Thomson, who agreed that the growth was too advanced for laryngo-fissure, and that the patient was not strong enough for laryngectomy because he had an enlarged liver and had suffered from haematemesis. Radium needles buried under a local anaesthetic. The growth rapidly shrank and had entirely disappeared in three months. The cord became freely movable although the edge was slightly swollen by oedematous fringes. He now has a loud, hoarse voice.

Case 15.—A fairly extensive growth involving the whole of the right vocal cord with infiltration of the ventricular band. So far the growth has not responded to radium treatment, and a further operation will probably be necessary.

EXAMINATION OF THE EYES AND EYESIGHT OF YOUNG CHILDREN.*

BY

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THE subject of this paper forms, I imagine, part of the work of all of us here, whether we be ophthalmologists, school medical officers, or general practitioners interested in eye work. Much has been written about the examination of children in elementary schools. Statistics dealing with very large numbers have been published by Mr. Bishop Harman¹ and Dr. James Kerr,² to whose useful work we are much indebted. It is the examination of young children, including those below school age, about which I wish to speak, and I should like to insist that my remarks apply to the children of all classes, and not merely those attending school clinics. For this subject forms an important part of what we have been discussing†—"visual efficiency" affects "working ability" no less in childhood than in after years; in some ways, indeed, more so. Vision being our most important special sense, it is possible for a child's whole "outlook," in the widest sense of the term, to be affected by his sight.

There are several factors peculiar to childhood which make a routine examination advisable. These factors ought to be more appreciated by the medical and teaching professions; for, roughly speaking, it is only those young children attending council schools who get a routine examination of their eyes. Young children seldom complain of their sight. They know no better. Eyestrain and the mental fatigue produced thereby are supposed to be part of the irksomeness of doing lessons. As I have already suggested, a child's character, health, and habits are liable to be affected by its sight. The "beautiful little needlewoman" or the "wonderfully studious boy" may be the result of short sight. The child who does not see across the room clearly, and who can scarcely see at all down the street, has few distractions from his books and toys. Such children who are taught in small dames' schools, home schools, preparatory schools, or by governesses do not get noted as do the children in the large classrooms of the council schools where a blackboard is in daily use. There is much need for propaganda on this matter. So, too, a rebellious hatred of lessons or so-called stupidity may be the result of a serious defect of vision. In order to read, a young child has to see every single letter, and this at a time when the eye is not fully developed, is still growing, and is ordinarily long-sighted. Children with their great power of accommodation may, for a time at any rate, disguise a big defect, and such children will pass an examination which merely depends on the reading of test types.

As well as the growth of the eyes, we have to remember the development of their functions. Binocular vision, or bifoveate vision, should become well established within the first few years of life, but this faculty, in association with the proper muscle balance of the eyes, has to be

acquired. Like walking, it is easily upset or retarded in infancy.

Variations from the normal, therefore, as regards fixation, muscle balance, and binocular vision, are the most important clues we have which lead us to discover defects of vision in early childhood. From this it follows that we shall have to distinguish between the spurious squint of the young infant and the incipient squint of the older child. From our clinical experience we know the importance of early treatment; after the seventh or eighth year we know that treatment of such defects often fails in the desired result, which is to obtain complete binocular vision. We bear all these facts in mind and also do not forget our general medical knowledge of children. In this way the examination by an ophthalmic surgeon may not infrequently be the starting point of great improvement in the child's health, mental and physical.

Certain simple details of a routine examination³ carried out on these lines may possibly be of help to some. The examination should be made in a large room which can be easily and quickly darkened. Good daylight is only needed at the place where the surgeon and child sit. Test types are artificially illuminated by standard illumination, using daylight lamps. When a number of children are to be seen, the brighter and older ones are first examined, whilst the others observe the proceedings without, however, being able to see the test objects. The child is seated to the left of the examiner, and behind the child is a lamp for retinoscopy. The child is allowed time to get accustomed to the surgeon's presence whilst the latter enters details. The surgeon then rapidly looks for external signs of inflammation, etc. The lids are carefully examined. Definite blepharitis is, of course, well known to be a suspicious sign of eyestrain, and the cleaner the child the more suspicious is this sign. The presence of quite inconspicuous scales at the roots of the eyelashes, apart from any redness, is, I think, quite as important, and more often than not indicates an error of refraction requiring treatment. The condition is a slight seborrhoea due to over-secretion, the result of reflex irritation produced by eyestrain. The presence of follicles inside the lower lid makes the examiner suspect the general health or hygiene.

