

manner. Whether the spirilla and fusiform bacilli acting together or separately were virulent to these tissues was not ascertained experimentally, but it seems likely from the avirulent character of the staphylococcus and *Bacillus xerosis* that the marked destructive changes which occurred in the patient's corneæ could not have been produced solely by them.

In any case, the presence of spirilla and fusiform bacilli in an inflammatory condition of the eye appears to us so uncommon as to induce us to record the preceding observations.

We are indebted to Mr. Fergus for his kindness in permitting us to publish this case.

The Education of High Myopes.

By N. BISHOP HARMAN, F.R.C.S.

At the British Medical Association Meeting of 1910¹ I gave an account of an experiment that had been initiated in London for the satisfactory education of children who were suffering from myopia to such an extent that they were not suitable subjects for any ordinary educational curriculum. Since that date there has been an extension of the work on the lines then indicated, and it is thought that the publication of the lessons learned by the working out of that educational scheme may be of assistance to others.

The demand for some scheme of education suitable for children suffering from a defect of vision is a very natural one. It is bound to arise when education is made compulsory for every child by Act of Parliament. It is bound to arise because no one scheme of education will cover all cases. The curriculum of any school is designed for the greatest good of the greatest number. Misfits must suffer, either because they are incapable of taking advantage of the education provided or else because the scheme would be injurious to them if their full attendance were insisted upon. This was early recognized in the case of the blind, and special forms of education were provided for them, and in the case of elementary school children extra grants were given by the State to meet the additional cost of their special educa-

¹ Harman, "The Education of High Myopes," *Brit. Med. Journ.*, 1910, ii, p. 1320.

tional needs. The difficulty became acute in the case of those who had serious defect of vision, and yet were not blind, and not likely to become blind. When such cases came to the ophthalmic surgeon he very rightly objected to the attendance of these defective children at the ordinary school; it was not right to subject them to the strain involved. In the end the children either were exempt from school altogether or they were drafted into the schools for the blind and partially blind under the definition given in the Act providing for these schools. Neither of these alternatives was satisfactory. In the first case the child loafed about the streets or became the household drudge, and the more intelligent of them took their lessons from their normally sighted colleagues and read without restraint under the worst conditions; indeed, the very aim of the exemption from school was defeated. Further, it must be recognized that the denial of the communal life of the modern school was a real loss to the children, and one that was recognized by the children themselves. In the second case the admission to the blind school had its own drawbacks. The children had to associate with the blind, and do the work of the blind, yet they themselves were sighted children and for the most part not likely to become blind, certainly not in school years. The work they learned was waste of effort and utterly useless. Teaching Braille to a short-sighted child is misplaced energy of the worst kind, for the child will not read it with its fingers, but at the instant the teacher's back is turned the child bends down its head to read with its eyes bare impressions on the paper, which are vastly more difficult to see than ordinary black print. Again the labour was wasted, for no such child ever dreamed of reading the limited works of the Braille Press after leaving school; if it wished to read, it read the books of the normal children of the household. Lastly, and this is the most serious matter for the children of the working classes, the child left school with the stigma of the blind school upon it. And in these days of Employers' Liability Acts that is no light matter. When a child leaves school and applies for work it is the usual thing for the would-be employer to ask from what school the child comes, and the standard passed; the mention of blind school is sufficient to terminate the interview, for who will run the risks that the employment of the bad-sighted entails?

These things were drawn attention to at the International Congress of School Hygiene in London in 1907,¹ and from that arose the first

¹ Harman, "The Mental Characters associated with Blindness, &c.," Second International Congress of School Hygiene, 1907, p. 794.

attempt to deal with this particular problem. These myope classes of which I shall give an account are provided for elementary school children, but the methods employed are applicable to any class of child, and to the education of single children by tutors at home. There is no particular novelty in the method, it is the mere application of common-sense to the situation. Indeed, it is a return to the primitive, almost prehistoric methods of education such as must have existed amongst our wood-tinted forebears, when the wise one of the tribe taught the traditions of the fathers to the children, initiated them in the secrets of their cunning handiworks, and showed them how to make the tribal marks upon the walls of their huts and caves. There, in brief, is the scheme of the myope class, it is essentially personal, and lacking in that modern substitute for personal teaching, the book.

METHOD OF SELECTION OF CASES.

