scowl—and when the 4 D. lenses are placed before the eye at the right angle, the face clears up and the physician can tell by the expression of the patient's face that you have something beneficial, and the patient returns to the other condition if the lens is reversed. In the test for astigmatism, the test by the radiating wheel, the reflex or shadow test was entered into quite fully. I know that persons become so expert that they can tell readily a one-fourth D. astigmatism.

ASTHENOPIA.

Read in the Section on Ophthalmology, at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5-8, 1894.

BY C. M. HOBBY, M.D.

IOWA CITY, IOWA.

Asthenopia is to the visual function what dyspepsia is to the digestive, a congeries of symptoms differing somewhat according to the pathologic views of the physician in charge, and often like dyspepsia cured by the physician instead of by the prescription. As ordinarily employed, without reference to pathology, it comprises several groups of symptoms following the more or less prolonged use of vision at short range, but it is sometimes made to cover uncomfortable vision at all distances; the same symptoms occurring to a presbyopic patient are not usually considered asthenopic, although some logically include unrelieved presbyopia with asthenopia. Not infrequently reflex disturbances, unconnected with the visual organs, are considered as asthenopic phenomena; blepharitis marginalis, which is apparently frequently caused by refractive errors, and mild forms of conjunctivitis, are sometimes considered as symptoms of asthenopia rather than as causes for the ocular discomfort. Accepting hyperopia, especially when associated with astigmatism, as a cause for headaches, and even of the more violent migraines and hemicranias, and believing, as we may, that epileptic attacks have ceased after the correction of refractive error, do we not recognize under all these circumstances that the refractive error is only one factor in the cause, and that back of all there exists a predisposing systemic condition?

Without attempting to describe or define all the symptoms which are grouped around the term asthenopia, patients complain of "sandy feelings," "itching," "smarting," "sticks in the eyes," etc.; symptoms due to hyperemia of the conjunctiva, frequently accompanied by redness, lachrymation, and photophobia; again patients describe their difficulty as "pain in the eyes," "pain over the eyes," "drawing of the eyes," "brow ache," "headache," "shooting pains through the head," "hemicrania," "migraine," etc., some complaining that the pain comes on at once if they begin to read (or use the eyes at short range); others that they feel it if they use their eyes for half an hour; others who persist in reading or in work, especially sewing girls, that they have headache every afternoon except Sunday afternoon; these are the symptoms of overwork and occur normally when the individual uses the eyes too long, just as fatigue follows any excessively prolonged exercise; occurring after only a moderate amount of work, these symptoms are especially entitled to be called asthenopic. Another group of symptoms frequently referred to by patients concerns the visual act; "blurring after reading for a time," "have to change the position of the book," "see spots moving across the page," "some-

times see double," etc., and this group, like the last, may represent the effects of overwork, or when the symptoms occur after only moderate use of the eyes the symptoms may indicate disordered muscular coördination of either the intrinsic or the extrinsic muscles of the eye.

It would be of decided advantage if the term, asthenopia, could be restricted in its meaning to the effects produced by the use of one or both eyes burdened by some abnormal increase in the muscular labor of vision; that is, some burden upon the accommodative function, internal or external; but the symptoms called asthenopic occur in perfectly normal conditions, at least so far as the visual organs are concerned, and we are compelled to consider these cases with others.

No special form of refractive error appears to predominate in asthenopic cases; out of 1,205 cases of refractive error applying for relief from all causes, 58 per cent. complained of asthenopic symptoms; that is the continuous exercise of vision was accompanied with more or less discomfort. Of these cases, 77 per cent. could be considered hyperopic, and 23 per cent. myopic; 31 per cent. had hyperopic astigmatism and 14 per cent. myopic astigmatism; that is 45 per cent. of the asthenopic cases were astigmatic, against 40 per cent. of all cases, showing that asthenopic symptoms occurred in a little larger percentage relatively of astigmatic cases; but this is because the low grades of astigmatism, where there is little impairment of vision, only come under the observation of the ophthalmologist when the patient is suffering from some form of uncomfortable vision.

When we come to consider the great number of cases who have defective vision, from refractive and other causes, but who never complain of those symptoms called asthenopic we are forced, I think, to the conclusion that asthenopia indicates inadaptability to environment, and that it is the individual and not the eyes that are asthenopic. What is true in regard to errors of refraction is apparently true of the so-called muscular asthenopia; while records of heterophoria are not so extensive and the observations made lack the ripening effect of time, and while as in astigmatism of low grade the subject of heterophoria does not consult the physician unless there exists some form of uncomfortable vision, enough observations have been made to show that heterophoria without asthenopic symptoms is sufficiently common, and to lead to the belief that it is not to the muscular insufficiencies alone that the occurrence of asthenopia of the variety termed muscular is to be attributed.

When we observe the different expedients that at times afford relief to asthenopic symptoms, the same lack of coherence is to be found. Patients will often report that they have great relief from glasses that have increased instead of diminished refractive error; the spur of necessity often banishes difficulties of this kind; the uterine specialist, the rhinologist, and the electrician all number asthenopia among the ills relieved by their special methods; and tenotomies that have increased heterophoria have in some manner relieved discomfort.

