

The Science of Optics.

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Myopia

(Continued.)

Usually, on account of the sphincter of the ciliary not having been used to it, following nature's laws, becomes weak and deficient and the Ac. being almost nil, cannot overcome the deep cavity of the lenses selected by the distance test. Then with these in the frame add pairs of + sph's of sufficient strength to make No. 1 (or the smallest type that can be read) legible at the proper distance. These glasses are to be worn constantly.

The reduction of the - sphincter must be as small as possible, as the glasses are of the highest necessity, much more so than when later in life the eyes have become set and hardened. In youth the lenses not only improve the sight more or less, but they also prevent an increase of the defect, prevent squint, and cure the asthenopia.

Asthenopia, headaches, muscular insufficiency and strabismus are all more common when the inter-pupillary distance is great, and so the con. effort of necessity greater than when the inter-pupillary distance is small.

It is by no means difficult to select the proper lenses. Let a case be illustrated. M being determined, it is found that OD with - 7.00 V = $\frac{2}{3}$, this is the weakest, because with - 6.50 D V = $\frac{2}{3}$ only. It is also found in the same way that OS with - 7.00 V = $\frac{2}{3}$.

Removing the disc and directing the client to look at the card with both eyes V = $\frac{2}{3}$ quite clearly. Now, holding in front of the lenses already in the frame a pair of weak + lenses, say + 0.50 D, with these V still equals $\frac{2}{3}$. A pair of + 1.00 is then tried and V still equals $\frac{2}{3}$, but with difficulty and not nearly so clearly as without; then lenses + 1.50 D are tried, but they bring V to $\frac{1}{3}$ only, so + 1.00 is the most that the - lenses can be reduced, and the - 7.00 are changed for - 6.00, which latter are absolutely the weakest possible with which V = $\frac{2}{3}$. With the - 6.00 lenses in the frame the client is told to read the smallest line on the hand-card, if he can do that without strain at 16 in. or so these lenses less 0.50 D, viz., - 5.50 D are what should be given for constant use. But let it be supposed that No. 1 cannot be read with the - 6.00 lenses, then there must be added to the lenses in the frame a pair of weak + lenses, say + 0.50, which might improve the near sight but does not yet make No. 1 legible. Then by increasing the strength to + 1.00 No. 1 is read, and the client is to be given a pair of - 5.00 for constant use, although with them V is, say, = $\frac{1}{3}$ or $\frac{2}{3}$. The sight for the distance is good enough, and these are the proper lenses for close work, as they cause the exertion of the normal quantity of A less 1.00. The my-

ope must be warned strongly against bringing the reading any nearer than 16 in. Such a person could read at 16 in. with - 3.50 D lenses using no Ac., but with the - 5.00 that are given to him, he exerts 1.50 D of Ac. Later on when the ciliary gets stronger, as it should, he will be able to use - 5.50 D lenses for distance and close work and will exert 2.00 D of Ac. for reading at 16 in., and distant V will be $\frac{2}{3}$. If the defect were slighter, say, M 4.00 or less, and the person fully matured, robust, healthy and with the Ac. normally active, the PP with lenses being at the same distance as in Em., then he might be given the full correction for constant use, making V = $\frac{2}{3}$; this, however, is rather risky and had better be avoided by young opticians.

In addition to fitting the lenses, the following advice should be given especially for children, and it is of almost as much importance as the lenses, they all point to the same thing—the prevention of an increase in the defect, by stooping or bringing the work close to the eyes, and of fatiguing or straining the eyes.

(1) For reading, writing, etc., a good, steady light should be used, which must be situated above or at the left side, so that in writing the shadow of the pen be thrown so as not to interfere with V.

(2) Easy fitting collars should be worn, so as to allow of free circulation of blood from the head.

(3) No reading or close work by twilight, or in a bad or flickering light, so that the work need not be approached to the eyes.

(4) No reading or close work when lying down, so as not to strain the motor-muscles by the unnatural position; no reading or close work when riding, driving or walking, nor in a tram so as not to call on the Ac. and Con. for constant changes by the alteration of the distance of the object viewed owing to the jolting.

(5) No close work for a lengthy period without rest.

(6) The amount of reading or employment of the eyes for close work to be strictly limited.

(7) Plenty of out-door exercise.

(8) No reading or close work without proper glasses.

(9) No stooping.

(10) If required a desk to be arranged for a child, so as absolutely to do away with the necessity of stooping.

The proper attention to the above rules and the correction of the defect by lenses should stop completely, or nearly so, any increase of the M. If, however, notwithstanding the lenses it is found in a growing person or child that the M. is really progressive, it is pretty certain that the advice given was not followed, unless the subject is one who has had health or debility to account for the extensive condition of the coats of the eye.

M_p is to be considered as really progressive if it is found in the record book that V = $\frac{2}{3}$ or $\frac{1}{3}$ or $\frac{2}{3}$ as the case might be, with certain lenses, two or three months ago, and that now stronger ones are registered to obtain equal acuteness of V. This must be looked upon as very serious as it indicates a condition of the eyes that can end only in a very diminished utility if not almost complete uselessness. The only remedy is a total abstinence from all close work for a few months, during which time no glasses at all are to be used and no reading, sewing, whatever indulged in, while there should be plenty of out-door work or play, country air, good food and tonic.

It is better for a child to lose a few months from school than that the eyes be ruined for life. It is rare, however, that such heroic measures are necessary, unless really the poor health of the child alone warrants his being toned up and invigorated.

To know that the progress of M in a child has been checked makes it always requisite that the sight be retested say, six months after the first lenses are prescribed. If there be found a slight increase of, say, 0.25 or 0.50 D, this is to be expected, as it is from the impulse that the defect had got before it was corrected, but now it is likely to and should remain stationary.

The necessary changes in the glasses should be made and the parent again forcibly reminded of the necessity of attending to the rules given.

Note if the visual acuteness must be made in the record and the child directed to come back six months later. If now there be again found another increase, or if the first increase found be large, the M must be considered progressive, and it is perhaps as well in these cases of true progressive M to refer the client to an oculist or medical man.

The subjective symptom of seeing flashes of light in high degrees of M is a bad one, as it indicates blood pressure and inflammatory action of the fundus oculi. Numerous muscae volitantes are also bad symptoms, as they may indicate approaching retinal detachment. Such cases should receive medical attention. Tinted lenses are advisable when there are muscae.

In M uncorrected there is frequently photophobia, for which light blue lenses should be prescribed, especially for out-door use. Blue is better than smoke, as it does not reduce visual acuity, which the latter does. In high M, lenses slightly tinted blue (say No. 1) are very advisable to prevent the weakened retinae receiving light that is too strong, and they should also be given when there are complaints of muscae volitantes. In the latter case they might be of rather a deeper tint (say No. 2 or 3), especially if the lenses be strong, or they might advantageously be smoke (tints No. 1 or 2).

In testing M it will be found sometimes that certain lenses are apparently the best correction for distant V, but that at points closer than 20 ft. straight lines look curved