RETINOSCOPY WITHOUT ATROPINE, AND SOME OBSERVATIONS ON OCULAR HEADACHES.

BY

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A LARGE amount of refraction work has passed through my hands during the last eight years—first as clinical assistant at the Royal London Ophthalmic Hospital, and then at the Glasgow Ophthalmic Institution.

RETINOSCOPY WITHOUT ATROPINE.

I have estimated the refraction by retinoscopy without a mydriatic in 100 young people who came to the Institution on account of eye trouble. Their ages were from 5 to 15 years, and, with a few exceptions, they were hypermetropes. I have again estimated the refraction by retinoscopy after atropine had been used for a week in the ordinary way. At the first examination the patients were urged to look straight into the distance, just past my ear, so that the activity of the accommodation might be in some measure eliminated. This method, without atropine, is a little more difficult in some cases, but not much more so in a good dark room. Young people are apt to look at the operator, and the nimble accommodation may produce a varying condition, but a little watchfulness enables one to find the strongest lens that does not reverse the shadow.

The results obtained I have placed in columns, then observed the differences in each meridian before and after atropine, and these I have placed in a central column. The four figures from each case have been added together, and the result divided by four to obtain the mean, and this I have taken as the amount discovered by atropine.

Before Atropine.	Difference.	After Atropine.
+1.5		+3
+ +1	1.5	+ +3
	2.0	
+1.5	2.5	+4
+ +1	2.0	+ +3
	8 ÷ 4 = 2 D.	

The average difference in 100 cases was 1.6 D. In 10 little or no error of refraction was revealed, and in these the differences averaged about 1 D. If these be omitted the average result is a little greater, say 2 D. In 12 cases the atropine brought out 3 D. or more, but these were mostly cases of high hypermetropia. In 16 cases the amount brought out was less than the average.

I have also taken a smaller number of cases of moderate myopia and estimated the refraction before and after atropine in the same way. Here there is less accommodation and, of course, less difference in the retinoscopies. There is a little less myopia under atropine, sometimes a difference of 1 D., sometimes less, but often there is no difference.

There are many cases in which retinoscopy without atropine or other mydriatic greatly facilitates our work. A few years ago I employed this method in some school work in Lanarkshire and at present it is used in the Glasgow Schools. By using the wheel-skiascope of Dr. Wright Thomson and with a teacher and some scholars assisting, it is possible during the school hours of one day to estimate the refractive conditions of 500 children, roughly, but with sufficient accuracy to pronounce the existence of defect and its nature.

Tscherning does not approve of the use of atropine for the determination of refraction, because it brings into use the periphery, the flatter, or non-working part of the cornea, and increases spherical aberration. Astigmatism is largely due to the curvature of the anterior surface of the cornea, and according to the measurements given by Tscherning, it is greatest at the periphery. The periphery of the lens is less refractive than the centre, and so the static refractive conditions of the pupillary area as a whole are variable. An emmetropic eye under the influence of atropine should have full distant vision, but this is not always the case, and a small amount of hypermetropia often gives a disproportionate amount of bad vision under similar circumstances. Again, after the effect of atropine has worn off, I often find that these patients will not take

the full amount of *plus* cylinders, and to a less extent, the full amount of *plus* spheres, that the retinoscopy warrants. These considerations seem to support the statement that "the ciliary muscle alone is not responsible for the differences out of and under atropine," and also suggest the probability of error if a patient is fitted with glasses while under the influence of atropine. If I disregard differences of only $\frac{1}{2}$ D., then about 40 per cent. of the patients in the first series had anisometropia. In only two or three cases did the superficial aspect suggest myopia from over-activity or spasm of the accommodation. Astigmatism was present in 69 cases, but in these I have not included amounts of only $\frac{1}{2}$ D.

Donders and Landolt thought the corneal astigmatism was partly counterbalanced by an astigmatism of the lens, the inverse of that of the cornea, and obtained by an unequal contraction of the ciliary muscle. Tscherning thinks it is not necessary to assume that the ciliary acts in this irregular manner. I have looked over my results to find if there is any difference in the amount of astigmatism before and under atropine. The cases being hypermetropes, a certain amount of accommodation would be in action even when looking into the distance. Of the 69 cases, 33 had the same amount before atropine and under it. Twenty-five cases had less astigmatism when out of atropine, and this was mostly due to the horizontal meridian being more refractive in proportion than the vertical meridian out of atropine than under it, the disproportion being in the direction of emmetropia. This looks like lenticular astigmatism, the inverse of the cornea, coming into operation; for the vertical meridian of the cornea is, according to rule, the more refractive; but it is quite likely to be static in its nature, and due to contraction of the pupil eliminating segments of the less refractive periphery. Eleven cases had more astigmatism when out of atropine, and this was mostly due to the vertical meridian being more refractive in proportion than the horizontal when out of atropine, the disproportion being away from emmetropia; that is, with the accommodation unparalysed the astigmatism was greater.

