where their contents may be worked up, with other substances, it may be, into an innocuous and valuable manure powder ready for immediate application to the soil. The utilization of the solid excreta is not, however (and this is a very important matter to public bodies which have to do with the disposal of sewage), confined in any sense to its employment as a manure, or as a source of ammonia and certain salts. It may be pressed, air-dried, and employed as ordinary fuel for use in boilers or other furnaces. Further, it may be ground up with clay and lime, and converted into brick or cement after the process devised by the late General Scott, of England; or, again, it may be admixed with other materials, such as are ordinarily employed, and converted into a material for use in the construction of sidewalks, foundations of buildings, etc.

INCIPIENT CATARACT; ITS ETIOLOGY, TREATMENT AND PROGNOSIS.

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In a brief paper published in the *University Medical Magazine* for March, 1889, I called attention to the underlying pathological factor in the etiology of *hard cataract*, and entered an urgent plea for the treatment of eyes afflicted with advancing opacity of the lens, before the stage of maturity. It was then claimed that by designating these cataracts as "*senile*" the tendency had been introduced to regard them as one of the unavoidable changes incident to the decline of life, and that by this means attention had been drawn away from other and more important factors in their production. It was shown that the hard and inelastic lens of even advanced life was not necessarily an opaque lens, and that approximately normal acuity of vision was quite compatible with old age. That the opaque lens was therefore an extraordinary occurrence to be explained by other causes than senility.

In my early experience, when consulted for relief from commencing cataract, the habit was to acquaint the patient or his friends with the cause of the failing vision. The opinion expressed was to the effect, that for the present nothing could be done to restore the vision—on the contrary, it would probably grow steadily worse, but that though blindness might and probably would ensue in one or both eyes, vision would then be restored by removal of the "*ripe*" cataract. The conjunctival irritation quite habit-

ually present was relieved by mild astringents, advice given regarding the general course of life in its relation to the laws of hygiene, and the patient requested to return occasionally for inspection. Thus the individual and the family were sent away with an abiding solicitude hanging like a cloud over the household, the anxiety—alleviated only by the hope when the worst had fallen—relief would come in the extraction of the mature lens. A more careful study and a steadily widening experience, have convinced me that in a considerable group of these afflicted persons a more hopeful prognosis can be given. In many of them the progressing opacity can be arrested; in still others the rapid increase can be greatly retarded, and failing in this the eye will be in a more favorable condition for operative interference, by virtue of the treatment instituted. For many years, I have with increasing confidence given this opinion to persons applying for relief from their failing sight, consequent upon the blurring lens fibres and the associated conditions, which it is here claimed sustain to each other an etiological relation, and are in large measure amenable to treatment. In the present paper no new facts are brought forward, but at the request of the chairman of the Section it gives me pleasure to once more call attention to the views before expressed, which I do with increased confidence after two years of additional experience, and a more careful study of the data at my command. The clinical picture I have in mind does not include those cases of stationary opacity in the peripheral cortex of the lens, occurring in otherwise normal eyes. Every surgeon must have had frequent opportunity to study these cloud-like bands hanging between the lenticular pole and periphery, usually situated in one of the lower quadrants, or a dense bank of opacity, well down in the periphery, remaining year after year unchanged, and causing the individual no inconvenience. That no misunderstanding may occur as to the claims to be made for the treatment of beginning cataract, I wish to say that I have never seen an established opacity of the lens disappear. In my experience, an opaque spicule once formed has remained or increased. When, under treatment, vision has improved, it has not been from the removal of the opacity in the lens fibres, but from the improved condition of the vitreous body, the retina and choroid. Nor is it intended to include in this study directly, the considerable group of cataracts, which, by common consent, are regarded as "*complicated*" or secondary, *e. g.*, the opacity of the lens which is a part of the closing scene in eyes lost from retinal detachment, inflammatory glaucoma, and irrido-choroiditis. No form of eye disease is more familiar to the surgeon than the posterior-capsular opacities *et al.*, which accompany and are dependant upon the more

