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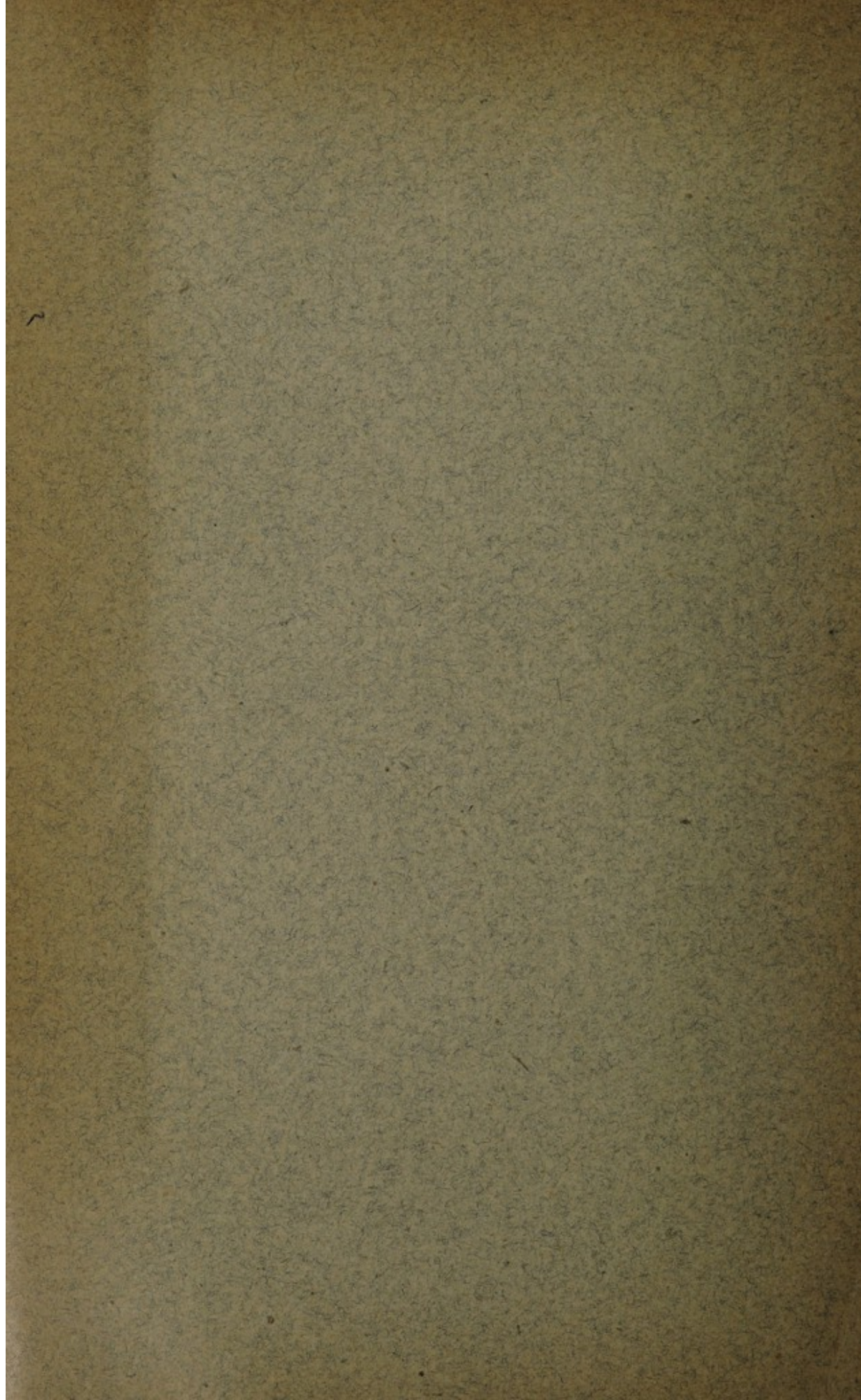
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CONTRIBUTIONS
TO
OPHTHALMOLOGY

BY
DR. C. R. AGNEW,

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THE INSUFFICIENCY OF THE OPHTHALMOSCOPE AS
THE SOLE TEST OF ERRORS OF REFRACTION.

By DR. C. R. AGNEW,

NEW YORK.

IN the *Boston Medical and Surgical Journal* for June 24, 1880, occurs a letter from Dr. Hasket Derby, entitled "Near-Sight in the Young," in which he replies to a communication to the same journal, under date of June 17th, from Dr. David Webster. It is not our intention to discuss the questions alluded to in the first portion of Dr. Derby's letter, but to reply to its closing paragraph. The paragraph is as follows: "Dr. Webster's concluding statement, that atropine will reveal a condition of the refraction which the ophthalmoscope has failed to discover, is so utterly opposed to general experience as to require no special refutation. The doctrine of the ability of the ophthalmoscope to determine the optical condition of the eye, first announced by Helmholtz, the inventor of the instrument, and confirmed by Mauthner in his brilliant treatise, may be said to be universally accepted. At the last meeting of the American Ophthalmological Society, Dr. Agnew gave utterance to views similar to those here put forth by Dr. Webster. Unless I am much mistaken he was found to stand alone in their advocacy, and was at once contradicted by Dr. Knapp."

