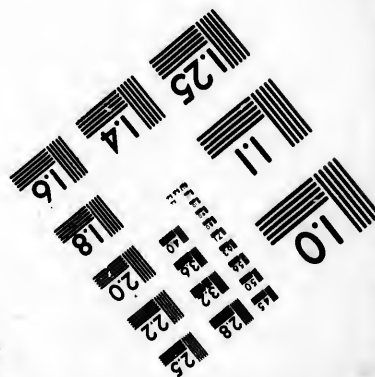
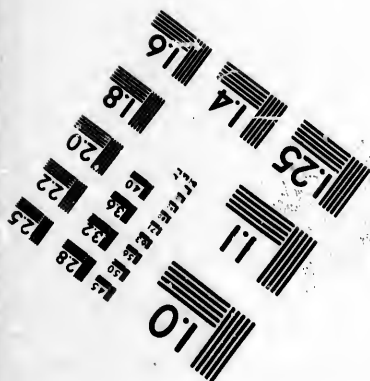
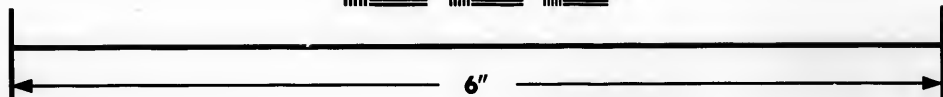
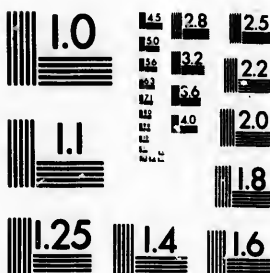


**IMAGE EVALUATION  
TEST TARGET (MT-3)**



**Photographic  
Sciences  
Corporation**

23 WEST MAIN STREET  
WEBSTER, N.Y. 14580  
(716) 872-4503

15 128  
16 32 125  
17 22  
18 20

**CIHM/ICMH  
Microfiche  
Series.**

**CIHM/ICMH  
Collection de  
microfiches.**



Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

11  
10  
01

**© 1985**

Technical and Bibliographic Notes/Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured covers/  
Couverture de couleur
- Covers damaged/  
Couverture endommagée
- Covers restored and/or laminated/  
Couverture restaurée et/ou pelliculée
- Cover title missing/  
Le titre de couverture manque
- Coloured maps/  
Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black)/  
Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations/  
Planches et/ou illustrations en couleur
- Bound with other material/  
Relié avec d'autres documents
- Tight binding may cause shadows or distortion  
along interior margin/  
La reliure serrée peut causer de l'ombre ou de la  
distorsion le long de la marge intérieure
- Blank leaves added during restoration may  
appear within the text. Whenever possible, these  
have been omitted from filming/  
Il se peut que certaines pages blanches ajoutées  
lors d'une restauration apparaissent dans le texte,  
mais, lorsque cela était possible, ces pages n'ont  
pas été filmées.
- Additional comments:/  
Commentaires supplémentaires:

- Coloured pages/  
Pages de couleur
- Pages damaged/  
Pages endommagées
- Pages restored and/or laminated/  
Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed/  
Pages décolorées, tachetées ou piquées
- Pages detached/  
Pages détachées
- Showthrough/  
Transparence
- Quality of print varies/  
Qualité inégale de l'impression
- Includes supplementary material/  
Comprend du matériel supplémentaire
- Only edition available/  
Seule édition disponible
- Pages wholly or partially obscured by errata  
slips, tissues, etc., have been refilmed to  
ensure the best possible image/  
Les pages totalement ou partiellement  
obscurcies par un feuillet d'errata, une pelure,  
etc., ont été filmées à nouveau de façon à  
obtenir la meilleure image possible.

This item is filmed at the reduction ratio checked below/  
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
					✓						

The copy filmed here has been reproduced thanks to the generosity of:

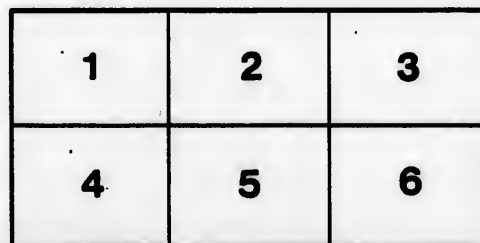
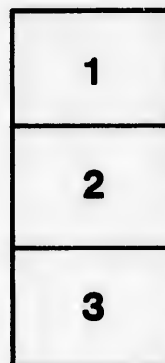
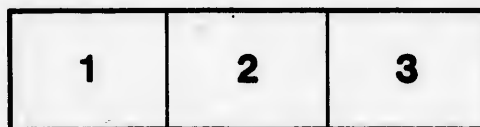
Medical Library  
McGill University  
Montreal

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol  $\rightarrow$  (meaning "CONTINUED"), or the symbol  $\nabla$  (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

Medical Library  
McGill University  
Montreal

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole  $\rightarrow$  signifie "A SUIVRE", le symbole  $\nabla$  signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

ails  
du  
odifier  
une  
mage

rrata  
o

pelure,  
à

32X

An

677

Buller, F.  
With the writer's compliments

[Reprinted from the OPTHALMIC REVIEW, December, 1897.]

---

## ANOMALIES IN THE FUNCTIONS OF THE EXTRINSIC OCULAR MUSCLES.<sup>1</sup>

By F. BULLER, M.D., MONTRÉAL.

---

THE complex phenomena which constitute the act of vision have been so thoroughly elaborated in the science of physiological optics, that the ophthalmologist justly claims for his work a greater exactness than pertains to any other department of medicine or surgery.