pronounced forms of intra-ocular disease involving the choroido-retinal tract. While these violent forms of disease are not included in this discussion, they are alluded to as pointing in the most unmistakable manner to the important possible relation existing between disease involving the nourishing membranes of the eyeball and the impaired nutrition of the vascular lens. It is probable that we might, with the greatest propriety, regard these complicated cataracts, so-called, as illustrations of a more advanced or violent type of disease, than that here contemplated. There is, however, a very large group of eyes suffering from irritation and chronic inflammatory processes of the retino-choroidal tract which do not present the gross ophthalmoscopic changes which characterize the destructive diseases above referred to, but which may, and doubtless do lead up to them under provocation. Eyes which by virtue of their chronic or subacute pathological state are ripe for more destructive processes, which are lighted up by the onset of some constitutional disturbances, or by some extraordinary exertion or exposure to light or heat. They may or may not be associated with some systemic dyscrasia. Frequently, commencing early in life, they are steadily progressive unless arrested by appropriate treatment, and sooner or later undermine the health of the eyeball, rendering it throughout life especially liable to various forms of acute disease, and are the more or less direct cause of the serious maladies to which the eyes are subjected during and after the middle period of life. To this category belong especially the eyes starting in life with errors of refraction.

The clinical picture presented by this group of *weak eyes* is important to our purpose. Subjectively, we have the familiar picture of asthenopia. They present, however, a characteristic group of objective phenomena which I design to connect with the forms of disease so frequently seen after forty-five years of age, and especially with opacification of the lens. Much has been written to establish the relation of cause and effect between eye strain and the inflammations involving the choroid and retina and the external tunica. A bibliography of this field of observation is no longer necessary, since it has been well established in the practice of ophthalmic surgeons. The woolly choroid or fluffy eye-ground, with the two capillary nerve surfaces; the ragged nerve margins; the ripe-peach choroid; the narrow crescent of choroiditis embracing the temporal margin of the optic nerves, and its steady advance to the large atrophic conus or posterior staphyloma of the distended myopic ball, are well understood, but I am not so sure that we habitually connect with these intra-ocular disturbances the affections of the external tunica. The chronic hyperæmia of the conjunctiva, and

dilated anterior perforating vessels, the swollen and red coruncles, the blepharitis ciliaris, the increased secretion and partial retention of tears, the recurring styes, are frequently but the external expression of the grave disturbances of the circulation of the intra-ocular tunica.

It were cause for surprise if, in the presence of this general disturbance of the nourishing membranes of the eyeball, the vitreous body and crystalline lens, divorced as they are from a direct vascular supply of nourishment, did not frequently suffer in their nutrition. Indeed, reasoning *a priori*, one would anticipate a proneness upon the part of these avascular structures to accept disaster, in the presence of any cause which would impede their ready supply of nutriment.

I have elsewhere urged that the chronic hyperæmia of the very vascular choroid, however produced, by increasing the contents of the globe, brought about increased intra-ocular tension. That in the readily yielding sclerotic of youth is presented to us the interesting clinical phenomena of increasing refraction, and finally progressive myopia. Later in life, however, the changed anatomical conditions materially alter the clinical picture. Here, in the presence of the rigid sclera, we find the conditions which give rise to the cases of violent asthenopia, from intra-ocular pressure, which too frequently passes over into the better appreciated and easily recognized phenomena of glaucoma.

