

THE CARE OF THE EYES.

EVERY observant person has recognized the recent striking increase in the number of people wearing glasses, and while this fact can be considered a sign of our advancing civilization, the question may be asked, What it will lead to and is it a necessity? The answer must be that while our environment, our professions and trades, compel a constantly increasing demand upon one of the most delicate and complex organs of our system, it is necessary, in order to preserve the function of the eyes in their highest possible state, that concerted action be taken to that end. The writer firmly believes that neglect of the eyes and the injudicious use of glasses are great contributing factors in the general deterioration that is taking place in these organs.

Very few realize the number of blind persons in every civilized community. Statistics are uninteresting, but a few figures are necessary to demonstrate the truth of the foregoing statement. The United States Census Reports for 1890 show that out of a total population of 62,622,250 the total number of persons returned as blind in *both* eyes was 50,568, or 808 to each million of population, which is in the proportion of one blind to every 1238 inhabitants. This proportion while less than in 1880, when there was one blind to every 1032 inhabitants, is still enormous. The proportion of blind to the entire population varies greatly in different countries, from that in Holland of 445 to one million of inhabitants, to that in Iceland where there are 3400 to one million of inhabitants; the percentage for the United States being slightly below the world's average.

A further study of the United States Census Reports for 1890 shows that the proportion of blind rapidly increases up to the age of twenty, remains stationary

from twenty to thirty, increases again gradually until forty-five is reached, and then increases rapidly to the age of seventy-five. These figures show that the period when blindness increases most rapidly is during school life and in old age. Statistics from reliable observers covering many thousands of cases show that 33.35 per cent of blindness could certainly have been avoided, and that 38.75 per cent were possibly avoidable. Thus we see that a large proportion of cases of blindness are unquestionably preventable.

It is not the purpose of this paper to enter into the study of the causes of blindness, or exhaustively to consider its prevention. Before studying the care of the eyes let us glance for a moment at the far more important subject, — the relation of the eyes to the general health. While but very few realize the extent of blindness in the world, I think I may say that no one but the oculist appreciates the amount of suffering and ill health caused by defective eyes. During the past few years the public have become somewhat educated to the fact that a large proportion of the headaches of school-children, and oftentimes of adults as well, are solely the result of some strain upon the eyes. Not many years ago the oculist would have been greatly surprised to have a patient come to him for headaches unless referred to him by the family physician; while to-day patients frequently consult the oculist first. The same procedure is followed in various nervous disturbances. The medical profession have learned that many cases of mental depression, irritability of temper, and inability to apply the mind have resulted from eye-strain; and that insomnia, spinal irritation, general nervous prostration, and even choreic symptoms may be due to the same cause. Epilepsy,

nervous dyspepsia, and other reflex nervous disturbances have undoubtedly, in many cases, been caused by some ocular defect and cured by its correction.

That such a series of conditions *may* result from the eyes is explained by the intimate connection existing between the eye and the brain by means of a nerve of special sense, nerves of sensation and motion, the sympathetic nervous system and the blood supply, which renders the transmission of an irritation or inflammation in one organ to the other a not unlooked for consequence. The nerve connections, motor, sensory, and sympathetic, between the muscles of the eyes and the nerve centres, are abundant and intimate. Is it, therefore, at all surprising that a constant regular or irregular strain on the ocular muscles, week after week, month after month, and year after year, will in time produce headaches and various other nervous disturbances by communication of the irritation to other nerve origins? No; it is more astonishing that we do not observe more frequent and more varied complications from eye-strain, when we consider the great frequency of anomalies in refraction and the outrageous abuse of the eyes in this intellectual age in which we live.

Every oculist has seen case after case of these various conditions promptly relieved by the correction of the ocular defect. He has seen cases where the child pronounced by the parents and teachers dull and backward becomes the brightest in his class after wearing glasses that give him normal vision without the effort that has caused a condition of brain fag. He has seen many a nervous, weakened, ill-nourished child become as robust and healthy as his playmates after the removal of some eye-strain.

The mechanism of the eye is perhaps the most delicate apparatus in our entire body. For the perfect performance of its function every part must work in perfect harmony. To secure this har-

mony both the refraction and the muscular balance of the eyes must be perfect. It is a fact that an absolutely emmetropic, or normal, eye is but rarely found.

