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Thesis for M.D.
by George Bernard Jamieson M.B. & C.M. England - 1895

Ophthalmia Neonatorum

Synonyms: Acute Purulent Ophthalmia of the new-born; - Blennorhagic conjunctivitis of the new-born; - Blepharo-blennorhoca neonatorum (P.V. Alt-Van Hecker). - 

This disease is one peculiar to the new-born occurring within the first week of birth, as a peculiar acute purulent or mucopurulent conjunctivitis, due to inoculation with the discharge of the mother's genito-urinary tract, either directly or indirectly.

It occurs commonly among the poor of large cities more especially, is occasionally also seen in the country, or very rarely among the better classes.

It is the commonest cause of blindness in one or both eyes, among the young, & furnishes a large number to the inmates of all blind asylums & institutions of all countries - while defective vision of a greater or less degree are usually resultant in a great proportion of those who have had the disease - these being most often due to want of proper care & efficient treatment - to ignorance & delay on the part of the parents, who
usually think it only a cold, together with
the absence of ordinary care, or cleanliness
- or neglect.

**Etiology:** There may possibly be a certain
 predisposition among certain infants, to
 conjunctival affection, whereas in the majority
 the predisposition is very slight or altogether
 absent.

Any mucous membrane will if irritated, produce
 excessive secretion, if this irritation be kept
 up, unhealthy products will also result.

As the great majority of all women have leucorrhoea
 in some form, of greater or less degree, possibly the
 introduction of leucorrhoeal discharge is only
 injurious in those conjunctivas which more readily
 provide the nidus essential to the development
 of pneumonic mononema - or the leucorrhoea which
 produces the disease must be always of a certain
 nature, or particular type. Again, one often sees
 infants, who, clearly from the history, have had the disease
 some two, three, or more weeks, although the discharge is
 expected of a mucous-purulent or purulent nature, one
 finds the cornea intact - these cases show great
 resistance to corneal infection & infiltration, it would be
difficult to account for, except on the score of greater vital
resistance, or a less active virus. Whereas, under exactly
the same conditions, apparently, one will find
the cornea sloughed, or absolutely destroyed.
In the worst cases, the condition, especially if
Occurring early, severe, has probably been of gonococcal origin, but not necessarily so, as on careful, enquiring into the history, the patient will usually deny the existence of any vaginal discharge, until late in pregnancy— a discharge from the genital-urinary tract is then a common condition (Spiegelberg's Midwifery, p.413 Vol.1)— more especially among the poor, a vaginal leucorrhoea is then usual.

Again, there may have been a leucorrhoeal discharge before pregnancy, which becomes increased, and possibly altered in character, by the cervical changes associated with pregnancy— this fluid also may have been a simple catarrh of the cervix or a deeper seated inflammation, accompanied by erosion or ulceration. — or there may have been a simple acute or chronic vaginitis—

Catarrhal endometritis of the decidua could hardly be a cause of infection, inasmuch as amniotic protection. The secretion, whether in nature, or source, will naturally spread over the mcosa & peritoneum— & the skin of perineum becomes saturated with the discharge. Again, the normal secretions (more especially if any leucorrhoea or vaginitis be present in any form) may become acid, irritating, & so infective, owing to any general ill-health of the pregnant woman. Probably vaginal or cervical discharges always cause this disease, either from their usual unaltered conditions, producing an inflammatory reaction or an irritably-thickened conjunctiva, or from the altered mucous
conditions, also undergoing some chemical organic changes, or becoming infective as well — in the most severe nearly severe cases, a gonorrhoeal element may be present.

Albenter p. 971 British Med. Journal, May, 1886, found the os internum to be about the boundary of parts free affected with germs in a healthy woman — therefore in one affected with leucorrhoea viti, these germs or their ptomaines may possibly, during the purpurism, take on a more active & harmful nature, giving rise to excessive reaction on the part of the vaginal mucous membrane, also produce the same or an increased effect, when brought into contact with a mucous membrane of the same essential structure viz. the conjunctival epithelium.

Leucorrhoea doesn't necessarily produce Ophthalmia Neonatorum by any means, but it often does, or at any rate there is usually a history of its presence. A. Graefe (p. 877 Edinburgh Med. Journal 1883 P. Simpson) also Grossmann (October 1884 Brit. Med. Jorn) declare that the secretions of the healthy genitale tract, may so, acquire infective character, before, during, or after parturition — this may or may not be true, but the number of cases of Ophthalmia Neonatorum, would be very much larger than actually now occurs, if this were common or usual; therefore probably some superadded infective organism or irritant is also required, perhaps already present but latent.
Only requiring some ill-health of the pregnant woman to occur during the end of pregnancy, to give it an actively irritant & infective nature. Severe cases cannot always be ascribed to gonorrhoea, as cases of apparently mild type will sometimes after some days of treatment, suddenly take on a severe form & in spite of every care, develop severe cerebral complications, even result in the eye being lost. In such cases there is often a general condition of ill-health of the mother or infant, to account for the severe turn, viz. gastro-intestinal disorders of infant, such as diarrhoea, thrush & often due to improper or injudicious feeding of the mother herself may set out of health & her milk deteriorating in consequence, secondary debilitation to the child, from its poorness in quantity or quality, or both - or the child may have congenital syphilis or other aphasis. Possibly in some cases a species of saprophytic poisoning, from putrefaction or septic absorption from the bile, may occur, & affect the general health of the infant.

Neisseri's uniform gonococci, discovered by him in 1879, to be present in the discharge of gonorrhoea, & Ophthalmia neonatorum, is usually said to be ordinarily the specific cause of this disease- hence, Haas, Settel's others all insisted upon its specific nature in these diseases, through others deny the specific nature of these cocci.
Kroner (p. 42, *Bürgsche Ohrheilkunde*) thought two distinct forms of the disease occur - this seems more probable. -- Zweifel (p. 42, *Bürgsche Ohrheilkunde*) found locoidal discharge, free from gonococci, mucousy introduced into the new-born conjunctival sac.

But, as Bumm confessed that diplococci (p. 42, *Bürgsche Ohrheilkunde*) of gonococci, which are of the same genus, cannot be distinguished from each other, practically, under the highest microscopic powers, it may be that many cases which gonococci have been pronounced as microscopically present, were really mucous diplococci.

Andrews (p. 58, *B. Vol. IV. 1891, Annals of Univ. Med. Sci. (Japan)*) found gonococci in the secretion of every case of 122 Ophthalmia Neonatorum & in 72 adult persons Ophthalmia -- probably many of these merely diplococci! again gonococci (? diplococci) have also been found in the discharge of glands of lachoma, by Sattler & Leber (p. 131, *Ophthalmic Review* 1885 quoted from Fuchs, Price Essay).

It is well known that gonococci will produce a specific blepharitis or inflammation, if any secretion containing them, be brought into contact with certain mucous membranes e.g. conjunctiva or genito-urinary tract - but, if all cases ophthalmia neonatorum, whether latent at first or later on, are gonorrhoeal then gonorrhoea must be a very rare cause of the disease - if all or most of these cases are gonorrhoeal, then gonorrhoea must be even
commoner than one would suppose, among the poorer classes, or its results to the owners themselves, only very occasionally disastrous.

Again as many of the mothers of these infants, have each successive addition to the family, similarly affected with Ophthalmia neonatorum, then if gonorrhea be the cause, it must be of a persistently chronic & latent character of years duration; or repeated prod attacks of the disease, which is most improbable. It may be due in these successions cases, to a peculiarly persistent or recurrent form (non-gonorrheal) of infective parturient discharge, superadded to gonorrhea or vaginitis.

According to Hicks in his Prize Essay (p. 131 of the Review 1885) a very slight urethral discharge, or a catarrhal vaginitis, whatever its cause, is often enough to set up a violent inflammation of the conjunctiva. Just so these same causes may also occasionally give rise to a simple urethritis in the male after continence.

Nieden of Stuttgart (p. 56, B. Vol. IV. 1842 Annual Medicin. Med. Scien. Med.) reported a case of a 5th child, born with membranes unruptured, & who developed Purulent conjunctivitis in spite of every care, no gonococci were found in the secretions, but every previous child had developed Ophthalm. Neonat. with gonococci in the secretions, each successive case being of a slighter character. In such a case, the amniotic fluid may possibly have
contained some noxious element, capable of exciting a purulent conjunctivitis, or possibly arriving there by metastasis, though the mother. But as no cocci were found in the secretions, the conjunctival infection may have been due to light seepage, soap, or coochial decomposing discharges.

Spiegelberg (Vol. I., p. 102 Medizitry) says amniotic fluid is in rare cases discoloured, with an offensive odour, even with a living child, the amnion membrane being generally diseased. This shows a possible, though most improbable, cause.

Fannucr Baner (p. 740 B.Med.Journal, Nov. 5, 1882) also reported a similar case to the above - he also concludcd for an absence of unhealthy discharges in either parent - and he quotes a case of Blemorrhoeocephalophthalmia after Caesarean Section, by Dr. Veit. Mothers often do not admit having ever had any discharge whatever.

Again Krückn (p. 601 Vol. VIII Med. Div. Oph. Hosp. Rep.) reported 2 cases of congenital corneal scaphoma - but suggested intra-uterine interference with the orbital contents, due to amniotic fluid, & cells of the respiratory passages, before the palpebral fissure closed. However Fuchs (p. 131 Oph. Revue 1885) assumes infection in utero to be due to the physician's examining fingers, in rare cases especially, when the eyes are already infected at birth, even to loss of cornea. This seems to assume a very severe progression case, & a very prolonged labour.
Randall (Vol. XXIII No. 4. Archiv. Of Ophthalmology) reported a case in which Ophthalmia neonatorum occurred 4 days after birth, both eyes were lost, the mother having had no leucorrhoea, but had been much reduced during pregnancy. This may possibly have been due to infection from subrefractive changes in the lochial discharges, or soiled linen, or from the natural secretions acquiring infectivity owing to ill-health.

S.C. Ayres (p. 59, Vol. VIII Liverpool Med. Rev.) thought many cases of Ophtha. Neonatorum occur, when there is no abnormal vaginal discharge present.

The disease shows the general characters of acute Catarrhal mucous-purulent Ophthalmia, or of acute Purulent Ophthalmia.

It is generally of a mucous-purulent character, but often becomes purulent, as a further and severe stage, is due to direct or indirect inoculation with some of the discharges (or their products) from the genito-urinary tract, in some part or parts of its course.

J. Wecker (p. 58, Vol. I, 'Meladies des Yeux' edit. 1868) quotes Mackenzie's note of Liderschold, who in the Stockholm Maternity found 1/7 to be the average, of mothers with leucorrhoea or other discharge, whose children developed Ophtha. Neonatorum cases — while 1/20 occurred, in those where the mother had no discharge.

Inoculation occurs during or soon after
birth, & probably so soon as the eyes are opened - if only a few days, it is probably due to an inoculation by soaked clothing, or the infected fingers of mother or nurse.

Careless washing of the eyes of the infant, after incomplete washing, also assists the virus to be conveyed into the conjunctival sac, if that virus is present in the discharges collected about the lids, & may be directly conveyed thus, by the discharges being wiped into the sac. Any vernix cascar, imperfectly removed or becoming decomposed, will add to the irritation.

After inoculation occurs, the general health, or susceptibility of the patient will influence the effect produced, & resulting.

The onset of the disease usually commences about 1-3 days after inoculation - usually the 3rd day, sometimes the 4th. - It is then pretty certain to be due to inoculation at, or just after birth.

