

WILLIAMS (H. W.)
ON THE

COMPARATIVE VALUE OF CAUSTICS AND ASTRINGENTS

IN THE

TREATMENT OF DISEASES OF THE CONJUNCTIVA,

AND ON THE

BEST MODE OF APPLYING THESE REMEDIES.

BY

HENRY W. WILLIAMS, A.M., M.D.,

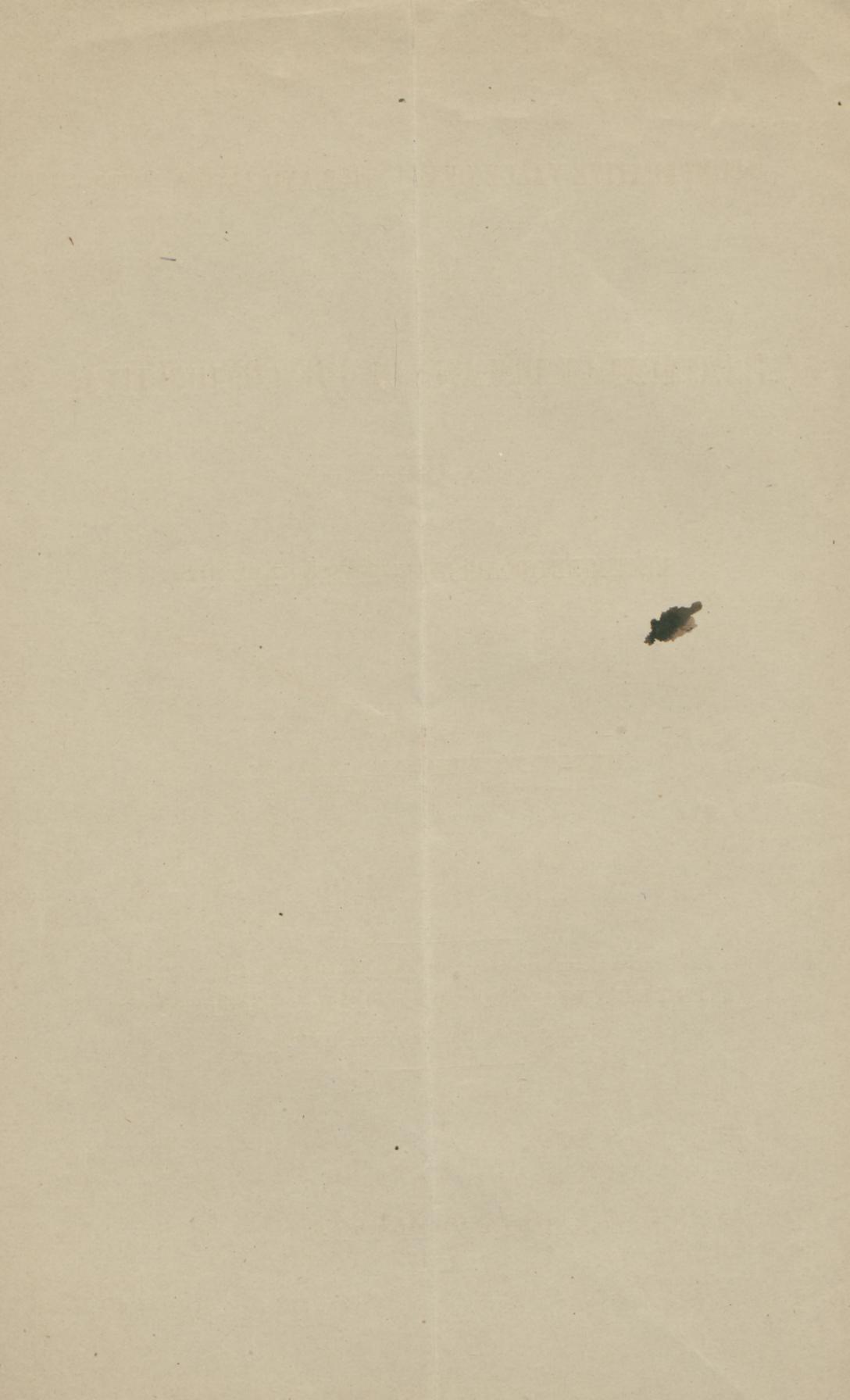
PROFESSOR OF OPHTHALMOLOGY IN HARVARD UNIVERSITY.