One afternoon each week at a certain place in London, twenty children who are reported by the hospital doctor, the school doctor, or other authority, as suffering from serious defect of vision are brought for examination. Each child is examined, note made of the state of the eyes, and such vision as may be present, and some decision arrived at as to what education is possible for each child. Some are returned to the ordinary school as capable of receiving the regular education. Others are graded for various degrees of exemption or special treatment up to the admission to the blind schools:—

- (1) Elementary school for easy treatment as regards eye work.
- (2) Elementary school for oral teaching only.
- (3) Myope class.
- (4) School for the blind and partially blind.

Many are invalided temporarily for treatment, some are transferred to country homes, but the majority fit into one or other of the four classes named above. Each case is considered on its merits, and many conditions besides eyesight influence the decision arrived at—e.g., the age of the child, whether one or both eyes are affected, the nature and degree of the affection, the possibility of amelioration or aggravation during school age, the possible effects of school attendance and work, the possible educational advantage of a change of regime, it may be both at home and at school, and lastly, in the case of the blind and partially blind, the most suitable school for the particular child in the knowledge of his or her age and capability.

Of the four groups named above one is a temporary expedient and liable to produce unsatisfactory results. It is the result of the rapidity with which suitable cases for entry to the myope classes are reported and slowness with which provision for these classes can be made. Up to the end of 1912 there had been entered on the roll of the myopes 300 children, but there was only room for 100 in the new classes, the remainder had to be accommodated in the ordinary schools but under special conditions; they were admitted for oral teaching only. Children admitted to elementary schools under such limitations are obviously in an anomalous position, and their presence must be a source of difficulty to the teachers in that they disturb the normal routine. Also they are likely to fall into a sort of backwater in the school life, a condition not favourable to their development. But despite these difficulties there is on the whole some advantage to the child, who is better off in the school than loafing at home or on the streets, and it would be quite easy to demonstrate that the children prefer it. At the lowest estimate they gain by the discipline of school life.

To make clear the nature of the defect of the eyes of these children and the limitation of the education they will receive, the matter is explained personally to the parent of the child, and a notice to the following effect is given:—

NOTICE REGARDING THE CARE OF THE EYES.

To the Parents or Guardians of _____

Your child suffers from a defect of vision that prevents him or her from joining in the ordinary work of the school. If it is impossible for you to obtain admission for the child to a special class for short-sighted children he (or she) may attend an elementary school with a view to gaining the educational advantage of school discipline and such general knowledge as can be given in the oral lessons of the classes. Reading and writing of any kind will not be allowed except blackboard work. You are particularly asked to watch your child at home, to teach games and outdoor play, and to stop all reading and writing. (In the case of a girl, sewing should be completely stopped, but knitting may be learned provided the child does it by feeling the stitches and not by looking at them.) The child should be out of doors as much as possible.

It is equally necessary that the teachers to whose care these children are committed should be clear as to the necessity for closely watching and limiting their work, and to this end a circular letter is sent to the headmaster of the school to which any such child is admitted:—

TEACHING OF CHILDREN RECOMMENDED BY THE MEDICAL OFFICER FOR
"EASY TREATMENT AS REGARDS EYE WORK" OR "ORAL TEACHING
ONLY."

Children recommended for "Easy Treatment."—These children usually suffer from a defect of one eye only or they have defective vision in both eyes of a moderate degree. With reasonable care school work should not cause strain of the eyes or entail the risk of exaggeration of their visual defect. These children should sit in the front row of the class, sit upright and not be allowed to stoop over any literary work allowed them. Girls must do no sewing, but may learn knitting, provided it be taught by touch and not by sight. Boys and girls should be prohibited the use of books with small print or writing of any sort other than a bold, large-lettered hand. They should not join in exercises that involve the reading or writing of masses of numerals or geometrical figures. They may read or write in large type, preferably for periods not exceeding twenty minutes without a break. They should not be allowed to stoop over their work, and if it be possible, the writing should be done free-arm fashion on a blackboard or millboard set up on the desk.

So far as school arrangements allow they should attend all the object lessons, demonstrations and oral lessons that are given in the school.

Drill, dancing, games of all kinds may be freely indulged in.

Home lessons of any sort should be prohibited.

Children recommended for "Oral Teaching only."—These children suffer from some serious defect of vision, such as gradually increasing short sight. When no place can be found for them in a special class they are admitted to the elementary school with a view to their gaining the educational advantage of school discipline and such general knowledge as can be given them in the oral lessons of the classes.

