

treatment is applicable, carried high enough to control advance of the ulceration, but not pushed so rapidly. There is no limit to the dose except the production of its effect. A patient at the Charity Hospital, with old disease which had destroyed both hard and soft palate, with most of the bones of the nose, had to be carried up to \bar{z} ij daily before the desired effect was reached. In all old cases not rapidly advancing, especially where the nasal cavity is involved, advantage is derived from the local treatment, as suggested, at page 588. When the ulceration has been arrested and cicatrization is nearly perfect, discharge, odor, scabs from the nose, are sometimes kept up by a piece of necrosed bone, surrounded by a partial involucrum. No amount of continuation of treatment is of service in such a case. The dead bone can usually be felt with a probe. An operation for its removal, if feasible, will be followed by a cessation of the symptoms.

The numerous other manifestations of tertiary syphilis will be considered in connection with the secondary forms of disease under sections devoted to the different organs and tissues of the body, as the eye, testicle (p. 432), larynx.

CHAPTER VIII.

SYPHILIS OF THE EYE.¹

The EYELIDS.—Chancre, Mucous Patches, Gummy Tumors, Ptosis.—The Conjunctiva.—The Cornea.—The Iris.—Mydriasis, Iritis, Varieties and Complications, acquired and hereditary.—Prognosis.—Treatment.—Vitreous Humor, Hyalitis.—Crystalline Lens, Cataract.—Cyclitis.—Choroiditis, exudative and atrophic.—Retinitis.—Neuritis Optica.—Paralysis of Muscles.—Periostitis.

ALL the tissues of the eye and its surrounding parts may be affected by syphilis. The influence is either direct or indirect, and the disorders thus induced are usually grave, are sometimes tedious, and are prone to do damage to vision. They can rarely with safety be left to take their own course, and in a satisfactory degree they yield to suitable and early treatment.

The imprint of syphilis on the eye may be made during any period of its career. Even chancre has been found upon the superficial parts, while, during the secondary and later stages, a variety of lesions may appear. Hereditary syphilitic taint finds expression in disease of the eye as a frequent occurrence.

To give due attention to the various lesions which may occur, I adopt the anatomical order from without inward, both for simplicity and completeness.

¹ Chapter VIII. is written by Prof. Henry D. Noyes, M. D., at the request of the authors, who fully indorse the opinions therein expressed. It appears in the first person, as conveying the personal experience and convictions of the writer.

The parts which we begin upon will be THE EYELIDS.

Here *primary chancre* has been noticed both in adults and in children. The sore presents the same appearance as when situated on the genitals, and does not require any special remark as to treatment. If the sore be on the cutaneous surface, it does not greatly endanger the eye; but, if on the mucous surface, or, as has been seen, on the caruncle, it becomes a serious thing. The accident is, however, so rare that it does not seem worth while to enlarge on the subject.

Mucous patches occur both on the cutaneous and conjunctival surfaces of the lids. I have seen them as large as a three-cent piece, but have not seen any more serious result come from them than a slight catarrhal conjunctivitis. Weak astringent washes, as of alum or sulphate of zinc, or touching them with a solution of nitrate of silver, gr. v vel x aquæ ad \bar{z} j, is all the needful local treatment.

Various forms of secondary *cutaneous eruptions* may appear on the skin of the eyelids, as upon other parts of the surface, and the eyelashes and brows are liable to be lost when the hair of the scalp is being shed, but these are incidents which only call for passing mention.

Somewhat more important is the fact that *gummata* develop in the eyelids and adjacent parts. They may grow to be as large as a hazelnut. In one instance, under my notice, such a tumor appeared in the skin over the lachrymal sac, and, months after the first tumor had disappeared, another occurred upon the border of the lower lid. These developments belong to the late stages of syphilis, the tertiary period; in the instance above alluded to, several years had elapsed since the first infection.

A mistake is not unlikely to be made in diagnosis of these cases, because cystic tumors, and less frequently fibrous tumors, are of common occurrence in the lids. They, like gummata, usually grow slowly and painlessly. But it is not always true that gummata grow slowly; they may attain considerable size in two weeks.