Certain well defined laws enable him to detect and successfully contend with abnormal conditions in refraction and accommodation. An absolute standard of visual perfection, both for form and colour, serves as a guide in every functional examination of vision, and the ophthalmoscope enables him to discover the most minute pathological lesions in the interior of the eye itself. A complete and methodical examination will often enable him to determine, with surprising precision, the nature and gravity of morbid conditions beyond the eye and even in other organs of the body. When, however, he comes to investigate the complicated problems presented in the function of binocular vision which, in the presence of a multitude of disturbing influences, may be rendered hopelessly difficult, he feels that he is still treading upon uncertain ground. Since the majority of eyes possess a normal refraction,

---

<sup>1</sup> Read before the Ophthalmological Section at the Meeting of the British Medical Association held at Montreal, August and September, 1897.

a definite power of accommodation and acuity of vision which varies but little in different subjects, though in all these particulars a certain physiological variation is recognised, it would be strange if the muscular movements of the eyes did not correspondingly follow approximately definite laws. In all probability they do, and it is not unlikely that estimated rotating power of the different muscles, as determined by innumerable examinations of the normal muscular functions, is fairly correct as regards both monocular and binocular vision. It is also probable that very considerable variations from the alleged physiological standards of motility thus obtained are consistent with easy and accurate vision. Since, however, slight errors in refraction in certain subjects unquestionably give rise to intense visual disturbance, there seems no reason why the same rule should not apply in cases of defective or faulty motility, except that in so complicated a piece of machinery it may fairly be assumed that the physiological limit is still more variable than is the case with any of the other factors which contribute to the act of vision. However this may be, there is no question as to the existence of serious visual and even systematic disturbances due to faults in the extrinsic muscles of the eyes, especially those which render the function of binocular vision difficult and wearisome.

The series of observations which form the basis of this communication relate, indeed, only to this class of cases.

To begin with I have relied chiefly upon the equilibrium tests made at the standard distance of six metres and assumed that the normal for this distance is the status known as orthophoria. Allowing for physiological variation from this, I have attached little or no importance to lateral deviations of two or three prism-degrees, and I am quite certain there are many persons who present much greater deviations than

this (latent squint) without experiencing the least discomfort.

I have also neglected all cases of hyperphoria which could not be shown to exceed one degree. I am not prepared to assert that one degree or less of hyperphoria may not in some persons cause more or less discomfort. If so this should be relieved by wearing a correcting prism, and I am under the impression that I have succeeded in relieving a few of these cases in this way.

The objections charged against prisms of two or more degrees do not hold good in prismatic action so feeble as this, and it may be that the mere mental effect of wearing glasses accounts for the apparent benefit, as there must be a strong neurotic element in all cases that experience distress from very slight perturbing influences, otherwise we should meet with an infinitely larger number of people disturbed by wearing improperly centred glasses than is actually the case. This statement must not be construed in such a way as to minimise the importance of wearing properly centred glasses in all cases. It is merely intended to point out the incontrovertible fact that there are vast numbers of persons who can and actually do overcome slight artificial deviations without difficulty.

It is not an uncommon experience that weak prisms, worn for the correction of faulty equilibrium, afford relief for some time and then lose their effect. I have come to regard this as an indication for operative interference in some cases where the proper course to pursue was difficult to determine.

The equilibrium tests were made in distance (6 metres) with prisms, Stevens' phorometer and the compound Maddox rod coloured red. I regard this instrument as not less reliable than the Stevens' phorometer, but have habitually used both.

It was essential to have some standard of fusion

power, and the following was accepted as normal. Abduction  $5^{\circ}$  to  $8^{\circ}$ , adduction  $25^{\circ}$  to  $50^{\circ}$ , sursumduction  $2^{\circ}$  to  $3^{\circ}$ .

This standard is not absolute, and is chiefly useful for purposes of comparison. In every case where there is binocular vision, the range of fusion may be temporarily increased in any direction by systematic exercise of the muscles. I have seldom known this apparent increase in power to be long maintained after the exercises had been discontinued.

Equal exercise of all the muscles will sometimes develop a preponderating power in a sense that did not exist before. This fact, when it occurs, is more significant than the original latent tendency. An habitual abduction of  $5^{\circ}$  and adduction of  $25^{\circ}$  (in the absence of hyperphoria) could hardly be regarded as abnormal, but an abduction of  $5^{\circ}$  with an adduction of  $60^{\circ}$  or more, and esophoria of more than  $2^{\circ}$  or  $3^{\circ}$  would probably be sufficient justification for operative interference.

When there is binocular vision with a latent tendency in any direction, and a considerable relative excess of power in the muscles acting in that direction, the fault may safely be corrected by operation—tendon relaxation or tendon shortening. Relief from headaches, asthenopia, and neurasthenic symptoms often follows such operations; they are, therefore, not only justifiable, but positively indicated under such circumstances in the absence of refractive error, or where the refraction has been corrected without affording relief. A careful investigation of every case of muscular anomaly during a number of years in private practice has furnished from a material of 8,000 patients 110 cases that seemed suitable for operative interference, *i.e.*, about 1.4 per cent.; they may be classified as follows :—



Esophoria	...	...	...	37
Exophoria	...	...	...	31
Hyperphoria	...	...	...	30
Hyper-exophoria	...	...	...	10
Hyper-esophoria	...	...	...	2

---

 110

A tabulated statement showing the principal features of each case may be of some interest. The figures showing the degrees of tendency and fusion power are the average of several, sometimes of many measurements in each case.

It will be seen that the number of cases operated upon for the three principal forms of deviation are nearly equal, *i.e.*, 37 cases of esophoria, 31 of exophoria and 30 of hyperphoria. There were only 12 cases requiring operation for the correction of both horizontal and vertical deviation, and only 2 of these were for an upward and inward deviation.

I desire to call attention to this fact, as it is a striking commentary on the contention of those who claim that the chief factor in the ætiology of convergent squint is to be found in the presence of hyperphoria.

A study of the tabulated results shows that there were 39, or 35·4 per cent. of cases which may fairly be classed as cured; 37, or 33·6 per cent., greatly benefited; 20, or 18 per cent., somewhat benefited; 8 unimproved, and in 6 the result was unknown. Leaving out these last 14 cases the operations would appear to have benefited in 87 per cent. of all the cases so treated. This is perhaps as good a result as attends most surgical operations, and in this connection I may add that I am not aware of any instance in which the result was actually injurious to the patient. I am therefore justified in claiming that the usual operations performed for the relief of persons