The mechanical interference with the circulation is important. It is obvious that increased intra-ocular tension, however slight, must produce the mechanical result of interference with the circulation of blood and secreted fluids through the organ. The veins being more readily compressible than the arteries, would not as readily, under pressure, empty the eye of its venous blood, which, as a physical necessity, would control in a measure the ingress of the nourishing arterial supply. By this mechanical means, the circulation would be at least measurably retarded, and the nutrition of the organ suffer a proportionate interference. In like manner the lymph channels and absorbents would be in a measure defeated in the proper performance of their functions. It is simply reasonable to suppose that these avascular tissues, the vitreous body, the lens and cornea would be prone to suffer harm, and the correctness of such reasoning is borne out by clinical experience, since in it we find a sufficient explanation of the steamy cornea of inflammatory glaucoma, the hazy vitreous with its web-like opacities in irido-choroiditis or cystitis, and the swollen, opalescent lens, with peripheral spiculæ of opacity, and the steamy nucleus of incipient cataract. In youth these phenomena are averted by the relief of pressure through the expansion of the globe,

but nevertheless result in the evils of progressive myopia.

While the uncorrected errors of refraction, particularly in the educated classes, and in those whose vocation demands accurate vision at a near point, are doubtless the most frequent cause of the choroidal conditions which are here described, there are numerous other causes, which are sufficient in themselves to set up and maintain an analogous choroidal state, and are equally baneful in producing the dangerous sequelæ which befall the eye after forty years of age. Among the most important of these causes is exposure to light and heat: *e. g.*, in the case of the artisan at his work-bench, facing, with his unprotected eyes, a window or gas-jet for many hours in every day; the cook over the heated range; glass-blowers, puddlers, stokers and engineers. Such persons are quite uniformly the subjects of subacute choroiditis, presenting pigment clouds and absorption splotches in the choroid, and red optic disks, with blurred margins, and very often with fine webs in the vitreous, or impaired transparency. It has fallen to my lot to see many examples of this, and, in not a few, posterior capsular opacities and opaque spiculæ in the margins of the lens. At my request, Dr. George E. de Schweinitz examined twenty-five men employed in one of the most extensive iron works in this country, selecting those whose employment exposed them to the intense light and heat of the molten metal. With only two exceptions, these men were subjects of well-marked choroidal disturbance. It was interesting to note that the most marked changes were present in that eye on the side which the man habitually turned toward the furnace in working the heated metal. Other causes were carefully excluded in every case.

Another fruitful source of trouble is the prevailing notion that it is best for the patient to avoid the use of presbyopic glasses as long as possible. It is obvious that all the evils attending upon eye-strain are here present even in the emmetropic eye, and that, too, at a period of life when the attending dangers are enhanced.

I recall the case of an eminent clergyman, æt. 50, with emmetropic eyes, who, although an industrious student and author, had not worn glasses. He came complaining of burning eyes, with a sense of fullness or tension, during and after his work, and severe occipital pain, which caused him not a little anxiety, because of its possible grave import. He had marked choroido-retinal irritation, and suffered greatly from insomnia. He received presbyopic glasses, and in a few weeks his headache and insomnia had disappeared, and with it his anxiety about his anticipated nervous break-down.

A still more marked example of the possible results from this erroneous habit of avoiding the

use of glasses to correct presbyopia was presented in the following case:

A postmaster, in robust health, æt. 49, with a low grade of H. As, had managed to attend to his duties without the aid of glasses. He complained of *muscæ*, blind spells, diplopia on looking up after reading—which occasionally persisted to his great annoyance—and insomnia. He had pin-head pupils, shallow anterior chambers, red and watery eyes, increased tension, and dilated anterior ciliary vessels. His vision, however, was nearly normal, but failed quickly. There was no contraction of the field. The symptoms slowly disappeared under correcting glasses, but not until after prolonged use of homatropia and rest. Here, too, there was well-marked eye-ground changes. Glaucoma in this case seemed to be imminent.

In looking over the clinical records I have been struck with the much greater frequency with which the lower part of the lens was involved than the upper, the commencing opacity almost habitually being below. It is in the lower part of the choroid also we ordinarily find the most marked pathological change, in many cases, particularly in clerks who sit facing window or gas light at their work, or in the case of artisans who are frequently compelled to stand at the work bench facing the light.