Fuchs in Prize Essay (P. 131 Ophth. Review 1883) asserted, 'perfectly fresh secretion to be more violent than old or dried, though the latter retained its infective property for 36 hours or more, but produced a milder disease, & a longer incubation - whereas acute purulent Ophthalmia after direct inoculation, might take from 6-8 hours only, to break out.'
then, the parturient journey, cannot well be the time inoculation occurred.

all authorities appear to agree, that infection must have occurred after birth; if the disease shows itself after the 5th day—do ticklish discharges, if healthy, cannot cause the disease, but if unhealthy, a possibly accompanying, or if mixed with infectious vaginal secretions, will most likely have been conveyed to the infant's eyes, by the mother's or nurse's fingers, by soiled linen, or other means, or from another child with the same disease.

as the head of the infant passes through the maternal passages, the eyes are closed, therefore infection can hardly occur during the actual transit of the face, unless there is delay in the birth of the head, over the perineum—rather its discharges will collect & accumulate in any depressions or crypts about the face & so the lids lashed receive their share, some adhering to the lashes themselves—so soon as the child begins its separate extra-uterine existence & breathes, one of its first actions is to open its eyes—this permits the entrance of any discharge accumulated about the lashes & into the conjunctival sac—
the eyes close & open from time to time & so just matter gains entrance.
both eyes are usually affected, either at the same time, from the first, or more usually a day or two between.
In course of the disease being inoculation from gonorrhoea, acute or chronic vaginitis, sometimes gonorrhoea in early cases, or perhaps rarely, unhealthy lobited diseases—all being acute, infectious more or less, incubation will vary greatly, or with the period of incubation—but usually the ordinary forms, incubate in from 1-5 days, or the very malignant from about 8-12 hours or a little longer—the earlier the onset, the more severe the case usually is, but not necessarily so—so it may then be due to either gonorrhoea or a purulent-lacunar-bacillus.

The severity of the inflammation and its results, will vary, with regard to the character of the infecting secretion, the susceptibility of the patient, and its general health.

Ill-nourished, ill-fed, or diseased, infants generally suffer most from the toxic action of the bacteria—thus the disease may begin, of any type—as a mucous-swelling of the bladder or a socket form, quickly assume a supplicative character, as a purulent stage or even septic stage—so with an unhealthy infant, concomitant complications are usually to occur. The children, brought in the disease, are often weakly, neglected, or filthy, or simple cases of the Catarrhal type are often aggravated by irrational home-remedies or even practising.

The real disease is always due to inoculation.
with infective matter - but slight catarrhal cases may occur, due to string light, soap, draughts &c, but unless aggravated by injudicious treatment, don't neglect, quickly disappear, & probably never produce the true phthisicemia mentioned, without infection superadded, though a semi-purulent stage, in badly-wounded or syphilitic children may be occasionally induced; it quickly yields to cleanliness & simple cotrigements.

The mucus usually day the eyes were weak from the birth, but generally on questioning, this means they were wetting at first & began to discharge on the 2nd or 3rd day.

Symptoms & Progress

The conjunctiva becoming inoculated with infective or irritating foreign matters, soon presents the usual reactions of inflammation. The disease may be divided into a number of stages - which can usually be more or less differentiated.

I. The Incubation: from 2-5 days, or more usually up to the 3rd, but is according to the nature of the infective material.

II. As soon as the incubation period has passed, an increased secretion from the conjunctiva arises, & is due to a Reactive inflammation. This discharge is at first slight,
serous, & mixed with tears - flakes of mucus & lymph are soon added - & then traces of pus - from this catarrhal state arises  
III. A further stage - the discharge becoming mucus-purulent, & in severe cases becomes almost entirely Purulent. 
IV. Resolution now occurs - the discharge again becomes more mucous & less purulent, & gradually less & less pus is present, until serous fluid alone comes away, & finally the normal secretions are again re-established. If instead of absolute resolution there occurs only a partial, the condition acquires chronicity. 
V. Chronic stage: is equivalent to the 'pust' of the urethra, & is very like it, in some respects. The discharge being then serous, & with tiny flakes of mucus at times - this is apt to become mucus-purulent or purulent again, on exposure to any slight irritation by dust, draughts &c. This stage is probably almost always really an imperfectly cured case - these cases often occur as so-called relapses, as in account of the very slight serum discharge, treatment is discontinued, cure being supposed to have been effected - if this treatment has ceased entirely, before the conjunctiva has again assumed its normal structures & secretions, relapses are very liable to
occur, and are usually due to chronic congestion, thickening of the retro-bulbar fold of the upper fornix, together with slight hypertrophy of the large papillae in that neighbourhood, and latent infection. Chronic cases are however said to be very rare by Peter v. Arlt (p. 47 text by travel). He probably speaks regards the majority of so-called chronic cases as sub-acute.

But Berry (p. 40) says a chronic state occasionally ensues—this I have found, as it is only in occasional cases that one meets with cases in which a chronic discharge continues for weeks after all acute symptoms have left, requiring continued astringent lotions and drops, over an extended period, or an occasional application of nitrate of silver solution to the incised lids, before the conjunctiva regains its normal state & secretion—a so long as any chronic discharge occurs, a relapse is possible, even a acute or more severe form than the initial one, may ensue—a even result in the ultimate loss of the eye.

A chronic case will predispose to a diphtheritic conjunctivitis. If diphtheria be prevalent or if infected by a case of trachoma, might in rare cases end in granular lids.
C.F. Graefe (p. 29 R. V. Balt) divided the disease into 3 stages or rather grades, which he also adopted viz. 1. Hydropneum 2. Blennorrhoea & 3. Pyorrhoea.

Mules in a Prize Essay (p.64 Vol IV B. 1869 Annual of Univ. Med. Sciences ed. by Sajous) in the causes of Blindness January 1870 divided the symptoms into 4 stages: 1. Incubation 2. Lymph-secretion, slightly infectious 3. Purulent secretion, very infectious & 4. Convalescence. The symptoms vary greatly, from mild or mainly catarhal, to purulent. The disease begins insidiously, and as (in a mild case) the incubation period is being completed, the mother notices the eyes are weak - the reactionary effects come on, & she notices a slight watery discharge, more or less straw-coloured, to come from the eyes, & the lids are 'gummed' after sleep, photophobia, in strong light especially, & some lachrymation - the lids begin to swell, & may be slightly cyanosed. The palpebral conjunctiva becomes red & hyperemic, & begins to secrete in excess, & a serous discharge is poured out in increasing quantity, soon showing flakes of mucus & lymph in it - thus being simply an exaggeration of normal secretions viz. tears, mucus.

7. Together with serum exudation from the
conjunctival capillaries.
The palpebral conjunctiva becomes greatly swollen & congested & is soon more or less tense & shiny, & with a smooth glazed surface, from uniform swelling, due to the pouring out of serum - it is a fibrino-plastic exudation & infiltration into the the subconjunctival tissues - more photophobia ensues, & some pain, shown by the irritability & perverseness of the infant: if a severe case, then symptoms are much more marked & aggravated in character, & the bulbar conjunctiva becoming affected may become edematous, & chemosis more or less pronounced, will result, but this severe ocular conjunctival complication usually occurs in the next stage - however, a severe chemosis is uncommon at any stage of this disease. Short of chemosis, the bulbar conjunctiva is generally hyperemic, slightly congested. Traces of pus may now be present, or if a severe case, in larger quantities, & the 3rd stage is reached. As the disease seldom assumes a severe type at once, it is often not noticed by the mother or nurse, until some time after the onset of the acute stage, & so she supposes it to be of a later origin.
The 3rd stage (acute mucous-purulent or purulent) quickly follows on the 2nd - the swelling &
Redness of the lids increase still more, the conjunctival vessels become more engorged, the mucous membrane becomes rough & velvety, from enlargement & swelling of the papillae--the lids now become more placid, & a chemosis may be present, but is rarely very great or very tense, if present at all, is usually slight & seldom tends to hide the corneal margins to any extent.

The edema of the lids becomes greater as their swelling increases & the discharge is now mucopurulent, getting thicker & more purulent, even to almost pure pus in the severest cases. The discharge is secreted rapidly, is often very great in amount, or opening the lids, flakes or strips of lymph may lie over the cornea, as in Catarhal Phthisemia.

In some few cases a pseudo-membraneous, non-adherent, deposit of lymph is to be seen upon the upper palpebral conjunctiva, if easily removed, it exposes the red, inflamed, swollen conjunctiva beneath, which very readily bleeds if roughly touched;--this membrane is the result of an excess of oedema fibrino-plastic material in the exudation, coagulating on the conjunctival surface, due mainly to excessive stasis in the venous capillaries. When this false membrane
occurs, the subjacent conjunctiva is usually smoother and less velvety than where it is not present; on removal, it generally soon reforms again, and for a few days will continue to do so, owing to the same conditions which at first caused it. This membrane is whitish and lymphlike, and not as dark grey underneath as in diphtheria, nor is the bleeding (if any) so profuse as occurs in the latter on removal of the membrane. A true diphtheritic conjunctivitis is said to be very rare in this country, though less so in Germany, and has no relation to Ophthalmia neonatorum, except perhaps as a rare super-added coincidence.

This pseudo-membrane does not result in cicatrization of the conjunctiva. Tweedy (p. 12, July 1883 Lancet) recorded 2 cases of diphtheritic conjunctivitis in infants, simulating Ophthalmia neonatorum with pseudo-membrane, which was semi-adherent, and began one week after birth. Cicatrization of the conjunctiva ensuing! As R.V. Hall (p. 28, Trans. Byres) says, 'The exudation of this membranous form of Ophthalmia Neonatorum, occurs in the parenchyma & tends to reabsorb, but not to a permanent resolution as in Diphtheria.'

The amount of discharge varies, from a small to a very large quantity, according to the severity, duration, or chronicity of the case.
If it be thin & not markedly purulent, the
inflammation is usually mild & slow, but
if thick & creamy, or yellow, it is usually
rapid & severe.

The infant is usually brought to hospital
in its 3rd stage, not often before the 2nd
or 3rd week of the disease, or even later,
as it is thought to be a cold; the discharge
being mucous-purulent or purulent, & nothing
having been done, or perhaps house-hold
remedies used, or the nurse has tried something
or other, or the mother had no one to send.

The mother often has to attend to the entire
care of the child, even from almost the first,
& they are at times also frightened of injuring
the eyes by doing anything to them, & the infant
is usually dirty & neglected.

The skin of the lids, owing to the great beauty
of their arterial tissues, often becomes greatly
thickened & semi-transparent, & this adds
to the swollen appearance of the lids - this
seems to especially occur in cases of plastic
or membranous conjunctivitis more than
in ordinary cases, being also due to excess
of fibrous material. The lids are glued-together
by their lashes, upon which the dried secretion
is caked in masses, each individual lash
bearing its share, & the whole completely
matted together into a solid mass.
The lids are swollen and elongated, & being tightly sealed together by the adherent lashes, their separation is difficult, & painful to the infant unless the dried mass is first softened with warm water. Upon separating the lids, the discharge wells out freely & in volume. The discharge, owing to the gluing of the lids together, fills the conjunctival sac, until it can hold no more, & the resulting tension bursts open the lids, when an over-flow occurs between the palpebral fissure, or running down the cheeks, dries on them; when an over-flow from the sac ceases, the lids are again closed by the irritative & spasmodic contraction of the outer fibres of the orbicularis muscle, when the discharge owing to evaporation & coagulation dries on & glues the lids & lashes together again, until the distended sac can again hold no more, & a little more escapes, the sac again closing, & so on.