The skin is sometimes thickened, and raised above the surrounding level. The most important local guide in diagnosis is that the swelling involves all the tissues where it is located, and, as it were, incorporates them all into itself. This, in connection with its indolent, painless character, the possible discoloration of the skin, and the constitutional symptoms and history, will guard one against the error of attempting to apply the knife or other instruments to the removal of these tumors. Like other gummata, they melt away under a suitable course of constitutional treatment.

Drooping of the upper lid (ptosis) is caused by affection of the third nerve, and will be alluded to when speaking of paralysis of the motor nerves of the eyeball.

CONJUNCTIVA.—The kinds of inflammation which syphilis may cause in this membrane (meaning the ocular conjunctiva) are: First, sores

from primary infection; second, mucous patches; and, third, gummy growths. The last belongs quite as much to the sub-conjunctival connective tissue as to the mucous membrane. All of the above lesions are rare. The most frequent is an ulceration which I have seen coexisting with mucous patches in the mouth. The common site is near the margin of the cornea, where a reddened and elevated spot appears, resembling a severe phlyctenula. It rises higher and is more extensive than such eruptions usually are, and it soon presents ulceration. The surface not only becomes excavated, but shows a jelly-like, semi-transparent tissue upon the eroded part—and this may spread to the cornea. The ragged, angry, irritated look of such an elevated ulcer, with the broad thickening of the base, and the large vessels running into it, its encroachment on the cornea, its slow recovery, the pain, lachrymation, and photophobia which attend it, mark the case as dependent on a constitutional vice. The search for corroborative symptoms of syphilis will usually be rewarded by success.

I have seen this lesion oftener in women than in men. The local remedies are: bathing the eye with lukewarm water for short periods, say fifteen minutes four or six times daily; the use of solution of sulphate of atropia, gr. ij ad ℥j, dropped into the eye three to six times daily; protection against strong light by a shade or blue glasses, and the avoidance of remedies of an irritating quality. Besides these local means, the constitutional treatment should not be omitted; the only caution to be observed, being to have regard to the state of the general health, and if needful to exhibit tonics as preliminary to, or in connection with, the specific remedies. This caution is not unimportant, because very many of these patients will be found to be in a feeble or cachectic condition, and their diet must often be as carefully directed as their medication.

THE CORNEA.

In the preceding paragraph the occurrence of the ulceration of the cornea in mucous patches of the conjunctiva has been alluded to, and needs no further mention. I have not seen these ulcers go on to perforation.

Inflammation of the cornea, as the effect of *hereditary* syphilis, is a very common disease among children. It usually appears between six months and two years of age, while it may remain latent until the fifth year, or be seen as late as the fifteenth year. It is commonly preceded by cutaneous eruptions, especially about the buttocks, and by glandular swellings. Often the children have coryza, with swollen lips, flattened nasal bones, and badly-formed or perishable teeth. Mr. Hutchinson first called attention to the importance of the teeth as a diagnostic mark; that the incisors are notched or pointed, or very small, or crooked, or decayed. The canines as well as incisors may be abnormal. The general health is bad, and the whole nutrition perverted.

The disease is not violent in its onset. A slight congestion appears

about the cornea, a little opacity upon its surface. There are moderate photophobia and pain, often no lachrymation. When the disease has deeply involved the corneal structure, the subjective symptoms become intense, and are often most distressing.

The alterations of tissue consist usually in opacity and vascularization. It is rare that ulceration, except of the minute superficial kind, or suppuration, occurs. The opacity, which at the beginning is faint, soon spreads over the whole surface, and into the depth of the cornea, and becomes more intense. It even affects the posterior epithelial surface, and, because of its extent, is commonly called keratitis diffusa. Of course sight is at once injured, and may be reduced to mere perception of light.

