I have no hesitation in stating that the usefulness of either mercury or iodine to cure iritis is exceptional and not the rule.

On the other hand, I must with equal readiness admit that specific constitutional treatment ought to be employed to counteract the poison whose potent influence has induced the iritis. This treatment is aimed at the general disease, and is to be selected and adapted according to the rules which are set forth in another part of this treatise. According to this view of the question, a practitioner is not compelled to dose a syphilitic patient with mercurials to protect his sight from the mischiefs of iritis, except under conditions specified, but should steadfastly adhere to that plan of treatment which the general welfare of the system demands, and attack the eye-disease with the local remedies which have been designated.

I have several times observed patients having iritis in one eye, who have already been brought under the influence of mercury, to be attacked with the same inflammation in the other. This certainly proves that no preventive virtue can be ascribed to the mercury, and argues against the beneficial influence of quick mercurialization in curing the acute attack.

In addition to the above remarks on treatment, I should speak of certain peculiar conditions calling for special measures. In cases of iritis serosa, where there is but little plastic exudation, the pupil will dilate readily, but often the pain and redness do not abate. On testing by the finger, the eye will be found to be tense and the anterior chamber will be seen to be too deep. Under these circumstances, paracentesis by a broad needle or a Graefe's cataract-knife is indicated. It is not necessary to draw off all the aqueous humor, but the proceeding may need several repetitions, as indicated by the recurrence of pain. The place of puncture should be at the margin of the cornea, the instrument should have a very sharp point, and be entered in a plane parallel to the surface of the iris. It should be withdrawn slowly, because a rapid gush of aqueous humor causes severe pain.

If, after an attack of iritis has passed away, the pupil should be tied down to the lens by extensive adhesions, relapses of inflammation are likely to occur, and the morbid process is prone to penetrate to the ciliary body and choroid. Hence arise opacities in the vitreous humor and in the crystalline lens.

The area of the pupil is sometimes overlaid by a false membrane and the capsule of the lens may undergo thickening.

If posterior synechia is complete, that is, if all of the pupillary edge be glued to the lens, an accumulation of aqueous humor sometimes takes place behind the iris, which makes it bulge forward toward the cornea in a series of protuberances or as a complete ring, leaving the pupil retracted. The peripheral parts of the iris sometimes come into actual contact with the posterior surface of the cornea, and the tissue always

undergoes atrophy. So great sometimes is the waste of the tissue that in spots it becomes an open mesh-work of fibres through which the light of the ophthalmoscope can be thrown. This has already been alluded to. On the other hand, after iritis, the membrane sometimes becomes greatly thickened by formation of new tissue both in its stroma and on the posterior surface.

The remedy for the conditions of adhesion and obstruction is iridectomy. Its efficacy will, however, be in the inverse ratio to the severity of the lesion. In the worst cases, especially in those last described, it is sometimes scarcely possible to be performed, and seldom, if done, is of much service. Where the iris is turgid with new vessels, the operation is attended by great bleeding, and no good, but rather harm to the eye, may ensue.

In spite, however, of these drawbacks, this operation offers the only chance to rescue the eye from serious and cumulative mischief, and may be the only means of avoiding the necessity of extirpating the organ.

For cases of moderate posterior synechia it may be needless to do any thing, or the simple pulling away of the attachments by a fine pair of forceps will suffice. This proceeding is attended by only slight reaction, and requires a small wound at the border of the cornea—the iris when seized is pulled upon until the adhesion breaks, and is then let go, without being dragged into the wound. The forceps employed should not have teeth. This operation, suggested by Passavant, is preferable to other methods of detaching the pupil, such as that devised by Streatfield.

VITREOUS HUMOR.