There is probably no question in the minds of ophthalmic surgeons regarding the causes of the choroidal engorgement and disease, but it is my purpose to show, that there is a positive relation between this choroidal state and the lenticular disease. That these deductions are not based upon purely theoretical grounds find ample demonstrations in the following statistics gleaned from my private case-book by Dr. John T. Carpenter, Jr.

A brief analysis of eighty cases with incipient cataract gave the following interesting results. The ages ranged from one æt. 26 years to one æt. 87 years, and presented all stages of development of the opacity.

In *thirty-seven* cases there was a clear history of "weak eyes" and long standing asthenopia, *i. e.* headache following use of the eyes; recurring styes, ophthalmia, etc., often dating back to childhood. In the remaining cases there was either no note bearing upon this point, or it was noted as absent. There was demonstrable refraction errors present in *fifty-eight* cases—either in one or both eyes. These errors were also noted as present if, *e. g.*, the individual brought his glasses, worn for distance before the failing vision from his cataractous lenses was observed, even though the opacity was too far advanced to permit the determination of the refraction at the time of the consultation.

In the remaining cases it was either impossible to determine the state of the refraction, or its

study had been neglected since. No information could be gained from the records. Vitreous opacities, webs, etc., are noted as observed in *twenty-two* of the cases, and choroiditis in *fifty-eight*. In many of these areas of pigment absorption, macular disease, choroidal splotches and other gross changes are carefully described, as present in one or both eyes. The woolly choroid, crescents of choroiditis at margins of the nerve and pigment absorption, "ripe peach" choroid etc., are included in this group, if the conditions were sufficiently marked to be justly regarded as a disturbing factor in the nutrition of the eye.

In some instances the opacity was too far advanced to admit of any study of the fundus oculi, on one side, but if choroidal changes or vitreous opacities were present in the better eye, the case was included as one of choroidal disease, whether the eye in which the study was made presented lenticular opacity or not.

The frequency with which the affections of the external tunica was noted as present forms also a striking feature of this group of cases. The conjunctival irritation, partial retention of tears, swollen caruncles, and blepharorrhœa of the lachrymal sac were observed in *forty-five* cases. In the remainder the record was silent. The frequency with which affections of the lachrymal sac had been noted and treated, was a source of surprise.

The number of cases might have been greatly enlarged, but these were sufficient to show the very obvious relation which exists between the formation of opacities in the crystalline lens, and local pathological conditions, and if they serve to show that incipient cataracts, in many instances, belong in the category of possible preventable diseases of the eye, the purpose of the essay will have been attained.

Among the many interesting details which appear in the study of these cases, is the fact that after the opacity has advanced sufficiently to prevent the use of the eyes at near work, and to exclude the light, that then the asthenopia and external inflammation gradually subsided. It is probable that the enforced rest thus secured to the eye permits also the gradual subsidence of the choroidal disease.

In this fact Nature affords us a suggestion for the management of these cases at an earlier stage in their history, when by rest and appropriate treatment, it is still possible to cure the choroidal disease. If the progress of the opacity is not by this means arrested at a point where useful vision is still possible, the prognosis upon operative interference would be more favorable than would be the case in a badly nourished organ.

The following cases related in some detail have been chosen as typical of the conditions described, and as incidentally illustrating the practical advantages which must follow advice based upon the views here set forth.

Case 1.—Incipient Cataract, Choroiditis, Asthenopia, Failing Vision. Mrs. L. æt. 63, consulted me in May, 1879, complaining of weak eyes, failing vision, headaches, to which she had always been subject, itching and burning of the eyelids. Recently she had made repeated changes in her reading glasses but without material benefit—three times within the year.

The caruncles were swollen and the conjunctiva was injected. V $\frac{2}{3}$ in each eye. She wears +.50 D. for near work, and with it reads Jr. 4. with difficulty.