EXTRACTED FROM THE TRANSACTIONS OF THE
INTERNATIONAL MEDICAL CONGRESS,
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THE conjunctiva, one of the least in extent, but one of the most important, of the mucous membranes, is the seat of affections singularly various in form and degree—from the simplest transient congestion to the most violent inflammatory processes and most persistent structural alterations. On the treatment of these depends, often, the preservation or the loss of the most important of our special senses, and the fairest prospects in life may be blighted by either mismanagement or neglect.

In preparing the paper which I now offer to the Section on Ophthalmology, I have avoided a recapitulation of every theory as to pathology and treatment, and offer simply a few practical suggestions, with no wish to unduly depreciate the value of other means and methods than those for which I express a preference. Skilful men will know how to use various instrumentalities to attain good results. Nevertheless, it is desirable, and important, to discriminate among the agencies at our command, and to select such as practically prove best adapted to the cure, *tuto, cito, et jucunde*, of the diseases which we are considering.

A considerable number of conjunctival affections require little or no treatment, and are injured rather than benefited by the use of other than the mildest remedies. The hyperæmia caused by the presence of a foreign body subsides upon its removal; the injection depending on astigmatism, or other defects of refraction, disappears after the selection of suitable eye-glasses; the sub-conjunctival ecchymosis following a blow, or the rupture of a small bloodvessel, is re-absorbed, perhaps quite as rapidly, without our interference. If, in these cases, we prescribe a lotion or a collyrium, it should be quite unirritating. So also in traumatic injuries of a simple character, and after operations for strabismus or pterygium, the healing processes go on without assistance from applied remedies. Chemical injuries, because of their graver nature and the degree in which the cornea may be involved, oftener require our aid; but even here, emollients and sedatives rather than active stimulants are most useful.

With the above-named exceptions, and apart from certain complications hereafter to be considered, diseases of the conjunctiva may be divided into two classes requiring essentially different management. The first includes a comparatively simple, limited, and benign, though sometimes chronic, affection; the second embraces several conditions of general and often severe conjunctival inflammation. The prominent feature of the first class is the development of small elevations or papulæ, one or

several in number, usually situated at or near the border of the cornea, though they may form elsewhere on the ocular conjunctiva. The summits of these may be whitish, as if containing a minute quantity of pus; more frequently they are red; and they may vary in size, but are commonly about that of a hemp-seed. Usually a fasciculus of vessels runs to each of these papulæ; but there is no general injection of the conjunctiva, except as far as may be the result of friction of the papulæ against the inner surface of the lid. Children are the most frequent subjects of this disease.

The tendency of this affection is towards a disappearance of the symptoms at the end of a few days, even when no treatment is employed. Therefore, no active remedies of caustic or astringent nature are needed, and they tend to delay rather than hasten the recovery. Calomel or other insufflations are similarly useless. All annoying remedies are moreover objectionable on account of the age of the majority of the patients. Simple lotions, cold or tepid, with water, or milk and water, may be used. Two or three times a day, a few drops of a solution of ten grains of borax in an ounce of water, or of camphor water, may be dropped into the eye from a teaspoon or a drop-tube. This usually proves a soothing and refreshing collyrium, grateful rather than painful to the patient, and appears to have a sufficiently astringent and stimulating effect to promote absorption of the papulæ. Although the ordinary duration of these small pimples rarely exceeds ten days, it is not uncommon, whatever treatment has been employed, to find successive crops of them, at intervals of a week or two. This disposition seems to be best obviated by continuing the use of the borax collyrium, once or twice a day, for some time after recovery, so as to modify the condition of the conjunctiva. Where the papulæ are slow in disappearing, the application of a crayon of alum, once in a day or two, to the inner surface of the lower lid, is often useful and is nearly painless. The astringent reaches the affected spot as the lid returns to its place, and seems sometimes to excite a more rapid resolution. The papulæ themselves should never be directly touched with caustic or astringent crayons or solutions.

