

tumors, amaurosis; also in cases of intestinal worms. It is a symptom of inflammatory glaucoma and is generally present in confirmed glaucoma and intra-ocular growths; it is induced by blows upon the eye, and the use of certain agents.*

Contraction of the pupil (myosis) is due especially to lesion of the cervical spinal cord, and may be due to meningeal irritation or incipient meningitis. Paralysis of the cervical sympathetic also causes it (or rather non-dilatability), as well as the act of accommodation and some drugs.† Inactivity of the pupil under varying degrees of light is often found in locomotor ataxy, with or without myosis, but with contraction during accommodation. Contraction of pupil induced by opium need not be dwelt upon.

OPTICAL DEFECTS, ASTHENOPIA, STRABISMUS.

In the case of so delicate an organ as the eye, it is not unnatural to suppose that if the sight be good and the eye apparently healthy there cannot be much amiss. As in other instances appearances are deceitful, and leaving out of count at present that vision may be perfect and the eyes functionate well with (double) optic neuritis, an optical defect may exist in an organ the perfection of beauty; and there may be weakness, so-called insufficiency, of one or other of the recti, though there be no squint, and the various ocular movements are properly made.

The normal eye is so constructed that distant objects within its ken are seen without effort, i.e., with the eye (or ciliary muscle) in a passive state; and by what is termed the accommodative effort, effected involuntarily, viz., by contraction of the ciliary muscle, relaxation of the zonula, causing or allowing increase of thickness and of focal power of crystalline lens, near objects are also seen distinctly, and this accommodation can be kept up for hours at a

*The list of mydriatics is on the increase, daturine, hyoscyamine, duboisine, and homatropine hydro-bromate being now employed, but atropine (atropine sulph.) is still by far the most generally available.

†Eserine, the principal ingredient of calabar bean, is a powerful myotic, and pilocarpine, of jaborandi, is a valuable one; and both reduce tension, especially eserine.

stretch with the delightful unconsciousness of one's having eyes. The latter implies also proper innervation of the internal recti, by which the convergence of the optics axes necessary in near work is effected, and a certain relation between the external and internal recti, and that there shall be no disturbing extrinsic causes.

Now, given the typical eye, whose depth, or antero-posterior axis is, say 25 mm., and there are two principal departures from the normal (standard): in one class the globe is too shallow, the axis too short—the far or oversighted, or hypermetropic eye; in the second, the globe is too deep, the axis too long, the shortsighted or myopic eye.

Since in hypermetropia some accommodative effort is required even for far vision and ordinary purposes, the ciliary muscle is never at rest, and there is also an extra strain upon it at near work, conscious effort is soon evoked, and more or less discomfort (which can only be relieved or prevented by the use of convex glasses.)

In myopia good far vision can, of course, only be had by means of concave glasses, and as the eye in a passive state is adapted for *divergent* rays, i.e., for near work, accommodation has, in certain cases, to be suspended while convergence is kept up, a divorce of correlated functions which is apt to cause trouble. There is a third kind of optical defect, astigmatism, in which owing to an abnormal curve of the cornea (or lens), different meridians of the eye have different refractive powers, and in some instances so great is this difference that the eye proves to be both shortsighted and longsighted at the same time. Peculiar cylindrical lenses are required, the ordinary spherical not meeting the indication.

Again, relative or absolute weakness of the internal recti (shown by inability to fix both eyes together upon an object brought up close in the mesial plane), renders prolonged adduction, as in reading or other close work, irksome or impossible, especially if there be general debility, or uterine or ovarian disease, hysteria, &c., which, in turn, induce also weakness or disorder of the ciliary muscle and impaired accommodation.