The disease may penetrate deeper into the eye, and involve both the iris and choroid. I have under observation a boy, now fourteen years old, who exhibits the effects of inflammation both of cornea and iris and ciliary body—the cornea mottled with diffused and spotted opacities, the pupil closed and adherent to the lens, the tissue of the iris atrophied so as to be translucent in many places, and the periphery of the iris drawn backward by contraction of exudation and its adherence to the ciliary processes.

The duration of these cases, under skillful treatment, is from one to three months when taken at an early period. But the continuance may be much longer if the disease have taken a severe hold before suitable treatment is undertaken. The prognosis as to vision will vary with the severity of the attack, but in general it may be considered favorable. The same disease may occur among adults, but is less frequent, and requires no special description.

The method of treatment must first have respect to the constitutional trouble. By this I mean rigorous attention to food, exercise, and bathing, as well as administration of mercurials. Food in easily-digestible form must be given in quantity and frequency which the stomach will permit; milk, beef-tea, chopped beef or mutton, either roasted or broiled, bread, and eggs, are to be the chief reliance, while sweets and fibrous vegetables are to be excluded. The child should be taken out-of-doors daily, with proper protection from the light by a veil, and a tepid bath should be given every other day. With these hygienic measures the tonic and specific treatment must be combined. It is often advisable to give cod-liver oil, sometimes quinine, or the syrup of the iodide of iron; while the readiest method of introducing mercury is by putting the blue ointment upon a flannel bandage which shall be swathed around the abdomen. The ointment must be renewed night and morning, and the skin carefully sponged with warm water to prevent it from becoming irritable. By this management no unpleasant effects take place and the influence of the remedy is seen in the gradual improvement of the health and appetite. The treatment of the eye

consists in fomentation, by compresses wrung out of hot water, for a period of one hour or two hours at a time, three times daily. The compresses must be changed as fast as they become cool, and the water must be kept as hot as the hand can bear. This treatment is laborious, but is unequalled in efficacy; sometimes poultices may be more conveniently used. A solution of sulphate of atropia, gr. ij ad ℥j, should be dropped into the eye three or six times daily.

As the photophobia and acute symptoms abate, the period of fomentation may be shortened, until with increasing amendment it may be stopped. It is well to keep up the atropia, so long as any hyperæmia remains. Inunction should be persisted in for about two months, unless contraindications forbid. If the skin become fretted, some other part of the body may be chosen for the ointment, or hydrargyrum cum cretâ in doses of five grains, administered three times daily. Usually the chief specific remedy demanded is some form of mercury, but in older subjects the iodide may also be required. The extreme importance of using specific remedies in these cases, as well as of guarding them as above indicated, cannot be too strongly insisted upon.

THE IRIS.

There are two affections of the iris which result from syphilis—paralysis of the sphincter of the pupil, causing *mydriasis*, and *inflammation*.

It is not necessary to say much upon *mydriasis*. It occurs under two conditions. In one case it is associated with evident paralysis, of one or more of the other twigs of the third pair of nerves. So that, besides dilatation of the pupil, there may be ptosis or divergent strabismus, or diplopia.

Another case in which *mydriasis* appears does not present any sign of lesion of the third nerve, so far as other twigs are concerned, but appears to be associated with obscure changes in the brain, or at the base of the skull, which may not at the time declare themselves by noticeable symptoms. Nothing definite can be predicated upon this fact, but it serves to awaken expectation of some disaster which may hereafter arise. It is also true that *mydriasis* is caused by irritation in the upper part of the spinal cord, or of the cervical sympathetic, and by causes wholly removed from syphilis. It is a common observation among the insane, and among those called merely nervous.

Furthermore, it must be stated that monocular *mydriasis*, without impairment of any of the other branches of the motor oculi, results from severe use of the eyes, and is attended by paralysis of the accommodation. This happens among miniature-painters, engravers, and such classes of workers.

While saying thus much, to guard against error, it must be added that monocular *mydriasis* occurs from syphilis, unconnected with either

diplopia or ptosis. (For detail of such a case, see a paper by Méric, in the *British Medical Journal* for January 8, 1872, p. 29, and in the same paper are cases recorded in which *mydriasis* was combined with ptosis, all other branches of the third nerve remaining intact.)