The secretion varies in colour from white, creamy, to greenish-yellow, & is occasionally tinged with blood;—this latter may be from the acuteness of the inflammation and exsecutive hyperaemia, or an abrasion of the conjunctiva during manipulations—though Dr. Wecker (p. 60 Vol. 1 Maladie de yeux edit. 1868) refers to a tendency to spontaneous hemorrhages, ‘larmoiement sanguin,’ in rare cases.
If icterus neonatorum is present, the conjunctival discharge will have the icteric color markedly. In severe gonorrheal cases, the discharge may be a bright yellow or greenish-yellow, but is much less common an appearance & character than in the purulent ophthalmia of adults.

In some cases, especially if there has been great swelling of the upper lid, the latter may slightly overlap the lower one, but this usually occurs late in the 3rd stage, when the lids are somewhat relaxed. It is probably due to over-stretching & temporary (more or less) atony of the levator palpebrae, together with edema of the lid. The lid is usually easily evicted & flaccid.

Hutchinson (p. 43 Vol. VII Ophthal. Hosp. Reports (Rap.)) reported a case of a child with symmetrical ptosis after purulent ophthalmia, which required operative treatment.

In rare cases, a spastic ectropion of the upper lid may occur, from swelling of the palpebral conjunctiva & retro-tarsal folds, together with chemosis, & spasm of the outer fibers of the orbicularis, it is most likely to occur after clumsy interference; if not soon replaced a conjunctival slough would probably occur, even to the lid sloughing.

The swelling of the lids, whether great or little,
hears no relation to the severity of the case, or the state of the cornea, as the worst cases are sometimes those with little swelling, & vice versa. In severe cases, the lids get dry & thick, & chemosis is liable to occur owing to excessive venous engorgement & stasis producing exudation of fluid. Under the empiric view - usually because the cyanosis is not excessive - the discharge is early purulent, yellow, & copious, & corneal complications are liable to occur early, & be severe. If thorough cleanliness & care, a free escape to the discharge be allowed, the tendency to bulging out of the sac with pus, will be less & its consequences less - but if the lids are allowed to be glued together, the consequences may be very disastrous, & the discharge will not tend to diminish.

Resolution rarely comes about untreated, or by cleanliness alone, unless a very mild case - or if a severe one, after the eyes have been last, & then a chronic state would first be present for some time. A mild case, without care & cleanliness, is apt to become more severe. Under treatment, resolution commences, as soon as the mucous surface of the lids, begins to repair its normal state; this period will vary with the nature & severity of the case, the state of treatment just commenced, a neglected subsault condition requiring more
caustic applications than others, to reduce
the excessive congestion & hypertrophy of the
mucous membranes & papillae.

The average time of cure is from 4-6 weeks,
but may be longer or shorter, & is dependent
to a great extent, not only on the case given by
the nurse, or whom the constant & real
responsibility of cleanliness & care rests, but
on her literally carrying out all instructions,
the general severity of the case, the corneal compli-
cations, & the health of patient, & matter of sucking.
As the inflammation subsides, the discharge
lessens, the pus cells diminish, the discharge
becomes thinner & gradually more serous,
the swelling of the lids slowly decreases,
the cyanosis & congestion of the lids &
conjunctiva diminish, the edges of the lids become
gradually into normal free apposition, & not
shied together if uninterfered with. The
thickening & interstitial edema of the
subconjunctival areolar tissue gets less & less,
& proliferated cells become absorbed, the
hypertrophied papillae become less prominent,
the conjunctiva smoother & less villous, until
the epithelium is quite regenerated, & the
mucous membrane again regains its smooth
surface, & returns to its former state & normal
secretions.

The oculo-palpebral cul-de-sac is the last
to become normal again, on account of its situation for applications, the size of its papillae, & the difficulty of seeing this fold of discharge quickly, & easily.
Resolution appears to commence at the edges of the lids, especially the upper & ascends descending in the lower.
The upper palpebral conjunctiva is always much more yellow & thickened than the lower, & is the last to return to normal.
Art 4.30 hours The first sign of recession is a slight wrinkling of the skin of lid.
Chronic Short of complete resolution, a sub-acute or chronic state may occur.

In the sub-acute stage, there is a somewhat slightly thickened villous conjunctival surface, more or less irregular & under treatment this becomes a more chronic condition, in which the surface may be smooth, except near the fornix of the upper lid, where the larger papillae are also prominent, & with this, there is present a thin colourless watery or slightly opalescent & scanty discharge, with occasional flakes of lymphatic discharge, the 3rd stage. Just as an urethral plot can take on a fresh & more acute action and characters of discharge, so can this.

Valente in Le Bulletin Médical, Paris March 25 1891
(1.55 B. Vol iv 1892 Dr. N. H. J. D. Enlarged Ophthalmia Neonatorum into 3 Tıpes - the 3rd
he calls, a chronically inclined persistent variety, ordinarily seen in weakly or premature infants, either primary or occurring secondarily to blepharitis or the follicular catarrh of elastic variety.

The majority of these persistent cases are

thought due to an incomplete or too early withdrawal of treatment, & though at times they may occur in weakly or strumous children, also do in apparently healthy ones— in such cases, astringents have to be used for a longer time, even 6 to 12 months, or there is a danger of relapse to an acute stage.

These relapses are probably due in all cases to incomplete cure, from chronic hypoplasia & thickening of the conjunctiva, especially near the upper fornix, hypertrophy of the papilla in that region, & a latent infection.

Periodic hiccots are more frequent in their subacute & chronic cases, & help to keep up the condition, from irritation of the upper mucous surface against the lower lashes—they take some time to return to their normal position & dimensions.

Relapses are often more serious than the primary attack; in fact the former acute stage may have been comparatively mild, & the renewed or second attack may even be so severe, as to destroy the eye; it is indeed, a fresh attack (acute) implanted as a chronic or subacute one.
It is conceivable that a long continued subacute or chronic case might very rarely give rise to slight circulatory changes in the conjunctival tissue.

Corneal complications: An event likely to occur during the 3rd or 4th, a periluculent stage, of untreated moderately severe cases, but may occur at any time, especially in severe cases.

The principal, near, really important change in this disease is to the cornea, because all other complications are entirely secondary, cannot well occur, without corneal implication.

First commencing in a severe case the whole or a part of the cornea may become affected, perforation ensues, according to its size and position, a projection of the iris only, or with the whole or the greater part of the orbital contents as well, escaping even in a few hours.

This is however very uncommon in the Paracentotic conjunctivitis of infants, even in bona fide small cases, as in them the suppuration action is generally speaking, slower and less concentrated in its destructiveness than in adults, usually a day or two or more elapsing before such extensive necrotic conditions occur. If a perforation of smaller size takes place, the orbital contents will not follow at once, nor the threat of inflammation go backwards.
directly - the perforation may become closed, temporarily, & then give way after some hours, followed by most of the orbital contents - or the perforation may remain closed, heal, and other changes result.

It is usually said that the earlier the corneal affection the more grave the prognosis, but in a few rare cases, the corneal affection doesn't occur until about the end of the 2nd week, & may be just as disastrous - when once corneal complications begin, the final result will be doubtful, as to loss of vision, partial or complete.

Mules in Phys. Essays (p. 164 Vol. IV B. 1847 Annuals) Medical Sciences (Sajous) considered a short - pebble deposit of the cornea conjunctiva to most militate against the recovery of vision after corneal complications. This first condition is not common, the pseudo-membrane is only occasionally met with, & I haven't found it more serious with than without its presence.

infection will probably occur conjointly with maceration, & perhaps occasionally without any solution of the epithelial continuity & repair. When first seen, or after a time, there may be present a more or less general faint haze of the cornea, due to interstitial oedema; a small localised haze may occur anywhere on the cornea, & if progressive, usually slowly increases & as a rule ends in a progressive paleness with an opaque centre - it may then spread generally, or remain fairly localized - a minute collection of pus cells may then form in its centre between the corneal layers, producing an inter-corneal abscess or only, which may become absorbed, or may rupture centrally towards the cornea onto surface & become an ulcer - or the infiltration may become so intense as to produce a necrotic area around its margins, which will give way from ulceration & lead to perforation & destruction of the underlying structures. The general diffuse haze may go on to a more dense opacity, infiltration increase, until the whole or a greater part of the cornea is absolutely opaque - dark spots may now occur as well, & are inter-lamellar foci of pus cells, or cones - these usually become ulcers.
A localized hazy occurs most commonly near the centre of the cornea, or at the lower part. Often most usually with no visible loss of epithelium - at times the lower haze may perhaps be really, though rarely, due to the effect of nitrate of silver solutions, during cautery on the palpebral conjunctiva, as the lower part of the cornea is more readily longer in contact with excess of solution, more or less unavoidably, and occurs after 2 or 3 days of treatment. This haze may, however, produce, on progressing ulceration, or even perforate. Or, if favourable, may eventually disappear. Again primarily tiny ulcers may occur as specks over the corneal surface, due to a slight disseminated epithelial degeneration from softening, or quickly acquire a haze of infiltration especially around them. A slight elevation of the epithelium, like minute bullae, also sometimes occurs, due to subepithelial exudation, and bursting give rise to tiny ulcers, they occur especially towards the centre of cornea. Abrasions, no doubt, occur sometimes, due to the nails of nurse or surgeon, during a careless opening of the lids; these speedily become infected and form ulcers - abrasions are very easily produced, on account of the softened
macerated state of the epithelium & cornea.

If an ulcer be thus formed, it will be at first clear & small, but may lead to deep & extensive corneal ulceration and sloughing, becoming an infective infiltrating & sloughing ulcer, whether the case be a severe one at first or not, this sloughing being especially liable to occur, if much purulent element be present in the discharges. Infiltration may occur at the limbus, with or without any apparent loss of epithelium & result in a small marginal ulcer, which may very become a marginal ring ulcer, even come to more or less encircle the cornea. - Slight chemoiosis is then generally also present as well, especially if the ulcer be of any length & this chemoiosis may have been the cause, the effect, or both & will help to greatly increase its activity & size. Severe chemoiosis is very uncommon in this cases. - Marginal ring ulcers are probably influenced in their direction of spread, entirely by the attendant chemoiosis, & the cornea of that part, being cut off from its nutrition, tends to necrose.

A severe necrotic form with a waster-leathery, yellowish appearance may occur, & affects the whole cornea, but it is very uncommon, but may occur in very debilitated cachectic infants.
who are usually premature or syphilitic, accompanied by some chemoas. This is the worst form of corneal implication, as in spite of everything, the eye is speedily lost. The cornea, looking in mass – it is practically, an acute supplicative keratitis with a ring ulcer, plus gangrene.

Translucent clear ulcers, with or without stiff edges, occasionally occur, and are also often the intermediated stage a day or two after an oype has given way & before the edges take on fuscous marginal opacities. These clear ulcers may rarely be transparent all through, until healing takes place, though more usually however become opaque.

Translucent ulcers more often occur at or near the centre, sometimes on the lower cornea, when present, the discharge is usually not so copious or so thick. They may ulcerate more deeply or spread, & often lead to perforation, proptosis, & loss of the eye. Their clearness being probably due to less vitreous edema & contemplation than in other ulcers.