It is true that we did, in the meeting alluded to, make a few brief remarks in asserting the insufficiency of the ophthalmoscope as the sole test of ametropia, in commenting upon the results which Dr. Derby presented to the Society of his examination of the eyes of the students of Amherst College. We contended that it is often impossible, however skilful the observer may be, to determine either the quality or the quantity of the error of refraction with the ophthalmoscope alone, while the accommodation of the eye under observation

is actively at work, and that the observer is by no means sure that the kind or amount of apparent ametropia is really what the ophthalmoscope seems to show it to be.

Hence, in many cases of asthenopia, the only safe way to study the refraction is to pursue the following method :

1. To examine the eyes first with the ophthalmoscope, and at the moment record the result.
2. To make the glass-test next and record its result.
3. To bring both eyes fully under the influence of atropia.
4. To test the eyes with the ophthalmoscope again, the eyes being under the influence of atropia.
5. To make a second glass-test, the eyes being under the influence of atropia.
6. To test the eyes with the ophthalmoscope and glasses at the end of ten days or two weeks, or when they shall have recovered from the effects of the atropia.

By recording the results of the ophthalmoscopic tests before making glass-tests, the observer gets the objective symptoms without any probability of the statements of the patient producing the slightest prejudice in his mind.

By such careful procedure, and by such alone, so far as our experience goes, may we safely deal with the apparent errors of refraction which occur in persons between the ages of ten and thirty-five years of age. We did not find this out till persons returned to us with unsatisfactory glasses which we had fitted after glass-test and ophthalmoscopic test alone, without atropia, or till we began to hear from our colleagues concerning cases of asthenopia which our glasses had not relieved, but which those selected by them had. Atropia had enabled them to discover and correct a variation in ametropia, which our glass and ophthalmoscope tests alone had not revealed. We do not say that we are necessarily to fit a glass, in all cases, to the ametropia which is revealed after full nullification of accommodation. Sometimes we may in myopia or in hypermetropia, where the asthenopia cannot be relieved short of a sharp correction of the extreme amount of ametropia. This is notably necessary in cases in which insufficient and otherwise erroneous correction has been made by the patient selecting his own glasses, by the optician giving over his counter

those which seemed to be best, or by the physician selecting them by a glass and ophthalmoscopic test without atropia.

The safest, and therefore the best way to make the diagnosis in asthenopia is to record the *data*, as indicated in the six steps above, and to give the glass, or correction, which embodies the results of all the steps. As an extra precaution the observer should record the data of his ophthalmoscopic tests *before* he makes any glass-tests.

We have had a patient, a college student, come to our office wearing *minus* elevens, which he had selected by the aid of an optician as those with which he seemed to be able to see best, far and near, who turned out, after thorough saturation of his ciliary muscle with atropia, to be largely hypermetropic, so Titanic was his spasm of accommodation.

We must not turn to the fathers of ophthalmology in any spirit of abject submission to their dicta. We must show ourselves worthy of our parentage. We must cultivate the same spirit of independent research which enabled them to do so much. They, by precept and example, bid us search for facts, and to use facts in a logical way.

Ophthalmology, however vast its progress since 1855 under the impetus given by Helmholtz, Donders, Von Graefe, Arlt, Bowman, and others, is not a finished science or art. Immense results yet await us, and in no domain are we to expect more than in that of *clinical observation*; and who is to say, if we are really moved by the animus of the fathers, whether we may not at noon-day see some things which they did not discover, or draw deductions which may vary greatly from those which they derived.

It will put a stop to science and art, as it has before now to good movements in the domain of morals and religion, if we submit in any spirit of servile subjection to the dicta of the fathers. Then, moreover, we may misinterpret or misrepresent the fathers, and thus embarrass our exercise of the natural and inalienable right of free thought, which they by their example have constantly encouraged us to value and use.

As we must bring the matter, however, to a clinical test, we take from our case-book, in the few hours which have intervened since the letter alluded to fell under our observation, the following brief cases, and for the labor of the collection we are indebted to Dr. D. Webster.

CASE I.—G. K., aged twenty-two, bookkeeper. Became cross-eyed at the age of four. Was operated upon by Dr. —, first upon

the right eye, and a year later upon the left eye. Has since then been much annoyed by diplopia.

R. V. = $\frac{2}{3}$: Hm. $\frac{1}{8}$.

L. V. = $\frac{3}{5}$: Em.

Insufficiency of int. rect., 24° at $20'$.

“ “ ext. “ 13° “ $1'$.

Ophthalmoscopic examination: nasal edges of optic disks pigmented; choroidal field marked by deep pigment-streaks. Right, hypermetropic $\frac{1}{8}$. Left, emmetropic.

