerably safe in saying, that we are far more likely to err on the side of non-interference, than we are to open the cornea too often under these circumstances.

Paracentesis of cornea.

Relieves dangerous tension

and pain.

The puncture through the cornea should be made near its junction with the sclerotic, and the point of a broad needle must only be allowed just to enter the anterior chamber, otherwise the lens may be injured; but beyond this caution, which is not peculiar to these cases, no particular rules are necessary for this operation. It is by no means always sufficient to perform paracentesis once, in the treatment of a case of this kind; the puncture made in the cornea heals within twenty-four hours, and the aqueous humour rapidly re-forms, so that it will very probably be necessary to open the cornea a second, or even a third time.

Precaution as to lens.

Repetition of puncture.

To sum up then: in the majority of cases of the class we are now considering, we shall have—1st, to make a thorough examination of the eye, and should we find the cornea ulcerated, we must 2ndly, apply a pencil of dilute caustic to the palpebral mucous membrane and semilunar folds; 3rdly, incise or scarify the orbital conjunctiva; and 4thly, puncture the cornea, if we find that one or more deep ulcers exist, but have not yet eaten through it. Lastly, if the eyelids are swollen, it is of the greatest importance to paint the skin over

Summary of local treatment.

them with a saturated solution of nitrate of silver. Cold compresses may then be applied to the eye.

Use of atropine.

We have still, however, one important adjunct to our treatment, and that is the instillation of a solution of atropine (one grain to a drachm of water) into the eye; these drops may be applied every six hours. The object of this treatment is to paralyse the intra-ocular nerves, together with those supplying the cornea, and by relieving the tension of the ciliary muscle and cornea, to lessen the chances of the latter giving way, if partially destroyed by ulceration. The iris also being retracted when under the influence of atropine, its vessels are somewhat empty, and less aqueous humour will therefore be secreted, so that the internal pressure will be reduced; moreover, if the cornea gives way, the iris is less likely to be forced through the opening, than if it be allowed to remain in its normal position in the anterior chamber.

General measures.

The above may be considered as the special and necessary treatment for cases of purulent conjunctivitis, complicated with lesion of the cornea. We may now consider one or two points bearing on the general treatment of such cases, whether complicated with ulceration or not; and probably one of the most important circumstances to attend to is the protection of the sound eye, if only one is affected, since the purulent secretion from the diseased eye is very apt to get into the sound one, and induce a similar disease. If, therefore, we can protect the sound eye by a pad of cotton wool and a bandage, we shall be doing the patient most valuable service. The patient himself will readily understand the advantage of this proceeding, and submit to the trifling discomfort of having his sound eye closed, so as to protect it from purulent infection.

Relieve pain.

The pain from which many patients suffer in this disease may be relieved by the application of the extract of belladonna over the forehead, and the administration of chloral. We shall often have to use the latter drug in full doses at bed-time, for it is then that the pain generally increases, and prevents the patient from sleeping.

Leeches seldom useful.

With regard to the application of leeches, I would simply say, that in a case of purulent conjunctivitis,

occurring in a plethoric individual, by all means apply six or eight leeches to the temples. But, on the other hand, no more dangerous rule can be laid down than that, because a person is suffering from pain and purulent conjunctivitis, leeches are to be applied in an indiscriminate manner. My own experience would lead me almost to reverse this rule, but in practice it will be found impossible to lay down any invariable directions on the subject. It would be as absurd to deplete a weak, anxious, and anæmic patient labouring under purulent conjunctivitis, as it would be to abstain from the practice in all cases: our common sense must guide us in the matter.

Discretion in the use of depletives.

So far, however, from leeches being always useful in purulent conjunctivitis, I am inclined to think that stimulants are more often required; rum mixture, with quinine and morphia, being frequently called for, together with a generous diet; the state of the patient's pulse will be our best guide as to the extent to which this practice should be carried. In many cases the infusion of bark with ammonia will prove of the greatest benefit: should it seem to increase the pain in the eye, it may be discontinued, but if it has no such effect, it is more than probable that the patient will improve under its use.

Stimulants and tonics.

