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Trachoma: its nature and treatment with Special reference to India.

There is no country in the world which is exempt from the ravages of trachoma: It has long ruled the world, inflicted incalculable harm & misery on humanity, and has all through the ages evaded the scrutiny of man as to its ultimate nature — therefore as to its specific treatment. Decade after decade Scientists of great repute, who possessed perseverance of an astonishing kind struggled to unravel the mystery of trachoma — they were on the point of a great discovery — yet to this day the mystery remains as great a mystery as ever. "Trachoma is as old as the Nile, Simoom and the desert", goes the statement, extravagant as it sounds. Egypt is the home of trachoma and its spread in Europe has been particularly noticeable since the Napoleonic wars.

The ancient world was fully cognisant of the disease just as the modern world is — the middle ages were aware of it in their own way.

Though trachoma was well known in Europe before the Napoleonic wars, still its extraordinary dissemination was due to the infection in Egypt which of the English, French & Italian armies.

Trachoma was not considered a extremely contagious disease — So proper prophylactic measures were not-

adopted to prevent its spread - The army was the source of infection in Prussia - Recruits were taken while they were infected with trachoma — they spread it in the army. When the army got disbanded the infected men spread it among the civilians. So a vicious circle was set up — and the disease spread to an alarming extent. But when repressive measures were adopted to reject recruits with trachoma from the army the disease fell subsided rapidly.

In U.S.A. Compulsory rejection of immigrants who showed the least symptoms or signs of trachoma helped in a great measure to prevent its spread there.

In England, when the rejected immigrants from U.S.A. came to settle in England, they spread the disease here. But Care in rejecting them here also, has reduced the disease.

Russia with her millions is still the home of trachoma in Europe. In Germany & Austria, the Army has been saved from the ravages of trachoma epidemic by the rejection of infected recruits.

Similarly the evidences of trachoma in the British army in India — a very notable fact — is due to the enforcement of the similar measures.

Again many attempts was made to segregate the infected men in the army & give them special wards

and superstition being made so that they should observe the ordinary decencies of life. Of late there have been considerable improvements in the methods of treatment & sanitary precautions.

Therefore trachoma epidemics are not common — and perhaps the disease has lost its former virulence, due to immunity (partial) or something else.

Still trachoma exists in the world — and its dangers to the individuals are as great as ever.

In the light of modern experience, there is no country, race, sex, latitude, age, or social status that is exempt from the ravages of trachoma. Anybody may get it, anywhere — where once the disease starts in the eye, the prognosis can at best be guarded.

Its geographical distribution is very wide, so as to embrace the whole world — though in some countries it is more prevalent than in others — and all classes of people stand the chance of infection; though the lower classes succumb to it more frequently.

In India the disease is common — though not to the same extent as it is in Egypt — and is responsible for much suffering & misery, particularly amongst the poor.

We are still groping in the dark as to the ultimate cause of the disease — and we have come to exclaim the idea that it is due to some microorganism, which has yet to be discovered.

There is no absolute certainty yet as to the nature or Causation of the disease — nor is there yet a Specific treatment forthcoming

Still we are getting a greater Control of the disease every year decade — and in Course of time with prophylactic, medical & surgical methods the disease might be stamped out of all Civilised Countries.

We seem to know a great deal about trachoma — a great many have written about it — Yet the uncertainties of the records and the vagueness of the results and the Conflicting interpretations of the experiments & researches of eminent men & women makes the subject all the more interesting.

We know everything about trachoma ~~except~~ one vital thing of the cause. Till that is known we have to go on ~~this~~ as we knew nothing.

The Symptoms of trachoma.

Trachoma may be acute or Chronic. In the acute variety there is severe Conjunctivitis, i.e. pain, redness, swelling, lacrymation, & photophobia — and often pericorneal injection. There is follicular formation, first in the palpebral Conjunctiva, especially in the neighbourhood of the fornices & the tarsal Cartilage, where they look as crude granulations, about the size of a pin's head. The papillary body might sometimes swell up to obscure the follicles & make the diagnosis difficult. Pannus & Corneal ulcers might occur as Complications.

The follicles might finally be absorbed & the Conjunctiva be restored to its normal Condition, or the disease may gradually pass into the Chronic stage.

Chronic Trachoma.

There are three stages in this Chronic Condition (1) the development of the follicles

(2) their destruction

(3) the process of Cicatrisation.

In the first stage the Subjective Symptoms are slight. There is slight irritation in the eye & occasionally a slight sticking of the lids together during the night. The patient occasionally rubs the eyes, and in tropical Countries like India, shuns bright-light. A few flakes float about in the lacrymal Secretion

But these symptoms are so slight & commence so insidiously that one does not take notice of the trouble till it gets firmly established.

The objective sign symptoms are a slight swelling & redness of the palpebral conjunctiva. There might be a slight papillary hypertrophy on the upper tarsus. Primary granulations can be seen in the tarsal conjunctiva & fornices. The cause to prominence by the aid of a lens.

But in course of time, after the elapse of months or years the inflammatory symptoms gradually increase with the result that ptosis ensues, associated with oedema of the lids. There is some hesitancy in the opening of the lids, their edges being tightly apposed to the globe. The follicles grow in number & size present the appearance of close-cut velvet. I have seen them frequently look like sago grains, and also arranged like a string of pearls. they are surrounded by a net work of blood & lymph vessels.

There is more irritation & irritation — the discharge become more viscid, which matts the lashes There is burning & pricking pain — people in India compare it to the feeling of grains of sand in the eyes — quivering of the lids & lashes in the morning, ptosis & lacrymation & photophobia.

Diffuse Superficial opacities or typical pannus may appear; Superficial ulcers or phlyctenules are occasionally seen. I have rarely seen cases where cervical & even axillary glands were swollen.

Later on, diffuse lymphoid infiltration of the adenoid tissue causes increased thickening & swelling of the Conjunctiva — then we have the degenerative stage with the breaking down & ulceration of the follicles, which become Confluent & appear as Yellowish round spots. The most characteristic appearance at this stage is the protrusion of the contents in the form of a soft Comedo-like plug from follicles on pressure — and the presence of Crateriform ulcers at the sites of the follicles. Many of the follicles are transformed into dense fibrous tissue, as does the Surrounding adenoid tissue. The Secretion becomes purulent & is highly infectious.

It is quite possible to See the various phases of the diseases in the Same eye i.e. follicles, crateriform ulcers & Scarring. A lense is a great help at times, though naked eye appearances are thrilling enough. The upper eye lid is more effected in this Second Stage than the lower lid. The latter being less Vascular & more at rest- the inflammatory products are easily absorbed — I have Seen the Condition practically subsided or passed on to the Cicatricial Stage in the lower lid, while it was very active in the upper lid.

The Subjective symptoms are those of more severe inflammation with an impairment of vision in the vast majority of cases due to pannus.
The cornea has become involved and the lids, specially the margins are tender & irritable.
The complications are severe & sometimes serious.
(1) Pannus develops with impairment of vision
(2) Staphyloma or bulging of the cornea, partially or completely through intraocular pressure, as the pannus softens the cornea.
(3) Corneal ulcers are formed: also phlyctenules are very frequent.
(4) Palpebral fissures are narrowed to such an extent in India that they are called the "Chinaman's eyes"
(5) Lacrymal ducts get implicated, the lower puncta lacrymalia becomes obliterated & everted. — occasionally even ~~dacryocystitis stasis~~ dacryocystitis is set up.
(6) the semilunar fold & caruncle are blended together into a single gelatinous mass.

Finally the conjunctiva becomes more & more disintegrated & finally gets transformed into fibrous tissue. As this process continues, the inflammatory symptoms subside — and we have the merging of the process into the third stage — The Stage of Cicatrisation. Thus the trachomatous process ends in the conjunctiva being transformed into connective tissue.

The adenoid tissue is destroyed - the discharge gradually disappears, while altered Meibomian secretion is seen as a fine white foam. In the less advanced cases cicatricles appear as irregular strands or the Conjunctiva presents a dull bluish appearance. In the severe cases the Conjunctiva loses its transparency & presents a mass of greyish white or greyish yellow tissue. Arlt's Scar streak is noticeable in the upper tarsal Conjunctiva, & from this fibrous process radiate networks. The Contraction of this streak causes distortion of the tarsus & gives rise to entropion, trichiasis, & distichiasis, — even to narrowing of the palpebral aperture in some cases - changes in the lacrymal apparatus - Dacryocystitis. Lacrymal glands may be obliterated by cicatricial Contraction so that lacrymal secretion is not increased. Thus Xerosis is Caused.

Acute trachoma is very rare at the present day, though it is quite possible to have it. It always attacks both eyes, whereas the Chronic form attacks one eye, the other remaining well, perhaps for years. Chronic trachoma is very Common. The so called acute trachoma is often a mistaken diagnosis. It is often a mixed infection - Some Organismal infection eg. pneumococcal, influenzal &c - on the top of trachoma.

There is also the possibility of the Chronic trachoma being superadded to simple Acute Conjunctivitis. But Kramsztyk doubts the existence of primary acute trachoma. (Kramsztyk Krytyka Lekarska 1878. No. 8. S. 221)

But inoculation experiments have proved that ac. trachoma can be produced.

"Trachoma bodies" they have been regarded as characteristic of trachoma — new formations of specific significance. (Graefe-Saemisch. loc. cit. S. 29 & 39.)

But the accumulated histological details of the present day makes us disregard them as of any pathological significance. They are simply true lymph-follicles but not specific formations. These follicles are found not only in trachoma but also in follicular Conjunctivitis, Conjunctival tuberculosis, Syphilis &c. Therefore they are the result of irritation on the Conjunctiva, be the cause of the irritage the virus of trachoma, bacteria or a chemical substance — the Conjunctiva is prone to produce the follicles owing to the adenoid tissue there is in it. J. Boldt is of opinion that the trachoma bodies are partly pre-existent & partly newly formed follicles. So long as the follicles are superficially placed they get absorbed & thus disappear.

But if they are deeply placed they stretch the Conjunctiva as they grow & lead to necrotic changes. The Clinical manifestations of the disease are, in fact, dependent on the anatomical changes occurring in the tissues generally & in the follicles in particular.

It was considered by Raehlmann that the follicles finally disappeared by the expulsion of their Contents. But modern researches favour the view that the granules undergo fibrous degeneration & Cicatrisation.

® Blemberg describes 4 stages in the development of follicles (1) Growth (2) fatty degeneration (3) Atheromatous degeneration (4) atrophy or cicatrisation.

I remember seeing a case in which the follicles were in a state of atheromatous degeneration. As I tried to scrape the follicles with a Calamel knife, they yielded at the touch of the Cold Steel!

As regards a Capsule of the follicle, there is difference of opinion whether it is ever quite closed.

Gelatinous trachoma: It represents an advanced stage of trachoma — here the "follicles fuse into tumour-like masses", and the tissue assumes a gelatinous appearance. It is not easy to distinguish the individual granulations with the naked eye. One can make it out only by experience. This Variety

(® Blemberg, Von Graefe's Archiv, Bd XV. 1. 1869.)

is very amenable to treatment by expression. Regressive metamorphoses, ~~is responsible~~ in the follicles, perhaps responsible, anatomically, for the gelatinous degeneration.

It is of considerable importance to remember one of two anatomical changes brought about in the tarsus & Conjunctiva — for rational treatment depends on the due recognition of them. ⊗ Fuchs drew attention to the fact that the infiltration & thickening of the tarsus is greatest near its lower margin, along the line of the perforating blood vessels. The inflammatory infiltration travels chiefly along these vessels from the Conjunctiva to the tarsus. Therefore the cicatricial contraction is most marked along the Sulcus subtarsalis. In fact, it is along this line that the incurvation of the tarsus is most obvious. Stranb is of opinion that Arlt's cicatricial band represents the whole of the shrunken tarsal Conjunctiva, which has been dragged towards the edge of the lid. As this occurs, the retrotarsal fold is drawn down until the posterior surface is covered over by the retro-tarsal fold.

