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THE RELATIONS OF BLEPHARITIS CILIARIS TO AMETROPIA.

By D. B. St. John Roosa, M.D.

At the Fifth International Ophthalmological Congress, held in New York in 1876, I read a paper on the above subject, and stated the following conclusions, as those which seemed to me to be deduced from my cases:

"1. Ametropia seems to be the condition of most eyes affected with blepharitis ciliaris.

2. When the blepharitis is associated with errors of refraction, the cure of the edge of the lids is very much facilitated by, and sometimes depends upon, correction of the ametropia.

3. Paralysis of the accommodation by the use of atropia will usually, with no other treatment, very much relieve the blepharitis that is associated with ametropia.

4. Patients suffering from blepharitis that is associated with ametropia will often ignore any other affection of the eyes than that of the edge of the lids, and deny that they suffer from asthenopia or conjunctivitis, complaining only of the discomfort and disfigurement produced by the disease; and this when the error of refraction is so marked that we would naturally expect quite serious consequences from its non-correction.

5. The form of blepharitis to which my statistics refer is not a mere irritation of the edge of the lids, such as often accompanies a catarrhal conjunctivitis, but a true hyper-secretion of the tarsal glands and hair-follicles, with the formation of crusts, and sometimes the development of ulceration.

6. Hypermetropia is the error of refraction most frequently associated with blepharitis ciliaris.

I have here restated them, because one writer* has not, I think, kept them sufficiently in view in his paper intended as an answer to mine, on the relation of ametropia to blepharitis ciliaris. Since reading my own paper I have continued my investigations in this and a cognate subject, and I now beg the indulgence of the Society for a

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* F. C. Hotz, Chicago Medical Journal and Examiner, April, 1878.

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few additional statistics, as well as for a brief reply to some of the objections that have been made to my conclusions.

Two hundred and one cases of blepharitis ciliaris have been observed at the Manhattan Eye and Ear Hospital since the reading of my paper.

In spite of my efforts to secure an examination of the refractive state of the eyes thus affected, in only forty-eight of these was it noted. In these the refractive state is recorded as follows:

Hypermetropia	34
Myopia	1
Astigmatism	7
Emmetropia	6

Hypermetropia.

Case 1. (Under atropia), + $\frac{1}{30}$.
" 2. By ophthalmoscope.
" 3. + $\frac{1}{30}$.
" 4. Hypermetropia cum Presbyopia.
" 5. By ophthalmoscope, $\frac{1}{16}$.
" 6. " "
" 7. " " R.E., $\frac{1}{40}$; L.E., $\frac{1}{24}$.
" 8. (Under atropia), R.E., $\frac{1}{20}$; L., $\frac{1}{24}$.
" 9. " R.E., $\frac{1}{30}$; L.E., E.
" 10. Hypermetropia.
" 11. "
" 12. " $\frac{1}{40}$.
" 13. "
" 14. Atropia, R., $\frac{1}{24}$; L., $\frac{1}{30}$.
" 15. H., $\frac{1}{50}$.
" 16. Ophthalmoscope.
" 17. R., $\frac{1}{60}$; L., $\frac{1}{50}$.
" 18. Atropia, R.E., $\frac{1}{30}$; L., $\frac{1}{30}$.
" 19. Ophthalmoscope.
" 20. " $\frac{1}{20}$.
" 21. "
" 22. "
" 23. R.E. (E.); L., $\frac{1}{36}$.
" 24. $\frac{1}{24}$.
" 25. R., $\frac{1}{50}$; L., $\frac{1}{60}$.
" 26. $\frac{1}{40}$.

Case 27. Ophthalmoscope, R.E., $\frac{1}{14}$; L.E., $\frac{1}{16}$.
" 28. H. and strabismus.
" 29. Ophthalmoscope.
" 30. $\frac{1}{30}$; ophthalmoscope, $\frac{1}{16}$.
" 31. H., "
" 32. H., "
" 33. H.
" 34. $\frac{1}{20}$.

Myopia.