I have before remarked that, as a general rule, purulent conjunctivitis is not accompanied by any marked constitutional symptoms. Should the patient be feverish, diaphoretics will be useful, and, under any circumstances, we must be careful to regulate the action of the bowels with mild laxatives if necessary. But as purulent conjunctivitis has nothing to do with a faulty state of the liver or stomach, we should not launch out at random with purgatives or drugs of this description, in the hope of improving the state of the secretions—as the phrase is. These drugs are beneficial when called for, but, as a general rule, are harmful in the class of cases now under our consideration.

Diaphoretics and laxatives.

With regard to the use of mercury in the treatment of this disease, without entering upon any discussion of the reputed power of this drug to cut short the inflammatory process, I am bound to observe that in cases of suppurative conjunctivitis I should never dream of ordering its administration.

Mercury worthless.

Pure air, the best of all tonics, must, if possible, be Pure air.

Preventive  
measures:

Importance  
of segrega-  
tion,

and clean-  
liness.

DIPHTHE-  
RITIC CON-  
JUNCTI-  
VITIS.

Fortu-  
nately rare.  
Prevails  
where diph-  
theria is  
endemic.

Exciting  
causes  
various.

obtained; and all unnecessary confinement to bed, or to one room, be avoided.

We cannot too strongly insist upon the enforcement of absolute cleanliness, and, as far as possible, segregation, among patients suffering from purulent conjunctivitis. The attendants must be strictly warned as to the danger they run from contact with the purulent discharges. Cases of purulent conjunctivitis should not be admitted into a general hospital, unless they can be isolated; and the strictest orders should then be given, that the dressings or rags employed should be burnt after use. Washing utensils, and in fact everything brought in contact with the patient, should be retained for his special use. If purulent conjunctivitis should affect a child at school, he should immediately be separated from his playfellows; and the same remark applies to soldiers, and, in fact, to collections of individuals, whether in families, schools, regiments, or any other condition of society.

DIPHTHERITIC CONJUNCTIVITIS.—This is, at present, a comparatively rare form of disease in this country.\* In some parts of Germany, however, the havoc which diphtheritic conjunctivitis commits among the lower classes is fearful, for when once a patient has been attacked with it, his chances of recovering his sight are even less promising than in cases of purulent conjunctivitis; the truth being that the affection of the conjunctiva is simply a local manifestation of a more general, and very grave form of disease, in which any inflammatory affection of the mucous membrane is apt to assume the unhealthy and dangerous type which is characteristic of the malady.

Unless, therefore, diphtheria be endemic, we are hardly likely to meet with instances of this kind of conjunctivitis; but, on the other hand, in districts where it prevails, if a person be susceptible of its influence, any cause inducing local irritation in the conjunctiva may give rise to the disease. In this way, the discharge from the eye of a patient suffering from pu-

\* See "Maladies des Yeux," par M. Wecker, vol. i. p. 70; Cyprien Raynaud, "Thesis," Paris, 1866; "Lehrbuch der Praktischen Augenheilkunde," von K. Stellwag von Carion, p. 378, 1864, Wien.

rent conjunctivitis, may be said to produce the diphtheritic form of the disease.

*Pathology and Symptoms.*—If we bear in mind the characteristic features of diphtheria in other situations, we shall readily comprehend the nature of the phenomena induced when it attacks the conjunctiva. The same tendency manifests itself here, as in the mucous membrane of the fauces and other parts of the body, for a fibrinous formation to occur, not only on the surface, but also in the connective tissue of the mucous membrane; the eyelids become swollen, hard, and brawny, so that it is with difficulty they can be everted, or, in many cases, even separated from one another, and in attempting to drag them apart we often put the patient to very great pain.

Fibrinous  
brawny  
exudation.

On examining the conjunctiva, we shall find it of a buff tint, streaked here and there with a reddish coloration, the inner surface of the lids presenting a mottled appearance. This arises from the buff-coloured fibrinous formations which infiltrate the part, exerting pressure on the vessels and stopping the circulation through their smaller branches; some of the larger vessels remain patent, while others give way, and their altered contents, staining the fibrinous formation around them, produce the mottled appearance referred to.

Conjunctiva, buff  
and  
mottled.

The contrast, therefore, between the condition of the mucous membrane of the lids, in this the first stage of diphtheria, and that of purulent conjunctivitis, is very marked: in the latter, the mucous membrane is swollen, and of a uniformly deep scarlet colour, with spots of ecchymosis scattered over its surface, the enlarged and prominent villi giving it almost the appearance of a granulating sore; whereas in diphtheritic conjunctivitis the mucous membrane is of a buff or drab colour, comparatively smooth, mottled over with superficial patches of exudation and extravasated blood, and a few large and contorted vessels are usually seen on its surface.