### TABULATED RESULTS.

Case	Name	Sex	Age	Refraction.	Vision.	Deviation.	Degrees.	Abduction.	Adduction.	Symptoms.	Operation.	Result.
1	M. L. ...	F.	31	R. + 1 D. ... L. + 1 D. ...	... ... ...	Exophoria	9	17°	30°	Asthenopia. Headaches. Frequent conjunctivitis	Tenot. L. ext. rectus	Not known.
2	A. S. ...	F.	37	R. 70° - 0.50 - 4.50 L. 100° - 0.75 - 4.50	... ... ...	Exophoria	6	14°	22°	Frequent neuralgic headaches. Blepharitis	Tenot. L. ext. rectus	Complete relief.
3	M. F. ...	F.	36	R. 50° + 0.50 + 0.50 L. 130° + 2.50 + 1.00	... ... ...	Hyperphoria	R. 3	6°	18°	Intense asthenopia. Severe headaches	Tenot. L. inf. rectus	Considerable relief.
4	Mrs. E. ...	F.	36	R. - 0.50 ... L. 90° - 1.25 - 0.75	... ... ...	Esophoria	15	3°	75°	Headache and asthenopia	Tenot. L. int. rectus	Great relief.
5	Mrs. L. ...	F.	60	R. Emmetropia ... L. Emmetropia ...	... ... ...	Hyperphoria	R. 2	5°	27°	Frequent sick headaches and asthenopia	Tenot. L. inf. rectus	Eight years later: relief from asthenopia ever since, but not from headaches.
6	T. S. ...	F.	34	R. Emmetropia ... L. Emmetropia ...	... ... ...	Exophoria	10	13°	22°	Asthenopia. Chronic conjunctivitis. Epiphora	Tenot. both ext. recti at intervals of 6 months	Much relief from the asthenopia.
7	J. A. ...	M.	43	R. Emmetropia ... L. Emmetropia ...	... ... ...	Exophoria	7	11°	10°	Asthenopia. Chronic blepharitis and conjunctivitis	Tenot. L. ext. rectus	Asthenopia relieved though not entirely cured. Exophoria 3° remained.
8	A. McA.	M.	23	R. H. I D. ... L. H. I D. ...	... ... ...	Exophoria	7	10°	10°	Asthenopia and chronic conjunctivitis	Tenot. both ext. recti	Complete relief.
9	A. J. ...	M.	19	R. M. 13 D. ... L. M. 13 D. ...	... ... ...	Hyperexophoria	6	18°	17°	Asthenopia. Spasm of all and of orbicularis	Tenot. both ext. recti and of R. sup. rectus	Complete relief.

10 J. C. A. ... M. 29 R. 90° + 0.25 + 0.75 ...  
L. + 0.75 ...  
...  
Hyperphoria 2  
6° 20° Asthenopia and headaches  
Tenot. R. inf. rectus  
Not improved, though orthophoria was at-

9	A. J. ...	M. 19	K. M. 13 D. ... L. M. 13 D. ...	...	...	...	1 1/2 Hyper- exophoria	6	18° - 17°	Asnenopia. Spasms of all and of orbicu- laris	Tenot. K. inf. rec- tus	Not improved, though orthophoria was at- tained.
10	J. C. A. ...	M. 29	R. 90° + 0.25 + 0.75 ... L. + 0.75 ...	...	...	...	Hyper- phoria	2	6°	Asthenopia and headaches	Tenot. K. inf. rec- tus	Not improved, though orthophoria was at- tained.
11	J. McA. ...	M. 28	R. + 0.75 ... L. + 0.75 ...	...	...	...	Hyper- phoria	2	24°	Asthenopia of many years, standing	Tenot. L. inf. rec- tus	Partial relief.
12	C. S. ...	F. 28	R. 165° - 3.50 - 1.00 ... L. 15° - 3.00 - 1.00 ...	...	...	...	Exophoria	8	15°	Frequent and severe headaches, not re- lieved by glasses.	Tenot. L. ext. rec- tus	Improved. Final re- sults not known; incomplete effect.
13	J. H. B. ...	M. 36	R. + 1.25 ... L. + 1.25 ...	...	...	...	Hyper- phoria	1 1/2	7°	Asthenopia for many years; pain in the eyes at night	Tenot. R. inf. rec- tus	Complete relief.
14	R. E. T. ...	M. 17	R. 10° - 0.50 - 9 ... L. 180° - 1.75 - 9 ...	...	...	...	Hyper- exophoria	2 1/2	13°	Headaches and asthe- nopia	Tenot. R. inf. rec- tus	Some relief.
15	C. C. A. ...	F. 56	R. 175° - 1.25 - 1.00 ... L. 10° - 2.50 ...	...	...	...	Hyper- exophoria	ex. 7 2	8°	Asthenopia and fre- quent headaches	Tenot. R. inf. rec- tus	Freed from astheno- pia and nearly so from headaches.
16	S. H. ...	F. 11	R. 180° - 0.50 - 7.00 ... L. 30° - 1.50 - 7.00 ...	...	...	...	Hyper- exophoria	4 ex. 15	18°	Asthenopia; cannot use the eyes in school work	Tenot. R. inf. rec- tus, L. sup. rec- tus, L. ext. rectus	Reported improve- ment. Result not known definitely.
17	S. W. ...	M. 24	R. Emmetropia ... L. Emmetropia ...	...	...	...	Esophoria	13	8°	Constant discomfort in near work. Fre- quent attacks catar- rhal conjunctivitis	Tenot. L. int. rec- tus, and later R. inf. rectus	Relief almost com- plete.
18	A. F. ...	F. 36	R. Emmetropia ... L. Emmetropia ...	...	...	...	Esophoria	9	5°	Frequent headaches. Blepharitis, con- junctivitis	Advanced both ext. recti. Tenot. R. int. rectus	Condition greatly im- proved. Headaches relieved.
19	E. C. S. ...	M. 37	R. Emmetropia ... L. Emmetropia ...	...	...	...	Esophoria	30	0°	Diplopia many years. Asthenopia Intense neutra- sthenia	Advanced both ext. recti. Tenot. both int. recti	Gradually recovered comfortable vision & resumed his work, which he had been obliged to give up. Greatly improved.
20	Mrs. R. ...	F. 29	R. 90° + 0.25 + 1.00 ... L. 4° + 1.75 ...	...	...	...	Esophoria	5	3°	Frequent headaches. Blepharitis conjunc- tivitis	Advanced L. ext. rectus, later R. ext. rectus	Not relieved. Exo- phoria only reduced to 5°.
21	E. B. ...	F. 25	R. Emmetropia ... L. Emmetropia ...	...	...	...	Exophoria	7	13°	Asthenopia and in- tense headaches for many years	Tenot. L. ext. rec- tus, later R. ext. rectus	Not relieved. Exo- phoria only reduced to 5°.

TABULATED RESULTS—continued.