Very rarely, the disease takes a more chronic form, the papulæ being as large or larger than a split pea, and sometimes umbilicated at the centre. Though persisting longer, and for a time intractable to treatment, the prognosis is always favorable. Tonic general remedies, and sometimes change of air, are useful adjuvants to the mild local applications. Solutions of atropia have of late been too much in vogue in the treatment of this form of disease. Though far less dangerous than the strong caustic remedies which were formerly indiscriminately employed, yet an unnecessary resort to them has grave disadvantages. In cases of corneal ulceration they may be of much service, in lessening the irritability and photophobia; whilst in these less serious conjunctival affections their action upon the pupil does but increase the intolerance of light, and, by exciting strong contractions of the lids, creates a disposition to corneal ulceration as an effect of friction.

The second class of conjunctival affections comprises catarrhal conjunctivitis in its acute and chronic forms, trachoma, purulent and gonorrhœal conjunctivitis, ophthalmia of new-born children, and diphtheritic conjunctivitis; each of which conditions has an importance claiming distinct consideration.

When the conjunctiva becomes affected from exposure to cold, dust, or other simple causes of irritation, the first symptom is injection with an increased flow of tears—soon followed by a velvety thickening of the

palpebral conjunctiva and a slight mucous secretion. These phenomena may occur so suddenly that the patient feels sure that something has been blown into his eye; but the scarlet, velvety appearance of the lining of the lids, as distinguished from the mere vascular hyperæmia excited by the presence of a foreign body, renders the differential diagnosis sufficiently easy. At this stage, caustics and strong astringents are alike to be avoided, or used with great reserve. Frequent bathing with cold or tepid water according to the sensations of the patient, with applications, four or five times a day, of a few drops of a solution of ten grains of borax in an ounce of camphor-water, or of five grains of alum or one grain of sulphate of zinc in an ounce of water or rose-water, will generally cut short even a sharp attack and remove the symptoms within three or four days. Occasionally this form of conjunctivitis is epidemic, large numbers of persons being attacked within a short time. Similar, with perhaps somewhat more active, means, are here called for; one or two touches inside the upper lid with a crayon of alum, or, very rarely, a single light touch with a crayon of sulphate of copper, acting as useful auxiliaries in arresting the symptoms in an early stage. If neglected or if too actively treated, the thickened conjunctiva assumes a more or less granulated aspect, and a chronic phase of disease is established which requires more active measures. The lining of the lids, especially the upper, from hypertrophy of the conjunctival follicles, now resembles in appearance the surface of a raspberry, and the sub-conjunctival tissues become so infiltrated that the lid-movements are difficult. The secretions are greatly augmented, causing abundant flow in the daytime, and agglutination of the lids at night. Here, as in another affection next to be described, the mild remedies, sufficient for the lesser degrees of inflammation, are of little avail. Caustics or astringents, of considerable potency, seem to be our only resource.

Trachoma differs widely, pathologically, from catarrhal conjunctivitis, though often coexistent with and complicating it. It consists essentially in a neo-plastic formation; at first in small, oval-shaped, semi-transparent masses, resembling grains of tapioca; and sometimes increasing until the conjunctiva, with its subjacent textures, is largely transformed into a dense, nearly structureless mass, which, as recovery takes place, is not replaced by normal tissue, but is followed by contraction of the conjunctiva and incurvation of the tarsal cartilage. Here, the prognosis is less favorable, the recovery slower, and the danger of secondary lesions of the cornea much greater than in the catarrhal form of conjunctivitis. But the local treatment of the two affections has much similarity, and may be either caustic or astringent, or both.

