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A NEW APPARATUS FOR DETECTING AND MEASURING THE ANOMALIES OF THE OCULAR MUSCLES.*

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The renewed interest which of late years has been awakened in the study of the ocular balance has served to demonstrate the necessity for some form of apparatus which would facilitate the work of the surgeon, and at the same time secure trustworthy measurements of the relative strength of the ocular muscles. The use of the series of prisms ordinarily found in our sets of test-glasses, was notoriously tedious, fatiguing both to patient and surgeon, and withal variable in

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results, so that the temptation to avoid a wearisome task constantly presented itself, since at the end there was placed but little confidence in the result.

It is not my purpose to discuss here the anomalies of the ocular muscles, but to describe briefly an instrument devised to meet the indications suggested above. In passing it may be said that not infrequently muscular defects parade themselves in a manner to deceive the observer, as to the real muscles at fault, or the defect may be wholly or in part concealed, but nevertheless the cause of ocular disturbance or reflected symptoms. To detect these latent disorders, or to unravel successfully the vagrant and confusing movements of the eyes, it is helpful to have the patient as far as possible in a position of general muscular rest, and the eyes placed under conditions which remove the ordinary inducements to binocular vision. It is furthermore desireable that these conditions shall be simple and readily understood, since for the most part our patients are not trained to habits of accurate observation. Then, too, the persons suffering from these anomalies are apt to be

"nervous," are afflicted with headache, particularly with occipital pain, which is aggravated by any protracted examination. The occular muscles become irritable under the effort to measure their relative strength, so that the more persistent the trial, the less trustworthy are the results reached. Nothing could be more annoying to the eyes of an already suffering patient, than the heavy trial-frame resting upon the nose, and the placing and replacing in wearisome successions of the cumbersome prisms of the test-set. To avoid these annoyances and at the same time meet the requirements for a rapid and careful determination of any existing anomaly I have had constructed, by John L. Borsch and Company, of Philadelphia, the apparatus here described. With various modifications I have used it daily for more than three years, and now present it in the hope that others may find it an additional aid in the daily routine of office work.

At the meeting of the American Ophthalmological Society, in July, 1889, I presented a convenient form of the Cretes rotary prism, a description of which will be found in the transactions for that year. The wood cut of

this instrument is here reproduced, Fig. I. The instrument now described is a fixed form of apparatus for the accurate use of the rotary prism and certain other accessories, *e. g.* the correcting-glasses for any existing defect of refraction, the stenoparic slit, the Maddox double prism and rod. The accompanying wood-cut, Fig. II, exhibits its details in a manner which will obviate any necessity for lengthy description. The essential part of the apparatus is the *holder* which can be mounted upon a stand designed to rest upon a table or desk—or as in the cut upon a floor-stand which is placed by the side of the chair occupied by the patient. At the top of this stand there is placed a strong horizontal arm, which is carried to the front of the patient and supports a second upright shaft, which moves

Fig. I.

up and down freely but is fastened at any desired height by a binding screw. On this shaft is placed a chin rest, N. and at its top the holders K. and accessories are supported. L. L. are a pair of rings or cells for the reception of the rotary prisms. These are hung on a spring hinge which permits them to be turned forward and downward below the line of vision, so that the prisms are out of the way when not in use, but are readily turned upward into place when desired. A rotary prism should be placed on each side for rapid working, the zero mark at 180° on one side and at 90° on the other. On the posterior surface of the holders, K. is seen the ring J. J. This is hung on a spring-hinge and on the left side is represented as turned outward, out of the line of vision, but *in situ* on the right side. These are designed for the reception of the Maddox double prism or rod, each of which are mounted in a cell which accurately fits these rings, and may be turned to any desired position, being checked at 90° and 180° by a stop-spring. These may be retained permanently in place, but are readily removed and replaced when desired, by other cells