As the diplopia was, at times, very distressing, and produced confusion and much asthenopia, we sent the patient to get the advice of Dr. —, and also of Dr. —, two of our most skilful colleagues, and we give their written replies verbatim.

Dr. — says: “ Nov. 7, 1873. This case of K. is one where the squint was due to extremely weak externi, especially of the right eye, and now he has insufficiency of interni for the whole horizon, far and near. When he looks at the finger held within three inches he seems to converge to excess, but careful tests with prisms and a candle show that at this place there are extremely divergent double images, amounting to about 40° prisms, bases inward. To account for this anomaly there must be a fault of projection in the right eye, which came from the prolonged period of squint, by which some other spot of the retina than the macula took on its functions, and he doubtless had, as some do, binocular vision with squint. He now fixes, sometimes with one eye and sometimes with the other, but always with the physiological conditions of divergence. I find in the right eye weakness of externus and also of internus; in left eye weakness of externus and not much of internus. He had better have converging squint than his present state; but to cut one externus would aggravate the state of general tremulousness which now affects the right eye. I would therefore not do an operation of any kind—the only one which I would consider physiological being to advance one or both recti interni and produce squint. But now I would correct his hypermetropia, which in the right is $+\frac{1}{8}$ and in the left $+\frac{1}{6}$, would cover up and throw out of use the left eye, and make him practise the right eye, and after six months see what has been gained. He should use the right eye for half of every day. I am very glad to see this case. It has been a refreshing puzzle, and this is my solution. I have not time to copy this, but desire to have a copy at your convenience, which I will take.

“ Yours ever,

—.”

Dr. — comments on the same case as follows, and we give his entire note verbatim, simply suppressing the full name of the patient :

“NEW YORK, November 8, 1873.

“C. R. AGNEW, M.D. :

“*Dear Doctor*—In examining K.'s eyes I find that by +50 cyl. axis upright, S. from $\frac{2}{3}^{\circ}$ and $\frac{2}{4}^{\circ}$ is improved to $\frac{2}{3}^{\circ}$ in either eye. With the ophthalmoscope I find the eyes emmetropic. There is some dynamic and ordinary convergence left, but the crossed double images are distinct. The squinting eye, therefore, had another centre of binocular fixation in the inner half of the retina. This condition of projection, undoubtedly acquired before the operation, still exists. The movements of the eyes could not be better. With regard to further details and prognosis, I should like to speak to you on our next meeting. As to treatment, I would recommend the use of the above-mentioned cylindrical glasses.

“Yours truly, ———.”

The glasses recommended by the latter, as the patient desired to try them, were ordered, and the case went from under observation. He returned, however, April 24, 1878, more than four years afterward, stating that he had been troubled by diplopia and pain, “and seeing black and white, kind of peppery” (possibly a conventional phrase for circles of dispersion), since he had worn the cylindrics, just about as much as before. Has been benefited by the glasses only by seeing more distinctly. Vision, however, is now, without glasses, $\frac{2}{3}^{\circ}$ each—an apparent reduction. As the distress of the patient was so great, we determined to do what we should have done before, namely, to nullify the accommodation by atropia.

A solution of sulphate of atropia, four grains to the ounce, was therefore dropped into the eyes five consecutive times, and he was kept in the office during the morning under observation till the full physiological effects were obtained.

He was then examined with glasses, and found to have the following total errors of refraction :

$$\begin{aligned} \text{R. V.} &= \frac{2}{3}^{\circ} \text{ with } +\frac{1}{18} \text{ s. } \ominus +\frac{1}{30} \text{ c. ax. } 95^{\circ}. \\ \text{L. V.} &= \frac{2}{3}^{\circ} \text{ with } +\frac{1}{18} \text{ s. } \ominus +\frac{1}{42} \text{ c. ax. } 90^{\circ}. \end{aligned}$$

May 9th.—Fifteen days afterward he returned, the atropia effect passed off, and reported “eyes never felt better than during the last week,” or the period of lessened accommodation.

Examination with glasses now showed :

$$\text{R. V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{30} \text{ s. } \bigcirc +\frac{1}{48} \text{ c. ax. } 90^\circ.$$

$$\text{L. V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{36} \text{ s. } \bigcirc +\frac{1}{48} \text{ c. ax. } 90^\circ.$$

Which glasses were ordered for constant use.

April 27, 1880.—Returned after an absence of a year, and reports “very much troubled by double images ; catches a double object which flies back to a single one, and so it goes, first double and then single, and is very annoying. Loses the place in reading, and the annoyance is at all distances.”

$$\text{R. V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{24} \text{ s. } \bigcirc +\frac{1}{48} \text{ c. ax. } 90^\circ.$$

$$\text{L. V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{24} \text{ s. } \bigcirc +\frac{1}{48} \text{ c. ax. } 90^\circ.$$

Ordered the above ground upon prisms of $2\frac{1}{2}^\circ$ for each eye, base to nose, to be worn constantly.