An abnormal eye may have any one of eight different refractive errors. To secure perfect vision, rays of light must be brought to an exact focus upon the retina of each eye. If any refractive error exists, these rays will either not be focused upon the retina, or the focusing will be done by an undue effort of the ciliary muscle, or some one, or more, of the twelve extrinsic muscles of the eyeballs. Furthermore, to have single binocular vision, it is necessary that both eyes should be so directed at the object viewed that the image shall be received upon identical points of the two retina, and for a perfect image must fall upon the macula lutea, or central point of distinct vision, of each eye. This is accomplished by six muscles attached externally to each eyeball. These muscles work in pairs, one practically antagonizing another, and at the same time working together with their fellows of the other eye. Therefore, to hold both eyes perfectly straight, without any undue strain, each one of these twelve muscles must possess and exert a given definite strength. As to the relative normal power of these muscles we find that they vary greatly; one muscle may normally have twenty to thirty times the power of another in order to perform its function, and the normal power of each muscle may also vary greatly in different individuals.

From this very general glance at the mechanism of the eye it can be readily seen how easily a disturbance of the refractive or muscular equilibrium may occur. In order to secure perfect binocular vision without undue strain or effort, any of the various forms of refractive or muscular errors that may be present must be corrected if causing strain. As we usually find both refractive and muscular errors existing in the same

patient, the key to the whole problem rests in the determination of *the* factor that is creating the mischief.

Here let me decry the too prevalent habit of going to the optician, or the far greater evil, the bargain counter of our large department stores. The optician should be, and as a rule is, a skilled mechanic whose sphere is the careful grinding and adjusting of lenses upon the physician's prescription. Unfortunately he is too often imbued with the instincts of the tradesman and will endeavor to make a sale to every applicant. Too much cannot be said in condemnation of the indiscriminate sale of glasses by stores, peddlers, and the self-styled professor. Every oculist of experience has seen many an eye lost and many a patient's health ruined by the use of glasses purchased from some of this class. In answer to the reason so often assigned, of inability to pay the oculist's fee, I would simply say that no conscientious physician ever refuses to reduce his fees to those unable to pay full charges, while at the numerous eye clinics thorough and careful work is given gratis to all unable to pay any fee.

As I have said, the safety of the eye as well as the health of the patient rests in determining the disturbing element; and here again is shown the necessity of the physician's skill to decide between cause and effect. If the trouble is dependent upon refractive errors, correct glasses must be prescribed; but if due to muscular errors, glasses are frequently not indicated, and many times when worn do positive harm. In the opinion of the writer, many persons, especially children, are wearing glasses unnecessarily, as by correcting their muscular errors the eyes can be relieved without such aid. The conclusion to be drawn is that to preserve to the eye its highest function, the physician should be consulted and not the tradesman. No one would expect the blacksmith, be he ever so skillful, to repair the delicate mechanism of a watch when out of order. No

more should one trust the most delicate organ of the body to the glass fitter.

Let us return to the prevention of trouble by considering the care of the eyes. This should practically commence at birth, and in order to secure its highest usefulness must be continued throughout the whole life. It is estimated that at least thirty per cent of the blind in this country have become so from purulent ophthalmia. The eye is most susceptible to any infection, and therefore the greatest care should be used that no infectious matter shall at any time come in contact with the eyeball. Absolute cleanliness is of the utmost value in the treatment of inflammatory conditions of the eye, and no nurse or attendant should ever touch his own or another's eye except with absolutely clean hands. More cases of blindness have resulted from this one cause than from any other. Many a babe has been rendered blind for life through the carelessness, in this particular, of the mother or nurse. Pure, clean water is the only application that should be made to the eyes of the newborn child, except upon the advice of the physician. The moment the babe's eyes show the slightest discharge or redness a competent physician should at once be called, as infants' eyes are especially susceptible, and oftentimes within twenty-four hours the disease will have advanced to such a degree as to render hopeless the possibility of saving any sight. The cautious physician should for the first week or two examine the eyes of the babe from day to day, so that the onset of any trouble may be at once met by active treatment. The eyes of infants should be protected from all glaring lights and especially the direct rays of the sun, both indoors and out. The babe should never have its attention attracted by objects held close to the eyes, for repeated convergence at near-by objects may predispose to or even produce strabismus. This observation holds good as the child grows older.