Therefore (1) the excision of the tarsus at the point d'appui is necessary to prevent entropion (2) but the excision of the retro-tarsal fold is contraindicated.

(⊗ Fuchs, Lehrbuch der Augenheilkunde. Leipzig und Wien 1898. p.)

Trachoma also affects the bulbar Conjunctiva, especially in the neighbourhood of the retro-tarsal fold and plica Semilunaris. The Granules here are yellow & transparent — I have seen in some cases the granules becoming Confluent.

There may be also the trachoma of the lacrymal Sac. This was found to be the case by Germain's researches at ~~St. Petersburg~~ Petrograd, though Kuhnt first suggested the possibility. Typical trachoma bodies were found in the living membrane of extirpated lacrymal Sacs. I have frequently seen trachoma patients suffer from dacryocystitis — the history indicated that the trachoma first symptoms preceded those of dacryocystitis. I have also seen cases of dacryocystitis, due to nasal disease, in which I could find no trachoma in the lids. ~~Perhaps~~ It is possible that trachoma virus might be carried from the nasal mucosa into the lacrymal Sac, where it would ~~do~~ cause trachoma — which would then invade the Conjunctiva.

The Sac swells up, first painful & tender: then discharge of a purulent nature either bursts on the Skin Surface or opens into the eye through the puncturum. The Sac can be emptied by pressure, but to fill up again in a day or two. The Sac may be blocked by the trachoma bodies, & the Canaliculi may be closed.

Abortive forms of Trachoma.

We owe this conception to Peters of Rostock. He contends, basing his contentions, no doubt, on his experience, that there are cases of trachoma in which follicles & scars are never formed. This conception of trachoma, which is neither clear nor very definite at best. Peters thinks that ~~a~~ the development of a certain amount adenoid tissue as the essential feature of trachoma. The follicular formation is merely a reaction from the large amount of adenoid tissue — and the decline of the disease, he says, need not be associated with the formation of a cicatrix.

In the so called abortive forms, there is of course the formation of the adenoid tissue — it can be made out under the microscope — but it is too small to produce the follicles, and therefore the cicatrices are either absent, or if they are present they are too small to be detected by the naked eye.

Again, microscopically, Chronic Conjunctivitis is a hypertrophic inflammation. Very like trachoma. This idea, though not yet universally adopted, does not by any means make the diagnosis of trachoma easy — it increases the doubtful cases of trachoma enormously.

I cannot do better than quote Dr J. Boldt's Comprehensive Summary & definition of trachoma (J. Boldt. Trachoma pp. 101) —

"Trachoma anatomically is a chronic diffuse dense lymphoid infiltration of the Conjunctiva (and tarsus), appearing sometimes diffusely, sometimes as circumscribed masses of cells, leading to the destruction of the Conjunctiva & its transformation into fibrous tissue, and showing for a time at its onset an abnormal secretion upon which its contagiousness depends."

Clinical aspects of trachoma.

Conjunctival hypertrophy is considered by Fuchs (loc. cit. S. 73.) as by far the characteristic Symptom of trachoma. He describes two varieties i.e. the papillary and the granular. I have frequently seen both forms occurring together, the papillary form showing itself most prominently on the palpebral Conjunctiva & the granulations over the fornices.

A third form is described — mixed trachoma — where the papillae conceal Granules or follicles.

Discharge in Trachoma.

There is usually discharge associated with trachoma. The Contagiousness of trachoma depends on the presence of the discharge. But I have read

about, and even seen, not infrequently, quite
deep trachoma. In this variety, treatment like
the nitrate of silver brought about a
reactionary discharge. The eyes lashes fot-
matted in the morning, so much that the patients
feared that they were getting worse.
(Hourmouziadis distinguishes in his monograph
"De la Conjunctivite Granuleuse" Paris 1902,
"une forme Simple ou Sèche" from "une forme
Compliquée (de Catarrhe)")

Trachoma is a Chronic infectious disease,
which may last years. Since at the outset no
serious discomfort is felt, the victims do not
put themselves under treatment till it gets well
established and impairs their vision by the
development of pannus, and considerable
irritation is set up in the eye. But early &
efficient treatment — is by no means a guarantee
of rapid & complete cure. ~~[illegible]~~
I have heard of cases where Spontaneous cure
occurred without any treatment in India.
I have seen a case or two of scar formation
without any adequate treatment. On the other hand,
in spite of the most scientific treatment, some cases
never get cured. But in the usual course, without
treatment, the terrible sequelae are bound to follow.

There are 3 stages in trachoma.

(1) Development. The follicles, their number, condition & position give one an idea of the course of the disease.

(2) Regressive changes: Severe inflammation, & purulent discharge — a stage of infection

(3) Cicatrisation: - The scar formation. The end of the disease — perhaps a spontaneous cure.

Trachoma develops on adenoid tissue But the scar formation destroys the adenoid tissue — so then, trachoma cannot thrive. But by early & efficient treatment it is possible to cure trachoma before the 3rd stage is reached.

I have frequently met cases in the 1st & 2nd stages, but very rarely in the 3rd stages

Aetiology of Trachoma:

It is considered as the disease of poverty & filth. Overcrowding & insanitary conditions seem to help its spread. It is generally held that trachoma is a contagious disease, and that the contagion is conveyed by the discharge from eye to eye. This eye to eye ~~transmission~~ transference may be due to actual spreading — as when a surgeon examines a patient — or indirectly by the discharge sticking to the fingers, which is abundantly touched the eyes of a surgeon who is operating — towels which are used by several people are the frequent ~~method~~ means of transmission. In those countries where several people wash in the same wash-basins or bathe in the same tanks or reservoirs, the virus is transmitted indirectly from eye to eye.

Flies are said to be transmitters — but I think that they do not stick to the eyes long enough to communicate the virus. But I have seen flies actually sitting on the secretions of the eyes of Children. If there be sufficient discharge from the trachomatous eyes, there is some possibility of the transmission of the virus in that way. But in all probability, flies ~~instead~~ alight on the lids & their irritation makes the kids being rubbed frequently — perhaps, contagion ~~might~~ gets into the eye if the fingers be infected.

We have no means of knowing at present that the trachoma virus, if it exists, has an heterogenous existence — but the idea cannot be easily ignored.

"Sulzer believes in air & dust transmission. Germann's Clinical observations led him to suggest that the germ lay in the soil, while Hirschberg incidentally states that it may grow in standing water. Schmidt-Rimpler, again, considers that in Egypt for example, it is impossible to exclude air transmission. Kuhnt advances the theory that in certain districts the soil & the water harbours the germs". J. Boldt. pp 109.

The germs may be carried in the dust by the air and then get deposited in the numerous membranes of the air passages & also in the Conjunctiva.

I doubt the possibility of air transmission except through the presence of this dust, — but unless we hold that the microorganisms (?) do thrive in the air.

It has not been proved that the Contagium can adhere to the walls of a room which has been occupied by a trachomatous patient. But I see no difficulty in believing that the discharge might be left on the walls by touching them with infected fingers — and then before they get dried up & the virus destroyed, they walls may be touched by others & thus the Contagium may spread.

In the same way articles like furniture, clothing bed linen, might become the mediums of transmission as towels do.

But it is stated that in the Prussian Army (1873 to 1878) that non-Commissioned Officers who slept in the same room as trachomatous Soldiers were only very exceptionally infected, because they did not use the same (washing) utensils as the privates. Therefore, in all probability, infection is not conveyed by the atmosphere of a room.

But recent experiments have shown that the virus is slow in its action and that it is soon destroyed by heat, but that it thrives in moisture. So it can be communicated by contact, direct or indirect, and it can thrive under only favourable conditions. It can live for a long time in wet-cloths, moist linen & damp air — So trachoma is most frequently found in low-lying parts by Coasts, rivers & marshes.

In all probability a broken epithelium of the conjunctiva offers an opportunity for a speedy establishment of the trouble.

No doubt family relationships tend to spread the contagion. Married people are most likely to infect each others: Mothers often give it to their Children & Vice Versa. Whatever interferes with personal cleanliness, whatever throws people very much together under insanitary conditions, whatever

lowers peoples vitality tends to help the spread of the Contagion. But one often meets with exceptions which makes one think, and hesitate to come to any premature conclusions.

I have seen wifes suffering from trachoma, while the husbands were free from it. Others had dreadful eyes, but their infants in arms escaped the scourge. In fact, I have seen one eye of a patient showing the symptoms of trachoma for several years, while the other was normal.

It may be that a certain immunity is possible under certain conditions. I believe that there is a more or less individual predisposition. The alkalinity of the lacrymal secretion might in some cases save the situation. Healthy, smooth Conjunctiva might not offer scope for the lodgment of the Virus, whereas rough, irritated, bleeding Conjunctiva offers a suitable media for the growth. Thus smoke, dust, flies, might &c, whatever might lead to rubbing of the lids & therefore help to keep up a Chronic State of irritation, make it easy for the Virus to grow.

But I am inclined to think that lymphatic diathesis is especially prone to trachoma. The patients were generally Anaemic. Whenever I examined there nasal mucosa, it was found to be in a hypertrophic state.

Attention to the nasal Conditions, removal of adenoids in Case of Children, Cauterising the Nasal mucous membrane in adults, hygienic improvement together with suitable dietetic treatment, helped me to Combat the disease pretty successfully.

Von Hilt, Von Michel, Raehlmann set Scrofula in close aetiological relationship to Trachoma. It is also said that trachoma is very severe in lymphatico-Scrofulous subjects & that it is relatively benign in persons exempt from this predisposition.

Beck is of opinion that the Scrofulous diseases of the eye are not Caused by a simple type of bacterium. Again in a Scrofulous person trachoma may arise from all possible bacteria of Conjunctivitis. We have frequently this trachoma Coming as after an infection of Conjunctivitis, given a suitable alteration & Chronic inflammation in the eye, there is a great Chance of infection. Influence of Vocation, like over Crowding, foul & dusty atmospheres might of great & the local & general Condition & increase the Chance of getting the infection. Age seems to have no influence on the disease, though so far as my experience in India goes, it is not so frequent in infants & young children & very old people.

(Deutsch Munch. med. Wochenschrift (1900. S. 256.)

as it is amongst those who are between the extremes.
Females are more prone to it, I believe, since they are more confined than men & more exposed to smoke & insanitary conditions of life.
Some observers think that malaria is in a way responsible for trachoma: others again that tuberculosis expresses itself in trachoma.
But I cannot have not seen any cogent reason for their general acceptation. They might complicate trachoma (but like the other organisms eg. influenza, pneumococci) but need not necessarily be its cause.
Race confers no immunity nor does it particularly predispose one for the disease. Some races were at one time exempt to the exemption from trachoma. eg. Negroes in U.S.A.: but in S. America Negroes of the same but Negro blood race were found the subject to the disease. Again the Jews were considered the subject to trachoma most particularly: but the cultured + well-to-do Jews of Hungary are practically exempt from it.
It is not so much the race, but it is the conditions to which the race is subject, that seem to influence the susceptibility to acquire trachoma.
Trachoma may be regarded as a contagious disease, caused perhaps by a micro-organism which is not yet conclusively demonstrated.

Infection is carried by Conjunctival discharge directly or indirectly.

It is only Conditionally Contagious:

Individual susceptibility is an important factor.

— this predisposition depends on

(1) the peculiar Structure of the palpebral Conjunctiva at the time when the discharge comes in Contact with it.

(2) On the existence or on the tendency to the formation of adenoid tissue which certain Constitutional diseases seem to exhibit.

Given these Conditions, the Spread of the disease is facilitated by (a) poverty

(b) ignorance

(c) filth & insanitary Conditions.