Nitrate of silver is the caustic most relied on in the treatment of conjunctival affections, though other means have from time to time been tested and enjoyed ephemeral reputation. The methods of using it, and the means employed to limit its effects, vary with different ophthalmologists. The crayon of pure nitrate and the nearly saturated solution, formerly much used, are now rarely employed, but have given place to the lapis mitigatus, as it is termed, in which one part of nitrate of silver and two parts of nitrate of potassium—or two parts of silver and one of potassium—are fused together; or to solutions of nitrate of silver of from ten to forty or more grains to an ounce of water. The caustic is applied, in most cases, to the surface of the everted, upper lid, more or less lightly or extensively, the stick of lapis mitigatus being preferred by some, the solution of nitrate of silver by other authorities. When

thought advisable, the action of these substances is limited by the immediate application of a neutralizing solution of salt and water, or pure water, or both of these, to the cauterized surface. The frequency of the repetition also varies greatly, in the practice of different individuals: once, twice, or thrice a week, daily, or oftener, according to the intensity of the symptoms or the preferences of the practitioner. Moreover, some rely wholly on this means; others employ auxiliary treatment. Theories as to therapeutic effect also vary with different observers, some seeking to destroy the apices of the granulations, while others, deprecating such an effect, use the caustic with more reserve, and, virtually, as a strong stimulant only.

In the class of astringents employed as topical applications by the physician himself, may be named, crayons of sulphate of copper; the lapis divinus, composed of equal parts of sulphate of copper, alum, and nitrate of potassium moulded into sticks; crayons of alum; and strong solutions of tannin in glycerine. Of these, the crayon of sulphate of copper forms the best type; as combining the several qualities of convenience, efficiency, and safety. The alum crayon has an excellent effect in mild forms of conjunctivitis, but is inefficient in the severer and chronic affections. The lapis divinus seems less reliable than the crayon of pure sulphate of copper. Tannin and other vegetable astringents, from which theoretically we should expect so much, have always proved, in my hands, in whatever proportion or combination, inferior to the mineral astringents; whether as a means of energetic action upon the conjunctiva, or as used in collyria to produce milder continuous effects.

The sulphate of copper cannot be fused in moulds, like nitrate of silver and lapis divinus, but the crayons have to be shaped from crystals of the substance. Unfortunately, these are generally much broken at the laboratories in packing for the market, but if good crystals can be found it is easy to cut from them crayons of convenient size. The harder parts of the crystal, free from pores or water of crystallization, are to be chosen. Nothing would be needed to obtain ample supplies of the crystals, or of crayons already shaped from them, but the knowledge that there was a demand for them, as they are easily made from crystals obtainable at the laboratories, and they require no care in keeping, being little changed by exposure to air or light. A single crayon lasts a long time, and may be used, like a silver probe or a bistoury, for successive cases, care being of course taken to wipe the crayon after every application. The crayon of sulphate of copper should be applied, as a rule, rather lightly to the conjunctiva of the everted upper lid; this lid, in which the circulation is more readily congested, being usually more diseased than the lower lid. It is rarely necessary to touch both lids, as a portion of the remedy, dissolved by the moist surface over which it is passed, is carried by the movements of the lids to every part of the conjunctiva. In sluggish cases the crayon may be applied more heavily, or may be more frequently repeated.

Used as above described, the crayon of sulphate of copper does not act on the conjunctiva as a caustic, but only as an energetic astringent and stimulant. In the more acute cases, the pain, after the first or even after several applications, may continue for some time; though it is much less severe and enduring than when caustic has been used. Bathing the eye with water shortens and mitigates the smarting. While the pain is much prolonged, the crayon should be used lightly and perhaps less frequently than after the eye has become more tolerant of the remedy.