Case	Name	Sex	Age	Refraction.	Vision.	Deviation.	Degrees.	Abduction.	Adduction.	Symptoms.	Operation.	Result.
22	Miss B. ...	F.	20	R. - 10 D. L. - 9 D.	...	Hyperexophoria	3 ex. 13	18°	34°	Frequent and intense headaches; new work always brings them on	Tenot. R. inf., L. ext. and L. sup. recti	Greatly relieved.
23	M. W. ...	F.	17	R. - 4.50 L. + 5.00	...	Hyperphoria	3	16°	40°	In reading the print is unsteady, and this always causes headaches	Tenot. L. inf. and R. int. recti	Could use the eyes with perfect comfort a year later.
24	L. H. ...	F.	34	R. + 1.25 L. + 1.25	...	Hyperexophoria	2 1/2 ex. 6	12°	17°	Asthenopia ...	Tenot. R. sup. and L. ext. recti	Much relieved.
25	I. C. ...	F.	19	R. - 2.25 L. - 2.25	...	Exophoria	6	18°	16°	Asthenopia and headaches	Tenot. both ext. recti	Complete relief.
26	A. S. ...	M.	30	R. Emmetropia L. 55° + 1 D.	...	Exophoria	7	13°	15°	Blepharitis. Asthenopia	Tenot. both ext. recti	Much relieved.
27	W. L. W.	M.	35	R. 65° + 0.75 + 7.25 L. + 1.75	...	Hyperphoria	12	6°	14°	Asthenopia ...	Tenot. R. int. rectus, later L. inf. rectus	Greatly relieved.
28	M. McG.	M.	18	R. + 1.50 L. - 1.50	...	Esophoria	6	5°	65°	Asthenopia and chronic conjunctivitis	Tenot. both int. recti	Complete relief.
29	A. H. ...	M.	20	R. 50° - 1.75 - 0.75 L. 90° - 1.50 - 1.00...	...	Esophoria	8	6°	65°	Asthenopia conjunctivitis. Hyperemia not relieved by glasses	Tenot. int. recti at interval of 2 weeks	Complete relief.
30	Mrs. F. ...	F.	42	R. + 1.00 L. + 1.00	...	Exophoria	10	12°	17°	Persistent headaches for many years	Tenot. both ext. recti at interval of 5 days	Eight months later reported much better.

31	H. L. ...	M.	16	R. + 1.25 L. + 1.25	...	Esophoria	11	5°	63°	Headaches induced by any new work	Tenot. both int. recti at intervals	Reported that the eyes could be used better.
----	-----------	----	----	------------------------	-----	-----------	----	----	-----	-----------------------------------	-------------------------------------	--

31	H. L. ...	M.	16	R. + 1'25 L. + 1'25	...	...	Esophoria	11	5°	63°	Headaches induced by any new work and not relieved by glasses	Tenot. both int. recti at intervals	Reported that the eyes could be used without discomfort.
32	T. O. ...	M.	12	R. + 1'50 L. + 1'50	...	...	Hyperphoria	6	2°	3°	Headaches almost continually. Nervous attacks supposed to be of an epileptic character. Sleeps very badly	Tenot. L. sup. rectus	A month later reported much better. Case not complete.
33	Mrs. A...	F.	62	R. + 3'50 L. + 3'50	...	...	Hyperphoria	2½	5°	17°	Invertate asthenopia. Frequent headaches	Tenot. L. inf. and R. sup. rectus	Followed by gradual and, ultimately, great relief. Reports some relief from asthenopia.
34	F. McC...	M.	34	R. + 0'50 L. + 0'50	...	...	Exophoria	3 10 in all	9°	20°	Asthenopia. Frequent attacks conjunctivitis	Advancement L. int. rectus	Reported perfect relief.
35	G. S. ...	F.	16	R. 180° - 1'00 - 8'00 L. 180° - 1'00 - 8'00	...	...	Hyperphoria	2	14°	10°	Headaches and asthenopia. Pain in back of the eyes	Tenot. R. sup. rectus	Relief of the asthenopic symptoms.
36	P. B. ...	F.	9	R. 90° - 0'50 - 1'00... L. 55° - 0'50 - 1'00...	...	...	Exophoria	10	14°	10°	Asthenopia ...	Tenot. L. ext. rectus in 1888, of R. ext. rectus in 1889	Complete relief.
37	A. F. ..	F.	25	R. Emmetropia L. 180° - 0'50	...	...	Esophoria	15	4°	65°	Headaches and asthenopia	Tenot. R. ext. rectus	Some relief.
38	A. P. ...	F.	25	R. + 0'75 L. + 0'75	...	...	Esophoria	5	14°	20°	Asthenopia ...	Tenot. R. ext. rectus	Asthenopia relieved.
39	W. McF.	M.	17	R. Emmetropia L. Emmetropia	...	...	Esophoria	12	3½	41°	Asthenopia ...	Advancement both ext. recti	Partial relief. Case never completed.
40	W. C. B.	M.	22	R. ... L. ...	...	...	Esophoria	8	2°	62°	Asthenopia. Burning sensation in eyes when used	Tenot. R. int. rectus	Complete relief for 8 years.
41	Mrs. S....	F.	39	R. 90° + 0'50... L. 90° + 0'50...	...	...	Exophoria	6	13°	10°	Neuralgia many years	Tenot. L. ext. rectus	Relief from the asthenopia and conjunctivitis.
42	Miss M...	F.	52	R. + 1'00 L. + 1'00	...	...	Hyperphoria	3	5°	22°	Asthenopia. Chronic conjunctivitis	Tenot. L. sup. rectus	

TABULATED RESULTS—Continued.