As to the constitutional treatment of syphilitic *mydriasis*, nothing special need be said. For local treatment the contraction of the pupil may always be temporarily secured by putting between the lids a disk of gelatine charged with the extract of calabar bean. But the remedy has only a temporary effect, and cannot easily be graduated to answer a useful purpose. The faradic current is sometimes used, and Duchenne says he has had success by putting one pole on the sclera and another on the temple, but this treatment is not to be commended.

IRITIS.—The most frequent affection of the iris which syphilis produces is *inflammation*. It has been calculated that about fifty per cent. of all cases of iritis are due to syphilis.

The attack may occur within a few weeks or months after primary affection, or it may come among the later phenomena of the secondary stage. Although the contrary has been maintained, there are no marks in the iris by which the syphilitic origin of an inflammatory attack can be asserted. In other words, syphilitic iritis has the same symptoms as other forms of the disease.

The tendencies of syphilitic iritis are especially to the formation of plastic exudation, and, when this reaches the exuberance of gummy nodules, it is very rare that such a case is not caused by syphilis. On the other hand, iritis syphilitica may exhibit only serous effusion. The most frequent cases are those in which a moderate quantity of plastic matter is thrown out upon the pupillary border, and causes adhesions between it and the crystalline lens.

A brief enumeration of the symptoms of iritis is as follows: The pupil refuses to expand when the light is obscured, and is apt to be of small size; the iris-tissue is altered in color, and likewise indistinct in texture; the color of the pupil is smoky, and not jet black; perhaps the pupil is irregular, and at its margin may be seen black specks of exudation; the effect of a drop of a solution of atropia is either not to cause any expansion of the pupil, or to give it an irregular form, the margin being festooned; there is hyperæmia of the sclera and conjunctiva, in the immediate neighborhood of the cornea, whose depth and extent will vary with the severity of the attack; there may be chemosis; there is lachrymation; the lids do not open fully, and may be a little swollen; light is offensive; pain is seated in the eye, but more often upon the forehead and temple, or at the vertex and occiput, tracing the course of the supra-orbital branch of the fifth nerve; vision is always impaired, and sometimes is reduced to perception of light.

In serous iritis, the aqueous humor will be very dim, and so abundant as to make the anterior chamber unusually deep by pushing back the

iris and lens. There are cases in which the whole anterior chamber is occupied by a semi-gelatinous substance, as if a thin and not well-clarified jelly had coagulated there. This mass sometimes presents such a similarity to a dislocated crystalline lens as to have been mistaken for it. It consists of exudation of a plastic quality diffused through the aqueous fluid. Its appearance when undergoing absorption is striking, because the lower part of the chamber will be murky and clouded, while the upper part will be comparatively clear and display the iris and some of the pupil.

In other cases plastic material exudes in nodules upon the free surface of the iris, presenting masses like mustard-seeds, or larger bodies, located upon any part of the membrane, but more commonly around the pupil. Sometimes this substance is so abundant as to be precipitated to the bottom of the anterior chamber as hypopyum. These masses are sometimes vascular, and their color is always a reddish yellow. They are correctly called gummata, and have been extracted and found to present under the microscope the features of true gummy exudation. This material, it must be understood, infiltrates the whole thickness of the iris, and its adhesion to the lens is consequently dense.

The reason for impairment or loss of sight is found in the turbidity of the aqueous humor, in deposits upon and proliferation of the epithelium of the posterior face of the cornea, and in the obstruction of the pupil. The reason why the pupil in the beginning of iritis is always small is, that the hyperæmia and swelling of the tissue compel the iris to push inward in the only direction in which it can find space. So far from the narrow pupil being due to contraction of the sphincter pupillæ, the muscular fibres are reluctant to act because of the sodden condition of the tissue. Inasmuch as a large part of the iris lies in contact normally with the crystalline lens, adhesion between the two surfaces is inevitable, and this is true even when the pupil is well dilated by atropia, as is illustrated in cases of serous iritis.