The use of books, pens, paper, pencils and slates of any kind and for any purpose is to be prohibited and the child should be reminded at intervals by the teacher in a friendly chat that the prohibition is for his or her own benefit, and that they must do at home what they are trained to do at school.

If the class arrangements permit they may be allowed to write or draw on the blackboard in large characters free-arm fashion.

If a girl shows aptitude for handwork she may learn knitting by touch, but not by sight. Similarly a boy may do the larger kinds of carpentry, but he must not use the rule or draw measured plans.

For the most part these children may drill and dance, but they should be warned against using gymnastic apparatus or dumb-bells, for example, in connexion with the Children's Happy Evenings Association. They should be cautious in the playground games.

But even presuming the greatest understanding and watchfulness of the parents at home, and the greatest readiness of the teachers at

school to make the necessary allowance for such abnormal units in their classes, this arrangement for the admission of myopes of high degree to elementary schools for oral teaching only is a makeshift, and only permissible with a view to its speedy abolition.

THE MYOPE CLASS.

The first necessity for the successful establishment and working of such a class or school is that it shall be associated with an ordinary school for normal children. The myope class must be considered and worked as an integral part of this school. The reasons for this prime necessity are three: (1) A better scheme of work can be provided by this association; (2) to establish the class as a separate unit is to run the risk of the children leaving school with a special mark upon them; (3) parents naturally object to any suggestion of their children being marked out as belonging to a particular class of defective child, even though it may be for their good, and for this reason the attempt which has been made to copy the London experiment in the provinces by establishing myope classes within the existing blind schools has proved a failure. It cannot be too definitely insisted upon that the only possible means of making these classes a success is by associating them, both in their practical working and in their classification with the ordinary schools; for that reason in London they are always spoken of as "classes," and never as "schools." The scheme of work laid down for these classes is as follows:—

(1) Oral teaching with the normal children for such subjects as can be taught orally.

(2) Literary work such as is necessary for the knowledge of the ordinary means of communication to be learned without books, pens, or paper, but by the use of blackboards and chalk, the writing to be done free-arm fashion.

(3) A very full use of every sort of handicraft that will develop attention, method, and skill, with the minimum use of the eyes.

After four years' experience with the experimental class and the extended observation of the work in two other larger classes, it has been found quite possible to carry on the teaching of children in this manner, and the experience has shown that the scheme is not only a success, in that the condition of the eyes of the children under observation has remained as satisfactory as could be anticipated, but that it is a success from the attraction it presents to both teachers and

pupils. Both enjoy it, notwithstanding that for one of these parties—the teachers—the method calls for a degree of alertness and constancy of effort that is not the rule in ordinary teaching. An essential difference in the basis of the teaching required under this scheme was early demonstrated. The teachers found themselves cut off from the regular stand-by of modern teaching, whether of normal children or the blind—the book. They could no longer hand over a text-book to the children; they had to give out something from themselves and make their own conception of the lesson so definite that they could convey it to the child without adventitious aid other than the most primitive materials, chalk and a wall. They had to do real teaching. It was, therefore, no cause for wonder that in the beginnings the teachers themselves had to be shown how to do things, and the readiness, intelligence, and suggestiveness of their efforts in face of the difficulties of the makeshift conditions of the initial experiment have made it a success.

THE CLASS-ROOM.

The one necessity of a class-room for myopes is perfect natural illumination. The windows must be in such size in relation to the floor space that there is on an ordinary day at least 15 ft. candle illumination on the wall opposite the window and at a height of 4 ft. from the floor. The windows should be on the left-hand side of the children's desks; windows on the right-hand side in addition to those on the left are permissible if the sills are at least 6 ft. above the floor level; indeed such windows, or top lights, are an advantage in those rooms on account of the amount of handicraft work done in them. Windows on several sides of the room are objectionable unless they are placed high up in the walls, for they limit the available wall space for blackboards. The children must not sit facing the windows.

Artificial lighting for these rooms is a negligible consideration. All work other than drill, oral lessons, or games, is suspended immediately artificial light is required.