Case 1. V. R.E., $\frac{20}{50}$; L.E., $\frac{20}{30}$, with $-\frac{1}{12}$.

Astigmatism.

Case 1. R.E., $-\frac{1}{36}\bigcirc-\frac{1}{48}$ axis 180°; L.E., $-\frac{1}{36}-\frac{1}{48}$, 180°.
" 2. R.E., $+\frac{1}{20}$c, axis 90°; L.E., $+\frac{1}{18}$; A., 90°.
" 3. Astigmatism.
" 4. Mixed astigmatism.
" 5. R.E., $\frac{20}{40}$; L.E., $\frac{20}{40}-\frac{1}{12}$c., 180°.
" 6. R.E., $+\frac{1}{12}$c axis $90\bigcirc-\frac{1}{30}$c; L.E., $\frac{20}{30}-\frac{1}{18}$c., 15°.
" 7. R.E., $+\frac{1}{80}$s$\bigcirc+\frac{1}{14}$c 90°; L.E., V. $\frac{20}{30}$ E. (?).

Emmetropia.

Case 1. V. $=\frac{20}{40}$. (No reason given in register for amblyopia.)
" 2. E.
" 3. R.E., $\frac{20}{70}$; L.E., $\frac{20}{70}+$.
" 4. V. $=\frac{20}{30}$.
" 5. V. $=\frac{20}{20}$.
" 6. E. R. E. Left opacity of cornea.

Opacities of the Cornea.

There were eight cases of opacities of the cornea among those of which the refraction was not tested.

There was also one case of diminution of the acuteness of vision, with no assigned cause for the loss. R.E., $\frac{20}{40}+$; L.E., $\frac{20}{70}$. Not improved by glasses.

This increases the number of cases that may be said to have been examined to 57.

Even a superficial examination of these statistics shows that some of the statements made in my first paper are sustained by them.

There is even a larger proportion of refractive error among them than in the first series. This ametropia is also generally of such a degree as to require correction. That such a correction will in many cases assist in the cure of the blepharitis will hardly be denied. It is a step far beyond this, I admit to say that the blepharitis was caused by the strain from an uncorrected error of refraction. I am not sure, judging from my own experiences in another direction, but that we shall be obliged to modify our views as to how injurious is the strain of accommodation in hypermetropia; but I think that we may still believe that in many cases uncorrected hypermetropia will produce all the consequences of continued hyperæmia of the edges of the lids.

Since the publication of my paper I have seen 40 cases of blepharitis ciliaris in private practice, as follows:

CASE I.—Miss P., æt. 37. Is subject to styes; always has had asthenopia; now has blepharitis. R.E., $\frac{20}{30}$; H., $\frac{1}{48}$; V. = $\frac{20}{20}$. L.E., $\frac{20}{200}$. No improvement from glasses. Under atropia, H. R.E., = $\frac{1}{18}$; L.E., + $\frac{1}{20}$ ⊃ $\frac{1}{24}$ c 90°; V. = $\frac{20}{20}$. Glasses were prescribed, and two months after the patient writes that the glasses have given her "full satisfaction." There is no account as to the styes or blepharitis.

CASE II.—Æt. 17. About 11 months ago the patient observed that his distant vision was dim; has had asthenopia and blepharitis since then. M. = $\frac{1}{18}$; R.E., L.E., − $\frac{1}{30}$.

CASE III.—C. C., æt. 13. Has had blepharitis and asthenopia for about a year. V. = $\frac{20}{20}$. Under atropia, R.E., + $\frac{1}{60}$ c 90° V. = $\frac{20}{18}$. L.E., + $\frac{1}{60}$ c 90° V. = $\frac{20}{16}$. V. $\frac{20}{40}$ under atropia without glasses. Four months after the patient was using his eyes with comfort.

CASE IV.—F. G., æt. 28. Has asthenopia in the evening and blepharitis constantly. Under ophthalmoscope, eyes are H., rejects glasses. V. = $\frac{20}{20}$. Local treatment alone employed, and one month after the patient was better.

