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A FEW WORDS

ON

THE EYE

AND

ITS FUNCTIONS.

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INTRODUCTION.

The Authors, in presenting this small Pamphlet to the Public, have endeavoured to make it simple and free from all technical terms. This merit, it is hoped, may render it exceptionally popular and useful.

The growing prevalence of weak sight in this country, both in children and in adults, would seem to make a wide knowledge of the eye, and how to preserve it, of some importance. To take proper care of our eyes is to do what we can to avoid such diseases and weaknesses of the eyes as are avoidable. But to do this efficiently we must know something about the eye and its diseases and weakness; we must know what certain feelings mean, the various causes of pain and fatigue, and why the eye is so often subject to fatigue and pain. We cannot afford to give up the entire use of our eyes because they ache, nor can we afford wholly to disregard ominous symptoms, lest we run the risk of impairing sight or losing it. We wish to use our eyes, to preserve our sight to the last, and to avoid all avoidable diseases.

The Symptoms of Weak Sight and when it can be Relieved by the use of Periscopic Spectacles.

The first symptom is fatigue of the eyes during or after reading, writing, sewing, painting, and similar work in the evening. Very soon the same fatigue is noticed after

similar occupations during the day when light is good. After a time the same feeling comes on immediately upon attempting to read or sew, and if disregarded, pain and confusion of vision follow. Letters appear to run together, lines are blurred and indistinct, and continued use of the eyes in reading becomes painful. If we then look up across the room, or in the distance, quick relief comes, and vision is as clear and distinct as possible, but an attempt to read again brings a return of pain and confusion of sight.

In order that persons may judge for themselves when their sight may be preserved by the use of spectacles, an attentive consideration of the following rules will be sufficient—

- 1st. When it is necessary to remove small objects to a considerable distance from the eye in order to see them distinctly.
- 2nd. When more light than formerly is required, as, for instance, to place the light between the eyes and the object.
- 3rd. If looking at, or attentively considering, a near object, it suddenly becomes confused and appears to have a kind of mist before it.
- 4th. When the letters of a book run into each other, and hence appear double or treble.
- 5th. If the eyes are so fatigued by a little exercise that it is necessary to shut them from time to time, to relieve them by looking at other objects and rubbing them.

DISEASES OF THE EYE,

From their great variety and frequent occurrence, present a claim to a careful and assiduous investigation, perhaps more urgent than that of any other organ.

The peculiar structure of the eye, its frequent exposure to impure gas, and other strong artificial lights, call loudly for the diligent use of all the resources of science to devise means for its protection and preservation.

The Authors having given much time and labour to the study of the eye, theoretically and practically, do not hesitate in saying, from cases that have come under their notice, that if greater attention were paid to general health, and to judiciously selecting glasses to

assist the eye as soon as required, there would be fewer operations and less work generally for the oculist.

Light is the agent through the medium of which external objects make their impression on the sense of sight. Strong lights pain the eyes, cause them to be bloodshot, and confuse vision. In almost every kind of artificial light there is an excess of the yellow over the violet rays, to the great injury of those eyes that are subject to such influences. To counteract which "neutral tinted glasses should be used."

Many people have a great aversion to wearing spectacles until it is absolutely impossible to do without them. This is a most deplorable mistake, with, too often, serious consequences, and after over-working and straining their eyes are obliged to begin with a much stronger pair of spectacles than would have been necessary for years to come, if timely assistance had been given. That this is correct is fully proved by statistics from our Ophthalmic Hospitals, which show that the disease most frequently treated is "Amblyopia," the cause of which is overwork at night, and by strong artificial lights. On the other hand, those engaged in occupations said to provoke injury, by working with concentrated light and powerful magnifiers, such as engravers, watch-makers, and a large number of persons who, for hours together, use microscopes, rarely complain of their eyes; but, as a rule, they preserve the sight until a late period in life.