The touch may then be harder, and may be repeated daily or less often, according to the judgment of the physician. When the crayon is well borne, cases often improve the more rapidly according to the greater frequency of its application; this being especially observed in many chronic cases, trachomatous, and other.

That many cases of muco-purulent or trachomatous forms of conjunctivitis may be successfully treated with nitrate of silver, pure or combined, does not admit of a doubt. Its action requires to be carefully watched, and good judgment must be exercised in determining the frequency and severity of its application, and in neutralizing at once any excess of the caustic. More benefit is obtained from its moderate than from its too free use. Care must also be taken not to continue it too long, as not infrequent instances have occurred in which the conjunctiva has acquired an indelible, olive stain, or even become quite black, from the prolonged instillation of a moderately strong solution. If employed, caustics should not be solely relied on, but should be supplemented by other milder remedies of stimulating or astringent nature, which may be more or less frequently applied by the patient or his friends.

The use of caustic as an application to the eye is not without its dangers. Its active properties render it a destructive agent in unskilful hands; and it sometimes disappoints even the most experienced oculist. The application of the crayon of sulphate of copper involves no such consequences as are inseparable from the use of nitrate of silver. If it happens to be injudiciously employed, no special harm is done and no immediately destructive effects ensue from its use. It is, therefore, a far safer agent in inexperienced hands.

It remains to consider whether the general results of treatment will be more successful under the one or the other plan.

My own experience, which has included careful personal observation of the practice of nearly every European oculist who has had celebrity within the last thirty years, has satisfied me that better and quicker results, with far less danger and suffering, are obtainable from the use of astringents than from the use of caustics. Many years since, I made comparative tests of the value of these two classes of remedies in severe and chronic forms of conjunctivitis, on a large number of patients. Selecting cases where both eyes were equally diseased, I treated all the right eyes with nitrate of silver, and all the left eyes with sulphate of copper. Of course, no differences of constitution could influence the effect produced, as might, perhaps, have been alleged had merely a certain number of patients been chosen for each mode of treatment and the same remedy used in both their eyes. The uniform result was a more rapid gain in the eyes treated with the crayon of sulphate of copper. Some of the eyes treated with nitrate of silver went on tolerably well, though slowly; but others did so badly that, after vain attempts to succeed by varying the strength of the caustic applications, I was at last compelled, in order to avert threatened loss of the eyes, to substitute the use of the sulphate of copper, under which they recovered. In no instance was it necessary to abandon the sulphate of copper and resort to another remedy.

A very important adjuvant to treatment, either by caustics or astringents, as applied by the physician himself, consists in combining with these the more or less frequent use, at home, of a milder astringent or stimulating collyrium. Of these, the mineral seem to be superior to the vegetable astringents, as also to the purely stimulating class of collyria, such, for instance, as those containing wine of opium or corrosive subli-

mate. Many substances have been employed with more or less advantage. Among those most in use may be mentioned solutions of nitrate of silver, sulphate of zinc, acetate of zinc, sulphate of copper, sulphate of cadmium, alum, and borax. Of these, the sulphate of zinc seems by far the best for the forms of conjunctivitis which we are considering, as it appears to have a more astringent with less irritant action than either of the other remedies. The silver, copper, and cadmium solutions, are too actively stimulating, with less of astringent effect; the alum and borax are too mild. The sulphate of zinc solutions may vary from half a grain to four grains to the ounce of water or rose-water; and a few drops may be poured into the eye from a teaspoon, a drop tube, or otherwise, two, three, or four times a day. In cold weather the spoon may first be dipped into hot water for a moment, so as to warm the collyrium, if the eye is sensitive as to the temperature of the drops. I have found the sensations of the patient a useful guide in determining the strength of collyrium likely to be of most benefit to him. If a solution of a given strength, say of two or of three grains to the ounce, causes smarting for more than five minutes, it should be diluted one-half, or until it no longer gives more than a few minutes' pain. Thus graduated, the collyrium should be used often enough to keep up a moderate remedial influence.