CASE V.—C. H. G., æt. 19. Has had blepharitis for 8 or 9 years, also asthenopia. V. = $\frac{20}{20}$. Under atropia, H. = $\frac{1}{4\frac{1}{2}}$.

CASE VI.—Mrs. B., æt. 42. Has always suffered from asthenopia. Has blepharitis, and there is a chalazion on the right upper lid. H. $\frac{1}{48}$ and $\frac{1}{4\frac{1}{2}}$. There is also marked insufficiency of the interni.

CASE VII.—P. T., æt. 20. The eyelids have been inflamed for two years; asthenopia in the evening; H. by opthalmoscope. Re-

jects all glasses for the right eye, accepts + $\frac{1}{12}$ for the left, under atropia + $\frac{1}{12}$. In a few days there was manifest H. of $\frac{1}{48}$.

CASE VIII.—A. C. B., æt. 25. Asthenopia, blepharitis in left eye for two weeks; under atropia H. = $\frac{1}{36}$.

CASE IX.—Mr. S., æt. 40. Has had red eyelids (edges) as long as he can remember. Sometimes, not often, has asthenopia. V. = $\frac{20}{20}$. Under atropia, R.E.H. = $\frac{1}{48}$; L.E.H. = $\frac{1}{12}$.

CASE X.—D. G. B., æt. 38. Has suffered from redness of the edges of the lids for the past five or six weeks. Has never had asthenopia. V. = $\frac{20}{20}$ − $\frac{20}{20}$, with − $\frac{1}{60}$. With ophthalmoscope eyes seem to be H. Ordered + $\frac{1}{48}$.

CASE XI.—Mr. C., æt. 31. Blepharitis ever since he can remember. No asthenopia. R.E., $\frac{20}{30}$ − L.E., $\frac{20}{20}$. Rejects glasses. Ophthalmoscope shows H. $\frac{1}{24}$ R.E.; L.E., $\frac{1}{48}$. Under atropia, R.E., + $\frac{1}{48}$ ⊂ $\frac{1}{48}^{c}$ 90° $\frac{20}{20}$; L.E., + $\frac{1}{48}$ ⊂ $\frac{1}{60}^{c}$ 90° $\frac{20}{20}$.

CASE XII.—Miss C. A. S., æt. 17. Asthenopia in the evening for a year. Red line along the edge of the lids for one year. V. = $\frac{20}{20}$. Under atropia, H. = $\frac{1}{36}$.

CASE XIII.—Dr. B. Has had blepharitis since he was seven years old. V. = $\frac{20}{20}$. Rejects glasses. H. as with opthalmoscope; atropia, R.E., + $\frac{1}{60}^{c}$ 80°. V. = $\frac{20}{20}$; L.E., + $\frac{1}{60}^{c}$ 90° $\frac{20}{20}$.

CASE XIV.—I. B., æt. 38. Asthenopia for the past four or five years. Has worn glasses, but latterly they have not afforded relief. Redness of the edge of the lids. R.E.H. $\frac{1}{48}$; L., $\frac{1}{36}$ − manifest.

CASE XV.—Miss H., æt. 18. Always has had asthenopia, and the eyelids get red. V. = $\frac{20}{20}$. Under atropia, R.E., $\frac{1}{12}$; L.E., $\frac{1}{48}$.

CASE XVI.—M. M., æt. 7. Eyes "weak" for a year. Slight blepharitis. V. = $\frac{20}{20}$. Advised atropia. No record of ophthalmoscope examination.

CASE XVII.—F. G. D., æt. 19. Asthenopia and slight blepharitis. V. = $\frac{20}{20}$. Under atropia, H. = $\frac{1}{48}$. Two months after, still has asthenopia and inflamed lids.

CASE XVIII.—Mrs. J., æt. 36. Has had asthenopia since she was eight or nine years old; blepharitis for a year. Under atropia, + $\frac{1}{36}$. Ordered glasses, and two months after writes that she uses them with perfect comfort.