No special equipment other than table and blackboard provision is required. The ordinary school desk is unsuitable and a special desk¹ designed by myself has been in use since 1908 (figs. 1 and 2). The first batch was made by the pupils at one of the deaf schools. The desk has proved satisfactory and is now the ordinary equipment of these classes. It provides for each child a full-sized blackboard suitably sloped and

¹ The myope desk is made by Messrs. Hammer, of Charing Cross, London, W.C.

at a convenient height for sitting, and also a full-sized horizontal table for handiwork. It is convertible from one use to the other by merely lifting the board. Each room has fitted all round the walls a band of blackboard. The boards are fixed from 3 to 6 ft. above the floor

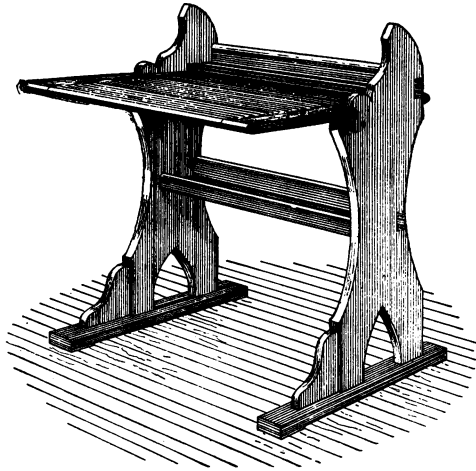


FIG. 1.

Desk in use in the myope classes, designed by the author, showing use as table for handicraft.



FIG. 2.

Myope desk in use as blackboard for free-arm writing.

level, so that they are available for both teachers and pupils without adjustment, and none is provided. In one school where the wall space is limited the writing surface is increased by the provision of continuous sheets of dull "oiled-baize" or "American cloth," this is fixed on to parallel rollers fitted to the wall; the black cloth runs over these rollers like a huge jack towel and gives a very large surface.

The use of a hall or a room clear of furniture is essential for the satisfactory working of these classes. Prolonged sitting or close work of any kind, even when it is so simple that it entails little use of the eyes, is bad for these children. For this reason none of the furniture of the ordinary class-rooms occupied by them is fixed to the floor; the myope desks and the chairs are easily moved to the walls and the floor space cleared. Further, a bare floor space permits of a variety of methods of teaching both useful and attractive, which cannot be undertaken in an ordinary class-room.

THE SIZE OF THE SEPARATE CLASSES OR FORMS.

The myope class comprises many separate classes, grouping children of the several standards of attainment and age. Each of these separate classes has a teacher, not necessarily one for each class, for the arrangement of the time-table allows of an alternation of the work of the teacher. When one group of children is taking oral lessons with the normal-sighted in the ordinary school, the teacher will be employed in giving lessons requiring writing, arithmetic, or manual work to another group. The number of children that any one teacher can deal with at the same time must of necessity be less than the same teacher could cope with in an ordinary school. Individual teaching is much more necessary for these children than for ordinary children, if only it be because there is the constant necessity of guarding against bad habits of stooping and peering at work. Further, the desk fitting—the combination blackboard and table—takes up the room of an ordinary twin desk. Experience shows that the greatest number any teacher can deal with successfully in any class working at the same subject and at the same time is twenty. But these conditions do not obtain at the present. The numbers of children are too small to afford such large groups of the same age and attainment, and in practice the teacher often has to run two separate classes, say of Standards III and IV, at the same time. Under these conditions twenty is too large a number. Twelve would be the optimum number. With that number of children the teacher

should be able to give to each child a fair share of individual attention, discover the particular difficulties of the child, and secure a result that could not possibly be approached under more crowded conditions.

THE CURRICULUM.

The photographs reproduced were taken at the experimental class three years ago, but they still give a very fair idea of the range of work undertaken.

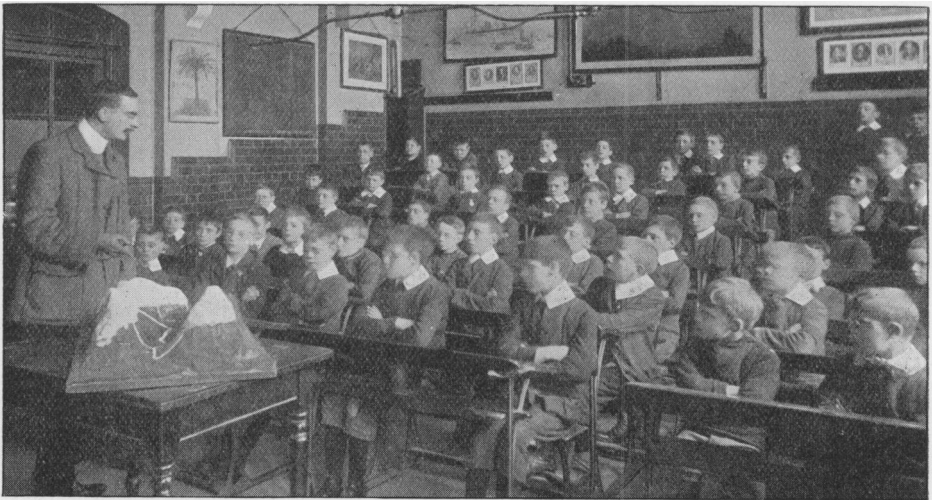


FIG. 3.