From poring over story and picture books when in too fine type or held too close to the eyes, myopia threatens. The fine worsted and bead work used in some of the kindergartens is for this reason objectionable. Give the growing child plenty of outdoor amusements, where the eyes have a long range during the developing period of life, and we shall see fewer little ones wearing glasses for myopia and astigmatism.

One of the most important fields for the exhibition of contemporary knowledge and interest in sanitary science is presented in our educational institutions. When we consider the total number of hours passed in the classroom during the child's school and college life, the additional hours required for study and preparation outside of the school-room by the present day system of forcing the child too rapidly, when we compare these hours with the time left for recreation, exercise, and sleep, and recall that these years are the years of physiological growth, is it any wonder that we find so many commencing their active life as physical wrecks? It is therefore plainly a duty we owe to posterity to consider carefully the hygienic environments of our children as well as their mental and moral training. The school life of the growing child should be so regulated as to secure the best mental advancement and at the same time the best physical development. Every observing physician has seen many children who commenced school life in apparently good health soon complaining of headache, nervousness, loss of appetite, and other symptoms indicative of impaired general vigor.

In the early part of the last century we find attention first called to the relations existing between the myopic eye and the demands of civilized life. Within a comparatively few years more complete and systematic examinations of the eyes of school-children have been made, so that to-day we have as a basis for our statistics the examination of the

eyes of over 200,000 pupils of all grades. An analysis of these examinations shows that in the primary schools nearly all the children enter with normal eyes. In the higher grades twenty-five per cent have become myopic, while in university life the percentage of myopia has increased to from sixty to seventy per cent, which shows that the number of near-sighted pupils increase from the lowest to the highest schools, and that the increase is in direct proportion to the length of time devoted to the strain of school life.

In the face of these facts it seems the imperative duty of the hour carefully to investigate the cause of this deterioration of the eyes of our children during school life. The evident relationship of this increasing near-sightedness to school work seems to indicate some fault in our educational methods. Owing to the fact that myopia is often hereditary it is impossible to eradicate the condition for generations to come, but acquired myopia can be prevented or very greatly decreased by careful and frequent examinations of the eyes, together with thorough hygienic preventive methods during the years of physical growth and mental training of the child.

First, as to the importance of frequent examinations of the eyes of children. Statistics prove that a very large proportion of the eyes of young children are hypermetropic. So great is this preponderance that many authorities claim that the normal eye is a hypermetropic one. Careful observations have shown that in almost every instance the change from far to near sight is through the turnstile of astigmatism. That this change does take place has been proven by the progressive increase in the percentage of myopia during school life. By repeated examinations from year to year, the first change can be detected and suitable treatment taken to check its progress. I believe that the eyes of every child should be carefully examined at the commencement of school life,

and that the examination should be repeated at least every year until the time of full development of both mind and body. The care of the teeth commences even earlier than this, and is continued throughout the whole life. We have become educated to the importance and necessity of sending our children to the dentist every six months or year for examination whether disease is suspected or not. The far more precious and delicate organ, the eye, is almost universally left to do its work unaided and uncared for, until often serious and irreparable damage has been done, and the innocent victims of our ignorance and neglect are deprived of the full realization of God's greatest gift, that of sight. It is not the vision alone that pays the penalty of this criminal neglect, but a long train of physical wrecks brought about through reflex action from eye-strain. It is not necessary to go into the details as to how or what general conditions may result from defective eyes, but merely to sound a warning as to the danger from neglect of the eyes in early life. To continue the comparison with the teeth, we can get very acceptable false teeth, but artificial eyes have not proven of much practical service.