A true picture of iritis cannot be presented without bringing into view *complications* which often accompany it.

The minute opacities above alluded to, which are often found on the inner surface of the cornea, especially on its lower half, are in part precipitations, but also result from participation of the epithelium of the membrane of Descemet in the inflammatory process.

The ciliary body and choroid are still more frequently affected. The evidence of the fact is not easy to obtain in the early stages of the inflammation, but all obstinate and persistent cases of iritis pass over into irido-choroiditis. Especially is this true when the plastic exudation is copious, or when the pupil has not been dilated. In old cases the iris sometimes gets a greenish tint or a chocolate brown, its fibres look atrophied, none of the normal tracery can be made out, but a blur overspreads the surface, and hæmorrhages are apt to occur. The vitreous

humor is hazy—the retina suffers, and often the eyeball becomes soft to the touch, or even reduced perceptibly in size. Vision in these complicated cases is extremely bad. The sclerotic hyperæmia may not be great, but is persistent, and the globe is both painful and acutely sensitive to pressure. Photophobia is often extreme. If complete posterior synechia be the result of iritis, it happens in course of time that an accumulation of fluid takes place between the iris and the suspensory ligament of the lens, which pushes the periphery of the iris forward and gives it the shape of a ring-cushion. As a result of this condition, the globe in time becomes hard, and secondary glaucoma with excavation of the optic nerve sets in. In such old cases the iris-tissue may have atrophied so much as to be semi-transparent, while its fibres show like the warp of muslin before the cross-threads are woven in.

In other badly-resulting cases, the iris is stuck fast to the lens-capsule so completely as to exhibit the convex outline of the lens and to present at its periphery an evident furrow. The attempt to take out a piece of iris in these cases often results in getting away only the front layer of the membrane, while its posterior, deeply-pigmented layer, sometimes erroneously called the uvea, remains adherent to the lens, and frustrates the operation.

The formation of a tough fibrous membrane across the pupil, and thickening of the anterior capsule of the lens, are consequences to be naturally looked for in badly-treated or severe cases; while, as a result of irido-choroiditis, cataract not seldom arises.

Iritis may attack both eyes, either in succession or simultaneously, yet is frequently confined to one eye.

The description above given applies to acquired syphilis, in its various stages, but iritis occurs as the effect of *hereditary syphilitic taint*.

It indeed may occur *in utero*, as is shown in clearly-developed symptoms of irido-choroiditis in new-born infants—the pupil completely shut by false membrane, the eyeball reduced in size, the color and texture of the iris abnormal. Hereditary syphilitic iritis usually develops in the early months or years of infancy. I am treating a child one year old, in whom, after the disappearance of an attack of keratitis, which was recognized as due to syphilitic taint, iritis began. It was not attended by great external hyperæmia nor pain, there was very little lachrymation, no swelling of the lids, and moderate photophobia; but the iris was almost concealed from view by a patch of yellowish-white lymph, which occupied all the anterior chamber, except at the upper outer third. The aqueous humor was so turbid, and the iris so discolored, as to look nearly black. The globe was hard, and the appearance of this patch at first suggested a chronic choroido-iritis, instead of an acute attack. This in reality is a sample of gummy exudation, precisely like this form of iritis in adults.

Such cases are uncommon, but have been noted by writers. They yield to suitable treatment, but great injury to sight usually remains.

The *prognosis* in iritis depends on the amount of lesion which has been inflicted at the time when treatment is begun. Firm and extensive attachments to the lens, and implication of the choroid, prolong the disease, and do more or less injury to sight. Success in dilating the pupil is speedily followed by abatement of symptoms. A very large proportion of cases of iritis, under early and judicious treatment, make a recovery in all respects perfect.

Treatment.—This is naturally divided into local and constitutional, and the former is by far the more important. The first and indispensable object of local treatment is to secure full dilatation of the pupil: measures to control hyperæmia are next in order; and, finally, remedies to relieve pain.