This and subsequent photographs were taken at the first class, which has been working for four years. A lesson in physical geography in progress in a class-room of the ordinary elementary school. The front row is occupied by the myopes.

The oral teaching is taken with the normal children in the ordinary school with which the myope class is associated (fig. 3). By this means the myopic children are kept up to the standard of knowledge of their normal colleagues, have the benefit of mixing with them in class, and the oversight of the regular teachers. There is no difficulty in the arrangement, it is merely a matter of planning a convenient time-table, and the recognition by the teachers in the ordinary school of the particular difficulties of the short-sighted children. It has the added advantage that it keeps before the ordinary teacher the elementary

principles of the care of the eyes, which they are perhaps likely to forget when all the defective children are withdrawn from their care.

The literary work of the children is done in the myope class upon the blackboards provided for each child, and upon the wall-boards. The photographs give a very fair idea of the proper method of blackboard writing to be cultivated in these classes (fig. 4). The small script of thin white lines usually seen on the boards of the ordinary class-rooms and in lecture theatres is quite out of place in these classes. Letters must be large and the chalk lines broad and strong, and to secure this the chalk supplied should be square-edged and of double the measure of the stock size. The small desk blackboards are marked with white lines 2 in. apart, and the wall-boards 4 in. apart.

In the higher standards the want of some permanent record of the work of the children was felt; the essentially temporary character of blackboard work did not seem altogether satisfactory; mistakes were so easily corrected that carelessness was engendered. In the higher standards exercise books are being tried of a distinctly novel pattern. They are made up of large black paper sheets,¹ and the writing is done with white crayon, which gives a record of fair durability, but it can be wiped off if desired. The exercise books are clipped on to the desk blackboards, and the writing is done free-arm fashion as though on the blackboard, so that none of the dangers of ordinary writing, such as stooping over the work, are involved. The eldest of the pupils are allowed to make a permanent record of their work by printing. Two sets of printing types are provided for the use of each class. They are rubber-faced block-letter types, one of 1 in. height, the other of 2 in. height.² These are mounted on wooden blocks fitted with lateral pegs and holes, so that they can be joined together to form words. The words are set up and printed upon large sheets of white paper, the record is permanent, and goes to form a class library of scrolls which are useful for subsequent teaching. This device has done away with the necessity of invoking the aid of the professional printer to provide some form of literary matter which could be hung up in the sight of all the children and read with comfort by even the children in the back row. The printing itself is an admirable training in care and exactness, and is greatly liked by the children, in fact, it becomes one of the prize tasks of the class.

¹ Black paper exercise-books are provided by the British and Foreign Blind Association, of Great Portland Street, London, W.

² The rubber printing blocks are supplied by Mr. E. M. Richford, Snow Hill, London, E.C.

Drill and games enter largely into the time-table, and attempts are made to associate some of the games with the instructional work—e.g., large sheets of scenic canvas¹ are now supplied to two schools that have sufficient floor space, on these the teachers paint outline maps of different countries, marking out the position of the principal cities, rivers, mountains, &c.; the children walk about on the floor maps pointing with sticks to the different spots and marks, learning their geography by travelling it in miniature. With a teacher of resource such methods of instruction possess endless possibilities of interest.