CASE XIX.—Miss B., æt. 22. Redness of the edges of the lids as long as she can remember. V. = $\frac{20}{20}$ rejects glasses. Under atropia. R.E., H. $\frac{1}{36}$; L., $\frac{1}{36}$. Two months after, the patient was doing well.

CASE XX.—E. A., æt. 24. Has had sore eyes ever since birth. Has entropion and blepharitis. V. = $\frac{20}{40}$ + R.E.; L.E., $\frac{20}{50}$. Under

atropia, R.E., + $\frac{1}{30}$ c 90° $\frac{20}{30}$, L.E., + $\frac{1}{20}$ c 120° $\frac{20}{50}$. A year after has worn glasses, and eyelids are much better. An operation for entropion was performed, which relieved it, but the blepharitis remained, when the glasses were ordered.

CASE XXI.—Mrs. A., æt. 23. Eyelids have always been "diseased." Subject to styes. R.E., $\frac{20}{30}$ — L.E., $\frac{20}{20}$. Manifest H. = $\frac{1}{4\frac{1}{2}}$.

CASE XXII.—Miss L., æt. 20. Blepharitis, phlyctenular keratitis. By ophthalmoscope, H. astigmatism. No improvement by glasses.

CASE XXIII.—L. W. D., æt. 14. Lachrymal catarrh, blepharitis. H. by ophthalmoscope.

CASE XXIV.—R. E., æt. 21. Inflammation of the edge of the lids ever since childhood; no asthenopia. R.E., central corneal opacities. L.E., H. = $\frac{1}{20}$.

CASE XXV.—S. J. F., æt. 21. Has been troubled with redness of the edges of the lids for four or five years. Asthenopia under atropia, R.E., + $\frac{1}{48}$ c 60° — $\frac{20}{20}$; L.E., + $\frac{1}{48}$ 120° $\frac{20}{20}$.

CASE XXVI.—J. V. W., æt. 22. Eyes "weak" for several years. Lids have been red for several months. R.E., $\frac{20}{25}$; under atropia, L.E., $\frac{20}{20}$. R.E., H. $\frac{1}{36}$; L.E., + $\frac{1}{36}$ ⊂ $\frac{1}{48}$ c 90°.

CASE XXVII.—F. G., æt. 22 (?). Blepharitis. Is wearing — $\frac{1}{18}$, selected by himself. V. = $\frac{20}{20}$ with — $\frac{1}{30}$. These were substituted for — $\frac{1}{18}$; three months after lids were much better.

CASE XXVIII.—S. O., æt. 20. Styes for four or five years. Has trachoma and blepharitis. V. = $\frac{20}{20}$. Rejects glasses. Under atropia, H. = $\frac{1}{36}$; V. = $\frac{20}{20}$.

CASE XXIX.—H. D. N., æt. 21. Weak eyes since he was three years old. Blepharitis; accepts + $\frac{1}{36}$. Under atropia, R.E., $\frac{1}{18}$; L.E., + $\frac{1}{24}$. The treatment was of benefit in this case, as stated by patient five months after.

CASE XXX.—B. A. C., æt. 22. Asthenopia, trachoma, and blepharitis. H.M., $\frac{1}{42}$. Declines glasses. Five months after, blepharitis no better.

CASE XXXI.—F. B., æt. 20. For two years has had blepharitis, and has been unable to read at night. R.E., E.; L.E., mixed astigmatism.

CASE XXXII.—E. B., æt. 14. Has had blepharitis for eighteen months, asthenopia for a year. H.m. = $\frac{1}{36}$.

CASE XXXIII.—Jennie Y., æt. 11. Has always had blepharitis. V. = $\frac{20}{20}$ — H.m. $\frac{1}{48}$, and V. = $\frac{20}{20}$.

CASE XXXIV.—Mrs. F. B., æt. 27. Blepharitis for six months. R.E., $\frac{20}{30}$; L.E., $\frac{20}{20}$. Under atropia, R.E., + $\frac{1}{48}$ ⊂ $\frac{1}{30}$ c $\frac{20}{20}$; L.E., $\frac{1}{30}$.