April 30th.—Has worn the above glasses since he obtained them, with relief.

Now, the above is a case in which Dr. —, our second correspondent, concluded, after ophthalmoscopic examination, that both eyes were emmetropic, although both accepted a + cylindric in the glass-test. Dr. Webster and myself found that the right eye, under glass-test, had a manifest hypermetropia of $+\frac{1}{36}$, and that the left eye was emmetropic—that is, refused a $+\frac{1}{72}$, or $-\frac{1}{72}$; that the right eye, under the ophthalmoscope, was $+\frac{1}{48}$ hypermetropic, and the left eye emmetropic. Dr. —, our first correspondent, found the hypermetropia to be $+\frac{1}{18}$ in the right eye, and about $+\frac{1}{36}$ in the left eye, but does not say whether with glasses or the ophthalmoscope, or with both.

Under atropia, Dr. Webster and I found the eyes as follows :

$$\text{R. V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{18} \text{ s. } \bigcirc +\frac{1}{36} \text{ c. ax. } 95^\circ.$$

$$\text{L. V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{18} \text{ s. } \bigcirc +\frac{1}{36} \text{ c. ax. } 90^\circ.$$

And after the eyes had recovered from atropia, and the snarl been, as it were, taken out of the accommodation, the apparent ametropia :

$$\text{R. V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{36} \text{ s. } \bigcirc +\frac{1}{48} \text{ c. ax. } 90^\circ.$$

$$\text{L. V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{36} \text{ s. } \bigcirc +\frac{1}{48} \text{ c. ax. } 90^\circ.$$

Now, we trust it is unnecessary to say that we do not give these details to attract attention either to our own mistakes or to those of our colleagues, but simply to show what may happen in the experience of men whom every competent judge confides in, and whose studies with glasses and the ophthalmoscope are probably as

acute and painstaking as possible, and in whose decisions, in cases of asthenopia, Helmholtz and Mauthner would doubtless cheerfully acquiesce.

The case is probably not yet cured, and will, more than likely, sooner or later overcome his extreme aversion to a convergent squint, and yield to the wise suggestion of our colleague, Dr. —, the first correspondent.

The following cases of apparent myopia are also of value :

CASE II.—Mrs. M. R., aged thirty-four years ; asthenopia, June 10, 1880.

$$R. V. = \frac{2}{5} \frac{0}{0} : \text{with } -\frac{1}{3} \frac{0}{6} \text{ c. ax. } 180^\circ V. = \frac{2}{5} \frac{0}{0}.$$

$$L. V. = \frac{2}{3} \frac{0}{0} : \text{with } -\frac{1}{4} \frac{0}{2} \text{ c. ax. } 180^\circ V. = \frac{2}{3} \frac{0}{0}.$$

Ophthalmoscopic examination : apparently myopic astigmatism.

Advised to submit to atropia.

July 13th.—Has used a solution of sulphate of atropia of the strength of two grains to the ounce three times a day for two consecutive days.

$$R. V. = \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{4} \frac{0}{2} \text{ s. } \odot +\frac{1}{3} \frac{0}{0} \text{ c. ax. } 90^\circ.$$

$$L. V. = \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{4} \frac{0}{2} \text{ s. } \odot +\frac{1}{3} \frac{0}{0} \text{ c. ax. } 90^\circ.$$

Ophthalmoscopic examination under atropia : as above, hypermetropic astigmatism.

CASE III.—J. K., a girl, aged twelve years, has for a year and a half suffered from blurring of vision and pain over the eyes.

October 21, 1879.—

$$R. V. = \frac{2}{7} \frac{0}{0} : \text{with } -\frac{1}{2} \frac{0}{4} V. = \frac{2}{3} \frac{0}{0}.$$

$$L. V. = \frac{2}{5} \frac{0}{0} : \text{with } -\frac{1}{2} \frac{0}{4} V. = \frac{2}{3} \frac{0}{0}.$$

The ophthalmoscope shows small crescent of choroidal atrophy at temporal edges of disks, and apparent myopia. It seems less than $-\frac{1}{2} \frac{0}{4}$, however.

Ordered atropia and colored glasses.

November 12, 1879.—The atropia was used sixteen days, and stopped six days ago.

$$R. V. = \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{2} \frac{0}{4}$$

$$L. V. = \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{2} \frac{0}{4}$$

Instead of an apparent myopia of $-\frac{1}{2} \frac{0}{4}$, the child now has a manifest hypermetropia of $+\frac{1}{2} \frac{0}{4}$; ordered $+\frac{1}{2} \frac{0}{4}$ for constant use. The case

may safely be regarded as one in which a progressive myopia was being developed in hypermetropic eyes.