Whilst the morbid state of the anterior segments of the eye-ball is sufficiently accessible to objective exploration by the naked eye or merely by the use of a magnifying glass, that of the posterior segment comprising the vitreous body, retina and choroid, have, until the introduction of the Ophthalmoscope, been but very little known. With surgeons it was, at best, guess work, they could only judge by external appearances, which were at all times very uncertain.

Jabez Hogg, M.R.C.S., etc., in his interesting work on the Ophthalmoscope, after speaking of diseases most frequent in the eye, has the following passage. "It must be admitted that these remarks most forcibly apply to a certain class of eye diseases hitherto 'huddled' under the names of Amaurosis, Glaucoma, etc., the treatment of which is very often mistreatment, and frequently places those maladies in the list of incurables." It must, however, be remembered that his remarks refer to a period when the Ophthalmoscope was not in use.

Dixon in his "Practical Study of the Diseases of the Eye," says— "Amaurosis implies no ascertained disease, it is only a word expressive of our own ignorance as to the cause of our patients' blindness."

From these and many similar quotations which could be made from works of really clever and eminent men, in the profession, it will clearly be seen that the clever and conscientious optician is the first to be sought when the eye first gives notice that it is no longer conveniently able to fulfil the duties it is called upon to perform. Great caution should, however, be exercised against the many spurious and cheap articles pushed into the market at low prices, badly made from the commonest glass, full of prismatic colours, which however, cannot always be detected by the unpractised eye, but nevertheless have a most injurious influence.

DEFECTS IN VISION.

Myopia.—Short-sighted persons generally complain that, although their eyes are able to distinguish the smaller objects near at hand, they cannot see well at a distance. This depends upon the fact that the refracting power of the eyes is too strong, or that the antero-posterior axis of the eyeball is too long, so that the rays of light are brought to a focus before reaching the bacillar layer of the retina. The consequence is that distant objects do not appear clear and sharply defined, but indistinct and blurred. In order, therefore, to improve the vision for distant objects, those persons so affected often acquire the habit of nipping their eyelids together. Myopia generally occurs at an early period of life, is sometimes acquired and not unfrequently hereditary. This defect can only be corrected by properly selected concave glasses.

PRESBYOPIA.

The first symptoms of Presbyopia (farsightedness) are that small objects (small type, fine needlework, &c.) cannot with ease be seen so clearly as before, but for distant objects vision is perfect. In order to see minute objects more clearly, they have to be removed further from the eye, or seen by a brighter light. But as the retinal images of these fine objects are very small, on account of the distance at which they are held, a difficulty will soon be experienced in clearly distinguishing them. The print, for instance, will get indistinct and confused, and the eyes become fatigued and aching. This defect is caused by the decrease of the humours of the eye, and the loss of activity in the ciliary muscle. The crystalline lens also becomes more firm and flattened with advancing years, and in consequence of this increased consolidation the amount of muscular action cannot produce the same change in the form of the lens as formerly. In this case no time should be lost, but suitable convex glasses selected as soon as the slightest inconvenience is felt. This defect sometimes increases very rapidly if speedy assistance is not given to the eye. Many, through a foolish shame or prejudice, have had to take to glasses ordinarily only used by those who have undergone an operation.

HYPERMETROPIA.

By this term is meant that peculiar condition of the eye in which the refractive power is too low, or the optic axis too short, so that the focal point of the dioptric system lies behind the retina, and, therefore, when the eye is at rest the rays are not brought to a focus upon the retina, but behind it. This is the reverse to MYOPIA.

The Hypermetropic eye is small and flat, and although its dimensions are less, this is more particularly and markedly the case in the antero-posterior axis. The eye does not appear to properly fill out the palpebral aperture, and the posterior portion of the eyeballs is flat and compressed, the expansion of the retina is less, and the optic nerve smaller with a less number of fibres. This, and other relative defects,

such as Asthenopia, Muscular Amaurosis, &c. (of which it is unnecessary to speak, as they have the same effect and more or less the same cause) can only be relieved by the proper use of convex glasses.