CASE XXXV.—Mrs. A. B. De, æt. 29. Blepharitis and asthenopia for four or five years. Has used local applications without benefit, under advice of an oculist. V., $\frac{20}{30}$. Rejects all glasses. Under atropia, $+ \frac{1}{36}^{c}$; axis, 90°, each eye.

After use of glasses patient is now, six months after, quite well as to lids ; has occasional attacks of asthenopia. The use of atropia did great good to the lids without glasses.

CASE XXXVI.—Mrs. A. E., æt. 41. Has had blepharitis and asthenopia for twenty-five years.

Oph. shows H. ; advised $+ \frac{1}{36}$, and patient, who is often seen, states that her eyes are well.

CASE XXXVII.—Miss M. O. R., æt. 21. Has always had blepharitis. Under atropia, H.R.E., $+ \frac{1}{48}$; L.E., $+ \frac{1}{48}^{c}$ 180°.

CASE XXXVIII.—C. L. W., æt. 11. Blepharitis for one year. Atropia, R.E., $\frac{1}{48}$; L., $\frac{1}{42}$. The patient did well under use of glasses.

CASE XXXIX.—R. D. M., æt. 19. Pain in eyes ; blepharitis for several years. Under atropia, R.E., $- 60^{c}$ 180° $\frac{20}{20}$; $\frac{20}{50}$ without glasses. L.E., $+ \frac{1}{60}^{c}$ 180° ; $\frac{20}{30}$ without glasses.

CASE XL.—Henrietta L. Has blepharitis ; has been wearing glasses for some time in the evening. Under atropia, R.E., $+ \frac{1}{4} \supset + \frac{1}{42}^{c}$ 90° $\frac{20}{20}$; L.E., $+ \frac{1}{42} \supset + \frac{1}{36}$ 90°.

CASE XLI.—J. M. C., æt. 22. Blepharitis for ten years ; photophobia ; no asthenopia ; trachoma. V. $= \frac{20}{40} - 35$. R.E., $- \frac{1}{60} \supset - \frac{1}{60}^{c}$ 90° $\frac{20}{20}$; L.E., $- \frac{1}{60} \supset - \frac{1}{60}^{c}$ 90 $\frac{20}{20}$.

CASE XLII.—Miss P., æt. 14. Blepharitis and asthenopia. V. $\frac{20}{30}$ — R.E. ; L.E., $\frac{20}{40}$; atropia, R.E., $+ \frac{1}{30}$; V. $= \frac{20}{20}$. Patient did well.

CASE XLIII.—Mrs. E., æt. 32. Asthenopia always ; blepharitis. Atropia, R.E., $- \frac{1}{60}^{c}$, axis 90° ; L.E., E.

CASE XLIV.—Bella P. Blepharitis ; hyperopia, $\frac{1}{60}$.

CASE XLV.—M. N., æt. 7. Asthenopia and blepharitis. H. by ophthalmoscope, $\frac{1}{48}$.

CASE XLVI.—Mrs. C. B., æt. 43. Asthenopia ; blepharitis. H. $= \frac{1}{36}$.

CASE XLVII.—J. W., æt. 9. Asthenopia ; slight blepharitis ; refraction could not be determined.

Summary.—Total number of cases seen in private practice :

Hypermetropia.—Refraction the same in eye. Degree—$\frac{1}{36}$, $\frac{1}{48}$, $\frac{1}{60}$, $\frac{1}{30}$, $\frac{1}{48}$, $\frac{1}{36}$, $\frac{1}{48}$, $\frac{1}{42}$, $\frac{1}{36}$, $\frac{1}{42}$, $\frac{1}{30}$, $\frac{1}{48}$, $\frac{1}{42}$, $\frac{1}{36}$, $\frac{1}{48}$, $\frac{1}{36}$, $\frac{1}{42}$, $\frac{1}{42}$.