Acetate of lead, in substance or solution, formerly much in favor even with the profession, and still in common popular use, should *never* be put into the eye. It has no special remedial value to warrant its employment; and whenever the conjunctivitis is, or becomes, complicated with corneal ulceration, great harm is done; the acetate being decomposed, and an indelible deposit formed on the ulcerated surface, causing permanent opacity of the cornea. It is therefore better to erase it from the list of ophthalmic remedies.

More actively virulent forms of conjunctivitis are found under the designations of purulent conjunctivitis, gonorrhœal conjunctivitis, and the conjunctivitis of new-born children. Purulent conjunctivitis, sometimes termed Egyptian Ophthalmia or Ophthalmia of Armies, is marked by far more rapid sequence and violence of symptoms than the catarrhal or trachomatous affections. In pauper asylums, schools, and barracks, it may speedily extend to a large number of persons by direct infection of healthy eyes with the purulent discharge from those which are diseased. This is largely conveyed through the promiscuous use, in such institutions, of articles of toilet, wash-basins, towels, etc.; and is sometimes purposely introduced; the fearful risk of blindness being incurred for the sake of avoiding military or other duty, or of obtaining some hospital privilege. Enormous tumefaction of the conjunctiva and of the entire lid, and copious muco-purulent discharge, characterize this disease. Serous or even phlegmonous chemosis of the subconjunctival cellular tissue often forms a dangerous complication, interfering with the proper nutrition of the cornea; and ulceration of that structure may result from the direct pressure of the swollen lid, or from the continued maceration in the copious purulent secretion.

Gonorrhœal conjunctivitis is even more intense in its symptoms and rapid in its course. Caused by infection with gonorrhœal matter or with the discharge from an already diseased eye, it is more common in men than in females, the fingers being often the medium for conveying the urethral discharge to the eye. One eye only is usually affected at the outset. The frequency of phlegmonous chemosis, and consequent danger

to the cornea, is greater than in the simple purulent affection. So rapid is the course of the disease, that an eye may be lost by sloughing of the cornea within twenty-four hours from the moment of infection.

Active cauterization of these forms of conjunctivitis, especially the gonorrhœal, was formerly practised as an abortive treatment, in the hope of substituting a less dangerous traumatic inflammation for the specific infection. This idea has been generally abandoned, and the modern treatment is in all respects milder. As general means, tonics, instead of copious depletion, are in favor; and, as regards local treatment, great importance is to be attached to the frequent use of mild detergents, injected beneath the swollen lids, to remove the abundant purulent secretion. If caustics are used, the applications should be neither too strong nor too frequent, and should be at once neutralized—as otherwise they tend to increase the phlegmonous chemosis and perhaps destroy the cornea. They should not be continued if corneal ulceration has begun. If the crayon of sulphate of copper is applied at all during the active stages of the disease, it should be lightly used; but it is most serviceable in removing the granulations which remain after the active symptoms are abated. The application of cold compresses, constantly renewed, to the lids; frequent removal of the fast accumulating secretions; and the keeping up an influence on the diseased conjunctiva by means of mild astringent collyria, appear to form the most reliable treatment. Solutions of five grains of alum or ten grains of borax to an ounce of water may be injected several times a day, and a solution of half a grain to two grains of sulphate of zinc may be used three or four times in twenty-four hours. The application of a crayon of alum to the inside of the lid, once or twice a day, is sometimes of great apparent benefit, and is safely and easily applied as an auxiliary to the astringent solutions. It is nearly painless, and has little stimulating action as compared with its astringent qualities. It should be used by introducing it beneath the lid without everting it. If the case is seen early, these means are generally effectual; but unfortunately the vitality of the cornea is in many instances already destroyed when the patient first applies for advice, and the prognosis is then unfavorable.