CASE IV.—February 15, 1878.—T. H., an architect, aged seventeen, complains that the steady use of his eyes at his drawing and in reading produces dimness.

$$\text{R. V.} = \frac{2}{4} \frac{0}{0} : \text{with } -\frac{1}{4} \frac{1}{8} \text{ V.} = \frac{2}{2} \frac{0}{0}.$$

$$\text{L. V.} = \frac{2}{4} \frac{0}{0} : \text{with } -\frac{1}{6} \frac{1}{0} \text{ V.} = \frac{2}{2} \frac{0}{0}.$$

Ophthalmoscope : emmetropic, both. Ordered atropia.

February 16th (the next day).

$$\text{R. V.} = \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{2} \frac{1}{0}.$$

$$\text{L. V.} = \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{3} \frac{1}{6}.$$

Atropia continued daily.

February 19th.—

$$\text{R. V.} = \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{18}.$$

$$\text{L. V.} = \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{2} \frac{1}{0}.$$

March 1st.—Effects of the atropia passed off.

$$\text{R. V.} = \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{7} \frac{1}{2}.$$

$$\text{L. V.} = \frac{2}{2} \frac{0}{0} \text{ with } -\frac{1}{7} \frac{1}{2}.$$

But on putting $+\frac{1}{3} \frac{1}{6}$ over both eyes, and compelling the patient to wear them, vision presently became $\frac{2}{2} \frac{0}{0}$. Ordered $+\frac{1}{3} \frac{1}{6}$ for constant use, with the prospect of changing glasses to a nearer approximation to total hypermetropia.

CASE V.—February 7, 1880.—Miss F., aged fifteen, has had recurring styes and blepharitis marginalis, for years.

$$\text{R. V.} = \frac{2}{2} \frac{0}{0} : \frac{2}{2} \frac{0}{0} \text{ with } -\frac{1}{6} \frac{1}{0} \text{ c. ax. } 180^\circ.$$

$$\text{L. V.} = \frac{2}{2} \frac{0}{0} : \frac{2}{2} \frac{0}{0} \text{ with } -\frac{1}{6} \frac{1}{0} \text{ c. ax. } 180^\circ.$$

Ophthalmoscope : no lesion ; both eyes apparently emmetropic.

February 11th.—Atropia gr. iv. to ounce instilled three times in each eye during the morning.

$$\text{R. V.} = \frac{2}{8} \frac{0}{0} : \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{4} \frac{1}{2} \text{ s.}$$

$$\text{L. V.} = \frac{2}{6} \frac{0}{0} : \frac{2}{2} \frac{0}{0} \text{ with } +\frac{1}{3} \frac{1}{6} \text{ s.}$$

An hour later, mouth dry and other signs of complete atropine effect. V. = $\frac{2}{2} \frac{0}{0}$ each eye with $+\frac{1}{3} \frac{1}{6}$.

CASE VI.—March 17, 1880.—P. H. W., a boy aged twelve, complains of near-sightedness. Has some pain after reading a few moments.

Ophthalmoscope : myopia $-\frac{1}{8}$. No staphyloma posticum.

$$\text{R. V.} = \frac{2}{3} \frac{0}{0} : \frac{2}{3} \frac{0}{0} \text{ with } -\frac{1}{6} \text{ s.}$$

$$\text{L. V.} = \frac{2}{3} \frac{0}{0} : \frac{2}{3} \frac{0}{0} \text{ with } -\frac{1}{8} \text{ s.}$$

March 20th.—Under atropia.

$$\text{R. V.} = \frac{2}{4} \frac{0}{0} : \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{8}.$$

$$\text{L. V.} = \frac{2}{4} \frac{0}{0} : \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{8}.$$

April 10th.—After effects of atropia had entirely gone, apparent myopia also gone, and replaced by a manifest hypermetropia in each eye of $+\frac{1}{6}$. Ordered $+\frac{1}{6}$ for near work.

CASE VII.—November 27, 1875.—W. B. G., aged twenty-one, complains of black specks before eyes, and defective vision.

$$\text{R. V.} = \frac{2}{7} \frac{0}{0} : \text{V.} = \frac{2}{3} \frac{0}{0} \text{ with } -\frac{1}{3} \text{ c. ax. } 180^\circ.$$

$$\text{L. V.} = \frac{2}{3} \frac{0}{0} : \text{V.} = \frac{2}{3} \frac{0}{0} \text{ with } -\frac{1}{3} \text{ c. ax. } 180^\circ.$$

Ophthalmoscope : no lesion ; apparently myopic astigmatism.

November 29th.—Ordered $-\frac{1}{3}$ c. ax. 180° for both eyes, to be worn constantly.

May 22, 1878.—“Has failed to use the glasses as much as he should, and does not see as well as he should.”