A common effect of inflammation of the iris and ciliary body and choroid is the production of opacities in the corpus vitreum. They are either effusions from the surrounding vascular tissues or proliferations and degenerations of the cells of the vitreous. The anterior part of the mass is most frequently thus affected. The opacities present every variety of form, as molecules, fibres, tangled nets, flakes, and membranes. They sometimes develop rapidly, more frequently occur slowly. A noteworthy instance of rapid development is the following: Lieutenant D—— had hard chancre in March, 1872. In the following September, double iritis took place, and disappeared in four weeks, leaving a few adhesions of the pupil of one eye. Vision in the right eye was $\frac{20}{20}$; in the other, $\frac{20}{30}$. In June, 1873—about eight months afterward—a sudden development of opacities occurred in the vitreous of the left eye, totally abolishing vision, but leaving perception of light. No external hyperæmia of the globe existed—the fundus could not be discerned. The appearance of the vitreous was like that of a tumbler filled with muddy water, in which a quantity of torn and broken leaves are floating. He had been under mercurial treatment, both at the time when the chancre

appeared and during the attack of iritis; in the last instance it was maintained for three months. When the acute hyalitis appeared he was directed to take a wine-glass full of Zittman's decoction three times daily, and by a life of regulated exercise in the country to keep his general health in the best condition. After six weeks the vitreous became so clear that the fundus could be perfectly examined. No lesions of the choroid could anywhere be found, and vision was restored to $\frac{20}{30}$. The other eye was not affected.

A case precisely like the above is not often observed, but a process slower in development and less in degree is a not rare effect of syphilitic poison.

It usually requires a long time for vitreous opacities to clear up—generally some of them remain permanently.

THE CRYSTALLINE LENS is, so far as I know, never the seat of syphilitic changes, excepting as they ensue in the course of inflammations of the choroid, the ciliary body, or the iris. More especially from chronic cyclitis and choroiditis does the nutrition of the lens become impaired and its transparency become damaged. In other words, it is changed into a cataract. The transformation of the lens-fibres begins in the deeper or posterior layers very often, and the lens when wholly opaque is either of a dead white or yellow tint, or becomes, in old cases, completely calcified. As a result of iritis, the anterior capsule sometimes presents opacities in the pupillary space, by proliferation of the epithelium of its posterior surface.

No good is gained in the attempt to cure opacities of the lens or its capsule by anti-syphilitic medication. The case will admit of nothing but surgical treatment, and in all cases the encouragement for success is dependent on the degree to which the integrity of the deep tissues has been preserved. It is always imperative to make a rigid investigation of the degree of perception of light, and the limits of the field of vision. Only by so doing can a patient be secured against the pain and disappointment of a needless operation.

The operation for cataract under these circumstances is always complicated, and may be quite difficult. For a discussion of this subject it is proper to refer to treatises devoted to diseases of the eye, while it is right to add that the probabilities of success in this class of cases are not encouraging.

THE CILIARY BODY.

I should not make special mention of inflammation of this part of the uveal tract, were it not that certain acute lesions of this tissue sometimes present themselves which have very striking features. It is the most highly vascular structure of the eye, and of necessity participates in the inflammatory changes of the iris and choroid. But it is entirely hidden from direct inspection, either by the naked eye or by the

ophthalmoscope. I have before alluded to a state of retraction of the periphery of the iris which indicates adhesion between it and the ciliary processes. So far as superficial vessels may indicate the existence of cyclitis, the same kind of hyperæmia appears as when the iris is inflamed; that is, the anterior ciliary vessels become engorged.

