

may have the same physical cause. Support is given to this view of the case by the fact that the difficulty of distinct vision varies decidedly at different times, not so much with moral moods as with variations in mental and physical vigor.

As has already been explained, four-fifths of the cases of internal squint are the result of hypermetropia, or long-sight, and this great deformity, which is increased by use of the eyes, may generally be prevented, and sometimes cured, by proper and timely correction of the optical defect.

The eyes of children with this defect are usually "weak," and become watery and bloodshot after prolonged use. The edges of the lids are often thickened and red. Finally, the constant strain, excessive even for distant vision and painfully so for near, is a frequent cause of headache and other nervous symptoms.

In astigmatism the difficulties are still greater, and, in high grades, cannot be, even temporarily, entirely overcome. Even with the greatest amount of strain, vision is never quite distinct. Professional men of middle age, who have all their lifetime been at work with books without correction of this defect, are heard to say, when provided at last with cylindrical glasses, "this is the first time I have ever seen print distinctly."

Children with long-sight, or astigmatism, often struggle on for years under painful disadvantages, until they finally break down utterly, and an oculist is consulted to decide whether they had better give up school. Of course, they need glasses, and are old enough to wear them if they are old enough to study. They may not be becoming, but neither are headache, bloodshot eyes, wrinkled eyebrows, half-closed lids, or a squint—any or all of which may be the only alternatives, so far as personal appearance is concerned, to say nothing of the importance of continuing their education with comfort and safety. Many people of a conservative turn of mind are greatly shocked at the degeneracy of the times, and the multiplicity and officiousness of eye-doctors, when they see a child with spectacles; ignoring the fact that such children, in the good old times when they themselves were young, were compelled to give up study altogether, or to struggle painfully and irregularly for a partial education.

As might have been expected from what has gone before, the most frequent of the injurious effects that follow tension of the eyes prolonged unduly, or under unfavorable circumstances, is short-sight. The highest authority upon this subject, Prof. Donders, of Utrecht, says: "The distribution of near-sightedness, chiefly in the cultivated ranks, points directly to its principal cause—tension of the eyes for near objects. Respecting this fact there can be no doubt.

"Three factors may here come under observation: 1st, pressure of the muscles upon the eyeball in strong convergence of the visual axes; 2nd, increased pressure of the fluids, resulting from accumulation of blood in the eyes in the stooping position; 3rd, congestive processes in the eye which, tending to softening, give rise to extension of the membranes. Now, in connection with the causes mentioned, the injurious effect of fine work is, by imperfect illumination, still more increased.

"To this it is to be ascribed that in schools where, by bad light, the pupils read bad print, or write with pale ink, the foundation of near-sightedness is mainly laid, which, in fact, is usually developed in these years."

These causes may not only increase to excess a slight degree of short-sight or develop an hereditary predisposition to the defect, but may produce it in an eye originally perfect. It has been positively established by careful and extensive statistics that short-sight is most frequently, if not almost exclusively, developed during school-life. This is due partly to the fact that the eye during the period of its growth is more liable to change of form, and partly

to the fact that children have a much stronger power of accommodation than adults, and therefore hold objects much closer to the eyes; but, to a greater extent, it is due to preventable causes that are too often overlooked by parents and teachers.

The dangers to be avoided are: a too prolonged tension of the eyes, concentration of the sight upon objects too near, and straining of the external muscles of the eyeball by a position of the book or paper unfavorable to their free and natural movement.

It is important in all cases, and particularly if a tendency to short-sight is known to exist, not to urge or to allow children to keep the eyes fixed upon the book too long without intermission; this is not an imaginary danger, when a certain task is to be accomplished in a given time. No form of punishment that involves this kind of strain should ever be adopted.

The book or paper should never be closer to the eyes than ten or twelve inches, and if there is short-sight enough to prevent the letters from being distinct at this distance, it is usually better to wear proper glasses in studying. The print should, of course, be large enough and clear enough to be seen with ease at a much greater distance, and it is important that pale ink should not be used in writing.

Reducing the size of print has much the same effect as diminishing the amount of light, as the smaller the print the more light necessary to make it distinct, and the closer it is brought to the eye. This is appreciated at the commencement of old-sight, when fine print can be read only in a bright light, because the loss of accommodating power prevents us from compensating for the smallness of the type by bringing it closer to the eyes. Children are able to do this, but they do it at the expense of a strain that may inflict permanent injury upon the eyes. Printers' type, particularly for school-books, is a bad thing to economize in.

The cause that most frequently necessitates a too near approach of the book is a defect in the amount or direction of the light. Dr. Cohn, whose statistics of the examination of more than ten thousand school children in Germany have already been referred to, found that "the narrower the street in which the school was built, the higher the opposite buildings, and the lower the story occupied by the class, the greater was the number of near-sighted children;" he also found that, while in the village schools the proportion of near-sighted pupils was only 1.4 in a hundred, in the city schools it was 11.4 per cent.

It is impossible to establish any general and uniform measure for the proportionate size of windows, as so much depends upon the point of the compass from which the light comes, and, particularly, upon the character and the proximity of surrounding buildings; but it should always be remembered that an excess of light is easily controlled, while a deficiency is an irremediable defect. Dr. Cohn, in a recent publication, maintains that a school-room cannot have too much light, and recommends the very large proportion of a square foot of window-glass for every square foot of floor, and says that less than about half this proportion should never in any case be allowed. Some other authorities consider the proportion of thirty to one hundred usually sufficient.

The direction of the light is scarcely less important than the amount. Much discomfort may be caused by shadows thrown upon the book or paper by the shoulders, head, or hand, but the most injurious direction for light to come from is that directly in front. Such a light not only causes a close approach to the desk, by bending over to shade the eyes from the glare by the brow or perhaps by the hand, or turning of the head to one side, which brings one eye nearer to the work than the other, but the dazzling has a directly irritable effect upon the retina and conjunctiva. It is extremely annoying to the strongest eyes, and is intolerable to persons whose eyes are weak or unduly sensitive.