It is Generally held that "Trachoma is a disease of the proletarial." It is true in a way. It is mostly found amongst the poor & the ignorant. But, on the other hand I found it amongst all Classes of people in India. I have found it among the rich, who Could afford all the Comforts & Conveniences of life. Again it is very Common amongst the Brahmins of India, who as a rule, are the most Scrupulously clean. I have seen it amongst all classes, all Castes, and all grades & all ages & in both Sexes.

Poverty may help to Spread, but Could not produce Trachoma.

Diagnosis of Trachoma.

At one time in my life I thought that it was the easiest thing in the world to diagnose trachoma. But I have learnt to consider it differently now.

A typical case of trachoma is easy enough to spot. But in practice typical cases do not always come within one's purview. We must take them as they come & decide whether they are trachoma.

I find it very helpful to make a thorough examination of the Conjunctiva. I evert the upper lid, by grasping the lashes with the thumb & index finger of the left hand & pressing down on the lid with a glass rod held in the other hand. After examining the lower half of the upper lid, I pull the lashes towards the brow, while the glass rod is gradually worked up, still continuing the pressure downwards. Thus the whole lid, which is practically everted on the glass rod, comes under view & even the fornix is exposed. I do this pretty quickly & without putting much pressure on the lid, lest the local anaemia brought about by continued pressure, might give it the appearance of a cicatrix. Again irritation might cause hyperaemia. I search the ocular Conjunctiva with a lens: I find lateral illumination very helpful: the loop combined with focal illumination is invaluable at times.

I study all the symptoms & put them together, — then arrive at my diagnosis.

Ptosis – An important Symptom.

(1) It is caused by the sinking of the lid

(2) It is, as Fuchs says – "the organic elevation of the lid whose smooth Muscular fibres directly lie beneath the reflected Conjunctiva, shares in the inflammation of the latter, & consequently becomes paralysed."
(Text Book of Ophthal. Fuchs. p/s. 170)

When a patient enters the room we can see, after a little experience whether he has ptosis or not. In a Trachoma Country, ptosis at the outset suggests the possibility of trachoma.

Hypertrophy of Conjunctiva: This is one of the most important signs. Typical follicles & Granules are characteristic of the disease.

Not I have seen hypertrophy of Conjunctiva in Ophthalmia – myopias & hypermetropias, particularly in young subjects.

Also in anaemias, follicular Catarrh &c.

Pannus: It is very pathognomonic of trachoma.

When it is very slight, oblique illumination reveals it.

In rare cases a Scrofulous pannus resembles it.

Occasionally obliquely growing Cilia, Keratitis Cornea & produces a superficial Change resembling mild pannus: also again healing Vascular corneal ulcers, marginal Keratitis & leprosy, sometimes produce a similar condition. A thorough examination will help diagnosis. Above Remarks should be remembered.

The presence of entropion, trichiasis are confirmatory evidences. The formation of pulses - tested by fluorescine solution.

By far the most decisive diagnostic help in the late stages is the existence of scars & cicatrices.

Pale cicatrices.

Symblepharon posterius

Conjunctival anaemias should not be mistaken for scars: there are also scars produced by (1) Diphtheria (2) Pemphigus

When two or more stages appear together, I generally diagnose the disease as trachoma.

(leads to atrophy of Conjunctiva)

Scarring also occurs in simple chronic blepharo-conjunctivitis & ectropion. Here the scarring is confined to the margin of the lids, particularly the lower lid — hardly any follicles.

Trachoma should be differentiated from Tubercle & Syphilis.

Tubercular Conjunctivitis (1) Unilateral

(2) Usual ulceration of Conjunctiva

(3) Swelling of preauricular & submaxillary glands

(4) Presence of T. B.

Syphilis (1) History of the case

(2) Evidence of treatment

(3) Wassermann reaction.

• In India Lt. Col. Herbert draws attention to the fact that in trachoma the inner side of the lid arches upwards & the outer side bulges down – due to blepharospasm. Very diagnostic of trachoma c̄ formation of ulcers on the cornea.

Gonorrhoeal Ophthalmia.

It looks very like trachoma in the second stage – copious secretion, follicles & papillary hypertrophy &c.

It should be distinguished by (1) History of the case.

(2) rapid improvement under treatment (1-2% Arg NO_3)

[(3) Presence of Gonococci, if at all.]

Spring Catarrh: looks like trachoma in the 3rd stage

(1) Here the milky white appearance is more diffusely uniform

(2) the Conjunctiva shows no scars in bands or cords.

(3) No pannus

(4) no entropion &c.

(5) The elevations on the palpebral Conjunctiva have a flattened surface – appearance of a mosaic.

(6) History of recurring attacks in Summer.

Scrofulous Conjunctivitis: Conjunctival hypertrophy.

(1) But it occurs only in Children

(2) Eczema or other associated Scrofulous signs

(3) Rapid recovery under appropriate treatment

Hairs of plants or caterpillars might start symptoms suggestive of ac. trachoma. Careful examination for hairs & history will reveal the nature of the trouble

In doubtful cases – I wait, watch, and start on the basis that it may be trachoma. Till the real cause of trachoma is found out, diagnosis cannot be absolutely certain.

[Follicles also occur in leukaemia, pseudoleukaemia, & after the use of eye drops – atropine, eserine, zinc – disappear when drops are discontinued]

Prognosis of Trachoma:

It is a Chronic disease, insidious in its progress, so that the trouble is fairly well established before the physician has the chance of diagnosing it.

The Chronic form is persistent, and it takes a long time to be cured. Sometimes (I have met them in India) people suffer for years with trachoma before they consult a doctor. So from the outset it is an uphill work to attempt to Cure.

I have heard of Spontaneous Cures only very occasionally: The Cures were effected by the formation of fibrous tissue — Scar formation, which prevented the further development of trachoma.

There seems to be some relationship between lymphoid infiltration & blood.

The following are the factors which guide prognosis —

(1) The Condition of the disease.

(2) The Condition of the blood

(3) Social Conditions of the victim

(1) The Condition of the disease —

When the follicles are situated superficially & there is not much adenoid tissue the disease generally runs a favourable course.

On the other hands, when the follicles are deeply situated — and lie in layers — an unfavourable course is apprehended.

Another help is the Condition of the Cornea. So long as it is intact & clear, so far there is hope of success. On the other hand if there be a thick pannus, the prognosis will not be so favourable. Sometimes I found it difficult to give the prognosis straightaway. I had to wait a week to watch the result of treatment. If the pannus, reacted to treatment rapidly, as it does in some cases, I gave a favourable prognosis. The other sequelae of trachoma e.g. trichiasis, entropion, dacryocystitis makes the prognosis unfavourable — though with modern surgical methods much can be done to combat the condition.

Narrowing of the palpebral fissure is an unfavourable sign: here the microorganisms find it possible to lodge more easily — again the reflex spasm of the lids is more severe & continuous.

Age — I found, the younger the patient, the more favourable the prognosis. Children seem to react to treatment rapidly. They get cured, because their regenerative powers were great — the scar formation was very fine — not easy in some cases to make out with the naked eye.

(2) The Condition of the blood —

In anaemias, Scrofula, debilitating diseases like malaria, diabetes, the prognosis was unfavourable: the more the adenoid tissue

actual or latent, the prove the prognosis.

A healthy, robust Constitution is a favourable indication.

(3) The Social Condition.

The better the hygienic conditions available, the more hopeful the prognosis.

Poverty, filth, and Crowding, insanitary conditions of life are unfavourable indications.

The Capacity (financial) to afford treatment for a long time is a hopeful sign: also the possibility of obtaining better conditions of work, Change of occupation & place & the ordinary decencies & Comforts of life are favourable indications.

The Cures may be permanent — but relapses frequently occur. The patients have to be under observation for a long time, after being declared cured.

Considerable abatement of Symptoms is by no means a guarantee for a Cure. The relapses at times are really re-infections.

The acute Variety is rare — but it is more amenable to treatment. Often after a few weeks, it lapses into the Chronic form.

I have not seen any Cases of galloping Consumption which seems to exist in Russia.

The earlier the treatment Commenced the better the prognosis — but early treatment is no guarantee for ultimate cure.

On the whole trachoma seems to have become

since the days of the Napoleonic wars. One only hears of epidemics of trachoma at the present day. Yet the misery & harm inflicted on humanity by this dreadful is very great indeed.

In India, trachoma is ~~most~~ responsible for blindness in an appalling degree, quite as much as, if not more than small-pox, glaucoma & ophthalmia neonatorum put together.

We are still groping in the dark. Till the cause of trachoma is ~~found~~ known, our prognosis must necessarily be guarded.

. Pathology.

Though trachoma is a specific ~~infective disease~~ infective disease of the sub-epithelial tissue of the Conjunctiva, no one has been able to prove, as yet, that any organism is solely responsible for it. Some observers thought it was a Coccus, others a bacillus, while not a few deemed it an ultra microscopic organism. But those supposed organisms subsequently proved to be merely fragments of cells formed by necrotic changes in the tissue.

Giemsa's stain had made it possible to discover some small ovoid bodies, very much smaller than any known Cocci, in the epithelial cells. These bodies occur massed together near the nucleus in the form of a cap — but there is a clear space between. It was also found that the area containing the granules and the whole cell enlarges rapidly, and discharge the granules by bursting. But nothing came out of this interesting fact, since these granules had not reproduced trachoma — nor had it been possible to cultivate them. Perhaps they are only the products of degeneration of the cell — thickenings of the Chromatin filaments. Our doubts are confirmed by the fact that these granules have been found in the epithelial cells of normal conjunctiva and even of the ~~normal~~ healthy urinary tract.

. In the fornicies trachoma assumes the form of . translucent rounded swellings, which look very like boiled sago or somewhat like frog Spawn. These follicles become Confluent, and when large, they rupture, discharging gelatinous materials. Whereas in the tarsal Conjunctiva trachoma shows itself in the form of Small, circular, pale grey areas. This condition is no doubt due to follicles embedded in the fibrous tissue. Later these grey areas enlarge + form elevations on the Surface, when they sometimes rupture

As the follicles develop, the blood vessels become invariably hyperemiac; there is also a varying degree of papillary formation. When the latter is very abundant, as it does in some cases, we have the Papillary form of trachoma; whereas in the Follicular Variety the follicular formation is the more striking feature.

The later stage, which is frequently noticed in trachoma is the Cicatricial Stage, when irregular white streaks are to be seen inside the lids. This is due to the formation of fibrous tissue which replaces the Sub-epithelial lymphoid tissue. Often enough one notices Arlt's Streak, which is merely a band of fibrous tissue formed along the line of the Sulcus Subtarsalis. Entropium is frequently Caused in trachoma by the Contraction of this fibrous band.

, occasionally one meets with Stelwag's bravery.
Oedema. In this Condition the Conjunctiva presents
a waxy-like appearance, due probably to the
hyaline degeneration of the infiltrate around
the follicles.

Pannus

In Chronic and Severe forms of trachoma pannus
develops on the Cornea. The latter first becomes translucent,
then opaque, depending on the Severity & Continuity of the
irritation Caused by trachoma. Besides, the Cornea becomes
Very vascular. The upper half of the Cornea is most frequently
involved, though I have Very rarely Seen the lower half
involved. I have also occasionally Seen the whole Cornea
involved. Generally a Sharp line of demarcation Separates
the involved tissue from the unaffected parts.
There are two Varieties of pannus, the difference between
them depending on the amount of Vascularity present.
Pannus tenuis — In this Condition the Vascularity is
slight, and where it is excessive, the Condition is
Spoken of as pannus Vascularis. The blood Vessels
in the Cornea are derived from those of the Conjunctiva
and are mostly to be noticed in the Superficial layers.
Very slight pannus is detected by the naked eye
with Oblique illumination with a lens.
Pannus Siccus. Sometimes pannus persists as a
permanent opacity with a few blood vessels, after the trachoma
is Cured.