The ophthalmoscope reveals a hazy image of the details of the fundus. The anterior chamber was shallow, pupils reacted to light and shade, and dilated to large medium under a mydriatic. The lens was now seen to be opalescent throughout, and at the inner border there was a cloud-like opacity and a few spicules of opaque lens projecting along the posterior capsule toward the pole.

In the left eye there were also numerous opaque spiculæ along the border of the lens, and a cloud in the outer part. There were in both eyes vitreous webs, which, with a convex glass, could be seen to move with a slight to and-fro movement with the motions of the eyes. The use of the eyes for all near work was forbidden, and a tonic and alterative treatment advised.

A weak solution of atropia with an astringent wash were directed locally. A month later V. had risen to $\frac{2}{3}$ in each eye, and the general discomfort and headaches much diminished. She then received +9, for reading, and was allowed to do a moderate amount of work. In 1883, she was last seen. The vitreous webs still remained, but the swelling and opacity of the lens had not increased, a much clearer view of the eye-ground could be had, and her general condition had much improved.

At her first visit she had been advised of the threatened cataract, and that in all probability her vision would grow worse. The gratifying result of treatment was a surprise both to the patient and myself. Without such treatment there can be but little doubt that the lenticular opacity would have advanced to ripe cataract.

Case 2.—Hypermetropic Astigmatism, Asthenopia from childhood, Failing Vision, Choroiditis, Incipient Cataract. Progress arrested. Mrs. T., æt. 60, came in January, 1884, because of recent rapid failure of vision, both for near and distant objects, and that she could not get glasses to aid her.

O. D. V = $\frac{2}{3}$ O. S. V = $\frac{2}{3}$. Not improved by any glass. No note was made of the external condition of the eyes.

She had been a great sufferer from headache all her life; had even as a school girl recognized the relation between the use of her eyes and the onset of pain in her head. Both lenses were strong-

ly reflecting. After dilating the pupils both lenses were opalescent, nuclei plainly outlined, and sectors of lenses visible, and there were innumerable small spiculæ in the periphery. With the strong illumination of the inverted image, the blurred details of the fundus could be seen, revealing well-marked choroiditis. She was on her way to her home in Kentucky, and could not stay for treatment. She was apprised of the nature of her trouble, and the importance of rest for the eyes was insisted upon. Potassium iodide prescribed internally, and a weak solution of sulphate of eserine locally. She returned a year later, January, 1885, having at first experienced relief from her headache, but lately it had returned, and with it increased fogginess of her vision. Potassium iodide and bromide were now prescribed, and homatropine locally, together with protecting smoked glasses. Numerous unsuccessful attempts were made to improve the vision by glasses. After a month, during which the treatment had been faithfully carried out, she selected without difficulty, although the opalescent condition of the lens remained as before, O. D. + .50 s. $\bigcirc$ —2c. ax. $150^\circ V = \frac{2}{3}$. O. S.—.75c. ax. $90^\circ V = \frac{2}{3}$. These glasses were prescribed for distance, and another calculated from them given for reading. The internal use of potassium iodide, alternating with iodide of iron, was continued for another month, when she was allowed to return to her home. Two years later she sent report by a relative that there had been no return of trouble, and that she was using her eyes without anxiety or pain.

In this case the usual train of symptoms and local appearances were presented which characterize the incipient stage of cataract, viz.: the failing or "foggy" vision, the swollen opalescent lens and peripheral spiculæ. Under treatment, which improved the health of the choroid, the vision improved, notwithstanding the fact that no change had taken place in the opacity of the lens fibres. The mixed astigmatism in the right eye, and the simple myopic astigmatism in the left, were doubtless important factors in the life-long history of these eyes.