The entire cornea may slough, but illness generally occurs in some form to aid this result viz. gastro-intestinal disorders. The conjunctival sac being filled, is tapped at with the discharge, which
being unable to escape, except at intervals, causes mechanical pressure on the surface of the globe generally, the cornea more particularly, t may be very great at times; thus, together with the soaking of the tissues in unbecoming, pent-up and therefore concentrated discharges, cause maceration & softening of these tissues which will suffer most, viz. corneal epithelium & the cornea itself, the epithelium becomes more or less separated from the cornea, from serum exudation under it, or aided by the acuteness of the inflammation, infective material is now absorbed, either under the bullae or after they burst, or through abrasions, or the epithelium simply, the cornea becomes directly infected.

again, without any efficient epithelial loss, the superficial layers of the cornea may become infiltrated with serum & render it & perhaps its corneas also, opaque. the acuteness of the inflammatory process, produces death of the part, from excessive exudation pressure, added to absorption-infection, & an ulcer or abscess results, depending on whether the subjacent tissues have gone or not, t becomes the "consecutive suppurative keratitis" of artt (p.31 times by warz).
According to Dr. Charles Collins (part IV Vol. XIIRoy. Soc. Med. Rep.), 'chemosis, giving rise to a lowered nutrition of the cornea; & the presence of infective material in contact with the cornea, are the two chief factors causing ulceration.' If chemosis be present, the effusion impedes the circulation of the deeper vessels near the corneal margin by mechanical pressure, it also interferes with those capillaries at the limbus, which provide it with nourishment. It is indirectly, that its nutrition being more or less cut off, the cornea is predisposed to infection necrosis. Possibly also the lymph stream may be impeded in its passage through the corneal lacunae, owing to the direct pressure upon the corneal layers; & with this, there is an excess of leucocytes & migratory cells contained in the lacunae or cell spaces, in the perilacunar lymphatic canalicular system, or perhaps the corpuscles themselves may swell. Again in severe cases the corneal corpuscles may possibly themselves become necrotic by pressure infection or the acting as foreign bodies become local foci of infective matter (oriaces), or large areas on the surface, or slough. Intralamellar lymphatic inflammation, or infiltration, would necessarily take place.
under the anterior elastic lamina, which is itself devoid of corpuscles & lamellae. The scleral lymphatic, possibly also, carry the inflammatory processes to the lymph spaces of the cornea direct, by continuity from the conjunctiva, by means of absorption of inflammatory matter & products.

Stillman says (p. 150 Macnamara Bio. of the Eye, edition 1882): 'the ulcerative process has a causal connection with the purulent secretion, its effect on the corneal substance may be excited, or at any rate favoured by a sort of decomposing action.'

When the discharges is present for a short time only, more especially if it only escapes at intervals, the dangers to the cornea are immensely increased, & infection may occur anywhere in the substance or on its surface, aided by oedema beforehand. The slight diffuse corneal haze often seen, & probably often due to oedema alone, often clears up with no evil results; but may become more pronounced & lead to the production of grey specks (onices, ulcers) or to an entire slough, or set-up by continuity & become a kerato-initio, and eventually when so large inflamed, a leukoma-adhesion. &
If an abscess becomes an ulcer, this increases in size & depth, until a perforation ensues, the result of this last will depend on the size & situation, on the effects. The immediate effects may be a complete prolapsus of the iris, or a prolapsus of iris together with a part or the whole of the orbital contents. If the perforation be small, a prolapsus of the iris may or may not occur, but without treatment it will sure to prolapsus - if a large perforation, any or the whole of the contents of globe may escape as well as the iris. Sometimes ulceration deepens, until it reaches Descemet's membrane, when this for a time prevents its further progress, and giving to intra-ocular fluid pressure prolapses into the wound as a tiny bright bead (keratocoele) - after a few hours it usually ruptures, allowing the escape of aqueous, perhaps also the lens in part or in mass if the anterior capsule pierce way, or even the capsule & vitreous to some amount. Once a perforation occurs, of whatever size it may be, if a severe purulent discharge be present, the prolapsus usually increases, the corneal wound enlarges & stretches to receive it, the lens capsule ruptures, the lens escapes, the eye is like a mild form of panophthalmitis may occur from septic infection travelling back.
General constitutional symptoms, as the result of the disease, are generally slight, until severe complications are added - some slight rise of temperature may then be present, if a progressive abscess or ulcer be present, or a perforation is imminent, with great irritability, & sleeplessness, & accelerated pulse - pain probably causing the latter these symptoms.

The general health has every considerable bearing on the progress of the case, & if stomach & other troubles occur, severe complications may arise from depression of the recuperative powers.

But in a few rare cases, apparently strong, healthy infants, without any apparent cause take on severe corneal complications, go from bad to worse, & in spite of every care lose the eye, when an apparent weakening does perfectly well.

Convulsions may occur rarely, but are then the result of indiscretions or improper feeding - I have never found any atopic irritation in these cases.

The disease is entirely a local affection.

Gonorrheal Rheumatism or Arthritis Blennorrhagia is very rare in infants with Ophthalmia Neonatorum, but cases have been reported
from time to time.
Deutshmann (p. 127 Vol. IV B. 1891 annual
Univ. Med. Sciences Sajas) in Arch. of Ophth.
XXXVI pag. reported 2 cases in his own
practice, & quoted 4 others.
A. Jacob reported a case (p. 143 Vol. IV B. 1869 ann.
Univ. Med. Sci. Sajas)

Clement duces a case. British Med. Journal
p. 429 Feb 23, 1885.

Deutschmann noted that conjunctival secretion
was profuse & uninflected by the anthraxis onset.
In his report, the 3rd week seems most frequently
mentioned as the time when a joint became
affected. The conjunctivitis in his cases
had existed for some time before treated.
Metastasis of the blood lymph channels
is usually held responsible for this
complication, but just as any acute
articular discharge, not necessarily gonorrheal,
is known to be occasionally accompanied by
arthritus in persons with a poverty or
Rheumatic diarrheus, so hemorrhagic
arthritus may possibly be due to one of
these diarrheas in the infant, or induced
by cold or damp.

Treatment of the boils:
As the mildest cases are more of the
cellulitis order & the discharge scanty,
they readily yield to cleanliness, and
mild astringents, e.g. alum sulphate gr. iv, 
\( \text{\textsuperscript{8}} \text{v} \) and zinc chloride gr. i-ii or the sulphate gr. ii to the ounce - used every 2 to 3 hours, some of it being allowed to enter the conjunctival sac - or perhaps with the addition of one or two applications of 2% nitrate of silver to the involved lids, to correct any slight tendency to conjunctival exophtalxm. 
- the conjunctiva quickly returns to its healthy state again.

As is often asked by the mother or her friends, the cause of the disease is due to venereal disease from the husband, but it is generally easy not to commit oneself.

The instillation of a 1% solution of nitrate of silver once or twice daily is often quite sufficient, with mild astringents used as constant lotions, to cure a mild case - is useful in more pronounced cases as well, together with a mild astringent lotion used every hour, to thoroughly wash out the conjunctival sac, and a bit of vaseline or weak Bovine ointment to prevent the lids striking together.

Generally, however, until in the ordinary type of moderately severe cases, the discharge has become well established, while the conjunctival surface is smooth and tense, reaction applications e.g. very weak Bovine...
acid lotions used warm - are the best, and generally recommended. 
At this early stage we rarely see them - but when the conjunctiva becomes more 
glaucid, the surface villous papillated, the discharge free, besides astringents 
the applications of a causticizing nature are required, to form a protective and 
coagulable layer to interpose itself between 
the cornea & the inflamed conjunctiva, also 
to stimulate the unhealthy discharging 
surface to a more healthy secretion, as well as to destroy the invading microorganisms. 

What I have is, as always has been, the 
best of all applications, though many 
rivals have from time to time sprung up. 
When the child is first brought, the lids 
& lashes are generally fast glued together with 
dried secretion - thus requires to be softened with warm water or lotion, squeezed out of 
cotton-wool & gently removed. 

Having secured the child's head in the 
usual method, on a waterproof apron, between 
the knees, the child's body, hands, feet by the 
nurse a mantle, we clear away all discharge 
from the lids & lashes - then very gently opening 
the lids (for which purpose short-tails are 
requisite, to avoid risk of injury to the cornea) 
the pus is allowed to well out, aided by
Ablation with tepid water or weak lotion of any kind - the whole of the conjunctival sac is then thoroughly irrigated with that squeezed out of wool - the best way, being to allow the lotion to run down by the side of the fingers holding the lids open, when a gentle constant stream is easily produced; any gentle separation of the lids is necessary - they are now fully separated again for a thorough inspection of the corner - great care being taken, never to press upon the-pre at any time, & especial care is necessary at first, before one knows if a perforation be imminent - as the least pressure would then complete it. The lids are then reunited & well irrigated.

If a pseudo-membrane is present, it is gently removed. The elevated conjunctiva is now gently dried with wool, to absorb tears & (which would counteract or weaken the action chemically producing the chloride) a 4% solution of Nitrate of Silver is painted on, either with a camel's hair brush just moistened, or by means of wood on a cotton-holder - the surface is again dried, & a second painting given, getting as far back to the retro-ciliary fold, as possible - the excess again dried up with wool. If possible, both lids are painted together. The eversion is now returned, the
lids again separated to expose the cornea, & a 10 per cent 3i solution of sodium chloride immediately run over the cornea to counteract any excess of the nitrate which may have escaped, following this with plain tepid water. Some vaseline is now applied to the edges of the lids. If the cornea is quite clear even, a drop of weak atropin solution acts as a precaution or a sedative, & at any rate does no harm. Care must be taken not to wet the child's clothes.

It might be as well, in severe cases at least, to cut off the lashes, to help the lid becoming adherent & closed.

The child cries a great deal & for an hour or two after the nitrate of silver application, from pain, & then usually quiets down. I have lately been using a solution of formaldehyde 1-2000 to wash out the sac, & 1-20 as instillations in addition to the silver treatment, as recommended very strongly by Frangesq de Bordeaux p. 87 Revue des Journaux d'Ophthalmologie Février 1895—he recommends the solution changed every 4 hours—but I have not found the 1-2000 solution superior to 1-4000 solution of Buckchloids of Mercury & others;—the 1-200 instillations I have used only once daily & after the silver nitrate, in some cases it
has acted most beneficially, but not in all— it does not seem to suit every case, it is I believe, rather inclined at times, to produce or at least to aggravate a corneal haze. In two cases has it, since produced an oozing, one of which was absorbed; and well, the other ended in ulceration and perforation—any ulcers which occur during its use appear to become semi-transparent at the centre, when resulting from an oozing. It is said to be antiseptic—in strong solution, to coagulate serum—It may be that 1-200 is too strong—at any rate I do not think it altogether a safe application.

Retractors are sometimes necessary for the examination of the cornea, if the lids are very greatly swollen, & require very careful & gentle introduction, to avoid pressure on the cornea or globe.

Having instructed the person in charge of the infant as to the dangers of infection to herself & others (if a hospital case, giving printed cautions & directions)—the constant care day & night, not to allow any discharge to collect in the conjunctival sac, by means of hourly ablutions with the lotion grain (1-400 corrosive sublimate, & separating the lids to allow the lotion to enter the eye), in
the day-time, 3 or 4 times at night, near to press on the eyes, (as corneal ulcer may present) to wash out thoroughly all discharge she can; to remove the discharge as it forms between the lids (so prevent its decomposing, suppurring, or getting so excessive the conjunctival irritation, inflammation, to ease the edges of the lids after each cleansing to prevent their adhesion— to use separate clothes or for the infant—to burn all wool, is used for the eyes, at once— E above all perfect cleanliness. The nurse must carry out all directions faithfully; a little good can be effected, or so quickly—

whether the constant irritating solution ordered, be 1:4000 or 1:5000 (sodium sublimate, zinc chloride, a sulphate of Al or Zn, quinine, or A or Zn, or Chlorine water), matters much less than the constant removal of the discharge, with some harmless fluid, even water (tepid), or antiseptic; antiseptics all the better—the constant separation of the lids to allow discharges to escape.

Unvenient: 100 parts of 10% castor oil, may be perhaps better than many other remedies, for causing on the edges of the lids, but irritates a few cases. Or ung. Acidi Borici may be used. The salm. nitrate application is repeated.
at the end of 24 hours, as the discharge is then nearly fully re-established again, the balance of healthy & unhealthy secretion, not being greatly affected for a day or two usually. 