No disease of the eye imposes greater responsibilities upon the general practitioner than ophthalmia neonatorum, the conjunctivitis of new-born children. Occurring within a few days after birth, under circumstances which, in a large proportion of cases, preclude a consultation with any practitioner of special experience, the preservation or loss of sight must depend on the skill of the family physician. A slight conjunctival injection and tumefaction, with some mucous discharge, is not uncommon in infants, and yields to simple means of cleanliness. But true ophthalmia neonatorum, preceded perhaps only by a slight reddish hue along the skin of the upper lid, becomes within a few hours an intense inflammation. The lids are tumefied, livid, sometimes projecting much beyond the supra-orbital ridge, or even completely everted from the enormous swelling of the conjunctiva. The chemotic infiltration of the cellular tissue beneath the ocular conjunctiva often causes this to overlap the cornea or even to hide it. The secretion is exceedingly abundant. This disease is one of the most destructive, but happily also one of the most manageable, of the affections of the eye. If neglected, or if treated with inert domestic remedies such as injection of breast milk, or with more harmful means such as the application of poultices, the result is too frequently the loss of one or both eyes. Equally baneful consequences follow the use of

harsh measures. The great danger attending the use of caustics, in any form, or of very strong astringents, and the *needlessness of resorting to them*, cannot be too strongly insisted on. The symptoms invariably yield to a mild treatment, if reasonably begun and faithfully carried out. If, as is sometimes the case, the cornea has already become more or less cloudy before the attention of the physician is called to the eyes, this furnishes an additional reason for refraining from strong caustic or astringent remedies, which are never well borne when the cornea has become involved.

The first indication is to insure the utmost attention to cleanliness. The copious, muco-purulent secretion should be washed from the eyes every two hours, every hour, or even every half hour if necessary. Should the great tumefaction of the lids prevent their being readily opened so as to permit free discharge of the pus, the nozzle of a small syringe should be passed beneath the swollen upper lid, and an injection thrown in to completely wash out the conjunctival cavity. For this purpose tepid water may be used in the milder cases; in those of more severity a solution of alum, five grains to the ounce, may be alternated with the injections of water. These injections should be repeated hourly or oftener, according to the severity of the case, during the day, and two or three times during the night. They are nearly painless, and the nurse or mother should be taught how to make them. In a few days the discharge lessens and the swelling of the lids diminishes; but the treatment must be kept up, though with less frequency. The physician should not fail to assure himself, by daily inspection, as to whether the cornea retains its normal appearances; and where the swollen condition of the lid prevents a view of the cornea, an elevator should be carefully used to draw up the lid. If the cornea is seen to be even slightly cloudy at its centre, a drop of a solution of sulphate of atropia, two grains to an ounce of water, should be put into the eye twice daily, to lessen the danger of hernia of the iris in case corneal ulceration and perforation should occur. This haziness and ulceration may come on very early in the disease, as a result of the continuous pressure of the lid upon the cornea, or as the effect of its constant immersion in the purulent secretion; but this threatening condition may also supervene at a later stage, and after marked amelioration of the active symptoms; so that the physician, unless on his guard, may lose the battle in the moment of apparent victory.

The use of the nitrate of silver or of lapis mitigatus, is still recommended by some of the continental European oculists; but the milder plan above described has been, for many years, almost exclusively in use at the ophthalmic hospitals of London, and especially at the Moorfields Royal London Ophthalmic Hospital, probably the largest institution in the world for the treatment of eye-diseases, and certainly the most distinguished for the celebrity of its medical staff. In my own experience, success has always attended the mild plan of treatment; and I have seen so many examples of the destructive consequences of harsher methods, that I cannot regard them otherwise than as unnecessary and injudicious.