But usually it disappears with the trachoma, often when the latter becomes abated in intensity under treatment. I am inclined to believe that Pannus is merely an extension of the trachoma from the palpebral Conjunctiva to the Cornea.

Discharge: N- is a variable quantity. N- may be very slight in long standing Chronic Cases, and mucoid in Character. Acute exacerbations are often flowed by muco-purulent discharges. In the latter Case there is the possibility of a mixed infection, since pyogenic organisms are invariably found in the discharges. Trachoma is essentially a Chronic disease, and probably it reduces the Vitality of the tissue and renders it liable to infection by organisms when the follicles rupture.

*Histology - Changes begin to appear in the epithelium only when discharge appears. N- becomes infiltrated with polymuclear variety of leukocytes - their abundance of course suggests the presence of organisms. As the disease advances the epithelial cells undergo mucoid degeneration, and they became even destroyed on the surface of the follicles. The inflamation here gives rise to pseudo-glands in the Crypts between the follicles & in the folds of the swollen sub-epithelial tissue. In some long standing Case Keratinisation of the epithelium

* My Summary is based on Mr. M.S. Mayou's Hunterian Lectures 1905.

occurs associated with a decrease in lacrimation. The secondary xerosis is specially noticeable when there is considerable formation of fibrous tissue so as to interfere with the secretion of the glands.

Two main types of changes are noticeable in the sub-epithelial tissue. (a) The formation of follicles. They are usually found in the lymphoid layer, and sometimes in deeper layers as well, their structure, & sense varying with their age.

"In the newly infected trachoma follicle there is externally a single layer of somewhat elongated flattened cells, which appear to be of endothelial origin; their continuity is often much broken up, more so than in the follicles due to other forms of conjunctivitis. Within this external covering are the cells supported by an ill-defined reticulum. The outermost cells in the follicles are chiefly darkly staining lymphocytes. Toward the centre are a number of slightly larger cells epithelioid in character probably derived from the outer ones. They stain slightly, suggesting that degenerative changes have taken place in them due to the action of the toxine. Scattered in this central area there are also a few large endothelial cells chiefly of the phagocytic variety. Well formed plasma cells are rarely found within a trachoma

follicle, probably because they tend to rapidly disintegrate in the presence of the toxin."

An older follicle consists of a capsule of connective tissue considerably infiltrated w lymphocytes, especially if the disease is spreading. Numerous mast cells are present. Numerous blood-vessels are found in the periphery of the stroma of the older follicles. They spread in more toward the centre as the follicle becomes organised.

Plasma cells are usually absent from the follicle.

A trachoma follicle may finally become encircled w undergo organisation & absorption.

Extinction of the follicle may occur

(1) as the result of operation

(2) From Contraction of surrounding fibrous tissue.

(1) In Sections through follicle shortly after expression the thick fibrous wall of the follicle encloses a space which communicates w. Surface of the Conjunctiva. There is considerable polymuclear leukocytic infiltration — Spider cells — owing to the presence of Septic or Gonococcus. Blood-corpuscles, plasma cells & mononuclear leukocytes are found within the follicle. Also fine bands of connective tissue stretch from one wall to the other. The original contents of the follicle are either thrown off or destroyed

(2) The contents of the follicle are compressed & expelled by the Contraction of the fibrous tissue around the follicle. Plasma cells — a thin layer — separate the follicle & the epithelium.

the epithelium ruptures by the friction of lids + by internal pressure - the follicle also ruptures + its contents partly extruded. The remainder becomes softer + is removed by polym. leukocytes.

Absorption + Organisation.

A large number of lymphocytes find their way into the blood stream + lymphatics - Venous radicles near the follicles are filled + them. The polymorphs are found only in the walls of the follicles at the time of infection. But when its cells degenerate the polynuclear cells enter the follicle - a result being phagocytosis or rupture + discharge of the contents.

"No doubt the beneficial effect of Copper Sulphate, Jequirity, + an attack of spontaneous Ophthalmia in trachoma is due to the polymorphonuclear leukocytes attacking the disease not only in the follicle but also in the infiltration." Collins + Mayo. Pathology + Bacteriology pp. 432.

Next is then the formation of fibrous tissue In long standing cases trachoma the upper palpebral conjunctiva is sometimes converted into a pale glistening looking tissue - brawny edema (Stelwag) It is associated with much scarring + represents one of the final changes in the infiltration. The epithelial layer is Keratinised. The conjunctival surface of the affected area is smooth. The sub-epithelial layer is mostly of infiltration, separated by fibrous bands - infiltration consists of a few mononuclear cells, numerous

Plasma cells — their cytoplasm is broken up + converted into hyaline material. The latter sometimes goes on to secondary Amyloid + Calcareous Changes.

Changes of the limbus + the subsequent pannus are due to infection of trachoma there. At first the cellular infiltration is superficial to Bowman's membrane, which in course of time becomes destroyed + the substantia propria invaded.

In the thick fleshy pannus follicles are formed.

Polynuclear leukocytes are found if the ulcers should be present.

Trachoma Bodies & their occurrence

M. Zade in the Graefe's Archiv für Ophthalmologie, Bd. LXXVII, Heft 1, 1910.) gives the results of his findings in 25 Cases of pseudobulbed trachoma from the Eye Clinic of Jena University. they were all Chronic Cases. In 10 Cases typical trachoma bodies were found; in 10 the result was indecisive, and in 5 the result was negative. But other observers found trachoma bodies in much greater proportion.

Perhaps the Chronicity of the disease makes the trachoma bodies to disappear. The treatment which the eyes were subjected to might have something to do with it. All the Eyes who were subjected to treatment did not show the bodies, while those who showed the bodies were known not to have been treated.

Hinder has again offers some pertinent suggestions on the Question of the identity of the trachoma virus, and of the "inclusion blennorrhoea" of the new born infants conjunctiva & of male genitals.

In his report "On the Biology of the Inention Blennorrhoea (Trachoma) Virus" v. Graefe's Archiv. f. Ophthalmology., Vol. LXXXIV part I... he records a number of experiments of inoculation upon the Conjunctiva of the apes: Persian apes. The former that the

virus of Inclusion blennorrhoea of the new-born Conjunctiva and of adult genitals generally excites a typical inflammation on direct transference to the parsian Conjunctiva. Under the microscope chalmydozoa + free initial bodies were often found in considerable numbers in the acute type, whereas in the more chronic inflammation they were very scanty. The more chronic type resulted particularly from infection with discharge from adult genitals.

Re-infection experiments have shown that one attack of inclusion ophthalmia in parians produces a definite immunity, though not a lasting one.

But infection by trachoma virus was not successful on parians, and it gave rise to a more chronic affection, producing marked Changes in the Conjunctiva. These differences were perhaps due to the Comparative Chronicity of the trachoma cases that Came under Observation the number of trachoma bodies found in the discharges were very much smaller than that found in even the mild inclusion blennorrhoea discharges.

It appears therefore that it is the acute trachoma, rare as it is, which is the more Comparable with inclusion Ophthalmia.

Some of his experiments showed that the resistance of the

of the inclusion virus to be very low, just as Bolteri has shown to be the case with trachoma virus.

Again one infection with trachoma virus seems to have conferred a certain local immunity against subsequent infection by inclusion blennorrhoea.

Therefore as the evidence was available hinder traces a close relationship between the two viruses. In his own mind he seems to entertain no doubt as to their identity!

Of course, Wolfrum has produced trachoma with scarring by inoculating the adult human conjunctiva from inclusion blennorrhoea. But the proof of identity is not established, because the inoculated eyes did not develop pannus.

But the report of the results of the numerous examinations of scrapings from the conjunctival epithelium in various conditions the following conclusions have been arrived at by E. G. Lasarev + Petroff M.D. of Tula®.

(1) They doubt the specificity of the cell inclusions for trachoma — in fact they doubt that they have any pathogenic properties.

(2) They found the inclusions in 65% of cases of recent and untreated trachoma, but also in 68% of non-trachomatous Chronic Conjunctivitis: also in 53% of Cicatricial trachoma.

® Vrachebn. Obozr. October 1912. On the Frequency of the Prowazek-Halberstadter cell inclusions in trachoma and other Conjunctival affections.

K. Linder of Vienna summed up the whole question of trachoma in the Archives of Ophthalmology, July 1912.

In 1907 Halberstaedter + v. Prowazek described what they found in trachoma tissues stained with Giemsa's method: there were dark blue granular inclusions in the protoplasm of the epithelial cells. At first round or oval, they apparently grow, become less dark, + then fine red points appear in the masses. The red points increase rapidly in number, while the blue masses gradually disappear — they called the latter plastin, because they thought them to be a reaction product formed by the action of the virus upon the cells, which was represented by the red points. Extra-cellular red-points also were found, though they were not characteristic enough to be identified. Anthropoid apes showed similar findings when they were inoculated with trachoma.

Subsequent investigations also confirmed the idea that Prowazek's inclusions are characteristic of trachoma, although they are not so easy to find usually. They are not found at all, even in fresh cases sometimes. But there was universal acceptance of this parasitic nature.

In the meanwhile Stargardt + a little later Schmeichler, each separately found the typical

inclusions in blennorrhoea neonatorum not gonorrhoeal. Heymann, soon after, claimed to have found the inclusions in few cases of gonoblennorrhoea neonatorum. As a result of these investigations one had to doubt more than ever (1) the parasitic nature of these inclusions (2) that they were typical of trachoma, since they might be a reaction product of the epithelial cells against the gonococcus as against the agent of trachoma.

Again Krönes showed that in many cases of Ophthalmia neonatorum no gonococcus was to be found. The onset of these cases was later than that of the gonorrhoeal variety + of considerable severity: but ulceration of Cornea hardly ever occurred.

A small number of these cases were due to Koch-weeks diplobacilli or to pneumococci — but in the great majority of cases no pathogenic bacteria were found.

Heinder + Wolfrum were able to show that in nearly all cases of non-gonorrhoeal ophthalmia neonatorum the cell inclusions are to be found, but they are not to be found when gonococcus is the source of infection.

These forms of ophthalmia were designated by Heinder as "inclusion-blennorrhoea".

As the result of further researches, he came to the conclusion that the so-called 'Chlamydozoa' is only a particular stage or generation of the virus, which is so delicate that it becomes quite irregular, and may be brought out when the cells containing it are dried in smears.

A Series of Scientific investigations proved that the inclusion blennorrhoea is similar to trachoma histologically as well as clinically. ie.

(1) Follicles appear later in inclusion blennorrhoea

(2) Some of them healed with Scarring.

(3) Monkeys are not Susceptible to the organisms, but the inclusion blennorrhoeas can be inoculated in them.

Hinden considering the great similarity of the Conjunctiva & the genital passages, wonders why the possibility of a Genital trachoma has been doubted so long. He is Convince also, which he cannot prove it yet that the initial bodies & the red points, called the elementary bodies, are really living organisms, and that the virus is a protozoa.

It may be that trachoma was originally a purely genital malady — but once transplanted to the ocular mucous membrane, it has, largely owing to its Chronic Course, been able to keep itself going as a purely ocular infection. For instance in Egypt gonococcal Ophthalmia, like trachoma, is usually Carried from eye to eye. But under European influence the Conditions tends to reduce adult ocular infection to a minimum, and to increase the Spread of the genital & infantile Complaint. But the propagation of trachoma & inclusion genital affections are not the same all the world over

The inclusion show the following Characteristics in well-fixed & Stained Sections — "blue, Sharply outlined, Round Coccia-like bodies are Seen in the Cavities of the protoplasm of the Epithelial cells. They multiply by Special division, and later on are found only near the wall of the Cavity at a time when red-points appear in the Cavities."

These "blue-bodies" were found both within & without the Cells, sometimes in large numbers.