Nitrate of silver has been objected to on account of the inability to localise its effect, but if one is careful, there is little chance of any ill-effects, if precautions as above mentioned, are employed – though occasionally, I think a haze is produced, sui sypho of every case, in the lower corneal region by strong solutions, but is exceptional. In bleeding occurs from the lids during the nitrate application, as it often does, it is rather salutary than otherwise, as it helps to relieve the conjunctival congestion, and should be encouraged with tepid water, especially if the cornea is affected.

When a pseudo-membrane has formed on the conjunctiva, a weaker solution viz. p.t. 1/5 of nitrate of silver is more useful & helps more safely to use than a stronger, sets up a healthy state more speedily – the excessive fibrous element present in such cases, coagulates very readily & the nitrate is apt to increase this effect, & the deposit used too strongly, the caustic application tends to penetrate rather more deeply than
Other cases, occasionally, though much harm doesn't seem to actually occur usually, the cure may be delayed a little if the nitrate is used too strong, so giving more time for corrosion mischief to occur — also a less frequent painting is sometimes more beneficial.

Dr. Hozier (p. 42 Sokolov Welle's edition 1873) recommended small doses of calomel while the cyanosis lasts to relieve the staining of the conjunctival circulation.

Also Dr. Hozier (p. 61 Vol. 1 Med. de Popa) used calomel 2 or 3 times daily with mercenical ointment on the forehead - stopping both, when pure discharge occurs — he (p. 62) also scarified the conjunctiva if cyanosis still remained.

If one eye alone is affected, the infant should be kept lying on the affected side, to prevent any discharge running over contaminating the sound eye — the latter may be clad with absorbent wool or plaster, or wool coated with colloidum — this is not always applicable for various reasons — a drop of 1% boric nitrate solution may be occasionally used to the sound eye for a precaution.

The child should, if possible, be kept in a darkened room.
The painting of the lids has to be repeated every morning until the discharge becomes slight or ceases; only then gradually reduces the increase and destroys its production, the micro-organisms this prepare.

The full effect of the nitrate cannot at once reach all over the conjunctival surface, as many of the depressions between the hypertrophied papillae escape from time to time, owing to their depth. So the effect of the painting appears to last about 12-14 hours, or less in severe cases, in which, the painting might be beneficially repeated twice daily or occasionally often.

As the discharge lessens and becomes thinner, the conjunctiva becomes softer, less hypertrophic, less frequent and weaker paintings become necessary, when the discharge is scanty or even, it will only be necessary to paint every 2nd, then every 3rd, Day, and so on, until the conjunctiva is no longer hypertrophic and thickened, but the papillae near the cul-de-sac of normal size — the cleansing with will also be less frequently required.

When the discharge is increasing, usually after each application of the nitrate, there is an increased discharge from the lids for 2 or 3 hours, and then it again lessens — this is probably due to tears in great part, as well as to a temporary excess secretion inhibition.
The discharge usually lessens considerably two or three days after treatment begins, it becomes more serous, 2 or 4th or 5th days the child often begins to open its eyes in the shade. If treatment be stopped before the cure is complete, however slight or serous the discharge may be, there is a great tendency to relapse; easily inducible by cold, dust, draughts, or even ill-health, it may even become an acute purulent ophthalmia, more serious than the initial attack, leading perhaps to rapid corneal complications, loss of the eye, because the tissues are already debilitated from the former inflammation or had not fully recovered. Neglect & dirt, also, help in producing a relapse, in an unsure case.

The longer a case is untreated, the longer it often takes to cure, thus often due to corneal complications.

If the child is weakly or cachectic, cod-liver oil may be used internally or by injection; drip sucking given to the mother; also quinine or iron to obliterate the anemia, or the mel怀抱 - the infant may require stimulants at times - mild tonics - the digestive function. Feeding will require supervision - also the burns of child - all these & any constitutional disorders, having great
leaving on the health & recuperative powers of the infant. Fresh air is also necessary, but without draughts.

Both fed children, require especial care to suppress their feeding - a wet nurse among the poor is very rarely possible - the mother must not be allowed to attend to the infant's eyes, until she is at least free from the earlier effects of child-birth. The infant must be isolated if possible, if other children are about.

Irritics will be required for mother and child if the disease tends to become chronically.

Sir W. Reddick (p. 59 Med. and Phys. 1868 ed.) quotes von Graef's statement that 'Inoculation with this disease produces a purulent Ophthalmia or granular Ophthalmia in adults, & disfigurative conjunctivitis in 2-3 year old children.'
Cautery can never be required, to relieve pressure, in this disease.

A great number of applications have been praised & said to be infallible, et various times: & all said to be non-inflammable (some) marvellous cures viz. Peroxide of Hydrogen - Frink, produced iodinism, applied to the external lids, as phytolytic & as cure - dutto Boracic acid - Cubes in ointment, uninterupted cold compresses - Pana's Solution. Many of
Alun gr. 75 ad gr. 3; seems unnecessarily strong
- Iannic acid gr. x - xvi ad gr. 9; glycine 3; as a pigment.
- Dichlorphenylate of Magnesium 42% for irrigation with acid retractor.
  of Univ. Med. Sci.)
- Chlorine water - neeck
- Law's fluid - Boracic acid lotion; many
- others - also styptor. Parcll 2500 to 5000
- by V. acid (4161 times, by Stare).
- Parcllulose of mercury 4000 - Boracic acid
- Lotion - Zinol Alum. or sulphate of adz is are
- about the best - I think - with for home use
- with painting of the lids with. mixture of
- Silver gr. x - x - x very simple ointment
- to keep the lids from sticking.

Treatment of corneal complications:
The aim of all treatment in this disease,
is to preserve the cornea, which is the
real danger, the only way to do so
is to arrest & cure the conjunctival condition.
The necessity for mixture of silver, applicatiois,
will be much greater if the cornea be affected,
and however severely, but extra care will be
required in its application, a weaker
solution, than at first, is usually advisable.
especially if the corneal affection is advancing rapidly, on account of the lowered vitality, certain to exist, & the softening around abscess or ulcer.

Corneal complications, usually give little or no warning when they arise, except when severe, when increased irritability, restlessness, 
Sheepness occurs - d. Wecker (p.61 Vol. I Med. Als Yeux) thinks these symptoms more due to the energy of treatment.

The indications are said to generally increase the more prevalent & the eyelids more swollen, when abscesses form, or ulceration is about to occur (Haymes Walton p 866 edit 1875).

This happens sometimes but just as often does not - but the lid often become more flabby & softer if severe ulceration is present. Neglect, a dirt will predispose to corneal affection in young weekly children especially. The cornea may become affected at any time but if much chemosis be present, the more serious will be the danger - but in infants it will rarely be sufficient to require scraping or scarification.

If a general diffuse corneal hazy be present, atropine + 1/100 adzi to 1/1000 die is the best to use - if a localized + not central hazy, then stronger 1/100 adzi 1/1000 die - if the centre is hazy, atropine is necessary on account of iritis
possibly ensuing - anywhere else eserin

In infants atropin does not always exert
its mydriatic effect quickly, possibly on
account of excessive backformation diluting
it - or it may not act for some hours, and
then only slightly - Carpenter (H. 147 B, Vol. IV
1873 Ann. of Enno. Med. Sci. Sappho) also notes
much the same - Eserin on the other hand,
always acts readily, can be relied on.

If an abscess or ulcer appears to be spreading,
or an ulcer deepening, the thermal cautery
or galvano-cautery will often stop this
increase, it is most useful occasionally.

Eserin 30 to 7 to 3; is generally speaking,
more useful in all corneal affections in
this disease than atropin, except when
the cornea is affected - even then, if the
cornea is deeply ulcerated in the cornea,
2 grains eserin mists every 3 or 4 hours,
gives more support to the lens 3; by means
of the iris, if a perforation does occur - if
if a perforation occurs results, atropin 30 to 7 to 3;
every four hours, usually reduces
it if seen soon after its occurrence, or a
constant pressure pad will then be applied,
+ atropin used, until healing takes place.

Eserin appears more sedative than atropin
in the corneal affections of phthisic mon-
asthenia, perhaps by reducing intraocular
tension, through the filtration angle being kept free & clear, & in that, it acts always when abscess doesn’t always act at all on the pupil in these cases, or very slightly. When abscess occurs, serum is more serviceable until all danger of ulceration or spread is over, then abscess is better, to await mitis or break down adhesions if it has occurred as many as possible.

Serum is also best in any but central ulcers, unless the latter be deep.

Makcock of Potsdam (p. 57 B. V. D. IV. 1893 Ann. of Univ. Med. Sciences) prepared Serum, & even added its absorps leucocytes?

De Schweinitz (p. 73 B. V. D. IV. 1891 Ann. Univ. Med. Sciences (Sajosi)) & Hansell (p. 72) found serum superior to abscess in deep ulcers, & in abscesses of the cornea.

If the health of the infant is now affected, a want of general & local vitality, result, the ulcer will deepen & spread, in spite of every thing & preparation & occur.

If any suspicion of syphilis be present in the child, mercurial injection of Hydarn. about 5% rubbed into the abdomen - cold linseed oil, stimulants & tonics may be tried.

If the abscess is spreading or the ulcer deepening, pain will still further depress the
child, the base of the ulcer will require puncture with a needle, to relieve tension, or better still a paracentesis of the anterior chamber below, away from the ulcer or abscess, repeated daily, to prevent a return of aqueous, tension upon the weakened tissues— if the base of the ulcer be punctured, it will require to be kept open daily, with a blunt probe, for the same reasons; the ulcer thus relieved from strain, may at times then heal. Paracentesis of the base of the ulcer even, will do less harm than a spontaneous rupture.

If a perforation does occur, or a paracentesis be done, a constant pressure-pad secured by plastic will have to be kept on, changing it once daily (or oftener if there is much discharge) to give support to the injured cornea—if the lens & vitreous are not lost, the cornea may heal, & lead eventually in spite of adhesions to a very useful eye—if the danger of staphylococci be averted by a constant pressure-pad, until the cicatricial tissue is quite firm enough to resist intra-ocular pressure.

When a spontaneous perforation occurs or a paracentesis be done, the child which before was restless, irritable & sleepless offsets just from pain, quickly quietens.
down & slumps: thus relish affected to the infant lasts until the aqueous reforms; but a spontaneous perforation rarely tends to heal for some days, if the interior of the eye become affected, septic intraocular changes may follow.

If any ulcers form, they are very hard to control, but eserin alone is of use.

When an abscess has become an ulcer, sheets of debris come away from time to time, from its surface, but often takes on a clear character for a day or two—it may then commence healing, or again become slumpy & rapidly perforate; in such a case, before perforation occurs, the daily instillation (once daily) of 1% solution of silver nitrate is very useful to keep the process in check; a pressure-pad also assists.

If the ulcerative process extend down to the posterior limiting layer of Descemet, a keratocele may form, as a small clear transparent bead easily seen when the lids are opened—at this stage, it has been possible, occasionally to prevent its rupture, and cause its return by a pressure bandage, & the cornea may heal.