Not red and  
villous.

If we attempt to remove any of this fibrinous formation, we shall find that it adheres firmly to the conjunctiva; we may detach it, but it breaks away in shreds, and from the jagged surface of the wound which is left, a bloody, serous fluid oozes away; the formation, in fact, is by no means limited to the

Exudation  
patches  
deeply  
connected.



surface of the conjunctiva, but exists principally in the sub-mucous connective tissue.

The changes and appearance of the conjunctiva above described are not confined to the eyelids; the same condition exists in the mucous membrane covering the sclerotic, the fibrinous formation infiltrating the conjunctiva throughout the whole of its extent, and too often extending to the cornea.

1st stage:  
exudation.

Pain and  
fever.

2nd stage:  
degenera-  
tion of  
exudates.

Free dis-  
charge.

Hyper-  
sæmia.

3rd stage:  
cicatriz-  
ation.

The period, during which the formation is being produced in the connective tissue, may be considered as the *first stage* of diphtheritic conjunctivitis; it usually lasts about six days, and is accompanied with fever and great pain in the eyes, extending to the temples and head; this pain is terribly increased if we attempt to open the eyelids, which are swollen and of brawny hardness. The temperature of the part is sensibly increased. The secretion at this period is scanty and serous. As a general rule, both eyes are affected, the disease being, as I before remarked, a local manifestation of a general disorder.

The *second stage* is one of reaction, degenerative changes taking place in the fibrinous exudations, which become softened and broken down. The detritus thus produced, together with pus cells from the connective tissue, and disintegrated blood corpuscles, are thrown off from the surface of the conjunctiva as a bloody, purulent discharge, containing shreds of fibrinous substance, supposed to have very irritating properties. The appearance of the everted lids is now completely altered, and nearly approaches that of the second stage of purulent conjunctivitis. The vessels are dilated and turgid with blood, the surface scarlet, but still presenting some patches of yellow exudation; the discharge is abundant. The patient is now almost free from pain.

The second stage varies in its duration, in proportion to the amount and depth of the primary croupy infiltration: if this has been great, the suppurative stage will be prolonged, and the reverse if it is scanty or superficial.

In the *third stage* of the disease the inflammatory action subsides, and the effects of the previous changes which have taken place in the conjunctiva become apparent. Of these, the destruction of the sub-conjunctival tissues, consequent on the deleterious in-

fluences exercised by the fibrinous formation on the part, is most obvious; and in the reparation of the damage thus done, cicatrices are formed, which, in contracting, press upon and obstruct the few remaining vessels of the conjunctiva, so that the mucous membrane may at length be entirely destroyed, and replaced by white, glistening, cicatricial tissue. The duration of this stage will vary with the amount of destruction already effected, but, like most reparative processes, it is usually prolonged.

*Diagnosis.*—M. Wecker states that the severity of the three stages of diphtheritic conjunctivitis varies in different individuals, and that if the first stage runs a rapid course, the case may be mistaken for one of purulent conjunctivitis; with regard to treatment, however, no danger would arise even if a mistake of this kind were to occur, for a solution of nitrate of silver, or the dilute caustic pencil, would be the agents upon which we should rely under any circumstances.

It is hardly necessary to mention that cases of diphtheritic conjunctivitis are not to be mistaken for cases of conjunctivitis occurring among people in a low state of health, on whose conjunctivas false membranes are apt to form; for beyond a somewhat similar appearance of the parts at first sight, there is no analogy whatever between the two forms of disease. These false membranes may be readily detached from the surface of the conjunctiva, the mucous membrane appearing of a florid red colour beneath them, whereas in diphtheritic conjunctivitis we can only detach broken shreds of the fibrinous exudation, the surface of the wound presenting a yellow granular appearance, from which a yellowish-red serous fluid exudes.

*Complications and Results.*—As in suppurative, so in diphtheritic conjunctivitis, it is the structural changes to which the cornea is liable which render the disease so dangerous to the patient's sight; and, unfortunately, the virulent character of the affection too often defeats all our attempts to save the eye.