The other cellular bodies are very Characteristic & can be easily recognized.

Hinder has found these free initial bodies & Prowazek's cell inclusions in trachoma as well as in the non-gonorrheal-blennorheal neonatorum.

E.E.H. in Ophthalmic Review of 1912 says —

"Halberstaedter & V. Prowazek thought that this virus was similar, but not identical with the Causative Agent of trachoma, and succeeded in isolating it from the genital Epithelium of a woman whose Child had suffered from an inclusion blennorrhoea. Hinder, however was Convinced that the two were identical, and succeeded in inoculating monkeys with the inclusion blennorrhoea. He at a later date succeeded in isolating the cell inclusions from the urethra of 3 patients who were suffering from a urethritis which was not due to the gonococcus."

Strangely enough they found both gonococcus and inclusions together in ophthalmia neonatorum — in some cases, one eye of the patient showed both, while the other only the inclusions!

[With regards to follicular conjunctivitis — I do not think that it is inseparably connected with trachoma. I am not a "unitarian" in that to suppose that trachoma developed out of follicular conjunctivitis. But I admit that in some cases it is very difficult to make up one's mind whether a particular it is trachoma or follicular conjunctivitis.]

Treatment of Trachoma.

It is unfortunate as yet that no specific treatment has been discovered. All the world over for Several Centuries attempts have been made to grapple with this disease, but the success has not been very great. So long as we continue to grope in the dark with regards to the real root Cause of trachoma, it is to be expected that the effective Cure will evade our grasp. Though the Specific Cure has not come to stay, (though Several have been proclaimed from time to time) it is of interest to note, that modern treatment has done a great deal to ameliorate the Condition, and effect Cures in certain individual Cases.

Lead acetate is said to be much in use amongst the ancient Egyptians. According to Sattler, verdigris was in use over three thousand years ago. Hippocrates had recourse to rubbing or Scraping off the granulations, with Subsequent Cauterisation. He even went to the extent of Sacrification with the prickles of Atractylis, wrapped round Milesian wool. Pumice stone, and fig leaves were used by Alexander of Tralles in 560 A.D. Paulus of Aegina is believed to have removed the granulations with a Spoon-Shaped respatory. In the Middle Ages, Benevenius Graphaeus attempted excision, while Kuhnt attributes a kind of excision to the skill of Hippocrates himself.

Very little is known as to the nature of treatment during the period, long as it was, from the decline of ancient medicine to the beginning of last Century, when the attention of the world was again seriously drawn to the treatment of trachoma. G. J. Beer (Wien 1813) almost calls trachoma an "Eye-itch" recommends cleanliness as a necessary measure for ensuring a cure, while prohibiting indigestible food, and insisting on the immunction of an ointment of tartar emetic into the affected parts of the skin to behind the ear.

Dr. J. Boldt, in his great work on trachoma, says "Cold applications, leeches, incisions, venesection and carteriotomy even to loss of consciousness, played the chief rôle in all European Countries during the first twenty or thirty years of last-Century, and were often combined with Counter-irritation, strong vesicants & mercury, purges & diaphoretics, & confinement in a dark room. The demands of hygiene gradually received recognition, and the Englishman Veleh, tho a warm believer in venesection, as early as 1820, pleaded for fresh air and life in the open. Among local measures, besides assiduous cleansing of the eyes, innumerable astringents were used, lead acetate, Silver nitrate & Copper Salts being already to the fore. Removal of the granulations with the knife & Scissors were emphatically by English (Veleh, Adams), Italian (Scarpa), & especially"

" German authors (Rust 1820; Philip's von ~~Walther, 1821~~, Walther, 1821; Calei, Eble & Hinly.) By excision Combined with hygienic measures, Von Walther succeeded in rooting out a severe epidemic in the workhouse at Braunweiler, on the lower Rhine, in 1818 - 1821. He was so enamoured of the Operation that he advised it in almost all stages, & even discussed its performance in the lower lid as a prophylactic measure. Over-enthusiasm & misuse, especially in England, soon brought the operation into discredit."

Caustics, Caustic-pencils were also in constant use, with sometimes appalling results.

But under modern Scientific conditions the treatment may be classified under the following heads.
(1) Therapeutic (2) Mechanical (3) Surgical (4) hygienic.
The most discouraging fact about trachoma is that the treatment takes a long, a very long time, to effect a cure. Months, may years, approximating to a decade, would have to be spent in treatment before a case can be said to be cured. Patients, & even the medical attendants, get "fed-up" with the treatment, and lose their early enthusiasm in continuing the treatment. The prolonged period of treatment makes it very expensive to the poor, who are often the most helpless victims of the disease. The situation is

aggravated by the frequent interruption with their work which constant attendance at a hospital or a surgeon's office involves. Consequently patients give up the treatment all together in despair or have recourse to it only occasionally when exacerbations occur in the course of the disease. It has been my experience in India to frequently meet with patients who had neither the patience nor the means to undergo an indefinitely prolonged treatment. In private practice, often enough, patients would turn round & ask me how quickly I could cure the disease. In my plight I generally avoided a direct answer and asked them to let me know how much they could afford to spend on the treatment & how long they would like to try the treatment. The prognosis I gave depended on the social position of the patient, his psychological disposition — whether he could persevere with the treatment or soon get dejected & give it up — and on the actual condition of the eye. Three months was the shortest period I had ever suggested for the course of treatment — and I made it clear at the outset that the months might, in any particular case, drag into years! There was often considerable abatement in the symptoms of the disease, and patients thinking themselves cured, even against the better judgment of their doctor, give up the treatment — only to return to me in some months hence with considerably aggravated symptoms.

Sometimes patients from the Country, Suffering perhaps for some years with trachoma come to the city to put in a full working week for treatment, with the hope of getting Completely cured to be able to return home during the week end. Some of them expect almost miracles from highly Qualified medical men, especially from those who have been abroad, and therefore lay claim to be Conversant with the up-to-date methods of treatment. I have had to eat the humble pie on Several occasions myself, and heard my head down in all humility unable to come up to the expectation of my trachoma patients, particularly with regards to the rapidity of achievement. "our Village physicians are ignorant & Crude in their methods. They may take months or years to effect a Cure. But you, a well trained man, professing to be a Specialist ought to be able to Cure in a few days," they often remarked to me. To suggest to them a three months Course of treatment is Courageous enough. But to ask them to risk a year or two on the possible chance of a Cure is madness itself. They would Simply return home with eternal despair in their hearts. I had therefore to do what I could in the time at my disposal, and leave the rest to my patients and to the fates! The insidious way in which trachoma develops Serves as a blind to the patient, who does not become

Aware of it till perhaps an attack of Ophthalmia Supervenes. Thus much precious time for effective treatment is lost often, and the patient thinks of Consulting an eye Surgeon, when he realises that his Ophthalmia has not been Cured after Several months domestic treatment, while his neighbours eye was perhaps Cured within a week with the Same remedies. The patients do not easily See the difference there is between Ophthalmia & Granular Ophthalmia. Therefore hardly a Case Comes for treatment to the Oculist before the disease gets thoroughly established in the eye. So from the Very Commencement one has to work under Considerable difficulties.

Perhaps the lay mind will never Sufficiently understand what great efforts have been made in different parts of the world to grapple with the problem of trachoma, and the most patient research & the most perfect Scientific investigation hasve up to now failed to stumble either on the Cause of the disease or on its radical Cure. They can only Judge us by our results, but not by our efforts and heroic failures. We must bide our time in patience & faith. The goal will no doubt be reached at no distant date. But, in the meanwhile we are yearly making progress towards it. Though we have not Cured trachoma, we have Controlled it — we have not been as yet, able to exterminate it, but we have broken its back.

The treatment of trachoma may be classified under the following heads. (1) Therapeutic (2) Mechanical (3) Surgical (4) Hygienic. I have not found the treatment of trachoma by any means easy. I also soon discovered that there are no hard & fast rules to stick to in the treatment. Each case had to be treated on its own merits. Observation, discretion, patience and experience are most essential on the part of the Oculist to achieve any measure of success in the treatment of trachoma. No one method sufficed to effect a satisfactory Cure. I have had to use, most frequently, all the four methods in individual Cases — even the the result was in some Cases exasperating.

Therapeutic Measures.—

The names of drugs suggested in the treatment of trachoma is legion. When I first started I armed my Consulting rooms with every drug that I could get hold of. But in Course of time I learnt to dispense with most of them, and stick to a few favourite ones, which my experience had justified. The following drugs I had Come to depend on for my work.
(a) Silver Salts (b) Mercury Salts (c) Pulv. Acid Boracic.
(d) Copper Sulphate (e) Bromine (f) Atropine.

Silver Salts — The best of them, so far as my experience goes, is Silver Nitrate (Argentum Nitras.)

Silver Nitrate — I found it invaluable in the treatment of trachoma. The great objection to it is from the point of view of the patients is the score of its being very painful. No doubt it has that great drawback. But its utility outweighs its drawback. In fact in India the fact of its being a painful remedy enhanced its value in the estimation of my patients. The Caustic property which causes the pain, is in their opinion is destroying the "morbid fleshy growths" in the eye. Moreover the copious secretion which the application of Silver Nitrate produces is termed in their dialect as the "drawing of bad fluid or serum from the eyes". So patients were quite willing to submit to the painful treatment, and I had recourse to it frequently and courageously. I had Silver nitrate made in solutions of several strengths, and ready for use. My stock solutions were 1%: 2%: 3%: 4%: 6%: 12½%: 20%. / (The latter I have not once used)

I started the case with 1% solution. I always had Common Salt Solution quite ready at hand. I never put the drops into the eyes. I simply paint the everted lids with a piece of Cotton Wool held tight with a forceps, and dipped into the solution — then put a few drops of the Salt Solution into the eye — finally wash out

the eye with Cold water. If there be signs of Considerable irritation at out-set, I instil a drop of Cocaine (1%) and put in a small quantity of Boric Ointment 5%. The eye soon acquires a toleration for this Solution, when I go on to the 2%: after a week or two try the 3%- then go on to the 4%. Generally the latter Solution proves Considerable reaction. The next day I go back to 1% then I go on to the 6%, as an inter mediary measure. I am very careful, in neutralising the $AgNO_3$ with the Salt-Solution immediately and then wash out with Cold water. If the patient Could stand this solution, I wait for a few days, then I loan my patient to buy my Royal Remedy (12½% Solution.)

For the application of this Solution, I have the patient lying flat on the operation table. I have rubber gloves on my left-hand the fingers of which hold the everted lids in position. (The glove saves my fingers from the stains of $AgNO_3$.) An assistant is ready with a pippet filled with weak Salt Solution. A Jar of ice cold water stands close by with a Spray arrangement fitted on to it. The palpebral Conjunctiva is anesthetised with 3 or 4% Cocaine Solution. As I hold the ~~upper~~ everted upper lid between my thumb & index finger, my assistant with a Spatula presses on the Skin Surface of the lid So that the whole lid practically falls everted & comes into View right up to the fornix. I rapidly paint the everted lid with the 12½% Solution,

till the typical colour of the action of the Silver Salt on the mucous membrane appears. I use a certain amount of pressure in passing the Scale up & down the lid, so that a little bleeding is noticeable on Spots deprived of their Epithelial Covering. The whole process does not take more than a few Seconds: and if there are any granules on the lower lid also, I take a Sweep or two round the it too, taking care that the lids do not touch the eye. At a Sign from me the assistant Squirts in the Salt-Solution, and the head is turned to a side so that the Solution perishes into a basin placed by the head on purpose.