Drain (p. 47 Dis. of the Eye) first touched it with the solid nitrate, then used a pressure bandage, & Pomer (p. 193 Dis. of the Eye) also punctures the
cornua below the cyst, if it continued after touching with the nitrate, and a pressure bandage. - This latter method is the most scientific. The best - a pressure-pad will in any case be required, as what with straining to close its eyes when washed by the medicated oozing by the surgeon, the cyst is very liable to give way, followed by a gush of aqueous, and prolapses into it. If the corneal loss be large, the sudden decrease of tension, will bring forward the lens & rupture its capsule, aided by the squeezing of the globe by the child's efforts to resist, 2 the lens escapes in part or as a whole, 2 may be followed by vitreus. In favourable cases, a perforation, (usually only if small) may close, heal & secondary changes hereafter ensue. When a large perforation, however, occurs, and a good part of the orbital contents escape, there is a temporary cessation of acute symptoms, but these will speedily recur, & in an aggravated form - the usual tract usually becomes affected & infected, a mild form of pan-ophthalmitis ensues, with a further increase in swelling of the lids & the child is now restless & furrowed, irritable & sleepless from the great pain - a pump will be required. Viz. Colonel - practicing will aid in alleviating
the pain & will further the inflammatory process to more quickly subside - the discharge which may have been abating before perforation occurred, again increases, will continue copious until the eye quietens down, & the tiny slough of its contents comes away, when the remainder clots & eventually shrinks. Instead of paralleling, constant hot fomentations are more easily managed sometimes. Daily painting of the lids with silver nitrate solution will be required, when the pain of the ulcer subsides, with constant astrigent lotions to remove the discharge, & bring the lids to a healthy state again - or Formol 200 instillations are now very useful, & will expedite matters. Formol suits some cases, but not all, & is I think liable in many cases to produce corneal affections, or if already present, to further increase them - but a few cases do splendidly with, & without ulcers, previous to its use: it is not, I believe altogether safe - at least in that strength - it seems to control ulcers & abscesses in a few cases, & increase them in others. The severity of the discharge will have some bearing on the increase or diminution of corneal complications. When a postpupillary iritis occurs, if of a moderate size & peripheral, if not replaceable
by strong eserin or aided with the curette, squeezing-off the extrusion is necessary to prevent a further increase of the prolapse — if large, strong eserin p. 74 — vis. edzi & a pressure pad in the plaited junction may occasionally allow the cornea to heal, if the lens & have not escaped & the tendency to further prolapse has ceased — if a central prolapse occurs, atropine is required, if it be small, but if it is large, the lens & will almost certainly have been lost. If the prolapsed iris is cut-off, it will on healing leave a plaited cicatrix, & somewhat lessen the chance of resulting staphyloma, than if left alone — Horner (p. 105 Swangy Dis. Ophth. by edition 1890) homed declared that absorption predisposed to a purulent infection of the deep parts of the eye & may occur — thus i think will just as often occur with, without, cutting off the extrusion — he recommends incising the prolapse, if inclined to be fistulous — the removal of an extrusion will depend upon its size & site, as if central or large is of doubtful wisdom, removing as it then, would any slight assistance it may give in supporting the lens-capsule. A constant pressure-pad will have to be applied until all healing has been completed, as long as the lens remains, for support.
A perforation may clos, & on healing the iris may form adhesions to the sides of the ulcer - if the whole pupil be attached = total ring synchia & leucoma, will probably end in staphyloma, & glaucoma. If part only of the iris is adherent to the healed ulcer, which itself becomes densely opaque = leucoma adherens. If iris has occurred, anterior or posterior synchie will form.

Rarely, a prolapsed iris will form a flap in the wound, & distending it further, more prolapse occurs, & a fullb iris may form, which eventually becomes on closing, by means of a pressure-pad constantly worn, covered over with fibrous matter, which closing the wound, is converted into cicatricial tissue, & usually terminates in a staphyloma cornea.

If the entire cornea sloughs, or its separation, the orbital contents escape, the eye collapses, & eventually shrivels up.

If less of the cornea be lost, a large portion of iris prolapses, then, if the lens & do not follow, may become covered with lymph, inclining to close the pupil - a cicatricial pseudo cornea will form over the prolapsed iris, & unless a constant pressure-pad be kept on, will yield to intra-ocular fluid pressure, before the fibrous tissue is strong enough to resist, bulging from
a staphyloma, partial or complete, as part of all the cornea, participates this cicatricial tissue, is sure to yield a little even with the presence pad, but the latter modifies the bulging very greatly, if not left off too early. Large necrotic areas of slough are not common under treatment, but if present, little can be done except cleanliness, care, continuing the usual treatment as before: tonics & stimulants:

Injections of 1% solution of bismuth nitrate twice daily are often most beneficial. But the eyes usually go in spite of everything: such cases usually occur in weakly, premature, or aphylotic infants; they may be an ulcer at first, which suddenly takes on an accretion of tenacity, & the whole cornea slumps in mass. If the whole cornea early, becomes flaccid, & yellowish, it quickly sloughs, & on this separating, the contents often flow follow.

Once the anterior chamber is punctured, one can only hope to keep the inflammation in check, until the cornea again closes, & if this perforation be small, this often does occur, if one can lessen the conjunctival discharge. If large, the best result one can hope for in a tumor with some clear cornea left: often in such cases, fortunately rare, the mother will bring up the lens, which had squinted out when she was trying to clean the eyes.
As the conjunctival discharge lessens, the corneal apposition also usually improves.

Sometimes a light application of 15% solution of silver nitrate, to an ulcer, carefully removing the excess, will stimulate a sloughing process to heal, followed by frequent warm fomentations; a 1% solution of nitrate methylated once a time daily.

Slight nitrate suppurations may be absorbed as the tissues repair their tone.

The unguentum flav. mold (μτηττης) often helps to further stimulate a healing ulcer, used once daily.

A healed abscess or ulcer, will become cicatricial tissue, of a density in proportion to the extent of damage done.

Infusorial exudations, in course of time, become absorbed, leaving the cornea more or less clear - but if any destructive changes also occurred, may give rise to macular, retinal, or leukoma, according to the nature and depth of tissue involved.

The great reparation, & active tissue changes of infants & children in health, often helps to completely repair corneal destruction, even if fairly extensive, & to remove their effects, viz. macula & retina incur of fairly dense or extensive character, & leukoma will often become more transparent in course of time - this will be
added considerably by the frequent use of
warm ointions & fomentations - a warm water
as hot as can be borne - also by the use of
the flax. Have mild (I'm medley. Has p.iV try)
one daily & massage of the cornea over the
lids. Keep up for 6 or 8 months or more, gradually
doing them less frequently from once a day
until once a week.

Swinlen recommended mitigated tuipinum as
an application for macula (p.62 Vol. V Reg. W. W. Reg.)
Rothmard employed subepithelial injections
of Sodium Chloride p.3 and 3/4 to hasten the
absorption of corneal opacity (p.264 Buildwell lecture).
Pyrogenin 1-2000 instillations will in a few
cases help to keep an ulcer healthy, to prevent
further infection, but is most uncertain, & some
case will not tolerate it - its punctuating &
sceptic lenses are said to be great, either in
the blue or yellow preparation, but chiefly decompos-
is not deep in the dark, & in case after about
9 or 10 days. So a fresh solution is always required.
Chronic cases will require occasional applications
of silver nitrate in addition to warm antiseptic
baths, & the mild yellow oint of mercury ointment
for stimulation of the ulcers, of the lids.

Action of Nitrate of Silver:

can be used from p.1V to p.1V - X, according to
the requirement - & condition of case - p.1V
solutions being at times most applicable.
The action is probably one of chemically destroying the cocci and their products, by causing a temporary protective exudate and intermediary protective layer between the cornea and the inflamed lids, by its action as a stimulating antiseptic agent, by coagulating serum, or by promoting the action of the fibrin ferment. It destroys the superficial tissues with them the embedded cocci, until all are reached by succeeding applications. It is less irritating than anything else, as effective, and will not (in very rare cases) unless unduly strong, cause injury to the healthy intact corneal tissues.

A solution is always safe, except with progressive ulceration present, when a 1% in Sapo is better. Sulfur nitrate is more lasting in its effects than other applications, which can be used with safety, & appears to penetrate sufficiently deeply into the tissues. The ulcer becomes detached in a few hours, & before much regeneration has occurred, the acute inflammatory process regains its power, prevents the reformation of epithelium, until a fresh painting again arrests the discharge.

Bony (143) says the reformation of epithelium begins about the 4th day of treatment.

Cases are generally said to occur without corneal complications, or at any rate without perforation. If seen early treated
before the cornea is affected—this isn’t invariably so, as in a few rare cases, without apparent or sufficient cause—with every case, they do go wrong & some of these infants can apparently stand the heat.

As Dr. Wickens (p. 61 Vol. I. Maladies the year ed. 1868) points out, ‘tongue & vigorous children often lose their sight, while weakly cachectic escape. I therefore still believe that the latter have a greater risk of losing their sight than the strong—this weak one, often, don’t go on to corneal opacities, while the strong do, therefore the strength of the infant has less to do with the prognosis than was supposed—the cachectic are often more irritable & subject, not because of their state of health, but because their parents are in such plight as not to permit the giving of proper nourishment.’

This concurs with what I have found in 5 or 6 cases, which greatly puzzled me as to the cause of such great differences—cases which I expected to be certain to go wrong, did well, while a few of seeming perfect health & every year’s children did badly.

Prognosis of aphthae corneae

will depend upon whether the cornea is attacked or not, before a lessening or stoppage of the conjunctival discharge occurs— if this latter is greatly diminished within
The first 10 days or so of treatment, careful complications will rarely occur. The prognosis is usually therefore good, if the disease can be attacked before the cornea are affected. The earlier the better - the health of the mother, the child, its food whether artificial or natural, the hygiene of its surroundings, the care & cleanliness used by the mother & nurse; the treatment employed, will all have a great bearing on the production or prevention of corneal infection - if it occurs, the vitality & power of recuperation of the infant.

If the cornea becomes affected, vision will at least probably suffer, by the production of staphylococci, tubercle or resulting. If the general health of the infant is or becomes lowered, the prognosis will be in doubt, as corneal affection in any degree may again go on to complete loss of sight at any stage. Any menacions or constitutional depressions are not in favor of visual escape. If however the case is seen early, treated properly, no affection or disorder of general health occur, corneal complications are not often seen, or if they do occur are very slight. A great deal will depend on the nurse & the literal attention to directions. The earlier seen the better the prognosis is.
all cases, especially, malignant cases, but the non-malignant are often seen for the first time in the 2nd, 3rd or even the 4th week, with concomitant unaffected.

Probably the individual virulence of the infecting vaginal discharge has a good deal to do with the severity of the case, and this shows itself generally by early concomitant complications in a malignant case.

If the concomitants become affected, the treatment will of necessity be prolonged, in accordance with the requirements of the case, or the stage when first seen. If short of perforation, a useful guide will subsequently result, though sometimes a subsequent operation may be required, if extensive uterine adhesions occur, which they very rarely do, a few synechiae perhaps remaining, or of slight consequence usually. If a small perforation occurs through a small perforation, healing generally results with no adhesions present except perhaps a small adhesion to the cervix, or a small adherent become as a small portion of it is apt to become adherent to the wound. If a large perforation with perforation occurs, so long as the entire cervix remains, & healing of the concomitants occurs, there is a cleavage at the concomitant margins with a non-progressive Staphylococcus, some useful reason may ultimately be obtained by operation.
as Dixon (p. 29 Dis. of the Eye, edition 1855) said, 'as long as 1/4 of the cornea remains transparent, a useful eye may result subsequently by operation. While any portion of cornea retains its vitality, there is hope.'

Children, who are healthy, even dense opacities clear wonderfully; and may even practically disappear, only to be seen with oblique illumination, this effect will be helped and accelerated perhaps by massage or hot fomentations.

An anterior-foveal cataract occurs when iridectomy has occurred near the center of the cornea, only if the wound closes very rapidly, without prolapse of the iris. It slightly interferes with vision, but does not admit of any treatment.

If any part of the lens escape through a perforation, this will almost certainly be a shrinkage of the pupil and secondary changes.