Cyclitis, as an independent affection with unmistakable features, has appeared to me under two forms. In one there are no other symptoms than circum-corneal injection, and a little discoloration of the iris, without impairment of the action of the pupil; the vision may be dim. In the other and more important form, the inflammation presents gummy exudation more or less conspicuous. I shall speak only of the latter condition, and by relating the following case:

CASE LII.—A man about thirty-two years of age, had had syphilitic symptoms about four years; had had iritis. A few weeks before I saw him, sudden blindness fell upon his left eye, without pain, irritation, or visible redness. He was able to perceive only an intense light. The globe was not hard or tender to touch. The pupil dilated fairly by atropine, and no illumination of the bottom of the eye could be obtained by the ophthalmoscope. The vitreous simply gave back an inky hue. As the eye turned in various directions, a white object suddenly flashed across the field, in most instances starting from the inferior part of the globe. It was evidently close behind the lens, and never retired to the depths of the eye. When he looked strongly downward, a white patch was discovered close to the border of the crystalline lens, situated in the ciliary body, or its near neighborhood. This had the look of plastic exudation. The nature of the disease was then assumed to be, a plastic cyclitis, with a localized exudation not very abundant, from which a mass had been broken off, and floated about in the anterior part of the vitreous. The general opacity would be the necessary accompaniment of this condition. The patient had been treated by specific remedies, and they were again prescribed, but, after a period of two months, no improvement was obtained in vision, and the exudation had scarcely altered its appearance. There was never any visible hyperæmia nor pain.

In other cases plastic cyclitis appears in a much more formidable way. In addition to the pain, swelling of the lids, and vascularity, characteristic of a severe attack of inflammation of the globe, a swelling soon begins to arise at some portion of the eye near the cornea. The spot on which it springs may be more intensely red than other situations, and the locality where I have most often seen it is at the upper part of the eyeball. The tumor grows rapidly, and within a week I have seen it become larger than a buck-shot, its base occupying nearly one-fourth the circumference of this part of the globe.

There is always severe iritis, the pupil is totally obscure to the ophthalmoscope, and the anterior chamber filled with turbid aqueous humor. The disease occupies several weeks in its course, and the tumor will entirely disappear. Sometimes its site is marked by a dark-bluish discoloration. Sometimes the eye becomes soft and slightly reduced in size, but this is not a uniform result. In no instance have I seen any vision restored. It is not needful to dwell upon the subject of treatment, because the measures suitable to a similar process in the iris

would be indicated. In two cases I have been obliged to extirpate the eye, because of the severity of the pain.

THE CHOROIDEA.

The frequent participation of this membrane, in the inflammations of the iris, has been repeatedly alluded to, and need not be further mentioned.

The similarity in structure of the two tissues causes a great resemblance in their morbid processes, but in many instances it becomes impossible to see the changes which occur in the choroid, because the pupil and refractive media become so soon and so deeply clouded. A form of choroiditis which may take place without affection of the iris, and without visible hyperæmia of the globe, is known by the name of acute choroiditis disseminata. Illuminated by the ophthalmoscope, the vitreous will be faintly hazy, but through it will be discerned a number of small isolated specks of a light-yellow color upon the posterior wall of the eye. These specks are more apt to exist near the equator, but may appear upon the central part of the fundus. They are seldom bigger than one-fourth the area of the optic nerve, often are much smaller. They show an unmistakable elevation, and in some instances a retinal vessel may be seen to pass over them. The optic nerve is always hyperæmic, but doos not show infiltration. None of the choroidal stroma appears clear, so far as the degree of pigmentation natural to the individual will permit a judgment.

These spots of exudation are sufficiently characteristic to secure an easy recognition of the disease, and they suggest the features of iritis gummosa. The picture thus sketched, after two or three weeks, begins to undergo alterations. The yellow specks grow fainter, but an aggregation of pigment takes place at the border of the deposit. After a time, with its more complete disappearance, the place it occupied in the choroid is found to have become thin by the destruction of the epithelium; and finally the stroma of the membrane is absorbed, leaving only a dead-white patch, whose border is deeply marked by black pigment. In old and severe cases the aspect of the interior of the eye is most striking. Circular, oval, and rounded white spots with black edges, are clustered thickly over the surface, presenting a brilliant contrast to the red color of the choroid, while upon the apparently normal surface pigment-dots are strewed about to give evidence of the extension of the disease over all the tissue. There may also be light-colored red patches, which indicate thinning of the membrane. As above said, these lesions are greatest around the periphery of the choroid, and leave the central and more highly-organized part of the fundus less impaired. But vision is always very badly reduced, and may be entirely lost. I have seen cases in which the above-described atrophy had spread over large spaces, leaving only a few of the greater choroidal vessels as vestiges of the

vascular tissue. The progress of the above lesions may be completed in a few months, and the efficacy of treatment is only moderately satisfactory.