CATARACT.

This term denotes opacities of the crystalline body. Sometimes it has its seat in the crystalline capsule, the lens, or vitreous humour. The capsule is subject to celloid formations, and those thickened portions of the capsule occasionally enclose opaque objects, which not only themselves obstruct the rays of light, but also have an indirect influence over the parts within the capsule; they modify or wholly prevent the nutritious currents through the capsule, and bring about most important changes in the superficial fibres of the lens. These alterations are attended with a loss of transparency. Persons of all ages are subject to Cataract, but those of an advanced age more so than at an earlier period of life, and it is frequently associated with Heart Disease. Opacity of the lens generally begins in a very unmarked manner, and increases slowly for months, and perhaps years. As soon as discovered, eyes so affected should be assisted, and the defect, perhaps, checked by the use of Spectacles; and even when an operation has been performed it is mostly found necessary to use cataract lenses.

HOW TO RELIEVE OR PREVENT WEAK SIGHT.

Persons having a tendency to weakness of sight or those experiencing unusual fatigue of the eyes in reading or similar occupations requiring close vision, should carefully observe the following rules:—

1st. Cease to use the eyes for a time, and look away from the work, when sight becomes in the least painful, blurred or indistinct. After perfect rest for a moment, or longer, work may be resumed, to be discontinued as before when the eyes feel again fatigued.

2nd. See that the light is sufficient, and that it falls properly upon your work. Never sit facing the light—it should fall upon the work from above and behind. Failing this, it may fall from the side. Never use the eyes at twilight; any artificial light for the evening is good if it is brilliant enough and shady; a flickering gaslight is injurious. When artificial light is at all painful, it is safer to read or write with *Neutral Tinted Spectacles*.

3rd. Never read in Railway Trains or Omnibuses. It requires too great an exertion of the accommodative power to keep the eyes accurately focussed and fixed on the letters. Never read when lying down—it is too fatiguing for the accommodative power. Many a tedious case of weak sight has been traced to the pernicious habit of reading in bed after retiring for the night.

4th. Do not read much during convalescence from illness. Before the muscular system generally has quite recovered its healthy tone we ought not to expect the muscles of accommodation to bear the continuous use to which they are subjected in reading or writing. We

cannot be sure that the delicate muscles of the eye are in a condition to be used until the muscles of the leg and the arm have regained their strength and firmness.

5th. The General Health should be maintained by a good diet, sufficient sleep, air, exercise, amusement, and a proper restriction of the hours of hard work. One ought not to expect strong eyes in a body weakened by bad habits or an injudicious amount of labour. Bright gas lights in crowded rooms, and the impurity of air in such places, are especially to be avoided.

6th. Take plenty of sleep. Sleep is a sovereign balm for those who suffer from weak sight. Retire early and avoid the painful evening light.

WHAT RESULTS IF NO ATTENTION IS PAID TO THE WEAK SIGHT.

If the symptoms of pain, confusion of vision, dread of light and of all use of the eyes continue, and no measures are taken to ameliorate or remove them, there is danger of the eyes not only becoming nearly useless, but that they may finally get so sensitive and irritable that ordinary daylight cannot be borne without pain and discomfort. When weak sight has been allowed to progress for years, it sometimes intensifies to such a degree that one finds a darkened room the only really comfortable place, dark blue or smoke-coloured glasses not affording a sufficient protection from the light.

Severe cases of weak sight are tedious and difficult to cure, and particularly so if of years' standing, but recent cases are curable.