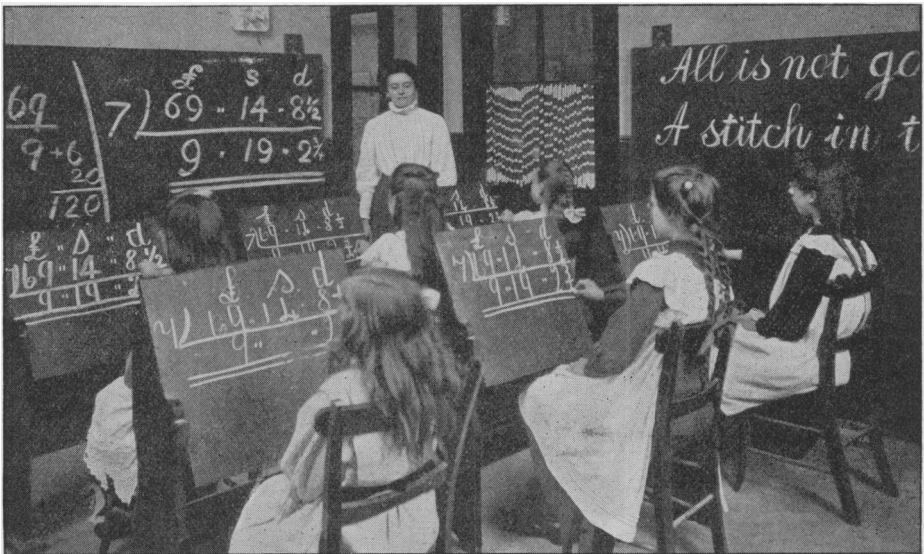


FIG. 4.

Arithmetic lesson in the myope class. The teacher uses the long wall blackboard, whilst each child has its own blackboard provided by the myope desk. Note the heavy strong lines of the chalk writing, and the bold upright characters. The ordinary thin-lined, straggly writing of the lecture theatre is quite inadmissible in these classes. Blackboard writing is an art to be cultivated.

The most difficult section of the work to arrange is the manual training. Whatever the work done it must be such that the fixed attention of the eyes is not demanded. For that reason all sewing

¹ The scenic canvas is obtainable up to 72 in. wide in two qualities; the better is known as long flax canvas, the inferior as jute canvas; one side is coated with ordinary white paint. It can be had from Messrs. William Good and Son, King William Street, E.C.

work is prohibited ; it has been tried with a few of the elder girls but was quickly stopped. Knitting, on the other hand, fulfils the necessary conditions ; a child that has any aptitude for it soon learns to do it automatically and with little use of the eyes ; such children are allowed to practise it (fig. 5). The junior children (both boys and girls) are taught paper folding, stick laying, felt weaving in colours, and knitting. The seniors and some juniors are taught modelling maps, rough wood work where measuring can be done with rulers marked with minimum $\frac{1}{4}$ in. marks. Advanced basket work is taught according to the advanced



FIG. 5.

Girls knitting. They are taught to work by feel and not by sight ; only those who show an aptitude for the work are allowed to practise it.

scheme on workshop principles (but not including raffia work, which is too fine) (fig. 6). Bent iron work is satisfactory, particularly for boys ; possibly also the netting of hammocks, tennis nets, &c. For the girls cookery and laundry of a simple kind, just sufficient to give an intelligent insight into the arts of housewifery.

The teaching of manual work to these children is not done with the same object in view that pertains to the teaching of the blind. With the latter the teaching is done with the view of the blind child subse-

quently earning a living by means of that particular work: basket-making, mat-making, and so forth. With the myopes it is quite different; these crafts are taught merely as a training in attention and care; it is not intended that any of them should enter into competition with the blind in doing these works; for that reason any particular work of this kind is not continued to the point where rapidity and skill is reached.

The scheme of education in view for the myopes is not merely technical but general. Many of these children are of high intelligence,

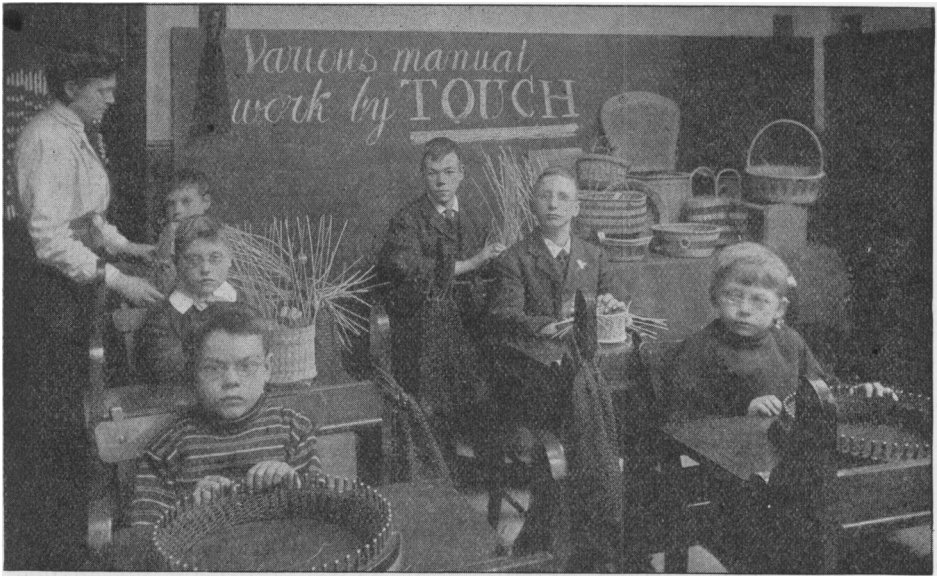


FIG. 6.