Case	Name	Sex	Age	Refraction.	Vision.	Elevation.	Degrees.	Adduction.	Adduction.	Symptoms.	Operation.	Result.
43	J. S. M...	F.	32	R. + 0.50 L. + 0.50	6/30 20/30	Exophoria	7	13°	11°	Frequent neuralgic headaches	Tenot. both ext. recti at intervals of 1 month	Headache less frequent and less severe.
44	R. G. ...	M.	21	R. + 0.75 L. + 0.75	6/30 20/30	Esophoria	7	1½°	60°	Asthenopia. Chronic conjunctivitis	Tenot. both int. recti at interval of 3 months	Complete relief.
45	G. S. D...	M.	37	R. 90° + 2.25 — 1.00 L. 100° + 2.00 — 1.00	6/30 20/30	Hyperphoria	2	5°	18°	Frequent headaches	Tenot. R. int. rectus	Said to have been relieved almost completely.
46	T. B. B...	F.	35	R. 140° + 1.00 — 4.50 L. 25° — 0.50 — 2.00	6/30 20/30	Esophoria	15	1°	50°	Headache. Frequent diplopia and confusion of vision	Tenot. L. int. rectus	Complete relief.
47	M. E. ...	F.	46	R. 180° — 3.50 + 1.50 L. 180° — 0.75 + 1.00	6/30 20/30	Hyperesophoria	5 es. 8	5°	13°	Headaches ...	Tenot. L. int. rectus	Not known. Case incomplete.
48	W. W. G.	M.	24	R. 80° — 1.00 ... L. 160° — 0.50	6/30 20/30	Esophoria	20	10°	70°	Headaches ...	Tenot. L. int. rectus	Said to have found some relief. Final result not known.
49	J. H. S...	M.	25	R. + 1.50 L. + 1.50	6/30 20/30	Esophoria	6	3°	63°	Asthenopia ...	Tenot. both int. recti at intervals of 2 days	Three and a-half years later: could use the eyes with perfect comfort ever since the operation.
50	J. D. ...	F.	24	R. + 1 D. L. + 1 D.	6/30 20/30	Esophoria	8	5°	53°	Asthenopia ...	Tenot. L. int. rectus	Three months later reports much improved.

51 Mrs. T. ... F. 36 R. + 1.50  
L. + 1.50 ...  
12 1° 8° Diplopia. Asthenopia. Neurasthenia. Advanced and shortened L. inf. Almost complete relief in the course of

Mrs. T. ...	F.	36	R. + 1'50 L. + 1'50	12	1°	8°	Diplopia. Asthenopia. Neurasthenia	Advanced and shortened L. inf. rectus	Almost complete relief in the course of a few weeks.
51	Mrs. T. ...	36	R. + 1'50 L. + 1'50	12	1°	8°	Diplopia. Asthenopia. Neurasthenia	Advanced and shortened L. inf. rectus	Almost complete relief in the course of a few weeks.
52	D. P. ...	12	R. 180° - 1'00 - 5'50 L. 180° - 1'00 - 5'50	3½	5°	24°	Headaches and asthenopia	Tenot. L. sup. rectus	No benefit.
53	Mrs. S. S.	35	R. 90° - 0'75 - 6'00... L. 90° - 0'50 - 7'00 ..	10	16°	14°	Asthenopia. Headaches. Hyperemia. Conjunctivitis	Tenot. R. ext. rectus	Improved.
54	D. K. ...	45	R. Emmetropia ... L. Emmetropia ...	7	3°	65°	Asthenopia. Hyperemia. Conjunctivitis	Tenot. L. int. rectus	Much relieved.
55	H. B. L.	19	R. 90° - 0'75 - 1'25... L. 50° - 0'50 - 1'25...	6 ex. 4	14°	30°	Frequent and severe headaches and asthenopia	Tenot. L. sup. and L. ext. recti	Complete relief.
56	C. K. A. ...	50	R. + 2'00 ... L. + 2'00 ...	6	5°	27°	Inveterate asthenopia many years	Tenot. R. int. and L. int. recti	Great relief.
57	A. G. ...	19	R. 140° - 0'50 - 5'50 L. 35° - 0'50 - 2'75	25	3°	65°	Asthenopia. Headaches	Tenot. both int. recti at intervals	Complete relief.
58	J. W. ...	24	R. 180° - 1'00 + 0'50 L. 180° - 1'00 ...	6	3°	54°	Asthenopia ...	Tenot. L. int. rectus	Much relieved.
59	C. M. ...	21	R. 15° - 1'50 - 9'00 L. 175° - 1'50 - 9'00	7 ex. 20	20°	11°	Headaches very severe and frequent	Tendon shortening both int. recti. Tenot. L. sup. rectus	A satisfactory equilibrium established. Final result not known.
60	A. E. ...	16	R. Emmetropia ... L. Emmetropia ...	3½	6°	18°	Headaches. Neurasthenia. Insomnia	Tenot. R. sup. rectus	Complete relief.
61	H. R. ...	26	R. ... L. ...	...	...	...	Epilepsy. Headaches. Asthenopia	Both ext. recti twice	Apparently some benefit.
62	C. C. ...	17	R. 180° - 1'00 - 6'00 L. 180° - 1'00 - 6'00	20	2°	60°	Frequent headaches. Asthenopia ...	Tenot. both int. recti	Complete relief.
63	Miss D. ...	24	R. 15° - 3'00 - 11'00 L. 160° - 3'00 - 10'00	5	9°	26°	Asthenopia ...	Tenot. L. inf. rectus	Great relief.
64	S. S. ...	26	R. + 1'25 ... L. + 1'12 ...	12	3½	50°	Frequent headaches and asthenopia	Tenot. both int. recti	Complete relief.
65	G. W. G. M.	41	R. 180° - 2'75 ... L. 180° - 4'00 - 2'00	25	?	?	Diplopia and confusion of vision	Advancement L. inf. and tenot. L. sup. rectus	Perfect relief, and binocular vision established.

TABULATED RESULTS—Continued.

Case	Name.	Sex.	Age.	Refraction.	Vision.	Deviation.	Degrees.	Abduction.	Adduction.	Symptoms.	Operation.	Result.
66	Miss P...	F.	24	R. + 1'25 L. + 1'25	6/20 6/20	Esophoria	20	1°	62°	Asthenopia ...	Tenot. R. int. rec-tus	Six months later esophoria 8°. Can use the eyes with comfort since the operation.
67	M. M. ...	F.	23	R. 90° — 1'25 ... L. 80° — 1'25 ...	6/20 6/20	Esophoria	4	1 1/2°	50°	Asthenopia and headaches	Advanced L. ext. rectus	Not relieved, though 7 months later there was orthophoria.
68	M. C. ...	F.	43	R. + 4'00 ... L. + 3'50 ...	6/15 6/15	Hyperphoria	10	?	?	Diplopia. Frequent headaches. Had an operation for converg. strabismus as a child. Diplopia ever since	Tenot. R. sup. rec-tus Tenot. L. inf. rec-tus	Vert. deviation cured, but not the diplopia.
69	P. D. J...	M.	43	R. Emmetropia L. Emmetropia	6/5 6/5	Exophoria	15	18°	23°	Headaches. Neurosthenia	Tenot. both ext. recti at 4 days' interval	Great relief.
70	F. X. L...	M.	30	R. 180° — 1'00 + 0'50 L. 180° — 1'00 + 0'50	6/6 6/6	Exophoria	9	12°	28°	Neurasthenia and intense asthenopia	Tenot. L. ext. rec-tus	Much relieved. Case not complete.
71	D. A. ..	M.	26	R. + 0'50 ... L. + 0'50 ...	6/6 6/6	Exophoria	12	19°	41°	Epilepsy. Asthenopia	Tenot. both ext. recti at interval of 4 days	No material improvement, though normal muscular relations were established.
72	J. H. L...	F.	24	R. + 1'00 ... L. + 1'00 ...	6/7 1/2 6/9	Exophoria	7	12°	25°	Asthenopia ...	Tenot. R. ext. rec-tus	Some relief.