Every school should possess a series of test letters, and each scholar at the commencement of each term should have the eyes examined by the teacher. This examination is so simple that any teacher can be instructed in a few minutes, so that she can determine if any defect exists. All that is essential is a set of Snellen's test types placed in a good light, the letters of which should then be read with each eye separately at a given distance. The child should then be examined with the astigmatic card, and the lines running in all directions should appear to each eye alone equally clear and distinct. Then a small card plainly printed in four and one half point (diamond)¹ type should be read by

¹ This line is printed in diamond.

the child while the teacher measures with a rule the nearest point at which it can be easily read. This distance should correspond with the normal near-point from an emmetropic eye, which should be recorded on the back of the card for the different ages from six to twenty years. If these tests show no defects, the child may be admitted to the school, but if a defect be found in any of these tests, particularly the first, the parents of the child should be at once informed of the existing defect of vision and the consequent need of professional advice. Further than this, during the school year, if the child complains frequently of headaches while studying, or seems to be getting nervous, anæmic, etc., the teacher's duty is to suggest again to the parents the wisdom of seeking a physician's advice.

The examination as suggested would at once detect imperfect vision from any cause; if due to refractive errors, it could be corrected; if to intraocular disease, treatment might save the sight which otherwise would possibly be lost.

In all cases of children with inflamed eyes, they should be required to present a physician's certificate of the non-infectious nature of the disease before being permitted to enter the schools. Our orphan asylums, public homes, and institutions of all kinds require a physician's certificate before admitting children with any redness or inflammation of the eyes. Should we be any less strict before permitting these children to associate with the healthy ones in our schools?

Let us now consider the faulty conditions of school life which bear more or less directly on the eye as well as on the general health of the child. The curriculum of study in the majority of public schools is a hard and fast one, which all students are expected to follow. I believe that a more elastic curriculum should be adopted, whereby children with defective eyes, or a more or less feeble health, shall be required

to take only as many and such studies as they may master in safety. Such a modified course, while it would lengthen the student life by one or more years, would do much toward preserving the eyes and general health.

A decided reform should also be made in the system of requiring study at home. The average school session of five or six hours a day should be sufficient to prepare for college by the time pupils are sixteen or eighteen without requiring nearly as many additional hours of home study, which robs the students of the recreation and sleep they should have. The work at home is usually accomplished when the body is tired, and the brain sluggish, generally by artificial light (which is too often an improper one), and frequently with a faulty position of the body. I believe that with a proper regulation of recitation and study during school hours alone, the brain, made more active by sufficient recreation, exercise, and sleep, will accomplish far more than by the present system.

The paper and type used in school-books have in recent years been vastly improved, yet there is room for still further improvement. In selecting books for children the type should always be large, bold, and clear. Cohn and Webber claim that type at least one and a half millimetres in height (equal to long primer) is the smallest that should be used in schoolbooks, and the distance between the lines, or leading as it is called, should be two and a half millimetres. The paper should be of a dull finish, instead of the highly glazed finish of many books, and of a dead white or a cream color. In many of the books used by children the print is too small and of a poor impression, which is very injurious to the eyes. This perhaps applies more particularly to the interesting books and periodicals prepared for the young, and especially to newspapers. The character and amount of reading are too often not properly regu-

lated at home. The reading of sensational papers and novels at hours when the child should be asleep is a habit too freely indulged, at the expense of both mental and physical development.

There should also be frequent breaks in the application of the eyes at close work. This frequent interval of rest for both the brain and the eyes can easily be secured in the schoolroom by a change from the book to the blackboard, to oral instructions, lectures, etc. The school session should be broken by short recesses in the open air and gymnastic exercises.

A consideration of the eyes and health of our school-children must necessarily involve the location of the building, as to surroundings, light, etc., and the school furniture. The location in cities should avoid narrow streets and high surrounding buildings which interfere both with light and air; and away from noises, exhalations, smoke, and dust from factories, stables, markets, etc. Playgrounds in the open air, either in ample grounds or on the roof of the building, should be provided for intermission of the sessions. The building should be so constructed as to avoid dampness, and should furnish ample ventilation without drafts. In the country, especially, care should be taken that the location be well drained, and away from malarial and other injurious environments.