Next, the movements of the eyes are tried. With small children the retinoscope mirror rarely fails to attract, and for a screen to cover one or the other eye the examiner uses the thumb of his left hand placed on the child's head. I need not further detail this examination to an audience of ophthalmic surgeons, except to remind you that, during the various movements of the eyes, opacities of the cornea or in the pupil area should be noted. If the lids, fixation, convergence, and other movements and muscle balance, as tried by the above methods, all appear normal and the cornea and pupil areas are clear, the child, being an infant, has passed his test.

In slightly older children, the toddlers of 3 and 4 years, the vision is further tested by pictures of familiar objects. Little children will whisper the names to a friendly examiner as the pictures are pointed out by a nurse. If the child is reading—if one may so describe it—the pictures well, each eye singly may be tried. Other children who can scarcely be persuaded to read the pictures have the eyes alternately covered. If the child dislikes having one eye covered and does not mind the other eye being covered, this latter eye should be suspected of being defective. Other things being normal, I do not think that at this age any further test of each eye separately is necessary. Such pictures are not drawn to exact scale like those of Snellen's type and the "E" test, but a small child who "reads" the smaller objects freely and easily has sufficiently good vision for his age. No preliminary training is required and there is very little mental fatigue. A picture book may be first shown to the child to encourage him to talk, and then he should be told to look in the distance. I have several times spotted myopia and other bad defects at an early age when an otherwise bright child has appeared to take no interest in the *distant* pictures. Although high myopia is relatively rare in infancy, anyone who does much children's eye work not infrequently meets with it. I have notes of many cases of high myopia in early childhood,

* A paper read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, Cardiff, 1928.

† See summary of the discussion on visual efficiency and working ability, *British Medical Journal*, August 4th, p. 205.

the worst case being one of 14 dioptries in a child a year and nine months old.

If a child does not read these pictures, retinoscopy is done straight away and the position of the corneal reflex is noted. The room is darkened and the child looks into the distance over the examiner's shoulder at a nurse whose duty it is to attract its attention. Children with obvious refractive errors are at once spotted, and, together with doubtful ones, are referred for retinoscopy under a mydriatic. With the arrangement above mentioned this is all done very quickly, and there is no moving of the child into a dark room.

A young child may have 3 or 4 D of hypermetropia at 4 years of age and have no need of treatment if it has passed these tests. In this connexion I should like you to consider some figures published by Mr. Bishop Harman,¹ together with the results of an examination by Dr. Margaret Hogarth.² Mr. Bishop Harman tested 350 children, between the ages of 4 and 7 years under a mydriatic, and in round numbers found 65 per cent. with hypermetropia not exceeding 2 D or with astigmatism not exceeding 1/2 D, which he calls a good average eye, and 35 per cent. defective through all causes, including six myopes. With this standard you notice that he found 35 per cent. defective. On the other hand, Dr. Margaret Hogarth, by testing very carefully the vision of 800 Peckham children between the ages of 4 and 7 years by the "E" test, found that 86 per cent. had normal visual acuity. I think we must allow, therefore, for the fact that, although the young child is normally somewhat hypermetropic, yet at the same time he is endowed with compensatory powers of accommodation. If, however, binocular vision appears to be defective, a child with as little as 2 D of hypermetropia may need to have this corrected.

Children who can read go through all the above tests, but are examined by Snellen's test types. For the sake of the youngest children it is wiser to use only the letters of the first half of the alphabet, and for the top letter to be a "B" or a "D," for example. A "Z" or an "X" at the top they may not be so sure of, and this may cause them to cry.