The value of atropine is established, but certain facts should be kept in mind when it is employed.

HEADACHE.

I have tabulated a series of cases of headache sent to us by medical practitioners as likely to be ocular in origin, or of patients who have come of their own accord for the same reason. A few cases have been excluded as not being ocular, otherwise the series is one of 200 consecutive cases of headache.

Ages.—The ages range from 10 to 49 years, with an average of 23 years.

Sex.—177 are females and 23 males.

Occupations.—Over one-half are dressmakers, typists, scholars, clerks, or students.

Locality of Pain.—Forehead, behind the eyes, top of the head and back of the head is about the order of frequency.

Time.—Some had it all day; in some it began in the early morning, and in many it was associated with near work only.

Vision.—68 per cent. had good or fair vision, both eyes $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{1}{8}$; that is, neither eye worse than $\frac{1}{8}$; 19 per cent. had moderately bad vision, $\frac{1}{4}$ or $\frac{1}{2}$; and 13 per cent. had bad vision— $\frac{3}{8}$ or worse—in one or both eyes.

Refraction.—The condition of the eyes was estimated by retinoscopy, after atropine, homatropine and cocaine, or without a mydriatic.

Emmetropia ...	...	20 per cent.
Low hypermetropia ...	...	24 "
Low myopia ...	...	9 "
Hypermetropic astigmatism ...	...	20 "
Hypermetropia ...	...	11 "
Myopic astigmatism ...	...	7 "
Mixed astigmatism ...	...	3 "
Myopia ...	...	3 "
Others ...	...	3 "
		100 per cent.

The low hypermetropes and low myopes were borderland cases with very little departure from the normal, and these with the emmetropes constitute 53 per cent. of the whole. There was evidence of spasm in 8 cases. Anisometropia spread over several groups amounted to 32 per cent. The amount of astigmatism against the rule was 9 per cent. Most of the cases in the emmetropia group had frontal headache brought on by near work, or had disturbance of the muscle balance.

Heterophoria, or latent deviation, as revealed at 6 metres by Maddox rods, or at reading distance by the small tangent scale was:

Esophoria, or convergence	...	37 per cent.
Exophoria, or divergence	...	19 "
Hyperphoria, or vertical deviation	...	4 "

Disturbance of the muscle balance was therefore present in 60 per cent. of the cases. Less than 1 degree of horizontal deviation has been disregarded. The esophoria varied from 1 to 6 degrees, with an average of 2 degrees. The exophoria varied from 1 to 10 degrees, with an average of 2.5 degrees.

Over 60 per cent. were ordered *plus* spheres, mostly low, and chiefly for near work. About 20 per cent. were ordered cylinders or sphero-cylinders; 5 had prisms and a larger number had the lenses decentred. I seldom find it necessary to correct up to the full extent of the defect, although I find many cases of low myopia require weak *plus* lenses for near work, and this is probably due to the accommodation being feeble.

I have not received reports from all these patients, but quite a large number have returned and reported satisfactory results. Conspicuous features of these figures are the large amount of esophoria and the prescribing of weak *plus* lenses for near work only. Convergence and accommodation being linked functions, sustained use of the latter, with energetic innervation, means the same for the former. Esophoria may be in many cases a negligible quantity, but it may be taken as an indication of the direction in which the source of some of the trouble is to be sought.

We often hear patients say they are free from headache when under the influence of atropine or other mydriatic.

Mr. Doyme¹ says, "Pain at the nape of the neck is perhaps always due to disturbance of muscle balance." Nearly all my cases who complained of pain at the back of the head or neck had disturbance of muscle balance.

Mr. Percy Flemming² says, "A very characteristic feature was that the patients waked up with headache." Many of my patients complained of morning headache.

Mr. Doyme also says, "*Anisometropia* is *facile princeps* the cause of headache," and that "the eyes have an automatic power of fine adjustment over and above that which can be stimulated by the will and that each eye has this independently of the other, and even a little irregular action in compensating a certain amount of astigmatism," and that it is to the exhaustion of this faculty that ocular headaches are mainly due.