Under the first head the only effective substance is sulphate of atropia. It has entirely put aside the extract of belladonna, and in only a few exceptional cases does it produce conjunctival irritation, and must be substituted by the alkaloid of stramonium, viz., daturine. The strength of the solution of sulphate of atropia usually prescribed is gr. ij ad ℥j. It should be ordered in such frequent repetitions as the obstinacy of the adhesions shall compel. Sometimes the instillation of three drops, three times daily, will tear some or all of the adhesions; frequently the same quantity must be repeated six times daily. In obstinate cases the solution may be ordered four times within an hour, three times daily, making twelve applications. When the pupil fails to yield to such solicitations, the effect of atropia will often be enhanced by leeches to the temple, say three to six at a time.

When the pupil begins to dilate, the inflammatory symptoms usually decline; especially is this true of pain. The energy with which atropia is employed is the peculiarity of the modern treatment of iritis, and is the chief ground of success. A word of caution must be interposed as to the liability of bringing on symptoms of poisoning. This effect is not very rare. The patient finds his fauces extremely dry, and, on inspection, their surface will be found congested and a little cedematous, the pulse is quickened, a mild delirium appears, and, in advanced toxic conditions, violent delirium and dangerous prostration will ensue. All this results from absorption of the atropia into the general circulation. Some persons experience unpleasant effects of this kind very easily.

If the pupil do not expand, even if aided by the application of leeches, I have sometimes resorted to the expedient of procuring a rapid but mild salivation by mercurial remedies, and found that, when the gums were touched, the pupil either yielded to the mydriatic, or the inflammation began to subside without expansion of the pupil. If it should not be deemed wise to employ this treatment, because of the feeble state of the patient's health, the operation of iridectomy is some-

times advisable. It is not fitted to the early states, but rather to the later period of a tedious inflammation.

The removal of hyperæmia often ensues when full mydriasis is obtained; but, if this be not so, leeches may be applied to the temple near the hair; three to six may be used, and may in some cases need repetition. Care should be observed not to be too free in depleting weakly subjects, and leeches must be regarded as having only a subordinate value. A mild purgative is often needful.

Relief of pain is an important item in treatment. Hypodermic injection of morphia may be needed to procure sleep, because it is at night that pain in the eye and head is most troublesome. Moderate degrees of pain are relieved by instructing the patient to rub the forehead with a mixture of extract of belladonna and powdered opium and mercurial ointment. A more efficient topical anodyne is the oleate of morphia (Squibb's), applied with a pencil and allowed to dry into the skin of the forehead and temple. The tincture of iodine applied with a brush is sometimes effectual. So, too, it is often a comfort to heat a folded napkin and press it against the forehead. Wet compresses, if of any use, should at the onset be cold, and in the latter stages be lukewarm. In a case of protracted iritis, the prolonged use of slippery-elm poultices is of the utmost benefit. They may be applied for two hours at a time, three times a day if necessary. The eye must be guarded against excessive light by blue or smoked glasses, although rigorous confinement to a dark room is not good practice, because of its weakening influence on the health. It will be found that feeble and cachectic subjects are more difficult to cure than the robust. If only one eye is involved, the patient should not use the other in any fine work. Exposures to the wind, and smoking, are to be avoided, and no attempt made to use the eye on near objects.

The question of *constitutional treatment* is important to be settled. In former times it was assigned the chief part in the cure. By some, at the present day, it is almost ignored.

I have seen a very large number, and, indeed, the majority, of cases of syphilitic iritis recover without being subjected to any of the so-called specific remedies. As above remarked, the facility of cure depends most upon the readiness with which the pupil expands, and can be kept open.

I have also said that sometimes the mercurial treatment will bring about prompt resolution when mydriatics fail. I must also say that where the plastic exudation is in large quantity, as when the so-called gummata make their appearance, mercurial inunction, or blue-pill by the mouth, may wisely be employed to aid in the disappearance of the exudation. I have seen entire absorption take place without this remedy, and in feeble patients would be unwilling to use it, but would give the vigorous the benefit of it.