Then the Spray of water is allowed to play on the eye freely for Several minutes, so that the eye is thoroughly washed, cleaned & Cooled. Then the other eye is treated Similarly if needs be. I generally do one eye at one occasion. I finish off by introducing Some Soft vaseline into the eye for Soothing & lubricating it. Pain generally returns as the effect of Cocain goes off: the patients are advised to put on ice Compress to the lids and lie quietly for a few hours. Generally the pain Subsides in two or three hours. But there is considerable reaction in the eye which lasts 24 to 48 hours. For a few days I Content myself with putting in Soothing & anti Septic Solution & ointments into the eye. If the lids need Still further treatment I go back to 1% or 2% Solution. I am a Slave to no one method or Solution — I use my discretion.

This may seem a drastic remedy, but it is justifiable when one considers what a desperate disease trachoma is! But I do not have recourse to it unless it becomes necessary to do so in any particular case. I do not remember to have adopted it more than half a dozen times in any one case: often two or three drastic paintings were all that were necessary. I believe this solution acts as an astringent, a mild caustic & a complete irritant. Hence is its beneficial results — at all events I have had very good results from it. The weaker solutions are sometimes too mild to cope with the virulence of trachoma. Months may pass without any tangible result being obtained. But one application of this strong solution sometimes achieved wonders. A few years ago, a boy belonging to a rich merchant was brought to me suffering with trachoma. He had been for some time under treatment. Several oculists tried him with weak solutions of $AgNO_3$, but they did not benefit him much. But I gave him 3 or 4 applications of the 12½% Soln of $AgNO_3$, at an interval of 2 to 3 weeks between; and in two months time his Condition so improved, that on his recommendation a girl, a relative of the boy who was suffering from trachoma & was sent for all the way from Delhi to Madras, with the special request that the very painful remedy be tried on her also, as they had been satisfied with its efficacy.

There were hardly any cases of trachoma when they left me. I have never used solid $AgNO_3$ stick for trachoma though I have used $AgNO_3$ in solution frequently & persistently — I began with it, continued with it & ended with it — I never had a case of Argyria! In my experience the strong solution materially shortens the period of treatment & reduces the necessity for the constant application of silver salts in weaker solution. Thus the chances of argyria are reduced to a minimum.

Argyrol : Protargol :

They are painless when introduced into the eye. They have everything to recommend for themselves though they are comparatively expensive. I have used them freely — but they have not given me the satisfaction which $AgNO_3$ has given. Argyrol (3j to 3ij) and Protargol (3p to 3ij) I found useful in starting, when the eyes were very inflamed & would not tolerate $AgNO_3$. I started with them & went over to $AgNO_3$ when the acute symptoms had subsided. Sometimes the eye seem to get used to the $AgNO_3$ & became tolerant of it. In such cases for a week or two I use Argyrol as a substitute, to return to $AgNO_3$ again soon after, when the latter acts with perceptible vigour. There is an art in the application of $AgNO_3$ sol^n to the palpebral conjunctiva — it is not easy for the beginner to acquire it, nor is it safe to trust them with it.

But Argyrol is a safe drug & a drop can easily be instilled into the eye. So, when I discharge my patients I usually order them an ounce of Argyrol to be used by them in their remote town or village, as a precautionary method against the recurrence of trachoma. I found Argyrol invaluable in Case of Phlyctenula also where the diagnosis of trachoma was uncertain; and in follicular Conjunctivitis. It acts as an astringent, stimulant and antiseptic. But it is too weak to grapple with the chronic trachoma. It is, so also is Protargol, a splendid adjunct to Argyrol — a complementary drug - but neither of them can replace the Nitrate of Silver.

Copper Sulphate —

Copper Sulphate has been held in great estimation by oculists with regard to its potency in curing trachoma. It has stimulating & Corrosive-irritating properties. I have used it on several occasions and found it useful in melting the follicles absorbed. There is also an art in the application of Cop. Sulph. to the granular lid. But it has one great disadvantage — its penetrating power is liable to needly irritation in the eye. In Solution it is not strong enough to act on the granules immediately & it is dangerous to leave the solution into eye for any length of time. When blue stone is gently passed on the everted lid, the reaction is not sufficient to promote absorption. On the other hand when a certain

degree of pressure is used, small particles of it tend to stick to the granules — and these particles are not easy to be dislodged. We have not any soothing solution (like Na Cl for $AgNO_3$) to neutralise it's effect immediately. So these particles continue to lodge & irritate the eye. I have seen considerable irritation caused in the ocular conjunctiva — in a few occasions, even to the point of ulceration. So I have learnt to avoid it as far as I can and use only very gently & take good care to wash off the lid & remove all the traces of it with a piece of moist cotton wool before closing down the everted eye lid.

With the Nitrate of Silver on the other hand, there is greater safety. It does not exhibit any penetrating properties. It acts immediately on touching the mucous membrane — and it is easily & thoroughly neutralised by the Solution of Common Salt. It can also be made into any Strength we need in the form of Solutions. So I have got to trust Nitrate of Silver, and distrust Copper Sulphate (it may be a fancy of mine!) I use the latter when I feel that the lid has had enough of the Silver Salt and needed a change badly. Also when I felt that the granules needed a certain amount of Stimulation

Dr. J. Boldt, in his work on Trachoma pp. 174, says — "We recommend Silver Nitrate in 1/2

"per cent Solution only. This is especially indicated (Rachlmann, loc. cit. S.6.) in soft, Succulent Conditions, with marked Swelling & infection. It is most efficacious when the Conjunctiva is lax & dark red, with purulent or Muco-purulent discharge — i.e. the more the Condition approximates that of Chronic blennorrhoea. The opposite condition, a rigid firm Swelling, with pale Yellowish red Colour & Muco-Serous or Scanty Secretion, & also the hypertrophic, Granular Condition, with Gelatinous or fleshy appearance, indicate the use of Copper Stick."

I agree with this Statement Generally, but so far as my experience goes in India, I used Silver Nitrate in every Conceivable Case, without restricting one Set of Cases to Copper Sulphate & the others to Silver Nitrate — and I have had exceedingly good results. By making Silver Nitrate Solns Very weak or Very Strong, one may get all the desired results. But when more mature experience is concerned, I shall not press my point. Only this much I will say. If I have to choose between Silver Nitrate & Copper Sulphate I shall, of course, stick to the former, — though I should like to have the latter also for any emergency.

Now, in India, a great many of the patients who came to me, had been already treated by the Copper Stick by their village physicians — Some of them remembered what they had gone through — they therefore dreaded the sight of it even in the hands of one, whom they trusted implicitly.

Mercury.

Hydrarg. Oxid. Flav. I use it in the form of ointment mixed with Vaseline (8 grs: 16 grs: 32 grs. to ℥j). It acts as an antiseptic, a lubricant & a mild stimulant. At the commencement only the mildest ointment is used: later on the stronger ones & finally the strongest. It is not only put into the eye, but also, used as a vehicle for massaging the lids on the Cornea. After painting the lids with the Nitrate of Silver & washing the Solution out with water, I give the patient a few moments rest, and then put in the Yellow Oxide ointment, and massage both eyes with my surfaces. to achieve both therapeutic & mechanical ends. Then I give the patients Some Yellow Oxide ointment to take home and use it before retiring for the night. They also take some of it with them when they return to their Country home, to put it into the eyes, occasionally as a precaution against a recurrence of Trachoma.

Hydrarg. Perchloride:

Occasionally I use it as an eye wash in (1 in 2000 Solution), particularly where there is considerable muco-purulent Secretion present. Rarely I use it as an antiseptic & Corrosive irritant in rubbing the granules with Cotton wool soaked in it.

Hydrg Cyanide of Mercury:

I have used this salt

for sub-conjunctival injections when trachoma was associated with pannus, with most gratifying results! (1 in 4000 solution.) The injection is extremely painful — Sometimes a hypodermic of morphia becomes necessary to reduce the sensibility to pain. On the other hand the addition of a few drops of a solution of Acoine reduces considerably the pain of the injection.

I have found pannus of considerable vascularity & thickness disappear under a couple of injections. — the 2nd injection was repeated at the end of a week or 10 days.

Even trachoma of the lid, which resisted treatment with agno3 for sometime, soon showed signs of yielding to treatment after an injection of Hydr. Cyanide. Perhaps the severe reaction which the sub-conjunctival injection produces in the eye, flushes the blood vessels & the lymphatics, thus aiding a rapid absorption of the pannus. The palpebral conjunctiva being so less so than the ocular one, the similar result could not be produced. Else trachoma would have yielded to sub-conj. injections of Cyanide of Mercury. I shall refer to this again when I come to discuss the question of treating pannus later on.

Zinc Sulphate

A solution of 2 grs to the ounce I give my patients to drop into their eyes frequently when they are at home, preferably before retiring for the night.

Pulv. Acid Boracic.

A lotion of 20 grs to 1 oz. of water, is used

as eye drops alternating with Zinc sulphate. the ointment of Boric acid (Grs X to ℥j White Vaseline) I use to prevent the adhesion of raw surfaces and also reduce irritability in the eye.

Atropine Sulph.

I hardly ever use it in trachoma, except when there is an ulcer on the cornea. Because, as a rule trachoma patients can hardly bear the light of the tropical Indian Sun — and the dilatation of the pupil induced by the instillation of Atropine drops into the eye, aggravates the sensibility to light. Hence they confine themselves in closed in dark rooms — which seriously interferes with the hygienic ideals of treatment. On the contrary I prescribe for my trachoma patients Smoke-glasses and insist upon their getting out into the open air as much as possible.

Diorine Sulph.

Most useful in the treatment of Corneal complications of trachoma Eg. ulcers: pannus: inflammation. It smarts on first introduction into the eye, producing a violent reaction in some cases. But it soon gets tolerated by the eye. Instillation of diorine drops, followed by a massage with the ointment of the Yellow oxide of Mercury, sometimes causes rapid absorption of the ulcers & pannus.

Cocain Hydrochlor.:

Only in the form of Solution in water (3% or 4%) just before or after strong application of Argyrol, Protargol & also prior to mechanical or Surgical interference.

The Mechanical Method.

Massage is a bloodless method. It is able to cause absorption of the deleterious products through its action on the blood or lymph-streams, besides being very simple. Various forms of massage have been recommended by various Authorities. In 1889 Coccius practised direct massage with the finger, boracic acid powder being spread on the Conjunctiva & Cornea. A glass rod or Spatula has been used by Others. Boissier seems to have rubbed the everted lids against each other; while Mise Jewitsch kneaded the infiltrated tarsus.

I am a great believer in massage & I have my own method. I have not seen anybody doing it on my precise plan, nor have to I read any literature about it. So, I may be excused for the liberty of calling the method my own.

I generally place on the inner surface of the lower lid oint. Hydrarg. oxid. flav., about the size of a pea, and if there be a paresis or ptosis rub the lid, the upper or lower, whichever is nearer the affected spot, gently first, then briskly [illegible]. Then I rub the two lids together in the following way. With the index finger of the right hand placed about the middle of the upper lid against the lower lid in such a way that it gets particularly everted & meets the lower lid, which is

in turn pinched up by the left index finger placed about its middle. Thus the ~~two~~ tarsal Conjunctivæ of both the lids lie opposed to each other, with a coating of the yellow oxide ointment spread on them. With the aid of the thumbs, one lid is stretched & the other ~~back~~ rubbed on it. With some practice the whole surface of tarsal conjt of the upper lid could be made to rub against that of the lower lid with skilful manipulation without causing any serious discomfort to the patient. Thus trachoma follicles get absorbed through the general stimulation of the Conjunctiva. Again armed with the instillation of a weak Solution of Cocaine, with increased pressure, I could make the rubbing pretty brisk, so as to cause some of the follicles denuded of their ~~blood~~ epithelium & a drop of blood occasionally ooze out of the excoriated surface. This localised scarring prevents the formation of fibrous bands on a large scale, and helps the destruction of the follicles. The presence of the mercurial ointment, helps to keep the Conjunctiva aseptic, and its germicidal properties might be of some service in the destruction of the microparasites, should such be found in the follicles within its power of penetration.