Children learning handicrafts. Any kind of work that will teach manual dexterity with the minimum of use of the eyes is admissible; no work that requires constant observation or the inspection of small parts should be taught.

and a good general training with special attention to the development of thought, initiative, a good bearing, and clear speech free from objectionable accent and idiom, will fit them for positions of usefulness and responsibility of the in-door and out-door type, such as small traders, collectors, agents, visitors, &c. This kind of occupation presents no risk to the eyesight.

The myopes drill in company with the normal children; they are also allowed to play with them so far as possible. But many of these

highly myopic eyes are very frail and unnaturally susceptible to injury. To give the teachers guidance in this matter lists are kept of the average and special cases. Those on the special list are limited in their games and drill to the mildest and least risky performances, and during school hours they do not play with the normal-eyed children.

THE ROLL OF THE SHORT-SIGHTED.

So far "myopes" have been written of as though they formed the total roll of these classes; they do not; one in every three on the roll is short-sighted because of the injury of some earlier keratitis or inflammation of the eye. The presence of these damaged children complicates the arrangements from an educational point of view, for they are rarely of the mental standard of the true myopes. But the classes are a great benefit to them. Cases of relapsing keratitis can rarely, if ever, be admitted to the ordinary school, for the mildest attempt at close work will usually induce a relapse. They do very well with the curriculum of these classes and get as much education as they are fit to receive or will ever be able to make use of. Further, they are under individual attention; the teacher learns what are the signs of an impending relapse, and the child is sent home on the slightest suggestion of a relapse; also under present arrangements the medical officer in charge has authority to order certain foods to underfed children (and cod-liver oil is included as a food), so that they are under better conditions than if they were left out of school altogether. There are also a small proportion of children with poor vision arising out of congenital effects. Any educational difficulties arising out of the inclusion of these children with the proper myopes will disappear as the provision for myope classes increases, and with it the possibility of better classification.

The list up to the end of 1912 is as follows:—

Cause of defective vision	Boys	Girls	Total
Myopia	93	103	196
Superficial keratitis	16	34	50
Interstitial keratitis	7	17	24
Disseminated choroiditis	2	6	8
Cerebral defect	3	1	4
Albinism	2	1	3
Purulent conjunctivitis after exanthemata	1	3	4
Ophthalmia neonatorum	3	6	9
Cataract	4	2	6
Coloboma uveæ	2	1	3
Aniridia	1	—	1
Buphthalmia	1	—	1
Dislocated lenses	1	—	1
Extreme hypermetropia	2	—	2
Muscle defect	—	1	1
Totals	138	175	313

THE NECESSARY STANDARD OF VISUAL ACUITY.

For the successful working of such classes as these it is obviously necessary that children for whom this mode of education is proposed must have a reasonable visual acuity. In practice it has been found that it is desirable that the standard should be $\frac{6}{18}$. When the vision is less than this it is very difficult to prevent the children from peering and groping at their work, and the bad habits of a few will be copied by the many. Children when first admitted almost invariably have the bad habit of getting very close to their work, and the first lesson that has to be learned, and one that has to be the subject of constant reminders, is the necessity of doing all their writing and manual work at full arm's length. It follows from such a standard of visual acuity that all myopes must have satisfactory correcting glasses. Children for whom it is deemed undesirable to prescribe glasses have no place in these classes, but are fit subjects for the schools for the blind and partially blind. At the present time a number of children who have only $\frac{6}{24}$ vision with their glasses are being tried, and it is possible that a fair proportion will be found suitable pupils when their mental intelligence is well up to the average.

THE GRADE OF MYOPIA SUITABLE FOR SPECIAL TREATMENT.