WHEN TO BEGIN WEARING GLASSES

The adoption of suitable glasses should not be neglected after the symptoms of old sight are noticed, especially during the early evenings. Nothing is gained by waiting, and much may be lost. We lose, in the first place, a great deal of amusement and instruction from the necessity of giving up our evening reading, avoiding small print, resting our eyes, and neglecting fine work of all kinds. In the beginning these interruptions in our way of life are not so serious and frequent as to give much annoyance; but as the old sight increases, they become of importance. In the second place, and of greater moment, is the risk we run of straining and fatiguing the accommodative power of the eyes, and so causing weak sight. In these days of weak sight and eye-glasses there need be no fear that the adoption of glasses will be interpreted as a confession of old age. Old sight becomes very early—much earlier than forty in most oversighted eyes—and this flat formation of the eye is more common than any other. Frequently, even,

in the best formed eyes, ill-health, nervous debility, or a constant and severe use of the vision in fine work or night work, will develop the symptoms of old sight as early as the age of twenty-five or thirty. All things being equal, a farmer, if he is not studious, may postpone the use of glasses longer than a professional or literary person, or any one who reads a great deal. Nothing, however, is gained by postponement of wearing Spectacles; the eyes are not made stronger, and are likely to be made weaker. The relief to the eyes in reading and sewing which follows properly fitting glasses is very remarkable. A Patient of ours had for years suffered from weak sight, weak eyes, inflamed eyelids, headache, and depression, and had tried all kinds of relief but the right kind. Properly fitting glasses gave her good sight, and as a consequence of this her other ills were banished.

SPECTACLES.

The Spectacles which are generally used for the purpose of correcting some optical defect in the eye are either CONCAVE or CONVEX lenses, or a combination of both. Care should be taken that the Spectacles fit accurately, that the glasses are on the same level, so that one is not higher than the other, that they are sufficiently close to the eyes, and the centre of each glass exactly opposite the centre of the pupil. If these points are not attended to, the glasses act as prisms, and give rise to DIPLOPIA or a correcting squint, and the latter may even become permanent if their use is persisted in. Single Eye Glasses should not be used as a rule, as they often lead to weakness of the other eye from disuse.

In preference to the ordinary double convex and double concave lens, the Authors have great confidence in recommending their Crystal Periscopic Spectacles

The most perfect vision with Spectacles is produced when the eye looks in the direction of the axis of the lenses, and more or less imperfection always attends oblique vision through them. Persons who use Spectacles therefore generally turn the head, while those whose sight does not require such aid merely turn the eye.

To diminish this inconvenience, use the minisci, or concave-convex lenses.

The effect of these, as compared with double convex or double concave lenses is, that objects seen obliquely through them are less distorted, and consequently that there is a greater freedom of vision by turning the eye without turning the head, from which property they are called periscopic.

The sense of dazzling of which many complain, when their eyes are exposed to bright light, is more efficiently relieved by blue-tinted glasses. It is a fact that the orange rays are most irritating to the retina, and, as blue excludes the orange rays, it follows that this is the proper tint for such glasses.

Those who require Spectacles for reading, writing, &c., and can see distant objects without them, should use the Periscopic Pantoscopic Spectacles.

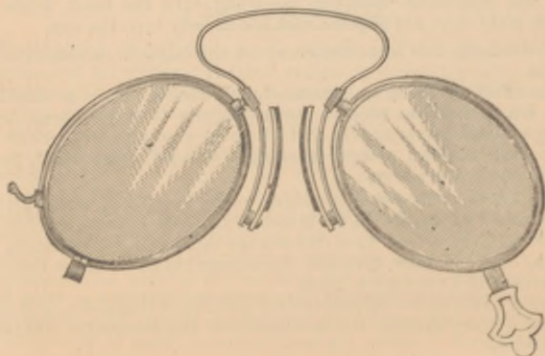
Although clear and correct lenses are the first object, the frames also form an essential part. They should not be made too light, as they often lose their parallelism, and, therefore, should be sufficiently strong to prevent this. Although rarely attended to, this is of great importance, because, unless the pupil of the eye looks through the centre of the lens, clear vision is impossible.

For elderly people who wear glasses to correct old sight, Spectacles are usually preferred to eye-glasses, still, for occasional use, Folders, suspended around the neck by a cord, are always at hand, and quickly adjusted upon the nose. For long periods of reading, writing, or sewing, Spectacles are more comfortable.

