With Compliments of the Author.

A COMBINED

Visual and Astigmatic Test-Card

Of Words made up of Letters Confusing to the Astigmatic Eye—Remarks on Astigmatism, Characteristic Mannerisms.

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Read in Section of Ophthalmology, Otology and Laryngology of the American Medical Association, May, 1884.

Reprinted from the Journal of the American Medical Association, August 23, 1884.

CHICAGO:
A. G. Newell, Printer.
1884.

Visual and Astigmatic Test-Card.

The influences of optical defects are three-fold; first, productive of vision less than normal; second, are productive of certain ocular diseases or render acute attacks of eye disease chronic by their presence; third, there are produced by their presence, headache, nervous symptoms, gastric disturbance, many cases of so-called biliousness and a chain of reflex symptoms due to the accommodative effort. Cases presenting a manifest defect of vision, seek relief by glasses, and are satisfied either partially or fully, as the manifest or total defect is corrected. In cases where ocular disease, or the form of trouble described under the third classification exists, accommodative effort may conceal the defect, which any of the mydriatics will expose and relieve the symptoms if they are the result of the optical condition of the eye; glasses are required to take the place of the therapeutic action of the mydriatic, and they represent the accommodative effort, which is not natural to an emmetropic eye.

Simple myopia or hypermetropia is productive of trouble in a small proportion of the cases under the second and third classifications, but more prevalent in the first. The myopic or hypermetropic forms of astigmatism are the more frequent condition in the last two classifications; either alone, simple astigmatism, or combined, the former with myopia, the latter with hypermetropia, compound astigmatism; or the two forms of simple astigmatism may co-exist, forming mixed astigmatism.

In a paper I read before the American Ophthalmological Society, 1880, a tabular report exhibiting

the position of the axis of the cylinder in simple, compound and mixed astigmatism, the myopic and hypermetropic form compared, with remarks, (Transactions, 1880), it is stated that simple astigmatism is present in 45½ per cent., compound astigmatism in 50 per cent., mixed astigmatism in 4½ per cent. of cases of abnormal astigmatism. A continued experience in refraction imposes a stronger belief of the influence astigmatism has as an optical defect in producing trouble, especially in the third classification.

While an instrument of precision, like the ophthalmoscope, enables these defects to be recognized, by either the direct or indirect method, or by keratoscopy or retinoscopy, the instrument must be properly handled, which is not difficult if undertaken to be learned, and though numerous visual tests already exist to enable the defect to be exhibited by a patient, they require a proper understanding to attain a diagnosis; and several tests have to be appealed to instead of one.

It has been my desire to put in the hands of the medical profession a visual test that will exhibit manifest defects more markedly, and bring out to a greater degree latent defects without a mydriatic, than I have found the various useful tests already devised seem to do, especially for the recognition of abnormal astigmatism; also, to express by the test a value for the defect as it is exhibited by the patient.

A point of light of a given size at a given distance, is sufficient to demonstrate all optical defects, especially astigmatism, certain conditions being obtained to render it fully effective; other simple methods to recognize astigmatism are the inability to recognize with equal definition, at a given distance, the radii of a circle of a given size; or call a letter O an O. Dr. Pray's astigmatic letters; Dr. John Green's test diagrams for the detection and measurement of astigmatism; Dr. Wm. Thomson's ametrometer; Javfal's instrument, and numerous other valuable

methods, by foreign and home observers, are at hand, based on given fixed laws in optics.

The letters in Snellen's type, or in all other letter tests, will exhibit the astigmatic defect; by the way the person tested expresses the name for the spherical and right-angled letters in the test; O is called C or G; F is called P; B is called S; the reverse holding; they distort the letters and are confused.

In simple myopia or hypermetropia with normal astigmatism, no such distortion or confusion occurs, but total obliteration of a letter of a given size, at a given distance according to the degree of the trouble.

This fact of the distortion of the letters by astigmatic eyes, has long been recognized and was spoken of by Dr. Reynolds, of Louisville, at the meeting of this Section of the Association at Richmond, in 1881; I then stated I had used this distortion, as a means of diagnosing astigmatism.

During the past year, I have been trying the value of a test, based on this distortion and confusion of letters, and now present it to the medical profession, especially general practitioners.