In all cases note *how* they read as much as *what* they read. For example, a boy aged 8 read 6/6 with each eye singly, but after 6/18 the reading got slower and more deliberate, and the boy shut his eyes at intervals. It had been previously noted that he had a few scales at the roots of the eyelashes. He had 2.5 D of manifest hypermetropia, and stated that his eyes were sometimes sore. Another boy saw 6/6 with each eye, but read the last few lines slowly and deliberately. He stated that his eyes troubled him when reading, and retinoscopy showed 5 D of hypermetropia. Both these children would have been passed if the mere reading of the type had been the only standard. Besides slowness and deliberateness and a strained attitude, the examiner should note whether the child stops reading, shuts the eyes, and starts off again; also whether the child screws the lids up, and, if so, should tell him to open wide and try if he can still see well.

Provided always that no abnormalities are noted under any of the above headings, and no complaints are made about the eyes, the following rough standards of vision are used:

A child of about 10 years of age and over should read 6/9 with each eye, and a child between 7 and 10 years should read 6/12 with each eye. Such children are passed.

I have notes of 4,186 children whom I have examined, as a routine, on these lines at Queen Mary's Hospital for Children at Carshalton.³ This is a hospital of 800 beds for orthopaedic, tuberculous, cardiac, and convalescent cases coming from the County of London. Slightly over 20 per cent. were found defective from all causes. Their ages varied from 2 to 16, the average being 11. Of 500 children, however, whose average age was slightly below 8, less than 15 per cent. were found defective. Statistics which do not give the average age and visual standards lose something of their significance. There are two chief reasons why less than 15 per cent. of these 500 younger children were found defective: (1) because of the lower standard demanded, and (2) because of the comparative rareness of myopia.

Thus, among the 4,000 or more children of the total average age of 11 who were examined, the average age of the hypermetropes was 10 years and that of the myopes 12½ years.

Next we come to the consideration of retinoscopy when examining young children. Do we need so completely to paralyse the ciliary body as to abolish the normal tone of this muscle at rest? Is it not enough that accommodation should be absent during retinoscopy? We do occasionally meet with spasm of accommodation in older children, hyper-sensitive and worried about school examinations, but I have not met with it in small children. Tablets containing cocaine and atropine 1/200 grain (previously shown to the child as "little sweets") are placed inside the outer part of each lower lid at the same moment whilst the seated child looks up at the surgeon or nurse putting them in. The tablets rapidly soften on the everted lids, and, when these are released, dissolve in the lower fornix without touching the sensitive cornea. If the child is examined an hour and a half later in a darkened room—not, be it noted, in a dark cupboard-like place—where he will not be frightened and where his attention can be attracted to look in the distance, this method is found quite efficient. It is certainly kinder to the child than drops or ointment used for three or four days, often very inefficiently inserted and often associated with struggles and crying at each attempt, of which I myself have vivid recollections in my early childhood.

If ointment is prescribed the best method is the use of ointment put up in soft gelatin capsules such as are made by Messrs. Duncan, Flockhart and Co. The ointment can then be safely and efficiently squeezed inside the lids by the most inexperienced; it is of a low melting point, and comes out of the tube sterile.

In infants and young children the angle of astigmatism must be accurately found when doing the retinoscopy. If a retinoscope with two mirrors is used one can always follow the bar of light moving with the mirror, and the angle in one meridian is checked by the angle found for the opposite meridian. The child should be looking straight at the mirror when the angle is being accurately determined. In older children final subjective testing may be attempted, especially if retinoscopy has indicated the need for strong cylinders. A trial frame is used in which the cylinder can be easily turned by the child himself. Put the cylinder in a known wrong position, and let the child have the amusement and pleasure of getting clearer vision by turning the little wheel. Comparatively young children will often thus make fine adjustments of a strong cylinder when the game has been explained to them.

So much for routine testing. It cannot be too strongly insisted that the mere reading of lines of type never should be the sum total of "sight-testing," and that young children of all classes should undergo a routine examination somewhat on the lines here suggested.