In conclusion, in handing this little work to the public, we beg to call attention to the fact that our glasses are optically clear, ground with mathematical correctness, and the frames in which they are mounted are clearly balanced and angled, and made from the best steel.

Having been before the public for a number of years, our Periscopic Crystal Glasses are generally known, but of late years they have introduced them further, and they can now be had in almost every place, large and small, in the United Kingdom. In order to ascertain the correct focus, the "Optometer" on Dr. Smee's principle may be used, or the graduated test type on other side will be found an easy and efficient guide to ascertain the strength of glass required.

The Authors strongly recommend their improved adjustable Folder, which possesses all the advantages of a Spectacle without any of the defects of an ordinary Folder, the use of which is condemned by many oculists, on account of their position on the nose not allowing the eye to look through the centre of the lens. Ladies also complain of their touching the eyelashes. Both of these defects are obviated by the adjustable nose-pieces; and as these latter are open at top and bottom, they relieve the nose of all pressure.



TEST TYPE

FOR THE

PERISCOPIC CRYSTAL SPECTACLES.

This Test	5
TYPE WILL ENABLE	6
The Reader to	7
Form a correct	8
JUDGMENT OF WHAT	9 to 10
Glasses he requires.	11 to 12
Place it with a good light,	12 to 14
At the proper reading distance,	14 to 16
Which is about 14 inches. Select the	16 to 29
Smallest type that can be Distinctly read with	18 to 20
Ease. The corresponding figures in the margin	20 to 24
Will show the focus required. The best Lenses,	24 to 30
Which being periscopic, give a larger field of vision,	30 to 36
With less strain on the eye than the convex lenses.	36 to 40
These lenses are recommended by the faculty for night use,	40 to 48
especially by gas light. Use W.H. and G.'s Periscopic Tinted Spectacles, they	50 to 60

THE PERISCOPIC CRYSTAL SPECTACLES.

The following are a few of the numerous

TESTIMONIALS

We are daily receiving from Medical men, &c.

From SAMUEL HITCH, Esq., M.D., 3, Grand Parade, Eastbourne.

Gentlemen,—I have worn Spectacles at least 50 years, and I have never found any to which my eyes adapted themselves so readily and so pleasantly as these do. They appear to me to render the type clearer, and by artificial light they certainly communicate a sense of coolness.

Yours &c., SAMUEL HITCH, M.D.

From ROBERT COOKE Esq., M.R.C.S., L.C.A., Infirmary, Newport, Mon.

I have great pleasure in giving my opinion of your "Periscopic" Spectacles. I have used them for over eight hours at the time, and with gaslight; they have never caused my eye to ache in the slightest degree; the print has been clear through the whole of the time, and no heat or over-exertion has occurred. I have, therefore, the satisfaction now of having a perfect glass.

From SPENCER T. HALL, Esq., M.D., P.L.D. M.A., Burnley.

Gentlemen.—I have no hesitation in testifying to the great comfort I have derived from the use of your tinted glasses. The sense of coolness and clearness to overwrought eyes is remarkable.

I am yours truly, SPENCER T. HALL.

From W. F. LAURIE, Esq., M.D. Dunstable.

Gentlemen.—I beg to say I have found your Spectacles most serviceable to me; far better than any I have ever had before, and I shall confidently recommend them to my patients.

Yours truly, W. F. LAURIE.

From JOHN WORRAL, Esq., M.D., Adare, Limerick.

Oct. 16th, 1878.

Gentlemen,—I am very pleased with the "Periscopic" Convex Glasses of a blue tint, which I had from you recently: no matter how long I may be reading, they never weary the sight, or cause heat with Epiphora, which invariably attended the use of other glasses.

Faithfully yours,

JOHN WORRAL.

From W. WALLACE, Esq., M.D., Towie Cottage, Turriff, N.B.