May 24th.—

$$\text{R. V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{3} \text{ c. ax. } 90^\circ \text{ } \subset \text{ } -\frac{1}{3} \text{ c. ax. } 180^\circ.$$

$$\text{L. V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{3} \text{ c. ax. } 85^\circ \text{ } \subset \text{ } -\frac{1}{3} \text{ c. ax. } 175^\circ.$$

June 3d.—Under atropine.

$$\text{V.} = \frac{2}{3} \frac{0}{0} \text{ each with } +\frac{1}{4} \text{ c. ax. } 90^\circ \text{ } \subset \text{ } -\frac{1}{4} \text{ c. ax. } 180^\circ.$$

June 17th.—

$$\text{V.} = \frac{2}{3} \frac{0}{0} \text{ each with } +\frac{1}{3} \text{ c. ax. } 90^\circ \text{ } \subset \text{ } -\frac{1}{3} \text{ c. ax. } 180^\circ.$$

Atropia effect passed off. Ordered the above for constant use.

CASE VIII.—Apparent emmetropia with the ophthalmoscope.

August 10, 1878.—W. R. P., aged twenty-nine, clerk, had some trouble with his eyes in 1860, which the doctor called “weakness of the optic nerves,” and, though temporarily benefited by tonics and attention to his general health, the weakness of the eyes has continued. They ache on use and whenever he gets fatigued.

$$\text{R. V.} = \frac{2}{3} \frac{0}{0} : \text{V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{6} \text{ c. ax. } 90^\circ.$$

$$\text{L. V.} = \frac{2}{3} \frac{0}{0} : \text{V.} = \frac{2}{3} \frac{0}{0} \text{ with } +\frac{1}{6} \text{ c. ax. } 100^\circ.$$

Insufficiency of the interni 4° at 1', and of the externi, 1° at 20.

Ophthalmoscope : no lesion ; both eyes apparently emmetropic.

August 14th.—After three instillations of a four-grain solution of atropia, and waiting three hours :

$$\begin{aligned} \text{R. V.} &= \frac{2}{3} \frac{0}{0} \text{ with } + \frac{1}{14}. \\ \text{L. V.} &= \frac{2}{3} \frac{0}{0} \text{ " } + \frac{1}{10}. \end{aligned}$$

August 28th.—Effects of atropia having passed away :

$$\begin{aligned} \text{R. V.} &= \frac{2}{3} \frac{0}{0} \text{ with } + \frac{1}{24}. \\ \text{L. V.} &= \frac{2}{3} \frac{0}{0} \text{ " } + \frac{1}{24}. \end{aligned}$$

Which were ordered for constant use.

CASE IX.—Largely underestimated hypermetropia with the ophthalmoscope.

October 16, 1877.—C. W. L., aged twenty-seven, has had inflammation of edges of eyelids for three years. The more he uses the eyes, the more irritable the lids become. V. = $\frac{2}{3} \frac{0}{0}$ each; cannot read $\frac{2}{3} \frac{0}{0}$ through $+\frac{1}{7}$ with either eye. No muscular insufficiency.

June 13, 1878.—V. = $\frac{2}{3} \frac{0}{0}$ each; cannot read $\frac{2}{3} \frac{0}{0}$ through $+\frac{1}{7}$ with either eye. Ophthalmoscope: slight hypermetropia; no lesion.

After instillation of atropia thrice, and waiting one hour :

$$\text{V.} = \frac{2}{3} \frac{0}{0} \text{ with } + \frac{1}{36} \text{ s. } \odot + \frac{1}{60} \text{ c. ax. } 180^\circ \text{ each.}$$

CASE X.—Hypermetropia largely underestimated with the ophthalmoscope.

March 2, 1878.—Mrs. J. M. G., aged twenty-nine, has had for a year an itching and burning sensation in the eyelids, with occasional blurring of the sight. Some pain also, and soreness of the eyes. For the last eight or ten years has had frequent attacks of severe headache, confined to the left side of the head and the left eye. These attacks have increased in frequency, and of late occurred as often as once a week.

V. = $\frac{2}{3} \frac{0}{0}$ each : $+\frac{1}{7}$ blurs each eye. Ophthalmoscope, apparent hypermetropia $+\frac{1}{48}$ each, and small central or physiological excavation of the disks.

After two instillations of atropia, and waiting :

$$\begin{aligned} \text{R. V.} &= \frac{2}{3} \frac{0}{0} \text{ with } + \frac{1}{15} \text{ s. } \odot + \frac{1}{48} \text{ c. ax. } 90^\circ. \\ \text{L. V.} &= \frac{2}{3} \frac{0}{0} \text{ with } + \frac{1}{14} \text{ s. } \odot + \frac{1}{48} \text{ c. ax. } 90^\circ. \end{aligned}$$

It may be said that such cases are rare and exceptional, and that in the vast majority of cases of asthenopia we are justified in prescribing after a glass and ophthalmoscopic test. That may be so,

but we are bound to confess that we have never had occasion to regret the more thorough method of the threefold glass and ophthalmoscopic test applied before, during, and after atropia, and to affirm that the inconvenience to the patient of having the accommodation suspended for several days is as nothing compared with the doubt which so frequently clings to the prescription of glasses without the factor which the entire nullification of the accommodation alone admits of. Especially is this true as regards the classes of eye-workers in school and professions. The proper selection of a pair of glasses in such cases is often of unspeakable value. It often determines the question whether a student should turn from a chosen vocation, upon which he may have already spent much time and effort, to an avocation for which he has no taste or aptitude.