The letters most frequently distorted have been selected from Snellen's type and formed into a word; underneath this word have been placed the letters of the same word, as they appear to an astigmatic eye, so that a person affected, will say, that each line of letters is alike, and the word in the upper line and letters in lower line, are the same word; no dissimilarity existing as there would be to an emmetropic eye.

To give an approximate mathematical expression to the degree of the defect, manifest or latent, in myopia or hypermetropia (simple) or in astigmatisms of all forms, the size of the letters are graded in the word from D = 18. to D = 6. Four letters being taken to form the word and four letters in the confusion line below it, same grade and size of letters under one another. The word FOOL has been

selected. In an astigmatism of 1. D manifest or after use of a mydriatic, the test being made from 6 meters, the size of the last letter in the word being D = 6., F. is called P; each O in turn is called C; L is called I; — PCCI underneath FOOL appears the same as FOOL itself, and are stated to be similar in appearance or nearly so. Astigmatism 0.75 D will distort the last three letters in the word at 6 meters, that of 0.50 D the last two letters, that of 0.25 D the last letter at 6 meters.

In simple myopia or hypermetropia with normal astigmatism of 1. D at 6 meters the whole word will be unrecognized and the letters underneath as well; no distortion or confusion occurring, but obliteration from spherical defect.

To obtain the position of the good and bad meridian in astigmatism, the horizontal lines, one above FOOL, the other below PCCI, will enable this to be found out by rotating them horizontally, vertically or obliquely to either side before the patient; the size of the lines are each D = 9. ~~Cited~~ Tested at 6 meters, both are seen clearly in one position and not at right angles to this position, the astigmatism is 0.50 D or more, the axis expressed by the angle they are held, defect same at 9 meters also. The word COCOON D = 9, letters uniform size, if distorted at 6 meters V = $^6/_9$, 0.50 D astigmatism exists or more; ~~A~~ illustrates the same principal as in FOOL and PCCI, only combined in one word and in one line of uniform size; it is a very expressive test and defects are rapidly recognized by it.

For astigmatism higher than 1. D the same type must be brought nearer to exhibit the defect; but in place of this, the word NULLIFIED graded in size from D = 60. to D = 4. can be used; they are confusion letters, and in the letters above the letter D = 18., a defect higher than 1. D will be recognized from either 4 meters, or better at 6 meters; the higher the astigmatism the larger the letter confused.

The word NULLIFIED has been placed at the top of the card and can be used to express visual power, as Snellen's type or others, is to be seen in full from 4 meters, the last letter in the line D = 4. thus recognized in full. $V = {}^{4}/_{4} = 1$ as a letter in list as confused $V = {}^{4}/_{5} - {}^{4}/_{6} - {}^{4}/_{9} - {}^{4}/_{12} - {}^{4}/_{18} - {}^{4}/_{24} - {}^{4}/_{36} - {}^{4}/_{60}$. It is to be brought nearer in higher defects; as $V = {}^{3}/_{60} - {}^{2}/_{60} - {}^{1}/_{60}$, the numerator of the fraction being the distance in meters from which the test is made. At 6 meters D = 6. is last letter recognized.

The word SUFFICIENT, ranging in size from D = 24. to D = 1, is also composed of confusion letters and as a confusion word, is introduced so that the test can be as accurately made in offices that are restricted in size, as well as in large ones, the last letter being D = 1, to be tested from one (1) meter. At 6 meters S, in the word D = 24, will be called B in astigmatism higher than 1. D.

I have adopted the metric system, which is readily convertible into the English foot or French scale.

Manifest defects give more of the defect to be recognized by this test, I find, than by other or more latent conditions can be detected; a mydriatic is required to give the total defect and obtain full effect in correcting all optical defects; certain ocular conditions rendering it unnecessary or dangerous; in the correction of astigmatism there is no half-way, the whole defect must be recognized under a mydriatic.

It must be looked upon as a deformity. Especially is this so in the cases under the second and third divisions I made in the early part of the paper; for to medical men the connection of optical defects with disease are principally interesting and useful as surgical or therapeutical means to obtain relief, the same as any other plan that might be adopted. In addition to these cases, the ophthalmic surgeon is called to treat largely the first class of cases, those with diminished power from all causes, among which optical defects have a decided prominence.