Gentlemen,—The Gold Spectacles came duly to hand and suit me very nicely.

Yours truly,

WILLIAM WALLACE, M.D.

WM HOGGAN, Esq., M.D., H.M., Dockyard, Sheerness, writes:

It affords me much pleasure to state that the pair of Spectacles I had from you suit me exactly, and are all that could be wished.

From THOMAS SHELDON, Esq., M.D., 125, Cornwall Road, Notting Hill, London, W.

Gentlemen,—I was very much pleased with one of your Registered sight tests, and shall be pleased to recommend my patients to you.

Faithfully yours,

THOMAS SHELDON.

From J. W. DREW, Esq., M.D., Surgeon, Ophthalmic Hospital, Newport.

Having given the glasses a fair trial, I have now much pleasure in reporting thereon. Results have verified all you predicted, and I am more than satisfied. My only regret is that I had not your help long since. I shall strongly recommend you to my patients.

From the Very Rev. WM. RONAN, S. J., College of the Sacred Heart, Crescent, Limerick.

Gentlemen,—The Periscopic Convex Glasses of a blue tint, which I have purchased at your establishment give me great comfort. I use them constantly in reading and writing, and I find them most satisfactory. Believe me,

Faithfully yours. W. RONAN.

From the Very Rev. JOHN HALPIN, P.P., Rathkeale.

I have reason to be thankful for the Spectacles I had from you, they are most comfortable by day and artificial light.

Yours very truly,

JOHN HALPIN, V.G.

From J. TIRRELL, Chemist, Market Square, Hanley.

Gentlemen,—A case has just come under my notice proving beyond all doubt the great advantage you claim for the "Periscopic" Spectacles. I have to-day sold a pair of No. 10 Spectacles to a customer who, two years since, required your No. 8; last year he had No. 9. He is therefore, to-day wearing

Spectacles two sights younger than what he required two years ago ; at once showing to what a large extent his sight has been benefited by the use of your Spectacles.

Yours very truly,

J. TIRRELL.

From J. Thompson, Secretary of the Working Men's Co-operative Society (Limited), Portland Street, and Church street, Ashton-under-Lyne.

Gentlemen,—I am delighted with the pair of Spectacles you have made for me, they suit me admirably, I never met with a pair before that I could see a long distance with, and yet be able to work in without inconvenience. They have in short so lengthened my range of vision, that outside appears almost like a new world, and things near are so clear and distinct that I can work with more comfort and ease.

Yours truly

J. THOMPSON.

From JOHN TOMLINSON, Esq., Haydn Terrace, Blackburn.

Gentlemen,—The "Periscopic" Spectacles give me great satisfaction. They suit better than any I have used hitherto. I can confidently recommend them, especially for reading by gaslight

Yours faithfully,

JOHN TOMLINSON.

From Col. E. VESEY BROWNE, Dromara House, Rathkeale.

Oct. 20th, 1878.

Gentlemen,—I have had two pairs of *periscopic* Spectacles from you, and am happy to bear testimony to their efficacy. I find that they cause less strain on the eyes than any glasses I have ever used, and I wear them with great comfort.

Yours, &c.,

E. VESEY BROWNE,

Late Lieut-Col. 60th Rifles.

From WILLIAM WHALLEY, Esq., Latchford, Warrington.

Gentlemen,—I have great pleasure in bearing testimony to the efficiency of your "Periscopic Spectacles" I have been short-sighted all my life, and worn spectacles for upwards of 20 years and I have had Spectacles from some of the most noted Oculists and Opticians in London, Liverpool, and Manchester, but I never succeeded in obtaining a pair which rendered me any assistance comparable with that which I receive from yours ; and, I may add, I wear them with equal ease and comfort by day and night.

Yours truly,

WILLIAM WHALLEY.

From JOHN COWIE, M.P.S., Falkirk.

I am pleased to say that your Spectacles are a very great boon, and I can strongly recommend them.

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