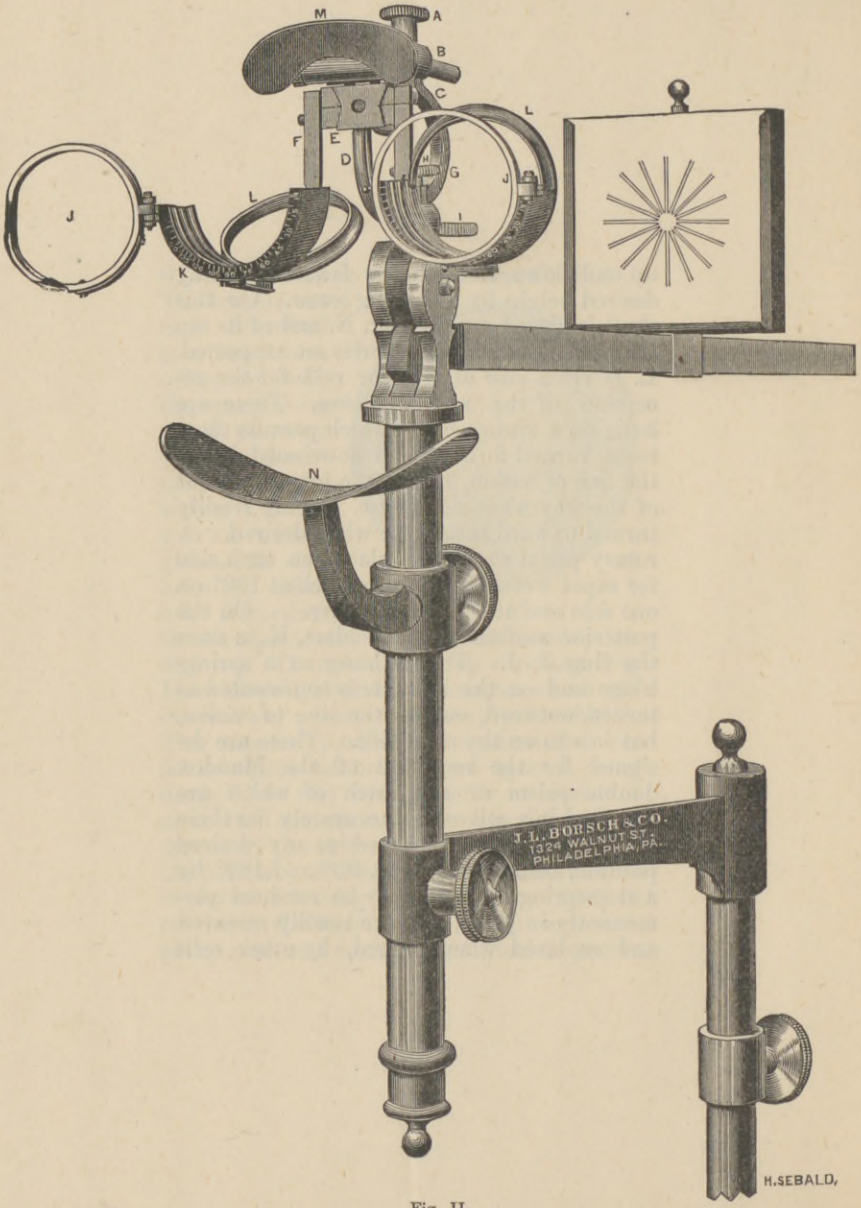
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Fig. II.

containing a stenoparic slit, a blank metal disk for excluding one eye, and a third with a central opening 2½ mm. in diameter to act as a diaphragm in correcting certain cases of high refractive error with widely dilated pupils.

M, is a brow-rest, adjusted by means of the screw A. Just below the border of this is seen a spirit level without which the triple images produced in using the Maddox double prism or the bar of light, as produced by the rod—are not easily maintained in a strictly vertical or horizontal position. When inclined they are confusing to the patient. The bar, with carrier on it containing the astigmatic chart is designed for work at a near point. The carrier moves freely to and fro on the bar and carries a series of test cards. The bar can be removed when not in use or turned down out of the line of vision.

The rotary prisms when in place as suggested above furnish a most ready and rapid method of determining the power of adduction, abduction and sursumduction at 6 m. or .50 m. At 6 m. a small point of light is used, while at the near point a small word

of D = .50 is placed in the centre of a white card. In all these respects, however, the instrument lends itself to the preferred methods of the observer as readily as does his test set and trial frames.