The few days of inconvenience resulting from the use of atropia is as nothing compared with its possible and probable advantages. Moreover, it is not unfrequently in cases in which your glass and ophthalmoscopic tests seem to be most conclusive that a mistake may arise.

We trust that we need not say that we are expert in the use of the ophthalmoscope, or that we are not. Our colleagues must judge. They have often done us the credit, however, of saying that we were. This much we do know: that we have not unfrequently made mistakes in determining errors of refraction with the ophthalmoscope alone. We have heard of it through the kindness of our colleagues, and occasionally through the complaints of patients. We have known the best skilled of our colleagues to make similar mistakes, and we are not sure that our being allowed to "stand alone" in the advocacy of the views advanced in this communication was not more due to the want of time for confessions all around the circle than from any inherent heresy in the views themselves.

Are we, then, to be charged with undervaluing the ophthalmoscope as an instrument for studying the means of refraction? By no means. Its value will be all the greater if we studiously limit, or guard, its application, and test its revelations by every possible clinical method. If we rely upon it with anything resembling abject or servile subjection we may be deceived, especially if we cripple ourselves by drawing false conclusions from the apparent dicta of the fathers. Much as we love the latter we must remember that they nowhere claim infallibility, and that our filial loyalty will be best proved by reverently reaching out on all sides for the truth, for the truth's sake; and we may find it, at times, apparently

against some of the dicta of past experience. But in our remarks, as well as in this brief clinical paper, we are advancing no new doctrine, much less promulgating heretical opposition to the teachings of authorities. Were it in keeping with the simple purposes of this brief clinical paper, we might go back over the proceedings of the American Ophthalmological Society, and cite from them, as, indeed, from other current ophthalmic literature, to prove that several of our colleagues have already touched on the same theme, and, therefore, made it apparent that we did not "stand alone." The cases cited in this paper run back as far as 1875, and it would be possible to show from our case-book, that, certainly as early as 1873, and perhaps earlier, we were awake to the dangers of trusting too implicitly or blindly to the ophthalmoscope as the sole test of ametropia.

REMARKS.

DR. H. DERBY asked Dr. Agnew whether Helmholtz had not claimed for the instrument "the ability to determine the optical condition of the eye, independent of its visual power or the statements of the person examined."

DR. AGNEW so understood it.

DR. DERBY inquired whether Dr. Agnew did not himself maintain that, in many cases, the true amount of latent hypermetropia could not be ascertained by the use of the mirror only.

DR. AGNEW replied in the affirmative.

DR. DERBY expressed himself as unable to see any agreement between the statement of Helmholtz and the views held by Dr. Agnew.

DR. AGNEW characterized his agreement with Helmholtz as a *substantial* one.

DR. WEBSTER said that what led to this discussion was an article published in the *Boston Medical and Surgical Journal*, in which the author, Dr. Hasket Derby, asserted that near-sight might begin with spasm of the accommodation, and cited, in support of this theory, the case of a student at Amherst College, whose eyes he had found at his first examination near-sighted. One year later he examined him again and found his near-sight entirely gone, and so concluded that when first examined he had been laboring under accommodative spasm. Three and a half years after the second examination he had made a third, and found that "true near-sight, to a considerable amount, had made its appearance, and the ophthalmoscope showed it to be real, and not due to spasm." This case seemed to him (Dr. Webster) inconclusive, as atropine had not been used. The young man might have had a *recurrence* of spasm of the accommodation, in which case the eyes might have appeared to be really near-sighted when examined with the ophthalmoscope, and yet really not myopic, but retaining the same degree of refraction as when examined the

second time. He (Dr. W.) thought that all would agree that where spasm of the accommodation was excluded the true refraction of the eye could generally be very closely approximated with the ophthalmoscope; that those were mistaken, however, who believed that in all cases of spasm of the ciliary muscle the accommodation was sure to become relaxed under the glare of light thrown upon the eye in ophthalmoscopic examination.

DR. AGNEW stated that the title of his paper was, "The Insufficiency of the Ophthalmoscope as the Sole Test of Ametropia in the Diagnosis of Asthenopia." He thought that the majority of cases of asthenopia were entitled to an examination both with the ophthalmoscope and with atropia: first, with the ophthalmoscope and then with atropia; then, after the effect of the atropia has passed off, with glasses and atropia.

Dr. Agnew thought all these means should be employed because he did not know in just what cases spasm of the accommodation could be determined without that sort of an analysis.

DR. KNAPP thought spasm of the accommodation was a rare occurrence; but he concurred with Dr. Agnew, that, in obscure cases of asthenopia, all means at our command for making a diagnosis should be employed.