Two classes of complications of conjunctivitis are worthy of our attention, in their relations to the questions of remedial action which we are considering. In one of these classes the conjunctivitis results from other morbid processes; in the other class the morbid conditions are the consequence of pre-existing conjunctivitis. In the first class, including

cases where conjunctivitis appears as a symptom in keratitis, iritis, or in other inflammations of the interior structures of the eye, the conjunctival injection is not to be regarded as a disease, and its treatment, if any, must be subordinate to or modified by that of its primary exciting cause, the removal of which often suffices for the cure of the secondary conjunctival symptoms. In most of these conditions the use of caustics and astringents is contra-indicated. Instead of relieving, they excite yet further congestion of the external membrane, and increase rather than lessen the deeper seated inflammation. Tepid, unirritating lotions, and collyria containing a few grains of borax, may be used as sedatives, if the patient finds them agreeable. Active use of either caustics or astringents is also to be avoided in conjunctivitis accompanying corneal ulceration, or the presence of papules on the epithelial layer of the cornea, in children; as also, especially, in ulcerations of the cornea in adults, occasioned by debility, in old age, or as a sequela of smallpox or other depressing disease.

The second class of complications embraces those conditions resulting from conjunctivitis, usually from its chronic duration, as seen for instance in pannus and secondary keratitis. Here, the attention must primarily be directed to the removal of the original disease, by such remedies as have been already indicated; but we must be careful to make such modifications of treatment as may be required by the secondary symptoms or structural changes, while we avoid the error of regarding these as the essential morbid conditions and directing our treatment solely to them. For example, in the affection styled pannus, where the epithelial layer of the cornea has become so thickened and vascular as to resemble a piece of red flannel, it is useless to attempt to remove this vascularity by division or scarification of the vessels. The abnormal condition of the external layer of the cornea is the result of constant friction by trachomatous or other granulation of the lids, and is to be cured through the removal of these by the patient use of astringents. After the friction has ceased to irritate the corneal surface, the injection and cloudiness gradually fade away. If ulcerative or exudative processes have begun in the cornea itself, caustics are not admissible, but the use of atropia should be combined with the astringent remedies, the continuance of which in moderation is necessary for the removal of the granulations. A certain degree of vascularity is essential to the absorption of the cloudy transformations, and disappears as these fade away.

Some other more exceptional complications should be briefly referred to. When chronic conjunctivitis accompanies obstruction of the lachrymal passages, mild astringent collyria may be combined with the appropriate means for the removal of this obstruction. When it is coincident with disease of the Meibomian glands or ciliary bulbs, these collyria may be used in connection with diluted citrine ointment, or other suitable, topical applications, along the edges of the lids. When it appears during an attack of herpes zoster ophthalmicus, or ensues after paralysis of the orbicularis, caustics are scrupulously to be avoided as being likely to promote ulceration of the cornea, to which, in these circumstances, there is always a predisposition; only the mildest astringents should be used. In chronic thickening of the conjunctiva and eversion of the lids in old people, commonly called "blear eyes," attention should be given to the lachrymal passages, and the everted lid should be brought to its place by a frequent but mild use of astringents, patiently followed up. These should not be applied, nor should caustics be used, upon the everted and

dry portion of the conjunctiva, as they only serve to harden, and, as it were, tan the surface; but the crayon of sulphate of copper or of alum should be applied, very lightly, to the non-everted portion of the conjunctiva. As this part becomes more healthy, the everted lid is drawn more and more to its proper place, the remedy can be applied more largely, and the improvement finally extends to the whole of the affected tissue.

The conclusions which seem to be warranted by the facts presented in the foregoing paper, may be summed up as follows:—

I. In a considerable number of essentially transient affections of the conjunctiva, and in pterygium or other growths, no active treatment by caustics or astringents is required.

II. When disease affects only a limited portion of the conjunctiva, as in phlyctenular inflammation, the mildest stimulating or astringent remedies are usually sufficient.

III. In the acute and chronic forms of general conjunctivitis, astringents are, as a rule, safer as well as more efficacious than caustics, and are, therefore, better adapted to the requirements of the general practitioner.