*Pathology:*

The infective micro-organisms may be often gonococci in the severest cases, but probably other organisms may also cause the disease in some severe cases, as well as in most of the milder forms, the total effect depends on individual predisposition. Decomposing, irritating discharge of any kind from the genital urinary tract, appears quite capable of causing conjunctival inflammation of a greater or less degree.
The organisms probably get caught in the crypts of the tubular glands of the conjunctival epithelium, lodging there, thus in their movements or through acting as foreign bodies set up a reactive inflammation, hyperemia of the conjunctiva then occurs with an increased formation of epithelial cells. The subconjunctival connective tissue then acts as a round-cell infiltration of the papillary mucous membrane, generally, become hyperplastic and thickened. This active congestion & striction produced, will cause the edema, or with the increasing cell production thus will occur a serum exudation, infiltration into the loose cellular tissue of the lids, causing them to swell & become edematous. The ocular conjunctiva is not often greatly affected, probably on account of the extreme paucity of papillary glands and from its stratified compact epithelial layer being more resistant to the gonococcus, if it does become affected, on account of the looseness of its sub-mucous tissue, it swells up more or less as Chemosis. The papillae get greatly enlarged & thickened from congestion, extreme cell infiltration. Chemosis when present, acts seriously on the cornea, probably partly, by mechanical pressure of a constant character on the circum-coronal area, so interfering with the nutrition
from the capillaries & vessels at the limbus, which supply the cornea with lymph, and upon the deeper vessels in that neighborhood are also impeded, partly by the tendency for pus or to put underrate its field, or not being easily removed, unless the field is raised, will become concentrated from being sent up - the cornea corresponding to the chemosis will thus, having its nutrition cut off, tend to elevate & increase, its vitality being also previously lowered by its soaking with discharge & pressure from the dilated lids, upon it.

Extra mucus will be secreted, from inflammatory stimulation of the glands; owing to overaction of cells & excessive formation of leukocytes around cells, some will break down & form pus cells, & colour the discharge according to the number that occur, from white to greenish yellow.

Proctor (p. 187, Owen & Drs. of by) found an irritant in the conjunctival sac, caused a breaking-down of the epithelial cells - all but the the nuclei, which having previously divided, became when pus pus cells!

During to an excess of fibrinous elements, t stasis, a fibrinous pseudo-membrane may form upon the conjunctival surface, but is not adherent to it.
Corneal haze, may be due to simple cloudy swelling, from the spread of the first stage of acute inflammation to it, and interstitial oedema (p. 27 Histology of the Eye, Pollock) — This may give rise to a proliferation of the corneal corpuscles (together with an immigration of leucocytes), in the interlamellar canals or lacunae of the cornea.


Leber (p. 48 & Vol. IV 1890 Ann. of Univ. Med. Sci. Sajnos) in April 1889 found that under certain conditions fibrin coagulation may occur in the substance of the cornea. When abscesses occur, the excessive cell-product, owing to excessive tissue pressure, will lead to degeneration & death of some of the cells. They break down and becoming coagulated into pus cells & f. gum., if deep in the corneal layers, an abscess, if superficial, cicatricial, if in mass, a slough. A surrounding zone of infiltration, opacity, is always present.

The degeneration is breaking down into pus cells, it is as doubt in part just also favoured by infective organisms.

The papillae near the upper fovea are larger & with broader bases than elsewhere & remain long emplaced & hypertrophied.
The discharge when purulent consists to microscopically of pus cells & leucocytes, mucus, epithelial cells, granular corpuscles, microorganisms & debris.

The gonococcus (or Diplococcus sometimes?) will often be found in the discharge. According to Juler, in Pemberton & Sheldon's Medical Year Book 1894, after staining with Methyl-blue, in the pus-cells, epithelial cells & surrounding fluid. Perhaps absorption of phlogonemes occurs as well, sometimes.

Hinde of Chicago (p. 56 B. Vol. IV 1894 Ann. of Univ. Med. Sci. Japan) states the location of the gonococcus is first supr, then inter, & later sub-epithelial. & all continued. As the discharge subsides & the conjunctival surface becomes more healthy, the conjunctival congestion disappears, the papillae become fleshy; the round-cell proliferation ceases, & absorption of exudation; cells take place until the palpebral conjunctiva is longer hyperemic, resumes its normal functions. Once more the cornea usually commences repair as soon as the lids secret less discharge, new tissue forms, & epithelium comes over it—the parts the round cell element, the aqueous the epi-the and

If perforation has occurred, further changes will follow.
Results and results:
Partial paresis may occur from over-stretching of the levator, together with chronic inflammatory changes in the tarsal cartilage, and connective tissue thickening.
Cicatricial changes in the conjunctiva, resulting from Ophthalmia neonatorum were described by Slethman of London (p. 57 B. Vol. IV 1893 Ann. of Univ. Med. Sciences Japan). They may, however, have been due to the retinotic conjunctivitis supplicated, as a result of too rigorous treatment with scarification. T. J. Lightowstores (p. 110 Vol. IV B. l. Ophtha. Spec. Rep. 1893) reported a case of Xeroma in a 6 weeks old infant with Ophthalmia neonatorum, which had had strong silver nitrate applied as a solution twice daily for weeks, the cornea being slowly, and a mucopurulent discharge also present. The fluctuation of vision is said to be often impaired, even when the cornea was not much damaged, in consequence of injury to the choroidal or retinal coats (Haynes Hallon p. 669 edit. 1875). This is more likely a very rare occurrence, without a perforation, prolapse, or staphyloma as well. But when there has been corneal necrosis of known slight occurrence, there may be a macula or nebula to obscure vision, if at
or near the centre of cornea - sometimes these opacities however, even when large & dense, completely disappear, or become less in the course of years, but may leave behind some alteration in the corneal shape, producing errors of refraction. maculas & submaculas will usually produce irregularities of the cornea, especially if near the centre, or occasion astigmatism, sometimes simple or regular, mostly irregular. If however the opacity be not central, little or no interference with vision may result, except in dim light when the pupil dilates. The opacity is great or slight according to the depth & area formerly affected and to few or all the corneal layers are involved. If deep ulceration occurred, a large dense opacity will result.

Teach's Collins says (p. 431 Vol. VIII part IV Roy. 1. Ph. 424. Ref.) 'the amount of opacity will depend on the amount of cell exudation in corneal repair.'

Corneal opacities in one eye may produce strabismus, owing to its defective vision, it tends to be thrown out of coordinate focus. Hypotropias may also result from opacities & Brudziale Cachex (p. 262 8th after bye) Thurtos has recommended an early enucleation to prevent this happening, 'if at least a clear ring of corneal tissue remain.'
Mystageria is in these cases probably due to the uncertain movements the eye goes through in being unable to focus anything—its impaired vision will not allow the educational effect of objects to direct its movements, until the comus becomes more transparent, when a sort of stammer of all the ocular muscles occurs, or more aggravated by excitement, when the eye is required to fix an object in any direction. An anterior polar ecatact or pyramidal may occur & result from a small perforating ulcer, if that perforation be small, it is very quickly closed—it occurs with or without very slight iritic adhesions, & is usually central more or less.

Hutchinson (p.138 Vol. VI R.I. Ph. Hosp. Rep.) says it is due to a nutritional disturbance of the lens-capsule from inflammatory proximity. Swangy (p.306 edit 1890 Dis. of Eye) that it is a sub-capsular cell proliferation.

It appears to be due to direct contiguity with an inflamed cornea, & to a localized lenticulo-capsulitis, resulting from a partial detachment of the capsule from its lens, during its separation from the cornea. Hutchinson (p.139 Vol. VI R.I. Ph. Hosp. Reps.) says an opaque act on the corresponding posterior surface of the cornea, may also be rarely seen!
If this pyramidal cataract be central, as it usually is, it may somewhat affect sight, but not otherwise. Anterior synchia may or may not accompany it, rigourous generally, very slight, clearing hæmorrhage any iritis is, with these appearances.

If a large perforation in the pupil occur, it may lead to leucoma-aderma, require subsequent indiction perhaps, (pro vision) a division of synchia; to relieve iritis drag, & tension, resulting, if unrelied into staphyloma and a secondary glancoma, from dragging of the iris & its vessels. A large indiction is generally required to remove this change of perforating staphyloma & glancoma. If staphyloma occurs, a total enlargement of the globe may occur, & a posterior staphyloma be produced as well. The staphyloma will be complete or partial, as the whole or a part of the cornea be involved, or sometimes it becomes a sclerotic staphyloma, or the cornea.

Irish Collins (p. 432. Vol. VIII part 4. Roy. Soc. Med. Symp. R. F.) says 'Anterior glancoma may also occur from adhesion of the capsule to the cornea, added to a closed pupil; the stretching of the globe in staphyloma, doesn't keep pace with the fluid secretion, & thus not being able to drain away, on account of closure of the irido angle, ultimately Results in Anterior glancoma.'
The extra-ocular muscles may in advanced cases, very slightly assist in keeping up pressure on the globe in a progressive staphyloma, eventually when protruding through the lids, the orbicularis will help also. An early incision may help to stop the increase in tension, by opening up the irido-angle.

As the different orbital structures become involved and stretched upon in the production of a staphyloma, various changes will occur in those structures.

If small, a leucoma may remain quiet, stationary in character, being well supplied with nourishment by the iris, it soon gets strong enough to withstand pressure effects. If a leucoma - adherens be present, with a fixed or semi-fixed pupil, it will probably end in secondary glaucoma.

Tattooing is sometimes required for cosmetic purposes, in leucomas.

Pupillary synchiae may be present from iritis, even to total synchiae, but this is unusual in this disease, without other complications, & under glaucoma will cause ulcers may occur on corneal cicatrices, probably partly due to fatty degeneration. With a large complete corneal staphyloma,
the disfigurement, the liability to inflammatory attacks from exposure to cold & dust, overjet & orbital cavity being often unable to close over it, & rarely glaucoma, & the tendency to sympathetic inflammation of the other eye, generally end in abscession, evisceration, Mule's operation, or emulsation.

When the eye has after perforation, lost its lens alone, or with vitreous as well, it usually collapses, the cornea shrinks, & the iris bulges. If a new button of the iris may remain after healing, this usually sooner or later may become painful, and cause sympathetic disease of the other eye, so requiring enucleation.

Optic neuritis has been found after emulsation for staphyloma. — Nietzsche (p. 537 P.R. Oph. Hosp. Ref. Vol. VIII) thought it may not be uncommon in the acute stage of Ophthalmic necrotorium, & that the inflammation spreads backwards.


Bone: on the inner surface of the pigment epithelial layer of the choroid, among the exudation material.


Detachment of the hyaloid from the retina:


A form of Retinitis pigmentosa: with atrophy of the choroid, retina, following choroiditis.


Enlargement of the fibers in various directions with thinning of the coats.

Cuffed discs are frequent with staphylococci:

Bands of fiber in lentumata: the remains of deep seated vessels in the corneal layers (Pollock, Histology of the Eye p. 31)

E. Hutch in his Proof Essay on the cataract
Of Blindness August 1884 - Section 7. on
Congenital & Hereditary affects - reported
a case of a man, blinded with ophthalmic
neuritis, having 2 microphthalemic
children (p.84 1885 Med. Review)

Prophylaxis

This disease is as a rule perfectly
preventible, by care & cleanliness, if due
precautions can be effected before, during,
or after the performance, in cases where
pregnant women are known to have
a vaginal discharge during their pregnancy.
Often, disease then does occur, its
severity will be very greatly modified,
almost without exception.