Sufficient light is of the utmost importance, and should be first considered in the architectural plan of all school-houses. The quantity of light, Cohn says, cannot be too much; while Javal says that every portion of the room should be so flooded with light that the darkest place will have sufficient illumination on a dark day. To secure this Javal believes that the distance of surrounding structures should be twice their height. The necessity of sufficient light is shown by an attempt to read in the twilight or in a dimly lighted room. A

test as to the amount of light required is the ability of a normal eye to read diamond type readily at twelve inches. According to Risley the window surface should never fall below one square foot of glass for every five square feet of floor space, and this should be exceeded in many locations, on the north side of the building, and on the ground floors. The quality of light is, of course, modified by the color of the walls in the schoolroom. The light shades of green, yellow, blue, or gray should be used in the coloring of the walls, and also the furniture and wood-work. The loss of light caused by large surfaces of blackboards can be saved by roller shades of the same color as the walls, to be lowered when not in use.

Next in importance to the quantity of light in the schoolrooms is its direction. The ideal light of the schoolroom is that from the left side, or the left and rear of the pupils. Lighting of the room from two opposite sides should be avoided if possible, yet when necessary to secure the requisite amount of light, that from the right should be high up in the room. In this way we secure a diffused light in the room from the illumination of the ceiling and avoid the objectionable cross-lights. This arrangement at the same time affords means of ventilation.

In the most excellent and thorough article upon school hygiene by Dr. S. D. Risley,¹ to which I am greatly indebted in the preparation of this paper, much space has been devoted to the consideration of the school furniture. While the faulty construction of the school desk and seat is a very important factor, according to orthopædic physicians, in the causation of spinal curvature, it has been, and undoubtedly still is, a no small factor in the increasing myopia of school life. Vast improvements have been made in the average schoolrooms of today in this respect; still a visit to al-

¹ System of Diseases of the Eye, Norris and Oliver, vol. ii. 1897.

most any school will show more or less of the pupils in an improper position. The great danger to the eyes lies in the pupil bending over his desk and thus bringing the eyes too close to the work. This abnormal near-point adds largely to the strain upon the accommodation and convergence, and at the same time causes an increased congestion of the coats of the eye, all of which serve to increase the tendency to near-sightedness. The proper arrangement of the seat and desk is such that the child will find it easier to sit upright at his work than in any other position he can assume. The direction and measurements for securing such a position by means of a correct seat and desk are fully given in many articles upon this subject.

The blackboard forms an important adjunct to school life, and its more general and extended use should be encouraged. The strain upon the eyes is much less when looking at a relatively distant object like the blackboard than it is at the near-point, as in reading and writing. Hence instruction by board exercise is much less fatiguing than work done with the pencil or pen. The surface of the board should be kept black and clear by frequent washing, and the crayons used should be either white or yellow. Wall maps and charts are also useful for the same reason as the blackboard, in that they permit of instruction at a greater distance. In all children who have already developed near-sightedness, to avoid the increasing tendency to draw the work nearer and nearer to the eyes some of the many forms of head-rests which hold the head erect and at a proper distance from the work should be used.

I have dwelt at length upon the care of the eyes in childhood, because it is at this time of life that there is the greatest danger to vision. Furthermore, when proper care has been given to the eyes in early life, we enter adult life with better eyes and a better

understanding of their requirements. In all classes — men, women, and children — there is an inherent prejudice to the use of glasses, but to those suffering from refractive errors the use of the correct glass is one of the greatest boons. I acknowledge that the prevalent error of oculists is the too early and frequent prescribing of glasses. In many instances the use of glasses can be avoided by the correction of some deficiency in the balance of the extrinsic muscles of the eye, which may be the cause of the asthenopic or reflex symptoms. In all cases of decided refractive errors, however, the use of correcting lenses is a necessity. When glasses are required they should be given proper care by the wearer. We have often seen patients wearing glasses so scratched and dirty that a great effort must necessarily be made to see through them. Eyeglasses should never be folded, as they soon become misshapen and scratched. For the same reason glasses should not be thrown carelessly upon tables, stands, etc., and when out of shape, nicked, and scratched, they should be repaired or new ones purchased. After the correct lens has been selected, care should be taken that the frames are skillfully adjusted by a competent optician, as oftentimes improperly fitted frames destroy all the benefit that would have resulted from the glasses.

The prevalent habit of going without glasses for reading as long as possible is also a bad one. The public should be taught that all normal eyes require glasses for near vision about the age of forty or forty-five; that postponing their use later than this age causes an effort of the accommodation which does harm. The prejudice to the use of glasses seems to be dying out, and the laity are realizing more and more the necessity of paying attention to the eyes.