The test may be made to answer a use in studying the visual field, using the word NULLIFIED at ½ a meter, closing one eye and fixing the other eye on the centre of the word and seeing if without moving the eye, the other letters can be recognized; placing the word horizontally, vertically or obliquely to either side will enable limitations or scotoma to be made out. While the test has been devised principally for the recognition of all optical defects, being founded on a scientific basis, as all such tests are, it is accurate for the correction of such defects and for proof of work done by other accepted and necessary tests at the hands of the ophthalmic surgeon.

The presence of abnormal astigmatism, especially of a high degree, can be recognized in a case, without subjecting the patient to a visual test, or an ophthalmic examination; certain characteristic manneriisms exist.

An emmetropic eye can swing around a circle, recognize a letter c with ease; the abnormal astigmatic eye is confined to a tight-rope constraint of visual power, which not only affects his sight, but his idea of objects looked at and the impressions made in his brain; he is constantly annoyed; as a person endeavoring to catch a ball with only one finger on each hand.

The position of the head, held at an angle, depending on the position of the axes of the good or bad meridian, gives them a peculiar pose; the narrowing of the palpebral fissure of the eyelids, to compensate for the defect, mars their facial expression and produces in youth the wrinkles of old age, about the eyes and forehead. The use of opera glasses, microscopes, telescopes, do not give the satisfactory results as to the perfect eye; seeking aid by spherical glasses they find none.

The design of the material of a costume, the selection of wall paper, carpets in a home, display their characteristic sight.

When the ciliary muscle gives way in the attempt at compensation, they become sufferers from bilious headache, which a darkened room and closed eyes for a day or two relieves; not the medicine taken; they begin again; till exhaustion follows again; such cases are literally sea-sick on land, on the high sea they are not sufferers from looking at the movement of the waves, as an emmetropic eye may be; to such cases with perfect eyes a pair of strong cylindrical glasses will give comfort, as the astigmatic eye finds relief in removing their correcting glass.

That certain cases of seasickness are due to annoyance from this movement of the waves, is a fact, and the suggestion of prevention by cylindrical glasses is only made to those so affected, other causes of seasickness not being considered. A personal experience with and without correction and statements from other persons so afflicted, justifies the statement of the fact. In our schools and colleges, theological seminaries and later literary life, also in the arts, astigmatism produces the greatest annoyance.

Letters and words are viewed that require a spherical eye to convey them to the retina, then to cause ideas in the brain and obtain results. Such persons work at great advantage; there is no distortion of letter, confusion of words, nor working at great odds in obtaining ideas. The astigmatic eye has its own letters and words; they are always uncomfortable, as a person translating a language with a dictionary at hand; the extra labor, uncertainty, mistakes, discouragements, often classified as stupid, render a literary life distasteful. If persisted in, health is impaired and serious lesions are produced in the eye itself. In the arts, a longer time is taken to do a given piece of work, and then not so well done.

There is no reason so potent for abolishing Greek from the schools and colleges as the inability of the astigmatic eye to recognize its characters readily, the

frequency of the defect, renders it distasteful to students and a great annoyance in studying it.

The fate of a friend in scanning Homer often resulted in his teacher's saying, "sit down 'ονος,'" when he gave that word for "ωνος," and the solid contents of the book not infrequently was attracted to the master's head, as a result of the indignity to his student.

The Hebrew type in the theological seminaries, and the German type are equally as annoying. The musical score is subject to the same criticism. The Roman letter should prevail for all these languages, as that is sufficiently troublesome to an astigmatic eye, but less so than other type. German medical works are largely in Roman type, and a recent statement that 800 medical men in New York City were studying German is not to be wondered at.

I am greatly indebted to J. W. Queen & Co., of Philadelphia, Pa., for the manner in which the test has been lithographed for use by the profession.

In addition to this test, I have been using for some time an arrangement of Dr. Pray's astigmatic letters, combining them into two words under one another, PUBLIC NOTICES. It gives an opportunity to locate the good meridian quickly, and after correction of the defect, is a good proof of the correctness of the work.

The size of the lines in the letters should be D=12. or D = 9. This test has not been lithographed.

To produce a test for the near point on the plan of the test first described is not necessary, the same confusion of words after distortion of letters will be found to exist for the near as the far point. So selecting these words in the text of Snellen or others at the proper point and using the proper size, the same will be found to exist.

The effects of astigmatism are constant, and the correction of the defect requires the constant use of glasses for far and near.