As asthenopia is not a necessary result of any of the various conditions to which it has been attributed, and is yet often cured or materially improved by relief or attempts to relieve real or imaginary causes of increased effort, or by training the internal or exter-

nal muscles of the eye, as well as by systems of muscular exercise, we can not do too much towards establishing some basis for efforts at relief that shall be less empirical, without substituting a dogmatic physiology of the function of vision. And it is well at this time to protest against the tendency to consider everything connected with the visual organs, as governed by inflexible mathematical formulæ. The evidence is not in, which compels us to believe that the muscles of the eye are innately endowed with certain coördinative functions, or that they have a brain center which is prepared to correlate their movements without the necessity of the training that experience gives, or that their functional activity is exerted under different laws from those governing the rest of the muscular system. It may be believed that the coördinated movements of the muscles of the eyes to perform a given task is the result of the same kind of practice, the same kind of training that pursued through a long time gives to the fingers and hands of the typesetter or the musician their distinctive skill, the same kind of training and experience that the babe must go through with before standing on its feet and walking.

A man accustomed to the work may saw wood for ten hours, a woman may busy her fingers in knitting for the same length of time, but the man unaccustomed to the saw would soon find back and arms complaining of the unwonted labor, and the inexperienced knitter would soon feel fatigue in the fingers; the same is true with those who attempt to use the eyes at new and prolonged tasks; the adult whom will or circumstances kept from studious habits in early life, suddenly attempting to make up lost time; the woman who is suddenly deprived of her means of support and who attempts to gain her livelihood by sewing; the active man who attempts to confine himself to book-keeping; all of these are likely to exhibit asthenopic symptoms whether they have refractive error or not; correcting visual disorders is of undoubted service to them but complete relief awaits their adjustment to environment.

Another numerous class who continually excite our sympathies, and who are preyed upon by spectacle vendors are those who are attempting to work with their eyes for lengths of time out of all proportion to their physical strength; seamstresses who ply the needle from 7 in the morning until 6 at night, and desire glasses to enable them to put in extra hours by artificial light; such cases, like some opticians, look upon the eye purely as an optical apparatus that only requires a little mechanical adjustment to go on with its work.

Ill health is a fertile source of asthenopia, and with impairment of general health we find refractive errors assume a greater importance than would otherwise have been the case; here relief of the ocular strain often proves to be not only an assistance to the use of the eyes but also to the efforts to improve the general health.

Sometimes an individual is unable to concentrate his attention upon the work in hand and uses the eyes at irregularly varying distances, and in various positions as to light and direction of the object looked at, and thus multiplying work unnecessarily, suffers from fatigue where systematic work would have been borne with ease; the student who without interest pursues his task and constantly suffers may become interested in a novel and spend hours with

no symptom of "eye-strain;" there is less likelihood of fatigue when the mind is on the work, and there is much less irregularity of muscular work.

But in recognizing asthenopia as depending upon something more than disturbance of the purely mechanical part of vision, it is not necessary to reject the assistance afforded by mechanical measures in the treatment. We can believe that the most perfect possible adjustment of glasses will often fail to cure asthenopia, and that a large proportion of cases can be cured without glasses, without at all underrating the use of optical appliances. While fortunately, we are unable to trace very grave pathologic changes to misfits in spectacles, yet it seems as though it were time for the medical profession to call a halt upon the indiscriminate optical treatment of asthenopia by those who have no knowledge of general pathology, or even physiology, and who consequently see in "eye-strain" only disorder of the looking-machine. Where rest is needed, and where exercise and training are required, where asthenopia is a symptom of a general disorder, or where a patient numbers fatigue of vision as only part of general nerve disturbance, equally with the optical imperfections that take from the patient that soundness of body which with the sane mind is required for the perfect use of all the senses as well as all the muscles, all these conditions fall within the province of the physician and are entitled to his thorough scrutiny.

CYCLOPHORIA, ITS DETECTION AND TREATMENT.

Read in the Section on Ophthalmology, at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5-8, 1894.

BY GEO. H. PRICE, M.D.

NASHVILLE, TENN.

Cyclophoria or the rotary tendency of the eye upon its antero-posterior diameter under certain conditions, known also as insufficiency of the oblique muscles, is now a matter of record upon the case-books of so many, as to no longer be a question of speculation. When the question of insufficiency of the obliques in certain cases of oblique astigmatism, was first presented and fully elucidated by Savage, of Nashville, Tenn., there was in the minds of some room for doubt as to the verity of the statement, but I am now ready to believe that this statement is received as a fact, by those who have given the question sufficient thought and have applied to it those tests which we now have at hand for demonstrating this condition.

For a long time only the grosser errors of balance of the obliques were considered of importance, and the methods of arriving at conclusive evidence were of such a character as to render it difficult, if not impossible, to bring out this defect unless well marked, or the patient was of that class of observers upon whose statements one can rely with certainty. These difficulties have been overcome, and the means of detecting the condition have been so much simplified that to-day we can not only detect but determine in degrees even small variations from the proper adjustment of these muscles.

Cyclophoria is not only found in oblique astigmatism, where we would naturally expect it, but is also present in many cases where there is no obliquity of the astigmatic condition and also in cases in which