One of the most important questions relating to the general care of the eyes is What is the best light? This should always be answered, the diffuse natural light of day; and the next best, that which most nearly approaches daylight. Artificial light should be profuse, white, and steady, and that which most nearly meets these requirements is that known as the Welsbach light. The incandescent light when protected by translucent globes is also an excellent light. Gas and kerosene are also good, but should be shaded with globes colored white on the inside and tinted green on the outside. The solar light when reflected from white surfaces has often been injurious. It is therefore wise to protect the eyes with a slightly smoked glass if they are to be exposed for too long a time to the glare of the sun upon snow, water, or the bright sand of the seashore. What has been said in regard to children in school applies as well to the adult, that the eyes should be used only when the body is in an erect position, and that the light should fall upon the book or paper from the left side. It hardly seems necessary to caution against the use of the eyes in reading after twilight, when riding on the cars, while lying down, etc., but as all these things are being done daily we cannot cry "don't" too often.

In conclusion let me remind the reader that the health of the eye depends to a great measure upon the condition of the general system. The eye is not a separate and distinct organ to be treated wholly independent of the bodily health. While the eye can undoubtedly cause abnormal conditions of other organs, it can at the same time suffer from other diseased conditions. Therefore, by obeying the common laws of health the usefulness of the eyes will be best maintained.

A. B. Norton.

A POSSIBLE GLIMPSE OF SAMUEL JOHNSON.

READERS of Boswell's Johnson are aware of a strange gap in the life, extending over the whole of the years 1745 and 1746. Johnson's "Proposals for a New Edition of Shakespear" appeared at the beginning of 1745, and with that exception, no single event is known, no anecdote recorded, no publication mentioned, no letter preserved. Yet those years were full of material for an author and a talker. Boswell reminds us — as who would not? — that in those years Charles Edward raised the Stewart flag in Scotland, invaded England, eluded two armies of King George, marched to a point only one hundred and twenty-seven miles from London, won two pitched battles over the royal forces, and was defeated only after keeping the whole country in anxiety for eight months.

The author of the article on Johnson in the National Dictionary of Biography sneers at the suggestion of Boswell that his hero might have been connected with the Pretender's expedition. But where is the absurdity? Johnson was notoriously a passionate partisan of the Stewarts. Lichfield, his birthplace, his mother's residence, the home that never lost his affection, was a chief station of the Duke of Cumberland's army, and the Pretender's line of march came within twenty miles of it; while all around it the Staffordshire folk were considered the most intensely Jacobite part of the English people. If Johnson had visited his native town, or even had letters from his mother and his stepdaughter in those years, he must have had his thoughts full of the invasion. Preston, Falkirk, and Culloden must have interested him as much as any man in England. Did he really know nothing about it all? Or did he know too much, that we find no more mention of "the '45" in his life than if he had been six years old instead

of thirty-six? For all that those years with their events and memories show us of him, he might have been on the Continent, in prison, or confined with a broken leg.

Johnson himself was so very obscure in these years, his talents slowly struggling into recognition, that it is not strange that his name appears so seldom in correspondence; yet as one repository after another of family papers becomes unlocked, the key to his more than obscurity in these eventful years may yet be disclosed. Whether the notes now offered to the reader really afford that key may be questioned; they are fragmentary, and I have no right, if I had the power, to expand them. Such as they are they may at least give shape to interesting conjecture as to the whereabouts of a man, every incident of whose career is more studied, now that he has been for more than a century in his grave, than ever it was while he walked the earth.

A short time ago a noble family, which had long maintained a spacious residence in one of the older but still aristocratic quarters of London, determined to let that house, and live exclusively in the country. Such a move, after long years of occupation, is almost sure to bring to light papers, hastily stored, never examined, and all but forgotten. That interesting old letters should be found in unsuspected repositories of a family mansion such as I mention was every way to be expected. Through an old and pleasant acquaintance with several members of this family, amounting to close intimacy with one honored and loved by all who knew him, — now, alas! deceased, — I feel justified in laying before the public a copy of some bits of correspondence. Nothing, however, has been published by the owners of the papers, and perhaps never will be. I have no right