Again as a lubricant it prevents adhesions & aids reparation of the lost tissue.

I have found my method very useful in the treatment of trachoma of not great severity — and since its adoption I have had very rarely recourse to roller forceps. In mild cases this method dispenses with the need of roller forceps, which I had to depend on frequently before I hit on the rubbing (Viz forceps) of the lids.

I generally choose my cases for the application of this friction massage. I avoid it when the eyes are highly inflamed or very irritable: also when the follicles are very large or when they are hard. Again when the tarsus is very much thickened it is not easy to employ friction-massage. In acute trachoma, I wait till all the signs of the mixed infection disappear.

From the professional point of view, the friction massage is very useful, as I found it to be in India, in nervous subjects who dread the very sight of surgical instruments near their eyes. Nor is there very little pain in this method. I have had no harmful effects produced by it — in fact it hastened the cure of trachoma in some cases very materially.

Heiselter's ointment (Potassium Iodide, 1·0; Sodium bicarb, 0·5; Vaseline, 10·0) has been recommended for massage. I never tried it — I was content to use mercurial ointment.

Where the lid is thickened & could not be easily drawn down or up, I twist the tarsus and rub it briskly with Cotton wool drawn into a pledget & soaked in 2% Solution of Argnos. I apply friction with it over follicles, so that they practically bleed. This helps localised destruction of mucous membrane & formation of localised fibrous tissue — thus aiding perhaps the partial destruction & absorption of the follicles.

Hygienic Method –

I have come to regard that hygiene plays a very important part in treatment of trachoma. I invariably recommend open air: change of place of residence if possible: clean and healthy surroundings. Avoidance of smoke & dust which cause & keep up irritation of the eye. Plentiful supply of clean water for washings & ablutions. The use of clean Separate towels by the patient: also the use of an antiseptic lotion for the cleaning of hands when they come in Contact with the eyes.

Plentiful supply of easily digestible nutritious food is most essential. Milk, butter, Sour milk, and fruit I have found invaluable, especially in treating those who are pure Vegetarians. Strict avoidance of indigestible food, such articles of diet, alcoholic beverages and excessive use of tea & Coffee & tobacco either in the form of smoking or Snuffing.

Since trachoma favours Scrofulous diathesis & anaemic Conditions, I have found anti-Scrofulous measures a great help in overcoming the disease. Liq. Strych. nitr. Sulph in 2½ gtt. doses three times a day I found to be helpful as a tonic and general Stimulant. Quinine Sulph is very serviceable, particularly in those who have a malarial taint in their blood. 2 or 3 grs. doses thrice daily may be continued till ringing in the ears warns one that the System Cannot stand any more of it Safely.

Arsenic I found as an invaluable drug. His action on the red blood corpuscles entitles it to the claim of a first rate blood restorer. Whether it has any germicidal effect on the microorganisms of trachoma (if Bacille exist?) it is too premature to say at the present state of our knowledge.

Liq. Arsenicalis 2 – 3 ms. thrice daily after food, along with Gentian or with Ferri ammon. Cit. 3 – 5 grs. is a wonderful pick me up or tonic.

I could also recommend Donovans Solution 15 ms. thrice daily freely diluted in water.

Ext. liq. of Cascara Sagrada 5 – 10 ms. at bed time in 1/2 of water, I found very useful in regulating the bowels.

Often trachoma is associated with abnormalities in the naso-pharynx. A douche to irrigate the nasal passages (Sod. Bibor: Sod. Bicarb: Sod. chlor. aa 3ij — 1 tea spoonful to 1 pint of water) or medicated nasal sprays are very useful. Attention to the naso-pharynx I found invaluable in the treatment of trachoma. I remember treating a well-to-do Indian lady for trachoma. After a long treatment I discharged her as Cure. Next she returned in 3 months, Complaining of a relapse of Trachoma. When I examined her naso pharynx, I found that both the inferior middle turbinated bodies to be greatly hypertrophied on both sides & her tonsils slightly enlarged. So I Cauterised her tonsils with Galvanic Cautery & ~~removed~~ resected her turbinals, with the result that when She met me a year afterwards she assured me that the trouble had not returned!

The Surgical Method —

The chief strength of the modern treatment lies in the surgical methods that have come into Vogue. But I need not enter fully into the various surgical methods & their relative merits here, since they may not be of much interest from the purely medical point of view — so far as the purpose of this thesis goes. I shall content my self with indicating the methods that I have found useful in my own practice

Expression with roller forceps:

Expression in this manner causes the epithelium over the follicles to rupture, with the result that the contents are expelled & the follicles are emptied without gross injury to the Conjunctiva, rapidly.

Dr. J. Boldt believes that roller forceps is specially indicated when moderately large follicles occur without previous inflammation or after the inflammation and discharge have subsided. Racklman, along with a host of others, advises expression when the follicles are "ripe" or softened. But Kuhnt (Zeitschrift für Augenheilkunde, Bd. I, 1899, S. 360) draws attention to the fact that in advanced gelatinous trachoma roller forceps causes serious injury, especially laceration of fragile fornices, with much scarring.

Whatever be the merits of roller forceps expression, I found it very painful, in spite of Cocain application — and nervous patients would not stand the treatment. I am inclined to agree

with Col. H. Smith of Amritsar India (the introducer of the method of Colin: Capsular extraction of Cataract) that in future expression by roller forceps would be considered a relic of ancient barbarity in Ophthalmic Surgery

The same object is reached without hurting the patient or running the risk of causing laceration by incising the follicles by the point of a Cataract knife, merely use & expelling the contents. I have found the method very useful & not unpopular with patients. Use cocaine in the Tarsal Conjunctiva.

Kuhnt used his "modified Expresser", one of the plates of which is solid, the other perforated. He also punctures the thickened tarsus deeply with a Special "puncturer", particularly the Convex border when the tarsus is infiltrated.

Galvano-Cautery is also recommended to pick out individual follicles. I have rarely used it when the follicles were large & resistant enough to justify its postponement to the Conjunctiva. The risk here is going too deep into the tissue.

Excision —

Excision of the fornices and of a part of the tarsus was introduced by Heisrath, of Konigsberg, a pupil of Jacobson's, in 1882, since the older authors had noted the predilection of trachoma to the fornices. (Heisrath, Berl. Klin. Wochenschrift: 1882. No 28-30)

"this procedure" says J. Boldt" heralded an unlooked-for advance in the treatment of trachoma, & has proved of invaluable service, particularly in the struggle with the disease in endemic areas."
Even Jacobson, who did not believe in excision at the outset became a Convert to the new rational method. Kuhnt in his Classical Beitrage Zur Pathologie des Auges, Commenting on the uses of excision says "fewer weeks suffice to Cure bad Cases there was requisite in as many years by the old methods — more or less interrupted use of lotions — to leave them blind or unfit for work."
Excision needs Skill & Judgement & experience to be a Success — else irreparable complications might arise. Kuhnt claims to effect Cure in Six weeks, and also is of opinion that there is very little Chance of reinfection after excision. The permanent Cures by excision are claimed to be as high as 50–60% by Kuhnt & 34% by Hoppe: while the percentage of Cures claimed for expression was about ten.
Kuhnt has of-late introduced his invaluable method of excision of tarsus, in Cases of infiltration and thickening — which can be used in the stage of Scarring with healed Conjunctiva.
In excision Care should be taken not to excise Conjunctiva below — the rotation of the eye ball be in the smallest degree

~~It~~ interfered with. When bulbar conjunctivitis involved one should have recourse to expression & treatment with drugs.

In Children, excision should not be practised, since trachoma more easily yields to the other forms of treatment than in the adults.

Excision is the best method of treatment we have in some cases, though, personally, I would have recourse to it, when the other simpler methods have been tried & found to be non-beneficial. I have had good results from it, — but I do not recommend it as a routine treatment.

But since Osler's in India, with considerable hospital experience have recently advocated its routine use amongst their hospital patients. I doubt the possibility of its becoming popular amongst private patients, in India. The better class of patients do not submit to operative treatment, until the other methods have been tried & proved ineffective.

In their vocabulary surgery means indiscriminate cutting into the human body by Western butchers who are ignorant as a rule of the efficacy of the 'drug-treatment'

I have often heard patients say to me "We have come to you to be treated by the application of medicines, though it wd. cost us something. Had we wished to be cut into (dissected off) we would have gone to the hospital!"

Ulcers:

When ulcers occur on the Cornea, I put in a drop of Atropine, very gently massage the Cornea with Yellow oxide Ointment + bandage the eye. If the ulcer be situated on the Corneal edge + if it be deeply situated with the danger of prolapse of iris into it, I put in Eserine to keep the iris tense + pupil contracted.

I have found diemine very helpful in promoting the rapid healing of ulcers.

Staphyloma — bone to Cornea losing its bonicity + to increased intra-ocular pressure. In mild case pressure bandage is all that is necessary. In more serious cases — Atropine, iridectomy + pressure bandage + recumbent posture.

Trichiasis — If not very troublesome, pull out the hairs + put on pressure by means of a strip of adhesive plaster.

When it is associated with Entropion: — Surgical method. Removal of the skin + portion of the tarsus: Splitting of the border along the edge of the ~~eyelids~~ lashes.

Dacryocystitis — Caused by the extension of trachoma into the lacrymal sac. I have not seen any cases of trachoma starting secondary to dacryocystitis. Syringing the sac out does not do much good. Extirpation of the sac, and sometimes Cauterising of the surrounding bony tissue is the only safe + reliable course. Then to an oculist:

Treatment of Trachoma Pannus by means of infection with Gonorrhoeal Secretion.

W. Goldzieher — Weiner Klinische Wochenschrift XXII-52.

According to Goldzieher pannus is an invasion of the Cornea by trachoma, an attack upon the Cornea by the trachomatous process which has already invaded and partially destroyed the Conjunctiva: it is therefore right & proper when this invasion occurs to attack it directly. He destroys the new formed blood Vessels, when there is an excessive formation of them

(a) by Cautery

(b) by peritomy, destroying Conjunctival vessels just as they enter the anterior Segment of the Globe.

But he rejects the infusion of the Jequirity bean on the grounds that this method of treatment is too risky for milder cases & too frequently a Complete failure in the really severe. He recommends the method of infecting treatment by infecting the pannus with Secretion from Gonorrhoea. He Seemed to have tried it in Six Cases, when all other methods had failed, and his efforts resulted in Surprising Cures. (Before him Von Jaeger, Chief Medical Officer of the Austrian Army, recommended it in the most unequivocal terms, in certain Suitable Cases.)

For inoculation pus should be taken from an Ophthalmia neonatorum, but never from gonorrhoeal urethra or from the Conjunctiva of an adult affected with Gonococcal Conjunctivitis.

A little of the infected material is to be picked up, not as a mass but rather by drawing the Sterilized glass rod along the everted lower lid & thus infecting the eye to be treated rather with lachrymal secretion containing organisms than with actual pus. A severe inflammation is excited associated with a alarming gray infiltration of the pannus Cornea, which he considers, an indispensable preliminary to clearing up. The healing has been without Scar formation, if there had been a great deal of trachomatous infiltration of Conjunctiva. This encourages one to entertain the idea that trachoma need not necessarily be followed by Scarring.

This might be considered a bold & risky method, Since Some remote consequences might be produced by the introduction of gonorrheal infection into the eye. If I had to choose between Gonorrheal infection and trachoma, I should unhesitatingly choose the former, because it is more under Control, through the methods of modern treatment.

It should be said to the Credit of Goldzieher, that though he had been treating trachoma for 30 yrs, or longer. he had Ventured to treat only Six cases with Gon. infection — which shows that he is not rash in pushing his treatment but very Cautiously Selects his Cases.

I must confess that I have not had any experience in the treatment of trachoma pannus by the method of Gon. infection.