Case 3. Choroiditis, Simple M. As., Vitreous Opacities, Incipient Cataract.—Mrs. H., æt. 63, November 10, 1884, complains of recent rapid failure of vision, which has progressed until she can no longer get a glass with which she can read. Has been near-sighted since about 15 years of age. Is certain that in early childhood she was not myopic. Any attempt to look at near objects brings on smarting sensation in the lids, and lachrymation. Eyes are red and watery, and have been so for many years. Strong white reflex from the small pupils on both sides, and anterior chamber in both eyes shallow. After dilatation both lenses were found to be opalescent, steep-like projections from all parts of their

periphery, the centres still remaining sufficiently clear to permit a foggy view of the eye-ground. There were numerous vitreous opacities, and a general haziness which appeared to be due to the untransparent vitreous body. Through it, however, with the inverted image, could be seen numerous splotches in the choroid, and large atrophic crescents to the temporal side of both optic nerves. O. D. V. = $\frac{2}{3}$, O. S. V. = $\frac{2}{3}$. She selects concave glasses, but they do not improve her ability to distinguish the letters. She received potassium iodide and bromide, aa gr. v, t. d., smoked glasses, and a solution of homatropine to be instilled four times each day. Also a wash of boracic acid, and the tear ducts were syringed with the same solution on alternate days. In two weeks she volunteered the statement that her vision was much clearer, — V. = $\frac{2}{3}$ without glasses. Treatment was continued from November 10, 1884, to December 9, 1884. She then selected readily the following formula for glasses: O. D. — 2.75 c. ax. $105^\circ V = \frac{2}{3}$ —. O. S. — 2.25 c. ax. $75^\circ V = \frac{2}{3}$ +. The homatropine was then stopped, and the correcting glasses given, to be worn, except for near work. The potassium iodide was continued. A week later she received for reading O. D. + 2.75 c. ax. 15° , O. S. + .50 s. $\bigcirc$ + 2.25 c. ax. 165° .

August 28, 1888, Mrs. H. came by request. V. = $\frac{2}{3}$ with each eye. Has worn her glasses constantly with great satisfaction. The conjunctiva is healthy, the choroidal splotches and crescents remain, but active inflammatory processes have disappeared. There is no swelling of the lens, but the opaque spiculæ are as before described.

November, 1890, Mrs. H. returned, suffering from a relapse. V. had sunk to $\frac{2}{3}$, she was suffering from headache, aggravated by any attempt to use the eyes or by exposure to light, and was afflicted by marked insomnia. The caruncles were swollen, the conjunctiva of tarsi soaked in tears, the eyes being red and watery. She was greatly annoyed by constant "itching" of the lids. After reading for a few minutes the page blurred, and she was forced to desist. The anterior chamber was shallow, irides reacted sluggishly, and the ophthalmoscope afforded only a foggy view of the eye-ground. Through the dilated pupils, a fine web and a granular detritus could be seen with + 4 D., moving slightly to and fro with each movement of the eye. The lens was swollen, but no new opacities. The relapse had followed an attack of influenza, which had greatly depressed her general nutrition. She was much alarmed, since a sister had but recently suffered an unsuccessful operation for cataract, at the hands of a homœopathic surgeon, and a brother had just placed himself under my care for rapidly increasing opacity of the lens, associated with vitreous opacities, bad choroiditis and myopic

astigmatism. Under treatment by homatropine locally, rest and smoked glasses, and the internal administration of tonics and alteratives, the headache, insomnia and local inflammation slowly subsided once more, and the vision steadily improved until, in the following February, 1891, she was once more able to read the letters in xxx at 20° with some difficulty, and she was discharged from any active treatment, having for the past month used a wash of boracic acid and a weak solution of eserine locally.