Another form of choroiditis which is seen in syphilitic patients consists in the formation of patches of atrophy at the peripheral part of the fundus without previous deposit of lymph. The wasting of the membrane is a gradual process, and the patches will present a mixture of white, bordering upon a light-red surface, and the whole bounded by a dark pigment-line. The light-red part of the patch indicates that here a portion of the membrane yet survives. These patches take on most irregular forms and may attain large size. They exhibit the most varied mixture of black and red and white, because of the diverse degree to which the choroid is destroyed, and the irregular deposit of pigment, both around and upon the patches. They are very chronic in their development, and may sometimes be discovered in an eye which the patient supposes to be perfectly sound. Indeed, direct vision may be normal, but the visual field must be encroached upon.

It is just to state that this kind of lesion is also found in persons who give no evidences of syphilis. The only attainable success of treatment in these cases is to delay or arrest the advance of the disease. I have never, however, convinced myself that a complete arrest has been secured. The difficulty of following up patients suffering from such a chronic disease will be readily appreciated. Several years must pass before a certain conclusion could be reached.

In the first-described cases a somewhat active treatment would be proper in the exudative stage; that is, the artificial leech should be applied to the temple to remove from two to three ounces of blood, and the patient be kept for twenty-four hours afterward in a dark room. This may be repeated, according to the strength of the patient, in five or ten days. Dark-blue glasses (*coquilles*) should be worn. The bowels should be mildly acted upon. The constitutional treatment for syphilis should be pushed with as much energy as the tone of the system will bear. Most authors urge a speedy mercurialization, but the same discretion is imperative as in all other cases of syphilitic lesion. The health of the retina is not more likely to survive the evil effects of overdosing with mercury than of the taint of syphilis.

In the choroiditis last described only the slow and milder methods of constitutional treatment are appropriate. Local treatment, beyond protection against excessive light, and moderation in the use of the eyes, is of little value.

RETINITIS.

When produced by syphilis, retinitis exhibits only a slight haziness and œdema of the retina, with lack of sharpness in the outline of the vessels and of the optic disk, and hyperæmia both of the retinal vessels

and of the optic nerve. The deeper part of the vitreous is hazy. The optic nerve is not swollen, there is very little radiate striation of the retina near the nerve; there are no ecchymoses and no thick plaques of yellowish-white exudation. The peripheral part of the retina may remain free from perceptible change, and not only is the disease usually confined to the central region of the retina, including the nerve, but it sometimes is more narrowly localized to the vicinity of the yellow spot itself.

Because it is thus inconspicuous, this inflammation is, on the one hand, liable to be overlooked, and, on the other hand, to be confounded with such troubles as faint haziness of the vitreous, or of the cornea, or perhaps of the lens. Indeed, I have had a case of slight astigmatism of the mixed variety, which, because there had been a syphilitic history, I for a time mistook for retinitis. The way to escape such errors is by careful refractive adjustment with the upright image to the several parts and depths of the dioptric media. Examination with the inverted ophthalmoscopic image will fail to assure a diagnosis.

This kind of inflammation may attack one or both eyes, and may pass from one to the other. It may last a very short time, say for three or four weeks, or it may persist for several months. It does not always, but may sometimes, cause lasting harm to sight. In both the transient and the obstinate cases it shows a disposition to recur. The subjective symptoms consist of occasional flashes of light at the beginning of the disease, and subsequent dimness of sight; there is no pain nor lachrymation, and but little photophobia. There is no external hyperæmia.