73	Mrs. S. ...	F.	48	R. — 3'00 L. — 3'00	... ...	$\frac{6}{7.5}$ $\frac{10}{10}$ $\frac{10}{10}$	Exophoria	8	11°	35°	Headache always brought on by use of the eyes. Has binocular vision	Tenot. L. ext. rec-tus	Some relief.
74	M. E. ...	F.	27	R. — 3'50 L. — 5'00	... ...	$\frac{6}{7.5}$ $\frac{10}{10}$ $\frac{10}{10}$	Exophoria	23	22°	20°	Headaches frequent and intense	Tenot. both ext. rec-tus	Complete relief.
75	F. C. ...	F.	26	R. 155° — 3'00 + 6'00 L. 45° — 3'50 + 6'00	6'00 6'00	$\frac{6}{10}$ $\frac{10}{10}$ $\frac{10}{10}$	Hyper-phoria	8	2°	10°	Headaches ...	Tenot. R. sup. rec-tus, later L. inf. rec-tus	Headaches almost entirely relieved.
76	Mrs. K. ...	F.	26	R. — 7'00 L. — 7'00	... ...	$\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$	Esophoria	16	7°	73°	Headaches ...	Tenot. L. int. rec-tus, later tenot. R. int. rec-tus	One month later, headaches were not relieved, though muscular relations were normal.
77	G. S. T. ...	F.	20	R. + 0'75 L. + 0'75	... ...	$\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$	Exophoria	8	15°	17°	Headaches. Chronic blepharitis	Tenot. R. ext. rec-tus	Greatly relieved.
78	L. G. ...	M.	17	R. + 0'50 L. + 0'50	... ...	$\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$	Hyper-phoria	7	6°	19°	Headaches and asthenopia	Tenot. R. sup. rec-tus	Hyperphoria reduced to 2°, with prism correction of this is perfectly comfortable.
79	L. S. ...	F.	32	R. Emmetropia L. 90° — 0'25 + 4'00	... ...	$\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$	Exophoria	10	15°	?	Asthenopia and blepharitis	Tenot. L. ext. rec-tus	Completely relieved.
80	Miss V. ...	F.	35	R. 135° — 0'25 — 5'00 L. 180° — 0'50 — 5'50	5'00 5'00	$\frac{6}{7.5}$ $\frac{6}{7.5}$ $\frac{6}{7.5}$	Exophoria	12	17°	25°	Asthenopia and frequent attacks of conjunctivitis	Tenot. both ext. rec-ti at interval of 3 days	One year later reports complete relief.
81	H. V. B.	M.	15	R. Emmetropia L. Emmetropia	... ...	$\frac{6}{6}$ $\frac{6}{6}$ $\frac{6}{6}$	Hyper-exophoria	7 ex. 10	vari- able	vari- able	Headaches and asthenopia	Tenot. L. inf. rec-ti. Advancemen L. int. rec-tus	Complete relief.
82	Miss R. ...	F.	20	R. 180° — 3'50 + 0'50 L. 180° — 3'50 — 0'25	0'50 0'25	$\frac{6}{10}$ $\frac{10}{10}$ $\frac{10}{10}$	Hyper-phoria	3½	9°	30°	Frequent neuralgia and occasional sick headache	Tenot. R. sup. and L. inf. rec-tus	Considerable relief 6 months later.
83	F. C. ...	F.	25	R. 180° — 1'0 — 6'00 L. 90° — 0'50 — 5'00	6'00 5'00	$\frac{6}{10}$ $\frac{10}{10}$ $\frac{10}{10}$	Hyper-exophoria	10 ex. 20	?	?	Headache and asthenopia	Tenot. L. sup. rec-tus; tenot. L. ext. rec-tus	Some relief at the time. Final result not known.
84	T. H. B.	F.	25	R. 180° — 3'00 L. 180° — 3'00 + 1'50	... ...	$\frac{6}{10}$ $\frac{10}{10}$ $\frac{10}{10}$	Esophoria	5	3°	53°	Headache ...	Tenot. L. int. rec-tus	Some relief. Final result not known.

TABLATED RESULTS—Continued.