But I had a peculiar Case, which throws some light on the Question we are Considering. It occurred a few Years ago in India — I cannot Vouch for its accuracy — I merely state it here, so that it may be taken for what it is worth.

A patient was under my treatment for trachoma, and he had to return home for family reasons before I could make up my mind to discharge him. A few months later he came back to me, expressing a desire to place himself under my treatment again, promising to stay with me till I could discharge him as cured. I finally agreed to take him back — but he had to wait a few days before I started him with the treatment. Of course he had a paucities in one of his eyes. On the 4th or 5th day, since he saw me he saw me, he came to me with both of his in a Violent state of inflammation, which he could not account for. I was able to draw out of him that he had suffered from fleas & that he happened to rub his eyes without washing his hands. I wanted to keep him under observation. He felt ashamed of himself, and in the pretext of an unexpected urgent business went home, pretending to return after the acute symptoms subsided. But he never turned up. Later I found from his friends that the trachoma had practically disappeared from his eyes since that acute exacerbation had subsided.

The Complications of Trachoma

Pannus is the chief of them. If it is thick, it interferes with vision very considerably. As the trachoma subsides under treatment, pannus too, gradually clears up.

I found massaging of the pannus with a little Yellow Oxide of Mercury ointment, by rubbing the lid over it frequently helps to clear up the pannus. When it does not yield so readily to massage I instil a drop or two Diocine Solution and finish off with the massage. It is wonderful how soon diocine helps the pannus to clear up.

The still resistant forms I treat with the Sub-conjunctival injection of Cyanide of Mercury, 1 in 4000. I cocainise the eye first & then inject about 10 minims of the Solution of Cyanide into the Sub Conjunctival Space, very near the upper fornix. I do it there, because gravity helps the fluid to spread round the Cornea — which would not be possible by injecting near the lower fornix. I make the patient look down as much as he can & then insert the needle. The Conjunctiva being so lax near the upper fornix, the slight fibrous tissue formed at the spot of the puncture does not materially discomfort the eye. The eye will be in a violent state of inflammation & Conjunctiva is swollen — a fleshy, semi-transparent basketwork like bed in which the Cornea lies, patiently

writing to be cont.

the inflammation subsides in a week, when the pannus generally disappears & the trachoma too loosing much of its Severity.

Some years ago, a girl Came to my door begging, being blind — Led by another girl. I Examined her eyes And found one of them was totally blind, with a huge pannus Seicca filling all the Cornea. The other eye too had a pannus — Ulcers & Vascules, with pretty severe trachoma. She could Scarcely Count the fingers. I ~~asked~~ Suggested the treatment of that eye to which She gladly agreed. I put her on a Course of Silver nitrate treatment & massage with the Yellow oxide ointment. She was a very ignorant & hysterical girl. One morning I applied the 1/2% Solution of $AgNO_3$ — She Shrieked & yelled — but She went home. She did not turn up for a month but when She returned, She Came by herself without any guide to lead her. So She was able to See just enough to walk in the Streets. I fined her for her indiscreet disappearances, and made her promise to Come to me regularly. The pannus by this time Ulcerated to such an extent that She could faintly See my face. One morning I put her on my Operating Cot and with the aid of an assistant, injected Some Cyanide Solution into her Conjunctiva. I scarcely injected 5 minutes, the girl Yelled frantically, pulled out the needle

and would not let me finish it off. So I bandaged the eye & sent her home. The next day she came in to have the bandage removed — but never came to me again. I thought that my treatment was wasted on her, and that since it was given gratuitously, it was not appreciated. Several weeks after words my father happened to pass a group of women who were attending to the repairs of a road. One of them turned walked up to him & saluted him & asked whether he recognised her? It was my blind girl.

She told them then that the pain had frightened her — and she feared that I would inject the cyanide again into her eyes — that was why she did not come back to me. But the interesting point was that she could see perfectly well. after the injection. She was in fact able to get some work, and help the woman by fetching water to repair the road. She could walk freely, recognise people without any difficulty. She took to this work for some months. I do not know what became since I left home.

Pannus Sicca.: Nothing can be done to cure it. I generally tatoo ~~it~~ leucomas with Indian ink for optical purposes and then if the vision is interfered with, I perform an iridectomy — preferably in the lower, inferior quadrant of the Cornea.

Some Specific forms of Treatment.

Radium: It has been declared to cure trachoma most effectively. Thiébault of Algiers, claims to have employed radium extensively in the treatment of trachoma, with gratifying results both in curing the disease and in clearing the cornea where pannus was present. Radium raised great hopes, but it has disappointed a great many who gave it a trial.

Mr. E. Treacher Collins, Senior Surgeon to the Royal Ophthalmic Hospital Summarises his experiences thus —

"About Six Cases have been treated with radium. A tube of radium bromide has been held over the everted lids for five or seven minutes daily. This has had to be continued for from three to ten weeks before any reaction was produced. If the exposures to the radium could be made for half an hour at a time, treatment with it would probably prove more efficacious. It would, however, be tedious to both patient & nurse to hold the tube over the everted lids for so long a time".

Radium has also been given a trial in the U. S. A. But the reports have been conflicting: at any rate the majority are not enamoured of its efficacy. Under such conditions, I could not recommend my patients to undergo the radium treatment. Of course it was too expensive for me to attempt to experiment with it.

Radium Treatment in the U. S. A.

In the Ophthalmology, July 1912, Dr. C. H. May of New York, under the heading of "the treatment of Trachoma with Radium. the use of radium coated plates for this purpose Came to the following Conclusions after extensively using radium in the treatment of trachoma.

(1) In most Cases the treatment had to be Continued not less than 3 months

(2) In no Case was the result of treatment with Radium as good as Obtained with Cop.r Sulphate.

(3) Used in the form of radium – coated Celluloid ~~plates~~ plates, the results obtained in the treatment of trachoma did not warrant the adoption of this remedy in place of other means, which are more or less satisfactory.

(4) The trachomatous Conjunctiva no doubt reacted very readily to radium, but the benefits was only temporary – new follicles developed after the radium treatment was discontinued.

(5) The Cost is prohibitive, while the radium is not always obtainable. ———

Quartz – light treatment for Trachoma

Molar + Baumm have treated trachoma with the mercury-Vapour lamp, by means of a Special modification. Only recent trachoma yielded to the treatment, which Completely failed to touch the Chronic type.

The X-ray Treatment:-

Mr. Stephen Mayou was the first in this Country to suggest & practice it. From his point of view the following are its advantages.
(1) It is free from pain (2) there is considerably less deformity of the lids afterwards (3) the pannus clears more thoroughly (4) the period of treatment is shortened.
This has been employed at the White Oak School, Swanley, in 40 cases, who were subjected to no other treatment. The results obtained there seem to justify the claims made for it by Mr. Mayou. The rapidity with which a reaction has come on & its amount seem to have varied considerably in different cases.
"As a rule, after the exposures have been made daily for 1 week, they have been employed alternate days for the following week, and after that discontinued for a time until the amount & character of the resulting reaction becomes manifest."
After a decided reaction has once been produced and has subsided, a fresh reaction is very easily reproduced.
Caustics applied after the reaction excited by X-rays, tend to produce a greater reaction than they use under other circumstances would do.
"If a case has been treated for some time with Copper Sulphate & is then exposed to X-rays, reaction is more readily excited than where no Caustic applications have been previously applied".

Some of the best results have been effected when the lymphoid follicles have been first expressed with forceps and exposure to X-rays Commenced a week later. It is claimed that in Several Cases marked and rapid improvement in the pannus had been produced by the X rays, the blood vessels disappearing, & the Cornea clearing in a most Satisfactory way. But much care & discretion are needed to employ this treatment to get Satisfactory results.

Gronholm, V. in his "Finsentherapie bei Trachom." Summarising his treatment of trachoma with finsen light admits that the most rapid improvement was obtained by using the light a week after a previous expression of the granulations. Considerable reaction follows, lasting 2 or 3 weeks, & leaving a smooth pale surface with Scarring more Superficial than that produced by Copper Sulphate. As a rule one application Sufficed & in many Cases treatment was Completed in a month. But recurrences occasionally occurred: In Several Cases Corneal Complications occurred, or when present were aggravated. He believes that finsen light has a Special power of destroying the trachomatous tissue — and in this respect, that it is Superior to Cop. Sulph. But unfortunately the apparatus used is elaborate and expensive, and its efficient management requires Specially trained assistants.

Indian Treatment

It may be of interest to note here some of the methods that are in vogue of treatment of trachoma, in India at the present-day, quite apart from the western medical science.
A friend of mine, an eminent Sanskrit Scholler, and who practices very successfully at Madras, the Ayurvadic System of Medicine (Ancient Hindu Medicine — the Science of life.) assured me sometime ago that trachoma had been mentioned in ancient Sanskrit works. It was styled as "fleshy growths in the lids". I regret that I am at present unable to quote the books or translate from them — as I have not any one of them here. In the treatment various parts are used in which Copper, Silver & mercury form the chief ingredients.
It is of interest to know that even in villages, the ordinary village physicians, scrape the trachoma granules with rough leaves. the red oxide of mercury is used in the form of ointment, mixed with Ghee (clarified butter) or Castor oil. Copper Sulphate is used in some parts: the stick is also used occasionally to touch the follicles with. Scraping is done with the fine point of a probe or wire. I have heard of the thermo-cautery being used very rarely, when granulations became resistent to ordinary treatment. Silver & Copper Coins are frequently rubbed on the tarsal conjunctiva. Castor oil is boiled in a spoon & on cooling to body temperature, is instilled into the eyes to allay the inflammation & prevent the adhesions of the lids together. In some cases

human milk is squirted into the eye, right from the woman's breast, for the sake of its soothing & its supposed antiseptic properties. When there is considerable irritation a paste of Sandal wood & opium is painted over the lids of the brows. Hot fomentations are employed, Cold prefiglations are made use of. Instillations of rose water into the eye is supposed to allay the inflammation. Poultices of the fresh petals of some scented flowers, are being used over night to keep the eye cool & comfortable.

Nux Vomica, Arsenic, occasionally Cambined the sub or perchloride of mercury are given internally as general tonics. Sarsaparilla & Chiraita are administered internally for their demulcent & "Cooling" properties.

A liberal allowance of Cow's milk, butter milk is given. Fruit, specially of the Citron Variety is permitted. But acid & pungent substances are withheld.

Alcoholic drinks are forbidden: tobacco tabooed. indigestible food is scrupulously withheld from the patients. They are also forbidden sexual indulgences. Exposure to heat & Cold, & Physical & mental fatigue are discouraged. The bowels are regulated. Patients are advised to abstain from callings which would expose them to dust & smoke. Sago & barley porridge are recommended, while Rice water is advised as a Cooling drink. Baths in the sea & rivers are forbidden.

I am inclined to think that trachoma is specific Contagious disease form of Conjunctivitis, extremely Chronic, lasting months & years, and when left to itself capable of Causing serious & permanent impairment of vision, leading even to blindness in some cases.

The possibility of micro-organismal origin of trachoma is very great at the present day. I do hope the organism will soon be found.

If some day we know the organism, we shall know also the method of Coping with it.

If we continue on the basis of organisms we cannot do better than treat the trouble with silver nitrate & mercurial ointments & Cyanide of mercury injections — besides Arsenic into the system — Since we have are the best germicides we have at the present-day and we try to approach the organisms in all the ways open to us.

I realize that I have said very little new about Trachoma in my thesis. Till the micro organism is discovered nothing startlingly new could be said on this old, world-wide subject. Some of my views might seem rather amateurish to the mature experience of my examiners.

I have only expressed my views, based as they are on my experience in India — I have seen several thousands of trachoma cases.

In my own blundering ways I have tried to do what I could. I am conscious of their imperfections. I am hoping to be able to continue the study of Lichens in India this autumn & winter. If I obtain any further results I hope to be able to submit them to the consideration of my Alma Mater.