As said of Heidelberg Says (p.145 Vol. IV
The inflammatory processes should be considered
as no longer injurious in themselves, but
the unavoidable consequences of damage
from without, which they try to remove:
so therapeutic measures should be directed
against the cause of the inflammation itself.
The disease being due to organisms of
a more or less infectious character, preventive
measures will generally abort the disease,
but rare cases of a virulent type will
occasionally occur in which pregnancy, most
careful obstetric treatment & careful
nutrition may then perhaps be answerable.
P. v. Wilt (p. 44 trans. by Ware) holds that the
infection can be destroyed or diminished
by dilution with 50 to 100 parts of water,
by aspiration, by prolonged preservation-
.s quotes Kirungen (p. 46) who asserted
that if within 3 minutes after infection,
the conjunctival sac be thoroughly washed
out with pure water & cold compresses
instantly applied & for several hours
continuously, will abort the disease!
This is probably too far-fetched, if the infection
be gonorrhoeal, as in adults, at any rate,
if any pus gets into the attendant's eyes
from using a syringe, or if a spurt occurs,
or when the distended sac is suddenly or
incidentally opened after some hours of
closure—i.e. without immediate & very
thorough & rigorous washing out of the
conjunctival sac with antiseptic lotions,
& every case apparently taken to the
all micro-organisms, a severe purulent
ophthalmia almost always results.
As Lennec has so commonly at the latter
end of pregnancy, though it doesn't necessarily
always cause hemorrhagic conjunctivitis
in the infert, it often appears to do so.
When therefore, there is known to be a
discharge from the foeto-urinary tract
previous to child-birth, it seems only
Common sense led the vaginal tract antepartum for some days before the birth—especially if previous infants had developed ophthalmia neonatorum at birth. Levan (p.66 Vol. IV B, 1894 Ann. of Univ. Med. Sci.) detected gonococci in the vaginal secretion after thorough irrigation of the whole tract with 1-2000 corrosive sublimate. In maternities, all cases can be reached, but not in private, where it is very rarely required, if it is required on usually easy to arrange if the patient is fully made to understand the importance of doing so.

Various vaginal douches have been recommended: Spiegelberg p.4/3 Vol. I (New York Am. Soc. Tram) recommends, weak solutions of caustic acid, salicylic acid, terebene, etc. Plumbite, in every night a small pledge of cotton-wool soaked in glycerine, covered with one of the above solutions in small quantity, introduced for vaginam, to diminish if not to heal the secretion.

Budrin of Paris (p.55 B. 1894 Ann. of Univ. Med. Sci. Paris) uses a vaginal douche before labour. 7 1-5000 corrosive sublimate, & the also instilled 1-150 nitrate of silver soaked into the new-born conjunctiva, before
cutting the cord & only 1 in 665 futures. According to Stiles in his Prize Essay (p. 64 B. vol. iv 1869 Ann. of Univ. Med. Sci.) boys are more attacked than girls, on account of the larger size of the head, than slower labors usually - 80% of premature infants birth - also in tedious labors, weak peripusion pains at the finish.

The hygiene of the lying-in chamber & house generally, has great bearing on the health of the mother. Therefore, the quality of the discharges, so should be supervised if possible.

The period of primary resuscitation is uncertain but may occur 1-6 hours after, whereas the child first opens its eyes, or very soon after, and lastly never before.

The accouchers' foetus has been suspected as an occasional cause during the vaginal examination of a face presentation, by Stiles in his Prize Essay January 1869 (p. 63 B. vol. iv 1869 Ann. Univ. Med. Sci.) - but this must be excessively rare & improbable as a cause - he also mentions among other possibilities, instruments used during delivery as a cause of opening the eyes, which is most unlikely during the passage of the child's head & face through the pertinent canal, some often vaginal secutions become deposited.
about the orbital depressions, & when the head is born, one of the infant's first acts is to open its eyes; when some of the discharges collected on the lashes, will readily find its way into the conjunctival sac, more especially if the secretion be semi-fluid, inoculation takes place & the disease will be produced, unless aborted. A delay in the passage of the head over the prepuce will be more likely to increase the chance of inoculation, from the saturation to which that locality will be subjected, previous to & during the passage of the head.

Special care of the eyes is therefore necessary if a protruded labum occurs, whether a vaginal discharge has existed or not.

Fuchs (p. 129 Ophth. Review 1885) in his Prince essay says, 'the purulent Ophthalmia of the new-born is allowed by all authorities to be the same disease essentially as the microbial Ophthalmia of adults!' Therefore it will be necessary to treat all cases of acute or chronic vaginitis or leucorrhoea, whether bacterial or thrush, & if only the slightest trace be present—when known to exist previous to child-birth—by local ancinch with antiseptic substances, viz. 1-4000 corrosive— to render the canal aseptic if possible, & thoroughly cleanse.
the perineum and under it aseptic - To carefully disinfect the genital tract of the examining hand after every examination, the hand before examination or when such affections are known to exist. To facilitate & assist the passage of the head once beyond the perineum, to allow the face to remain unfrosted or it long, it is possible. This can be aided by softening the canal perineum with vaseline, by gently stretching the perineum with the fingers, holding the face away from the perineum as much as possible, by wiping away all blood, mucus, discharge, or vernix, from the eyelids & cheeks, as soon as the head is born, or if there is time a delay in the birth of the rest of the body, a drop or 2% solution of silver nitrate (devan p. 66. B. Vol. IV 1884 found 1% strong enough) into the conjunctival sac, by placing the lids & dropping the silver upon the cornea, by means of a camel's hair brush or glass rod, if the body is born quickly after the head, or if the body is born quickly after the head, a drop of the silver solution as above described before the cord is cut - after dividing the cord, the child should have its face and legs washed with separate co-distinct water,
If soap be used, only the mildest, (or a mild antiseptic soap) - a weak corrosive sublimate lotion would be still better for use in the eyes & lids - the eye-lids, eye-lashes, receiving especial attention. After drying, the ooze of some local form ointment along the edges of the lids. The eyes should then be again bathed with 1/4000 corrosive sublimate lotion, some 2 or 3 hours later, ointment again applied to the edges of the lids - repeating the same, when next awakening.

In the first week, the child should be under constant supervision, if any discharge occurs, promptly treated.

The mother should not touch the child without washing & disinfecting her hands first. She came into the nurse - all which discharged, & soiled linen should be carefully removed. The dirt, clothes, used, carefully burnt, or run through wash, aseptic cleansing, both with respect to the mother & the infant, is necessary for the nurse & attend to. The use of separate distinct towels, lint 1/9 for the child which must be kept at of clean pots & bright light.

The majority of authorities seem in favour of Bridle method or a modification of it.
but seem to differ as to the universal applicability.

Professor Simpson (1878 Edin. Med. Journal 1883) in an article, mentions Cheff of Santorini, as the first to systematically employ abortion treatment viz. pure water to the new born conjunctiva of the birth.

The years 1870 or 1871 seem to have been about the time when prophylaxis was apparently begun, or at least to systematically and scientifically.

Scherer in his Priy's Essay (p.136. Phil. Review 1885) quoted Gibson, who in 1807 formulated systematic rules for prophylaxis, practically endorsing the present day views - and who especially quoted Lacerotuba as a case.

Great credit of De Buer' commencing with sterilizing the vagina, eventually used 2% silver nitrate instillations, to the new-born conjunctiva, alone; discounting his first method of salicylic compresses as well, as vaginal irrigation.

Brunner (p.59 B. V. N. IV 1894 Ann. of Univ. Med. Sci.) uses Griese's method in every case, private or public, because of the difficulty of detecting lacerotuba sufficiently malignant, to rid the disease in the new-born. - This seems excessive caution, unnecessary; it appears
quite sufficient to use Crédé's method in public hygienic institutions and suspicious private cases. The two principal methods in use to about the disease are: i. Crédé's & ii. Hégar-Kosch's. The latter consists of the antiseptic washing of the face & lids with Van Swieten's 1:1000 corrosive solution, after burnt, and according to Peich's companion with Crédé's method (p. 56, B. Vol IV 1891 Ann. Univ. Med. Sc.) - the two methods were about equally effective - so he recommends Hégar-Kosch's method in private, as less alarming, & Crédé's in hospitals &.

The last method seems a combination of the two. During the corrosive solution, wetness is perhaps too good, as the stronger, & less irritating, together with previous vapour irrigation. Nebel (p. 66, B. Vol IV p. 1889 Ann. Univ. Med. Sc.) recorded 330 cases without pathologic phenomena, using Hégar-Kosch's method, only in 1-3000 strength, in addition to previous vapour irrigation, often same strength.

Nitrate of Silver is said to cause no reaction usually, at most a slight
hypersemia & discharge, which passes away of itself in 2 or 3 days.
The disease is generally preventable, but if it does develop, the mother and
father must be warned of the danger of infection. If after prophylactic measures,
the disease does occur, it will probably be slight, if it is as a rule possible in
many cases to prevent loss of sight.

Efforts have been made at various times
to obtain the aid of government in
this country, to aid in a spread of
knowledge, as regards the danger,
& simple directions, in this disease.
Why: to instruct nurses, to punish if they
refuse to send for proper advice & at
once, to require knowledge of disease
& its danger from midwives, before granting
them certificates; but met with
little or no support from government.

January 8, 1885. Subsequently: Petitions.
The suggestions to government have
mostly been for the utilization of registers
of births & for law officers, to attain
cards, or notices at the back of vaccination
papers & with short warnings of the danger
of the disease & its requirements, but
this has not carried out in this country.

Nearly all eye-hospitals in this country issue cards with brief directions and warnings about disease, which are distributed to those who bring infants suffering from Ophthalmia Neonatorum, in this way, some slight knowledge of the existence of such a disease & its dangers, is probably spread to their poor neighbours, whom it most concerns usually.

Some arrangement is however needed at dispensaries & other places for the destitute poor, for spreading a wider knowledge of the dangers of this disease. If midwives also were systematically trained to employ Fegan-Korin's method or some other solution than sublimate, viz. even Cordy's fluid 1 to recoup the disease early, & then send it off at once to a competent surgeon, more good might be done—but as most nurses among the poor, are ignorant neighbours, who can't be expected to know anything of this disease except by hearing, or the spread of cards, there should
The facilities for getting harmless lotions from dispensaries & such like,  
i would be better than nothing at all. Such lotions as Salts of Azulene  
20-83 by the ounce, as some one has suggested.

But a great deal of fault also lies with medical men themselves, some of  
whom, not having any real knowledge of the disease, either over-treat it or  
use insufficient or harmful measures, 
when the corner is hopelessly affected or lost, send it on for treatment elsewhere.

The subject of ophthalmia neonatorum
is only casually mentioned in general text books, never in Books on Midwifery,
for only being an important place in works on eye disease, its effects  
in statistics of causes of blindness.

of Univ. Med. Sciences) asserted that 72%  
of the blind in England were due to  
ophthalmia neonatorum  
(p. 169 Atlas). Whitmarsh said there was  
less in Sweden than elsewhere in 1885.

Heyl (p. 30 Vol. III 1888) 30% to 50% of 300,000  
blind, from third asylum reports  
Magrath (p. 183 Vol. III 1888) 20-66 per cent of 32,040  
blind.
Fuchs (p. 81. Ophth. Review 1885) gave 18 1/2% 10.87%, from Siedelmann's tables. According to Fuchs (p. 134 Ophth. Review 1885) 17-40% have permanent damage to the eye. Of those cases brought to hospitals, a total blindness of both eyes was 3-4%.

Statistics are obviously most difficult to obtain, many of the cases only visiting hospitals once or twice, and then disappear. According to Cowell p. 385. Lancet-Feb. 1885 1/3 causes of blindness in Europe.

Professor Mukherji of Calcutta (Lancet-Feb. 9, 1895) in his address on Ophthalmology, at the Indian Medical Congress, pronounced 40% of the totally blind in Bombay, to be due to Ophthalmia Neonatorum.


Laws also exist in Switzerland and Austria.