Treatment never needs to be energetic: protection against bright light by colored glasses, abstinence from use of the eyes, the artificial leech, according to the usual rules, two to four times, at intervals of a week, constitute the local treatment which can be of much avail. The chief reliance is in the constitutional treatment, according to the principles before enunciated.

NEURITIS OPTICA.

This is of two varieties: 1. That which is primarily in the outer and orbital extremity of the nerve; and, 2. That which is set up by intracranial causes. In both cases the retina may be more or less implicated. The distinction between the two classes of cases cannot be made with any certainty by the ophthalmoscope alone, but the question of intra- or extra-cranial origin of the lesion always presses for solution. The *symptoms* which appear vary according to the quality of the inflammation and according to its stage: 1. In simple cases nothing is seen but redness of the nerve surface, and a little fullness of the central vessels, with scarcely any blur of the edge or of the tissue. 2. In other cases the nerve is swollen to an extreme degree, its structure infiltrated and opaque,

often striated, its color red or gray or leaden, its border partially or wholly obliterated, its vessels tortuous and turgid. The aspect is then that of the so-called "choked disk," and its cause is usually intra-cranial. A typical case of this kind has just come to my notice in a man lying in Bellevue Hospital with manifest brain-disease, as denoted by the partial coma and delirium, the headache, the tenderness of the skull on pressure, and the evident periosteal swellings of the forehead and vertex. Both optic nerves are in the condition described, and he has the history of syphilis—a gummy tumor in the substance of the brain, or basilar meningitis, may cause the same result. 3. In other cases of brain-syphilis the optic nerves become impaired, and exhibit to inspection only a white color and woolly texture with a little blur of the edge—the vessels being small. There may perhaps be a doubt whether a faint degree of hyperæmia has not preceded this condition—but, if it has, its duration has been extremely brief. The look which the nerve in these cases possesses is difficult to describe, because the change is in texture.

In these cases, as well as in the nerve-lesions before mentioned, it is extremely important to determine the extent of the field of vision. It will be found in almost all instances to be curtailed at some part. Very common is it, to find irregular hemiopia or the loss of a quadrant of the field—concentric limitation is not so common.

Prognosis in these affections is never good, but a valuable degree of sight is often preserved or recovered.

Treatment is mainly constitutional.

AFFECTIONS OF THE ORBITAL MOTOR NERVES.

An extremely common effect of syphilis is to disturb the function of some of the motor nerves of the eye; one muscle, or any number of the muscles, may be paralyzed. Inasmuch as the third (motor communis oculi) supplies four muscles, the eye, when it is impaired, is most helpless; but separate twigs may be singled out while others are undisturbed. If the whole nerve is at fault, the eye stands at the outer angle, is incapable of motion up or down, and cannot turn inward farther than the median line; the upper lid droops and cannot be lifted. It can be carried more outward by the external rectus, and under influence of the superior oblique will make some rotatory movements. The pupil will be in medium dilatation and the function of accommodation paralyzed. Diplopia will not commonly be noticed, even if the lids be opened, because the two images are so far asunder as not to attract attention. As the nerve begins to recover and the eye to regain mobility, diplopia will become annoying and the images will be crossed.

If the sixth nerve is paralyzed, the eye stands in abnormal convergence, because the abductive power of the external rectus is destroyed. Double images then are correspondent (homonymous), and are most an-

noying for distant objects, while an object brought very near the eye may be seen correctly. If the fourth nerve is paralyzed a superficial inspection may fail to recognize the defect in mobility. It will be detected with certainty by careful study of the double images. To do this it is better to take a lighted candle for an object, and to put a slip of red glass before one eye. There may be no diplopia in the field above the horizontal line, but, as the eyes descend, double vision occurs, one image (the false one) being below the other, and, as the object is carried to the temporal side of the affected eye, the images, besides being above one another, separate laterally, the false one being farther to the nasal side. Another fact about the false image is, that it is not vertical, but leans so that its top inclines inward. Without study of the double images, a strong suspicion of paralysis of the fourth nerve may be awakened by noticing that the eyeball when caused to move in a straight line below and parallel to the horizon, in reaching the middle of the orbit in its excursion outward, makes a twitch and an imperfect rotation of the cornea, and also fails to go as easily and completely to the outer angle as the healthy eye.