Questions are frequently asked as to the grade of myopia which should indicate the necessity for special educational treatment. I am inclined to deprecate the setting up of any hard-and-fast lines of numerical limitation. Each case should be considered on its merits. So much depends upon the age of the child, the progress of the myopia, the fundus condition, and the existing educational attainment of the child. It is obvious that a child aged 7 with 5D. or 6D. of myopia is not to be compared with a child aged 13 with 8 or 9D. of myopia. The one is at the outset of its school career, the other at the end. The one case is suitable for immediate and radical change of its school work, the other may be sufficiently met by a modification of its existing school arrangements. So far as any indication can be given by diopters of myopia, it would seem that children with from 5D. to 15D. of myopia are suitable subjects for these classes. Those with less than 5D. are fit for the ordinary school with special precautions, such as those indicated under the heading of "Easy treatment as regards eye work"; those with more than 15D. are suitable for education in the schools for the blind

and partially blind (with the possible exemption from Braille teaching), unless the fundus conditions are fair and the vision, with a suitable correction, is so good that they can safely take advantage of the myope class. In any case there can be no doubt that as the knowledge of the existence of this scheme of education becomes widespread and sufficient provision for reported cases is obtained, there will be a much greater demand for special educational treatment than at present. And it is possible that the range will be extended downwards, especially for cases of myopia occurring in the earlier years.

REGULAR MEDICAL SUPERVISION.

The children who are in these classes are regularly examined by an ophthalmic surgeon at intervals of six months. Each child is examined in a dark room, the refraction worked out and the fundus condition noted. Subsequently the vision with the glasses being worn, or with any alteration suggested by the previous objective examination, is recorded. The records are kept in a card index and are ready for reference in any inquiry concerning the work and progress of a child. The result of these repeated examinations was the subject of a paper recently read before the Ophthalmological Society of the United Kingdom,¹ and in that paper will be found details of the mode of recording the fundus conditions and the degree of change in the myopia of eighty children over a period of years. The importance of the systematic examination of the eyes of these children cannot be overestimated.

The medical officer in charge also exercises a supervision over the educational work of the children. He suggests or inquires into the advantages and possible risks of new methods of work. And in particular he indicates to the teachers those children whose eye conditions are such that they may not do any work entailing the least degree of strain, or join in games or drill in which there is any risk of blows to the face or head. For such the freedom of the playground, common to the whole elementary school, is prohibited; they must play in their own limited area.

In conclusion, the lessons of the experimental establishment of these classes and their extended working are: That a suitable system of teaching myopes can be arranged and carried out successfully. That such classes should never be independent units, nor be associated with

¹ Harman, "An Analysis of 300 Cases of High Myopia, with a Scheme for the Accurate Record of Fundus Conditions," *Trans. Ophthal. Soc. U.K.*, 1913, xxxiii, pp. 202-220.

existing blind schools, but be formed as integral parts of existing elementary schools. That their success depends almost wholly on the intelligence and initiative of the teacher, who has to do real teaching and not merely to act as a pedagogue to lead the child to the school book. That the training for these children should be general and not merely technical. That classes for these children should be of small size with an optimum number for each teacher of a dozen, but never more than a score. That there must be a standard of visual acuity of $\frac{6}{18}$ vision for the children to successfully take a share in the work. That the children must be under regular individual supervision during the whole of their school life.

Glaucoma associated with Venous Congestion.

By A. FREELAND FERGUS, M.D.

THE subject of glaucoma is, at present, receiving much attention alike from pathologists, physiologists and operating surgeons. I desire in this short communication to bring to the notice of the Society cases which I think must be attributed to some changes in the vascular system, probably of the nature of sclerosis in the small veins. Far be it from me to pose as an authority on the pathology of glaucoma. Till the case which I am about to show you to-night came prominently under my notice I, for the most part, held, as I still do, to the theory of obstruction of the filtration angle. Now, unquestionably, high tension and obstruction at the filtration angle are such frequent concomitants that it is almost impossible not to regard them as cause and effect. Still, the cases which I wish to bring before you to-night, of which the most important is that of J. G., show quite distinctly that high tension can exist without any adhesion of the root of the iris to the posterior surface of the cornea, but, on the contrary, with an enormous increase in size of the filtration angle.

J. G. first came to the Glasgow Eye Infirmary on January 13, 1911, and was diagnosed as a case of separation of the retina. At that time there was no suspicion whatever of tumour. The separation was extensive but the tension was normal and the eye transilluminated. He was not seen again by me till January 13 of this year, when he returned, and now it was found that in addition to the separation the