The danger to the cornea is twofold: First, the fibrinous exudation may infiltrate its laminated structure, and in degenerating, completely destroy it. Thus we sometimes find, on opening the lids of a person suffering from this affection, that the cornea is of a yellowish-grey colour, owing to this infiltration of its

*Diagnosis.*

Milder forms mistaken.

Conjunctivitis with false membranes.

Dangers to the cornea.

Total destruction.

Peripheral  
ulceration,insidious  
and dis-  
astrous.Secondary  
opacity,from cic-  
trices.

Entropium.

Symble-  
pharon.Prognosis  
unfavour-  
able,

or guarded.

tissue; and when the second stage of the disease is established, the cornea appears to break down *en masse* with the exudative material, a large staphyloma resulting. In other cases a deep circumferential ulcer may be seen surrounding the cornea,—a most dangerous symptom in this disease, for in spite of all our care the ulcer generally spreads rapidly, a few hours often sufficing to complete the mischief, and the cornea giving way, the eye is destroyed. This ulcerative process is sometimes peculiarly treacherous: the cornea at first looks hazy, as if affected with keratitis; this condition having lasted for a few days, the anterior and middle layers become disintegrated and destroyed. On examining the eye, at first sight the cornea may appear bright and clear; a closer observation, however, will convince us of the fact, that the posterior elastic lamina alone remains intact, and is bulged forward from the pressure of the aqueous fluid behind it; nor can it stand this tension long; it is almost certain to burst open, and then the lens, the aqueous humour, and a portion of the iris are protruded through the wound.

Secondly, if the patient escapes these evils, and the cornea is not destroyed during the active stages of the disease, it may still suffer at a later period; the rough cicatrices which form during the third stage, and at length replace the palpebral conjunctiva, by constantly rubbing against the surface of the cornea, induce opacity of its structure, and ultimately loss of sight. Nor does this complete the list of misfortunes, for in course of time the cicatrices contract, and in contracting they shorten and displace the ciliary margin of the lid, inducing a most obstinate form of entropium. Lastly, in the reparative process, the opposed surfaces of the palpebral and ocular portions of the conjunctiva are apt to become adherent, and the conjunctival sac obliterated.

*Prognosis.*—From the foregoing account, it is evident that a favourable termination can rarely be looked for. If, then, the first stage has been severe, we cannot but be extremely anxious as to the result; disorganization of the cornea is almost sure to occur, and we must frame our opinion accordingly. Even in apparently mild cases, our prognosis must be very guarded, for, like purulent conjunctivitis, the disease

subject to relapses, and a case which at first appeared favourable may be less so afterwards.

*Recapitulation.*—Before leaving the subject, I will briefly recapitulate the symptoms of diphtheritic conjunctivitis. It may be divided into three stages: in the first, fibrinous formation occurs; in the second, this is broken up and removed; and in the third and last stage, cicatrization and reparation of the damaged conjunctiva take place.

The first stage may last from five to ten days; it is usually accompanied with fever, and the patient suffers great pain in the eye and neighbouring parts; the swelling of the lids is of brawny hardness. On separating them, the conjunctiva will be found of a pale yellow or buff colour, with a few distended vessels coursing over it, and here and there some spots of ecchymosis may be seen; a yellowish serous fluid, sometimes streaked with blood, exudes from the surface. The cornea, in the majority of cases, will be found to be more or less opaque, as if stained with a solution of carbonate of lead.

The second, or suppurative stage of the disease, is of variable duration. The patient is now almost free from pain, but the discharge is often very profuse, and pours away from the eye directly the lids are open. It has assumed a purulent character, being, in fact, a mixture of pus, disintegrated diphtheritic formation, and blood. The conjunctiva is swollen and of a bright red colour, but scattered patches may still be seen. It is in this stage of the disease that we may expect to find rapid and destructive changes going on in the cornea; it may appear bright and clear to a superficial observer, but the appearance may be delusive, and destruction far advanced. In some cases, suppuration having commenced, the cornea looks somewhat like a piece of moist wash-leather; in others, deep and rapidly extending ulceration may be going on at the margin. It is very seldom that the cornea is found in a normal condition throughout the suppurative stage of the disease.

The third stage of diphtheritic conjunctivitis consists in the formation of cicatricial tissue, by which the mucous membrane is replaced. As, therefore, the vascularity of the second stage of the disease gradually subsides, and the discharge ceases, the inner surface

Recapitu-  
lation of  
symptoms.