Case 4.—Miss S., æt. 81, came complaining of failing vision, violent headaches, giddiness and nausea, which followed any protracted use of the eyes. She had used convex glasses for reading up to her 78th year, when she discovered that they were no longer needful. She had always been subject to attacks of headache, which she said made her eyes weak. O. D. V. = $\frac{1}{5}$, O. S. V. = $\frac{1}{2}$. Slightly improved by concave glasses, confusion letters miscalled T + ? Eyes red and watery, caruncles swollen, conjunctiva injected, pupils dilated, large medium under homatropine. Lens in both eyes is strongly refracting, nucleus steamy and plainly outlined. In extreme periphery of both opaque spiculæ are seen shooting toward the pole in both posterior and anterior cortex. All the conditions more advanced in right eye. There was a large conus embracing the temporal margin of the optic nerve, semiatrophic at the nerve margin, and imperceptibly losing itself in less marked choroidal changes as the macular region was reached. There was a woolly eye-ground throughout, and in places advanced pigment absorption. In O. S. the same conditions were present. There was no albuminuria or glycosuria. She was placed upon syrup of hydriodic acid internally, boric acid wash and homatropine locally. In a week the headache was greatly alleviated, the external redness and irritation was much better. At the end of a month she had so far improved that she experienced no difficulty in selecting correcting glasses, O. D. — 1.50 $\bigcirc$ — 1, $\bigcirc$ ax. 105° V. $\frac{2}{3}$, O. S. — .50 $\bigcirc$ ax. 30° V. $\frac{2}{3}$ dif. —. The vitreous haze had disappeared, the eye ground was greatly improved, the anterior chamber was of normal depth, lenticular opacity unchanged. T. u. No headache. There are no changes in the lenticular opacity. She received her glasses for constant wear in October, 1890, and a suitable formula for reading. All went well until the following January, 1891, when she returned, suffering from dim vision, headache and insomnia, which she said was brought about by too constant use of the eyes in working over Christmas presents for her friends. Under the same treatment the symptoms subsided, but V. in O. D. had sunk to $\frac{2}{3}$, and there was a distinct increase in the number and size of spiculæ in the lens. In April, V. remained as before, $\frac{2}{3}$, O. S. $\frac{2}{3}$ with difficulty,

and the intraocular conditions were approaching a condition of health.

It is not my purpose to weary the Section with a report of cases, only so far as is needful to present the clinical picture I have in mind. It will be observed that in the foregoing cases, there is a distinct history of long standing eye trouble, either recognized as such, or obviously present as indicated by the asthenopic history. The cases brought forward are simply examples taken from a large group, and are not intended to carry weight by their numbers. In each case the inflammation of the external tunica and the choroïditis were present. The results of treatment were very gratifying.

In my former paper, I presented a condensed statement of 64 cases of incipient cataract, hurriedly collated from my private case-books by Dr. Ring. In the preparation for the present paper, the deductions are based upon still other cases, taken from my private records, carefully tabulated by Dr. Carpenter, but do not materially alter the results based upon the smaller number. In it, however, are included not only incipient but mature cataracts. It is obvious from this statement, that figures cannot accurately express the true state of affairs, *e. g.*, the table shows over 70 per cent. of demonstrable intraocular disease. Had it been possible to study the eye-ground in all cases, it is probable that this percentage would have been still higher, since it was rarely absent where such examination was possible. There was a distinct asthenopic history in 47 per cent. of all the cases, and refractive error in 70 per cent.

In closing this paper, I repeat the conclusions closing the former paper, since a further study and widening clinical experience have served to strengthen the conclusions there expressed:

"In the views here expressed we find additional argument favoring the great importance of carefully correcting the refractive defects in the eye, since they lie at the foundation of certain diseases which strike at the very root of the vital processes upon which the health of the eye depends. It would seem to justify, furthermore, the conclusion: *That, while opacity of the lens is a disease of advanced life, it does not, in all probability, depend upon senile change, but is originated in local pathological states involving the nutrition of the eye itself.* That hence, in the stage of incipency, it is amenable to treatment by such measures as are calculated to remove the choroidal disease upon which it depends. That if these deductions are true, we are justifiable in giving a more hopeful prognosis to many persons who apply for treatment with incipient cataract. That if treatment fails to arrest the progressive degeneration in the lens, by virtue of the treatment adopted, the eye will be in a better condition to submit to the trials of operative interference."

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