I have notes of many cases of anisometropia associated with headache, and also notes of many in which there was no headache; cases in which the difference between the eyes was great and cases in which it was slight. The same observation also applies to astigmatism. Is there anything in the incidence of headache which suggests a preferential basis of etiology? In my series it falls on eyes apparently normal, and it falls on all varieties of abnormal eyes, without much evidence of preference. The cases of anisometropia were mainly found in the following groups: Hypermetropic astigmatism, myopic astigmatism, hypermetropia, and mixed astigmatism. My series of retinoscopies, without and with atropine, is not exactly comparable with my headache series; but it is worth observing that there was 40 per cent. of anisometropia in it and only 32 per cent. in the purely headache series. If anisometropia is conspicuously responsible, it should bear its share relatively to its prevalence. I am disposed to group the emmetropes and what I have called borderland cases and credit this group with the largest share.

My net may have gathered unduly of one type, but I have not made any selection. A great majority of my cases were females, and in this sex certain sensitive nerve conditions are more common. Whatever may be due to error of refraction, inefficient accommodation, disturbance of muscle balance, and their inter-relations, there is behind all this a varying quantity, a background of susceptibility which belongs to the province of the physician or the general medical practitioner.

REFERENCES.

¹ BRITISH MEDICAL JOURNAL, August 13th, 1910. ² Ibid., January 14th, 1911.

AT a meeting of the American Society of Tropical Medicine recently held at New Orleans a movement was started to raise a fund for the endowment of a chairman of tropical diseases in the Tulane Medical College. A sum of over £1,000 has already been collected.

SEVENTY-NINTH ANNUAL MEETING

OF THE

British Medical Association.

Held in Birmingham on July 21st, 22nd, 24th, 25th, 26th, 27th, and 28th.

PROCEEDINGS OF SECTIONS.

SECTION OF STATE MEDICINE AND INDUSTRIAL DISEASES.

Professor ALFRED BOSTOCK HILL, M.D., President.

PRESIDENT'S INTRODUCTORY REMARKS.

GENTLEMEN,—It has been intimated to the Presidents of Sections that they are not expected to deliver anything in the way of a Presidential Address. This, I feel, is a matter of congratulation not only to the Presidents, but to those attending the Section. At the same time there are just two or three matters of interest on which at this Section I propose to make a few remarks.

First of all, I desire to welcome all those attending the Section in this large, and about to be further enlarged, city. It is the hope of every one locally that not only will those attending find matters of interest within the work of the Section, but that they shall carry back pleasurable recollections of other incidents, which should be closely connected with the general work of the meeting.

In looking through the programme one or two facts, I think, strike one at the outset. First of all, that while it is varied, it deals with matters of great importance to those interested at the present time in practical public health work. It might, perhaps, be urged that the subjects down for discussion are those about which much has been heard of late; but, even if this be true, they are still subjects waiting for solution and about which it is impossible to obtain too much information.

The question of tuberculosis, for instance, is, from the public health point of view, in my opinion, the one pressing problem now awaiting solution, and it is by the publicity that can be given by a meeting like this, to all its many and varied aspects, that we can hope best to come to a final conclusion of how the problem may best be met and dealt with.

Another point in connexion with our programme appears to me to point to one very marked fact, and that is the change coming over those within and without the profession in the conception of the work of State medicine. In the early days when as a science State medicine came into being it was essential that its view should be more or less parochial, and that such matters as the association of disease with sanitary conditions should practically engage the major part of the attention of administrators. The proper drainage of the bulk of our communities, the institution of pure water supplies for large areas of the country, the establishment also of infectious hospitals, has now brought us to the position of looking at hygiene as being concerned with greater administrative problems, and this is undoubtedly reflected in the programme of the meeting of this Section, so that what I have before termed "drain-pipe hygiene" practically finds no place in our programme.

Another point of interest, I think, in our conception of hygiene at the present time is that every day we are coming to see that the work of the hygienist is very closely wrapped up in that of the profession generally, and while in the past there has been some danger of undue specialization, at the present time the problems of hygiene are being looked upon as closely associated with all branches of medicine. It is very difficult, in fact, to see where any line of demarcation comes in. Take, for instance, the latest development of hygienic work, the medical inspection of school children. It is obvious that this, if it be effective, can only lead to ameliorative measures being taken to deal with defects found, and there must therefore of necessity be a close association