When the eyes were of different refraction—R.E. $\frac{1}{48}$, L.E. $\frac{1}{42}$; R.E. $\frac{1}{30}$, L.E. $\frac{1}{36}$; R.E. $\frac{1}{48}$, L.E. $\frac{1}{36}$; R.E. $\frac{1}{24}$, L. $\frac{1}{48}$; R.E. $\frac{1}{48}$, L. $\frac{1}{42}$; R.E. $\frac{1}{48}$, L.E. $\frac{1}{42}$.

Degree undetermined—1.

Total number of cases of H.—25.

Hypermetropic astigmatism.—The same in both eyes, $\frac{1}{60}$, 180°, $\frac{1}{36}$, axis 90°; R.E., $\frac{1}{48}$, a. 60°; L.E., $\frac{1}{48}$, a. 120°; R.E., $\frac{1}{60}$, a. 90°; L.E., $\frac{1}{60}$, a. 90° $\frac{1}{60}$, a. 90°—5.

Of different degrees—R.E., $\frac{1}{60}$; L.E., E.; R.E., $\frac{1}{4}$ ⊂ $\frac{1}{42}$ᶜ 90°; L.E., $\frac{1}{42}$ ⊂ $\frac{1}{36}$ 90°; R.E., $\frac{1}{48}$ ⊂ $\frac{1}{30}$ᶜ; L.E., $\frac{1}{36}$ H.; R.E., $\frac{1}{36}$; L.E., $\frac{1}{36}$ ⊂ $\frac{1}{48}$ᶜ; R.E., $\frac{1}{48}$, axis 60°; L.E., $\frac{1}{48}$ᶜ, axis 120°; R.E., $\frac{1}{30}$ 90°; L.E., $\frac{1}{20}$ᶜ 120°; R.E., $\frac{1}{60}$ 80°; L.E., $\frac{1}{66}$ 90°; R.E., $\frac{1}{48}$ ⊂ $\frac{1}{48}$ᶜ 90°; L.E., $\frac{1}{48}$ ⊂ $\frac{1}{60}$ᶜ; R.E., $\frac{1}{18}$; L., $\frac{1}{20}$ ⊂ $\frac{1}{24}$ᶜ 90°—9.

Degree undetermined, 1. Total, 15.

Myopic astigmatism.—$\frac{1}{60}$ − $\frac{1}{60}$ᶜ 90°—1.

Myopia.—$\frac{1}{30}$; R.E., $\frac{1}{18}$; L., $\frac{1}{30}$—2.

Mixed astigmatism.—R.E., E.; L., mixed astigmatism—1.

Refraction not determined—2.

These statistics are certainly very different from those given by Dr. A. Alt,* who examined forty-eight cases of blepharitis with a view to test the connection between ametropia and inflammation of the lids. According to Dr. Alt, "thirty-nine of them had emmetropia, five myopia, three hyperopia, one astigmatism." I know of no way of reconciling Dr. Alt's statistics with my own, since there is no record of the manner in which the refraction was estimated, or of what Dr. A. considers an emmetropic eye. I do not regard any eye as emmetropic, which, not having V. $\frac{20}{20}$, obtains it under the influence of atropia with a convex glass of $\frac{1}{60}$ or upwards; neither do I regard the test by the ophthalmoscope as sufficient to determine the existence of latent hypermetropia.

Dr. F. C. Hotz † examined eighteen cases in private practice, "of which five, or thirty-three per cent., showed ametropia (four showed hypermetropia, one myopia, and one astigmatism (6?)). Dr. H. did did not use atropia for the determination of the refraction in his cases; and he concedes that, had he employed it, some of his cases might have shown a slight degree of hypermetropia. Dr. Hotz is, however, of the opinion that, however great may be the proportion of

* Archives of Ophthalmology and Otology, Vol. VI., p. 180.

† Chicago Medical Journal, April, 1878.

ametropia, there is no etiological connection with this and blepharitis. Dr. H. is mistaken, I think, in his statement that Dr. Erisman examined his cases under atropia. The mistake is all the worse because a correct account of Erisman's statistics rather makes for Hotz's views than against them. Erisman * states that under atropia it is probable that there would be a larger percentage of H. than he found and that the hyperopic eye is probably the normal one in youth.