Case	Name.	Sex.	Age.	Refraction.	Vision.	Deviation.	Degrees.	Abduction.	Adduction.	Symptoms.	Operation.	Result.
85	E. C. ...	F.	32	R. — 12'00 ... L. — 11'00 ...	$\frac{6}{16}$ $\frac{6}{12}$	Hyperphoria	15	?	?	Neurasthenia. Intense asthenopia. Blepharitis spasm.	Tenot. L. sup. rectus; tenot. R. inf. rectus	Great relief.
86	Miss M. ...	F.	42	R. 16 <sup>5</sup> — 3'50 ... L. 25 <sup>0</sup> — 1'25 — 2'75	$\frac{6}{9}$ $\frac{6}{9}$	Hyperexophoria	5 ex. 14	16 <sup>0</sup>	25 <sup>0</sup>	Neurasthenia. Intense asthenopia	Tenot. L. ext. rectus; tenot. R. sup. rectus	Greatly relieved.
87	F. McK.	M.	18	R. Emmetropia ... L. Emmetropia ...	$\frac{7}{6}$ $\frac{7}{5}$	Esophoria	12	2 <sup>0</sup>	50 <sup>0</sup>	Asthenopia ...	Tenot. both int. recti at intervals	Greatly relieved.
88	Miss J. M.	F.	33	R. — 13'00 ... L. — 13'00 ...	$\frac{12}{12}$ $\frac{12}{12}$	Esophoria	25	7 <sup>0</sup>	63 <sup>0</sup>	Asthenopia ...	Tenot. both int. recti at interval of 1 month	Complete relief.
89	L. C. O. ...	M.	29	R. 17 <sup>0</sup> — 4'00 + 5'50 L. 20 <sup>0</sup> — 4'50 5'50	$\frac{6}{12}$ $\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$	Esophoria	17	5 <sup>0</sup>	45 <sup>0</sup>	Asthenopia ...	Tenot. L. int. rectus	Final result not known.
90	W. M. ...	M.	10	R. + 0'50 ... L. + 0'50 ...	$\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$	Esophoria	20	3 <sup>0</sup>	61 <sup>0</sup>	Asthenopia. Hyperæmia of conjunctiva	Tenot. both int. recti at interval of 2 days	Complete relief.
91	E. H. ...	F.	29	R. + 0'50 ... L. + 0'75	$\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$	Exophoria	12	12 <sup>0</sup>	16 <sup>0</sup>	Asthenopia ...	Tenot. both int. recti at interval of 3 months	Great relief.
92	K. McF.	F.	32	R. Emmetropia ... L. Emmetropia ...	$\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$	Hyperphoria	3	6 <sup>0</sup>	15 <sup>0</sup>	Hystero-epilepsy ...	Tenot L. sup. rectus	No improvement.
93	C. C. McC.	M.	28	R. 40 <sup>0</sup> + 1'25 + 0'50 ... L. + 0'50 ...	$\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$	Esophoria	7	4 <sup>0</sup>	63 <sup>0</sup>	Headaches ...	Tenot L. int. rectus	Not known.
94	L. E. ...	F.	17	R. 90 <sup>0</sup> + 0'25 + 0'50 ... L. 90 <sup>0</sup> + 0'25 ...	$\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$ $\frac{6}{9}$	Esophoria	6	1 <sup>0</sup>	50 <sup>0</sup>	Asthenopia ...	Tenot. both int. recti	Great relief.
95	S. C. ..	F.	28	R. 90 <sup>0</sup> — 1'00 — 12'00 L. 90 <sup>0</sup> — 1'00 ...	$\frac{6}{12}$ $\frac{7}{5}$	Hyperphoria	12	?	?	Headaches and asthenopia	Tenot. R. inf. rectus	Considerably relieved, though there is still 6° of hyperphoria.

96	J. C.	...	M.	30	R. Emmetropia ... L. Emmetropia ...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Hyperphoria	5	3°	17°	Headaches and asthenopia	Tenot. L. inf. rectus	Only partial correction; some relief. Case not complete.
97	W. C. T.	M.	18	R. 20° - 3'50 + 3'00... L. 165° - 3'50 + 3'00	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Hyperphoria	3	1°	14°	Headache and asthenopia	Tenot. L. sup. rectus	Much relieved.	
98	M. D.	F.	14	R. 180° - 0'62 - 1'25 L. 180° - 0'62 - 1'25	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Exophoria	15	17°	15°	Headaches and asthenopia	Tenot. both ext. recti at intervals	Greatly relieved.	
99	L. M.	F.	31	R. - 5'50 ... L. - 5'00 ...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Exophoria	8	11°	8°	Asthenopia ...	Advanced both int. recti	Complete relief.	
100	L. D.	F.	28	R. + 0'50 ... L. + 0'50 ...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Exophoria	15	15°	20°	Asthenopia ...	Tenot. both ext. recti	Much relieved.	
101	J. B.	M.	21	R. Emmetropia ... L. Emmetropia ...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Exophoria	11	16°	24°	Asthenopia ...	Tenot. both ext. recti	Greatly relieved.	
102	F. W.	M.	23	R. + 1'00 ... L. + 1'00 ...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Esophoria	10	3°	68°	Asthenopia ...	Tenot. both int. recti	Complete relief.	
103	G. T.	M.	23	R. Emmetropia ... L. Emmetropia ...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Hyperesophoria	7	?	?	Diplopia. Asthenopia and difficulty in fixing the eyes	Tenot. R. sup. rectus; both int. recti	Experienced great relief from the diplopia and distress in using the eyes, but muscular conditions were still imperfect.	
104	A. H.	F.	34	R. 180° - 0'75 - 0'25 L. 180° - 0'50 - 0'75	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Esophoria	13	4°	65°	Intense asthenopia ...	Tenot. L. int. rectus twice, R. once	Complete relief.	
105	Miss C.	F.	30	R. Emmetropia ... L. Emmetropia ...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Hyperphoria	12	?	?	Intense and frequent headaches	Advanced R. Tenot. L. inf. recti	Considerably relieved, but hyperphoria still present.	
106	L. B.	M.	22	R. 180° - 0'50 - 5'50 L. 180° - 0'50 - 5'50	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Hyperesophoria	6	1°	11°	Asthenopia ...	Advanced L. inf. rectus; tenot. R. ext. rectus	Case not completed.	
107	Miss C.	F.	28	R. 90° - 0'50 - 2'00 L. - 2'00 ...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Hyperphoria	4	10°	50°	Headaches and asthenopia	Tenot. R. inf. rectus	Some relief.	
108	C. H. T.	M.	40	R. Emmetropia ... L. Emmetropia ...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Esophoria	6	3°	55°	Asthenopia and continued vertigo and headaches	Tenot. L. int. rectus	Complete relief.	
109	J. R.	F.	53	R. 90° - 0'75 - 2'00... L. 55° - 0'75 - 2'00...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Exophoria	15	15°	0°	Diplopia. Neurasthenia	Tenot. both ext. recti	Much relieved.	
110	Mrs. L.	F.	43	R. Emmetropia ... L. Emmetropia ...	$\frac{6}{15}$ ... $\frac{6}{15}$ ...	Esophoria	16	4°	11°	Vertigo and asthenopia	Tenot. both int. recti	Greatly relieved.	

suffering from the various annoyances due to faulty muscular equilibrium, in carefully selected cases are not only harmless, but in a very large percentage of such cases they are followed by satisfactory results in as large a percentage as are obtained, according to most statistics, in the operations for removal of cataract.

It will be observed that whilst there were many cases of refractive error among the 110 cases, there were also a great many with little or no refractive error, and in no case was an operation performed in the presence of a refractive error in which relief was not first sought by its correction. I cannot agree with those who contend that the correction of errors of refraction will always correct associated muscular faults. If this be true, how can we account for the many cases of muscular faults in which refraction is emmetropic ?