Patients who, from any kind of paralysis, have diplopia, are thereby much disturbed, sometimes having nausea and headache, while, to use their eyes, they must either shut one, or correct the double sight by some twist of the head, or by means of properly-adjusted prisms. The use and choice of prisms is a subject not suited to the present treatise, and for which the reader is referred to the works on ophthalmology, e. g., *vide* Wells on "Diseases of the Eye."

During the early stages of the trouble, the proper treatment is counter-irritation to the temples, the faradic electric current, and constitutional remedies. After a number of months have passed, if some imperfection of motion remain, the use of prisms, or the performance of tenotomy, or of some operation on the muscles, may be resorted to.

Periosteal inflammation of the orbit does not often occur, but some symptoms which it causes are worth attention. If it affect the deep parts of the cavity, it may cause disturbance in the function of some of the muscles, and hence diplopia; or, if attended by serous or other effusion in sufficient quantity, may produce exophthalmus, and visible signs of inflammation in the globe and eyelids.

This I have seen, in the most emphatic character, in a case where the anterior part of the orbit was the seat of periostitis. So great was the congestion, œdema, and secretion from the conjunctiva, and the swelling of the lids, that the disease resembled acute purulent conjunctivitis. The pain which the patient suffered was intense, and greater than is common in conjunctival inflammations. This fact, and the presence of an eruption on the face, led to digital exploration of the margin of the orbit. The exquisite tenderness at once revealed the true nature of the diseased action, and indicated the need of constitutional as well as of local treatment. After one eye had suffered in this way between two and three weeks, the other was similarly though less severely attacked, and in this instance the onset of the trouble was distinctly seen to be in the lining membrane of the orbit, and from it acute inflammation was propagated to the external structures of the globe. There was no evidence of gummy exudation. The treatment of the case consisted in leeches to the temples, iced-water compresses changed so often as to be constantly cold, application of a solution of nitrate of silver—ten grains to the ounce—to the everted palpebral conjunctiva, at first twice and afterward once daily, and hypodermic injections of sulphate of morphia: besides this, very high doses of iodide of potassium, at one time reaching three drachms a day, were employed, but the benefit derived from the heroic doses did not appear to be great. The patient recovered without damage to her eyes.

As to gummy tumors growing in the orbit, nothing special need be said: that their bulk must displace the eyeball, and that they must otherwise interfere with its functions, is self-evident.

CHAPTER IX.

SYPHILIS OF THE EAR.

Syphilis as affecting the External, Middle, and Internal Ear.

The affections of the ear, caused or modified by syphilis, are conveniently considered by arranging them, in accordance with the anatomy of the organ, into those of the external, middle, and internal ear.

The integument of the *external ear* is liable to be involved in the cutaneous affections of syphilis, its substance to be destroyed, or its cartilage eaten away by syphilitic ulcers and gummy tumors. The auditory canal may be invaded by mucous patches, sometimes showing exuberant granulations, by erythematous spots, or by pustules. A dry exfoliation of portions of its skin is not uncommon, together with a change in the quality of the sebaceous matter, so that the latter accumulates in a scabby way over the drum-head, perhaps causing partial deafness. The cerumen may also become impacted. Bony growths—exostoses and hyperostoses—in the external auditory canal may also be encountered in the course of syphilis, but Roosa[1] believes that these growths occur quite as commonly as the result of local irritation in persons who have never had syphilis.

The middle ear may be involved, in the course of secondary disease, by an inflammation of its lining membrane. This inflammation is not

[1] "Diseases of the Ear," p. 402.