Dr. Knapp remarked that the use of the ophthalmoscope was certainly not the only means of determining the refraction of the eye, but that it was probably the best. He wished to point out those conditions in which its use would lead to fallacious opinions:

First.—He had committed errors when the relief of the fundus oculi was irregular. *Secondly*, in astigmatism. If we examined the minute blood-vessels—those, for instance, which passed from the disk directly toward the yellow spot, we obtained the refractive condition of a particular meridian only (the vertical, in the above example), and we could appreciate the proper degree of ametropia only by the successive determination of the refraction of fine blood-vessels that showed different directions. The third fallacy was the influence of the ocular muscles upon refraction, particularly in convergent squint, in which, without artificial paralysis of accommodation, we could determine only the far point of the relative accommodation.

THREE CASES OF PERSISTENT PUPILLARY MEMBRANE.

CASE I.—R. A., a boy seven years of age, was referred to me by Dr. R. F. Weir, for divergent strabismus of his left eye. The vision of his right eye was found to be $\frac{20}{xx}$, and that of his left $\frac{20}{c}$. The refraction, as determined by ophthalmoscopic tests, was: right eye, H. $\frac{1}{4}$; left eye, H. $\frac{1}{8}$.

In the right eye there was a small opacity on the posterior capsule of the lens a little to the nasal side of its centre, probably a remnant of the hyaloid artery. The left eye presented a beautiful specimen of persistent pupillary membrane, a condition which the picture of the eye, on opposite page, by Dr. C. Heitzmann, represents far more faithfully than I can describe it in words.

The mother of this child was examined with the ophthalmoscope. Her right eye was found to be myopic $\frac{1}{3}$, and her left myopic $\frac{1}{2}$. Both eyes presented extensive staphyloma posticum.

CASE II.—J. E. W., a married woman, sixty-two years of age, consulted me on account of "a disagreeable feeling as of sticks in the eyes."

I found: right eye, vision $\frac{20}{xl}$ without a glass, made $\frac{20}{xx}$ by $+\frac{1}{2}$; left eye, vision $\frac{20}{xl}$, made $\frac{20}{xx}$ by $+\frac{1}{8}$. Ophthalmoscopic examination revealed the presence of numerous dust-like opacities in the peripheries of both lenses, and abundant floating specks in the anterior portion of the vitreous humor of both eyes. There were also to be seen in the left eye a few delicate, thread-like opacities attached to the sphincter iridis, and extending across the nasal margin of the pupil, and anastomosing with one another.

CASE III.—S. M., artist, thirty years of age, states that two weeks ago the lower "wisdom-tooth," on his right side, became ulcerated, and he abused his eyes by working for hours in succession by a magic lantern; the next day or two he worked on buff paper without a lamp. For the last three or four days his right eye has felt

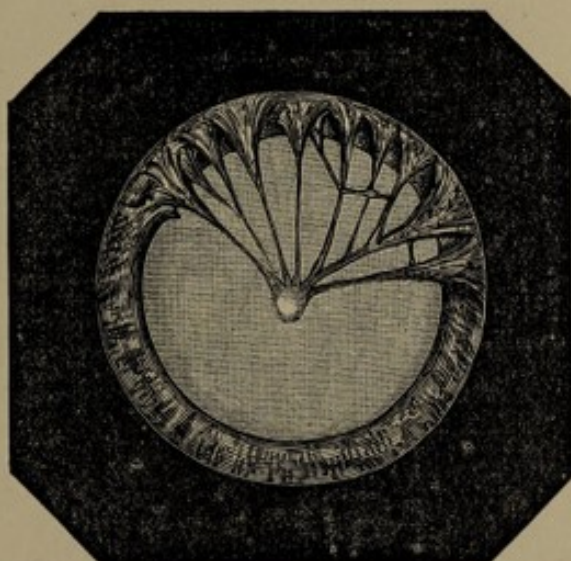
“swelled,” and the vision has become somewhat obscured. The eye is painful afternoons.

The usual tests show :

Right eye, V. $\frac{20}{xxx}$; $\frac{20}{xx}$ with $+\frac{1}{8}$ s. $\subset +\frac{1}{60}$ c. ax. 90° .

Left eye, V. $\frac{20}{xx}$; improved by $+\frac{1}{60}$ c. ax. 90° .

Ophthalmoscopic examination shows small, bead-like, floating bodies in the right vitreous. In the left eye there is a single slender



filament attached at both ends to the pupillary edge, and extending downward and outward across the temporal portion of the pupil—undoubtedly the remains of the foetal pupillary membrane.

After some weeks' rest and the use of atropine in the right eye, with colored glasses, the floating, bubble-like opacities disappeared. Mr. M. was then found to have vision $\frac{20}{xvss}$ in both eyes, with $+\frac{1}{60}$ c. ax. 90° , which glasses were ordered.

It is remarkable that in all three cases reported above the *membrana pupillaris perseverans* affected only the left eye. Also, all the cases were hypermetropic.

The first case illustrates a fact in heredity which I have frequently observed, namely : that where the refraction of the parent is abnormal the refraction of the child is likely also to deviate from the normal type, but may be the reverse of that of the parent.