It is undoubtedly true that some of the lower grades of muscular faults may be benefited by wearing suitable prismatic glasses, but the usefulness of these is exceedingly limited, and those who depend upon them are doomed to frequent disappointment.

I have not had sufficient experience in the correction of muscular faults in persons suffering from epilepsy and chorea to say that they cannot derive benefit from ocular therapeutics or operations to secure equilibrium, but so far as my experience goes I am inclined to believe that little or no relief is to be expected from such treatment, at least *quoad* the functional nervous disorder, but I would not hesitate to recommend the scrupulous correction of refractive errors in such persons, or of any considerable muscular fault, if present, just as I would recommend the removal of every discoverable source of nerve irritation or cause of ill-health whatever it might be.

A searching analysis of the 110 cases I have tabulated

would bring out a good many interesting facts which I cannot discuss now ; for instance, among those cured there were two of esophoria with normal refraction in which the chief complaint was persistent vertigo, both entirely relieved by tenotomy of the internal recti ; in neither of these, however, was there anything approaching epileptiform phenomena.

The clinical investigation of functional muscular anomalies can only be undertaken at the expense of enormous loss of time and the exercise of unbounded patience on the part of the surgeon ; hard conditions, it is true, but not too hard for him who delights in his profession and feels the joy of overcoming difficulties that have baffled others.

If the results I have now placed on record are reliable, and I believe they are, being the outcome of many years' patient observation and steady work, free, I hope, from partiality of any sort, then it follows that whoever ignores the injurious effects of muscular faults in ophthalmic practice, fails to accord at least 1 per cent. of his patients the benefit which a proper application of his knowledge should bestow.

I have purposely abstained from any discussion of the theoretical aspects of faulty muscular equilibrium, for the reason that I could not on the present occasion do justice to this part of the subject, and from a clinical standpoint it matters not what the cause of physical distress may be so long as the means employed for its relief are efficient.

In reply to some points raised in the discussion which followed the paper, Mr. Buller said : Mr. President, first as to the point raised by Dr. Stevens—want of uniformity in standard of measurement. I claim that it is impossible to establish a definite standard for all cases, and say that a man must come up to that standard or he is abnormal. I think that Dr. Stevens supports me in this contention,

if I remember rightly, in his work on functional muscular disturbances, the first work in which he brought this subject prominently before the public. He admits, I think, in that work, that there is a difference in individuals, and that a man may be allowed a certain difference of muscular power in different ocular muscles, and that what may be normal for one man is not normal for another. In other words, that the relative strength of the ocular muscles has to be taken into account in considering what is the normal standard.

I said, from five to eight degrees for abducting power and twenty-five to fifty for adducting power. Now the relative proportion between these is pretty much the same, and if a man is comfortable with five degrees of abducting power and twenty-five degrees of adducting power after a good many trials as to the strength of the muscles, surely that is sufficient evidence that, as far as he is concerned, we may regard this as a normal condition or a fairly normal condition.

On the other hand, there are a large number of people who I am perfectly convinced cannot get an abducting power of eight degrees excepting by long-continued exercise of the external muscles, and I believe that the abducting power, if increased by exercise, will lapse back into the original condition unless the exercise is maintained, so that it is exceedingly difficult to establish an absolute standard, if indeed it is possible.

As for the method of testing for deviations or the relative merits of the Maddox rod or Stevens' tropometer, I must say I have not found the tendency to confusion with the Maddox rod that Dr. Stevens claims to exist. I have, however, found a somewhat greater degree of deviation by the use of the Maddox rod than by Stevens' tropometer.

Now as to Dr. Mittendorf's remarks concerning the frequency of operating. I would have no objection to doing frequent operations, and getting very little effect at a time, and repeating the operations as often as seemed necessary to achieve my results little by little; indeed I would prefer to do it in that way if I had such control over

my patients as would enable me to do it, but I am quite sure that if I were to propose to operate upon my patients half a dozen times for correction of slight degrees they would leave me. I have gone on the principle of correcting as nearly as possible in one or two operations any moderate degree of defect, or if there is a large degree of defect I have stated plainly to the patient that I might have to perform several operations. Sometimes I have operated upon one muscle more than once, but never more than twice. That is my position. With regard to the refractive question I thought I had expressed myself distinctly on that point. I do attempt to correct every error of refraction, and correct it as absolutely and completely as I know how. I cannot do more than that. I am only restrained from absolute correction of a refractive error by the ignorance of my patients, most of whom are too ignorant to tell me the difference between a quarter and an eighth of a dioptré!

With reference to Dr. Osborne's question as to what is the proportion of cases in which I have used atropine, I would say I have used atropine or homatropine in all my cases, as I consider that it is essential to use one of these drugs. Homatropine is sufficient in some cases, but in others I think that atropine is necessary, and I use it in order to get absolute correction of the refraction, for I know that in people less than 50 years of age you cannot depend upon getting absolute correction without using a mydriatic. I investigate the refractive error most scrupulously before doing anything for the muscular faults. I think Dr. Howe has misunderstood me in my statement as to the large number of cases of normal eyes in which hyperphoria was discovered. I quite agree with him that an absolutely normal eye, a physiologically normal eye, is a rarity, and I thought I had explained that part of my position sufficiently clearly in saying that I allowed for physiological deviations to a slight degree, and where there was no disturbance apparently resulting from abnormal conditions I certainly would not be in favour of interfering in any way.

The tests as to muscular strength were made of course by examinations repeated sufficiently often to justify me in my own mind, in assuming that I had arrived at about what was the limit of the muscular power in the individual before I proceeded to operate.

I have not operated upon any of these cases where it was fair to assume that the headaches were due to a fault in the general health. Surely if a person comes to you with a history of having headaches for fifteen or twenty years, it is absurd to assume that it is due to some fault in the general health which can be cured by giving him some trumpety drug or other. As a general rule, long-continued trouble of this kind depends upon something pertaining to the individual, which cannot be so easily corrected. If in the course of ten or fifteen years an individual has not had opportunity of improving his health in such a way that he can correct headaches depending on it, it is certainly remarkable, but if he comes to you with headaches, and obvious errors of ocular functions are detected, such as to entitle one to assume that their correction may lead to some beneficial result, and after the operation your patient steadily recovers from the malady which has pursued him for ten or twenty years, surely it is fair then to assume that at least your result was due to the therapeutic measures you adopted.