Dr. Hotz assumes that no strain on the accommodation occurs in myopic eyes unless they are armed with unsuitable glasses. I believe that not only those that have improper glasses, but also those myopes that wear no glasses at all, suffer from strain.

Dr. Hotz's argument against the occurrence of blepharitis without asthenopia may be answered by my own experience and that of my associate in practice, Dr. E. T. Ely, as follows: We have seen many cases of blepharitis without noticeable asthenopia. Some of these were cured for the time by a simple paralysis of the accommodation by means of atropia, and many are the cases that have been treated for years without apparent benefit, which were entirely relieved of their unsightliness and discomfort after glasses were worn in conjunction with a simple local treatment.

There is no probable way of accounting for the cure in these cases, except by a reference to a correction of the error of refraction. In saying this, I am very far from asserting that every case of blepharitis is caused by an error of refraction.

I cannot agree with those who have objected to my views, who argue that slight degrees of H. seldom give rise to asthenopia. My experience is just the other way. Of course, I consider a $\frac{1}{4}\frac{1}{2}$ a low degree; perhaps a $\frac{1}{2}\frac{1}{4}$ is the first point at which H. may be said to be at all of a high degree; certainly there is often great relief from the correction of a $\frac{1}{4}\frac{1}{8}$, or even a $\frac{1}{6}\frac{1}{0}$, when that sixtieth is in one meridian only, while the other is emmetropic.

Donders regards the degrees of H. from $\frac{1}{1}\frac{1}{0}\frac{1}{0}$ to $\frac{1}{4}\frac{1}{0}$ as not to be observed in youth. Under ordinary circumstances I grant this, but in some cases I am inclined to the view that $\frac{1}{4}\frac{1}{8}$ may need correction after ten years of age, or least for a time.

In others, as I have shown in another paper, a $\frac{1}{2}\frac{1}{4}$ may exist even in the eyes of a student, and never cause any inconvenience of any kind. When all the factors are at work that produce asthenopia, blepharitis, and so forth, even a very slight error of refraction

* Graefe's Archiv, B. 17, A. I.

will materially assist in making the patient uncomfortable, and its correction will do great good.

Dr. Hotz is of the opinion that blepharitis occurs chiefly in children. I am not sure that this is a fact; certainly those cases observed by me in private practice were chiefly among adults. Of two hundred and one cases seen at the Manhattan Eye and Ear Hospital, a little more than fifty per cent. occurred in persons under fifteen; but of very young children, that is, of five years of age or under, there was only twenty-eight per cent., whereas Dr. H. states that he has observed the greatest number among these. Dr. H. asks if I omitted young children from my statistics, because I could not employ the tests of vision. I answer that I have inserted in my statistics every case that has presented itself to me. Because children do not read and write, it cannot be argued, however, that they do not use the ciliary muscle and interni. Any one who has watched a child at play, for instance, picking up small objects for a number of minutes at a time, will soon be convinced that they are often using a great deal of accommodative power, in their effort for exact vision, before they learn to read and write.

If Dr. Alt and Dr. Hotz will examine their cases under atropia, I am sure they will form different conclusions, as to the existence of ametropia in connection with blepharitis ciliaris, from those that they have expressed. I still believe that there is much more than mere coincidence in the frequent occurrence of blepharitis in connection with strain on the accommodation from refractive defects and opacities of the cornea, and that correction of the error will do as much towards the relief of the hyperæmia and inflammation of the lids as the correction of hypermetropia does for asthenopia. I suspect, however, that since Donders' exposition of asthenopia we have all overrated the curative power of glasses, and that some writers have been led greatly into error in ascribing nervous affections too exclusively to the influence of an uncorrected error of refraction. Certain it is, as I have before indicated, that there are many cases where quite a high degree of uncorrected hypermetropia does no harm to the subject of it.