A final word about the children who are brought to see us because of some supposed defect or because of some complaint about the eyes. We have already noted that quite young children do not complain. Squint or suspected squint is by far the commonest cause of mothers bringing a young child. Of 550 children seen privately for all causes, 83 (15 per cent. of the total) came to see me for this reason, and the average age of these children (when first seen by an oculist) was 4 years. Older children do complain of their eyes. For those who have some definite abnormality treatment is usually obvious. I would like to refer to those in whom no such defect is found. Forty-nine of these 550 (that is, over 8 per cent.), of the average age of 10 years, were found with normal vision, and, as regards their refraction, came within the limits of the "good average eye" of Mr. Bishop Harman.¹ Yet they were brought because of symptoms referred to their eyes, principally frontal headaches, inability to read for long, frowning, twitching of the eyes, etc., or severe mental fatigue after lessons, or because of a general tendency on the child's part to use the eyes, as it were, as a peg on which to hang his troubles. Not counting two cases of chorea and one of definite acidosis, the remainder come under the heading of what I call "anxiety strain." All young children are apt to be uncontrolled in their actions,

and the nervous, excitable, worrying type is especially apt to throw an excessive amount of nervous energy into whatever it does, accommodation included. Being anxious and over-intent about their lessons, they accommodate for the book nearer than it is, draw closer, therefore, and have to accommodate still further, overdo that, and get closer still. With their big power of accommodation they keep this up for a while. The so-called accessory muscles of accommodation (orbicularis, corrugator, frontalis) are reflexly put into strong action, and this helps to aggravate the ache in those regions. Later the effort becomes too great to be sustained. Convergence gives out, I think, first (letters are said to run into each other), and accommodation fails; the whole process is followed by headache and severe mental fatigue following on the expenditure of nervous energy. These children are of the type who have "night terrors." The treatment of these cases is the treatment of the child rather than its eyes. The cause of the trouble has to be explained to mother and teacher, and in a certain degree to the child, in order that its habits may be altered. The family doctor's help is obtained, and a daily dose of bromide may be of more use than a pair of spectacles. Our reputation will suffer if we limit our examination to the correction of half a dioptr of hypermetropia in an individual with 14 dioptr of accommodation. It will be enhanced by the explanation that glasses are not necessary, and by the subsequent improvement in the child's health.

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THE KIDNEYS IN PNEUMOCOCCAL INFECTIONS.

BY

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CONFLICTING records appear in the literature concerning the relationship to nephritis of invasions of the body by the pneumococcus of Fraenkel.

Sir Thomas Horder¹ in a recent address remarked that it had been suggested that pneumococcal infections were responsible for a large proportion of haemorrhagic nephritis cases, but he himself was unable to confirm the statement from his own experience.

Abrahams,² discussing the results of 558 cases of typical lobar pneumonia occurring in the Aldershot Command during the war, shows that although there were 61 deaths and 116 developed complications, only 2 cases developed nephritis, giving the extremely low figure of 0.35 per cent.

Parsons,³ discussing the etiology of nephritis in childhood, believes "acute catarrhal desquamative or tubular nephritis" to be a condition occurring in varying degree as a result of acute infections, such as septicaemia or pneumonia, and being principally due to the circulating bacterial toxins, the renal lesion being largely recovered from when the cause is removed; but severe cases may pass on to a subacute form to constitute nephrosis (Volhard and Fahr). Several workers have attempted to associate the pneumococcus with lipoid nephrosis. Volhard⁴ observed the frequency of termination of the nephrosis cases by a pneumococcal peritonitis; and Stolz⁵ in one case found bacteria resembling Fraenkel's organism in the walls of the glomerular capillaries, the tubule cells, and the intertubular capillaries, and in another case in the intertubular connective tissue. He is of opinion that the coccus in the kidney causes an inflammation that is at first acute, but soon takes on a chronic form and results in injury to the tubules. It is suggested, however, that the germ may be a secondary invader. Variability in the incidence and degree of kidney lesions may be related to the particular virulence of the pneumococcal infection, or even to a special group type of the pneumococcus.

It would seem, therefore, that some authorities attach significance to pneumococcal infections as a source of acute nephritis, or as a starting point in the genesis of certain degenerative lipoid processes in the renal tissue (nephrosis). Others have less regard for this suggestion. However, I have made some investigations into records and certain cases which will be considered.

An analysis of the urinary findings in 287 cases of acute lobar pneumonia in adults has yielded the following:

No. of Cases.	Urine.
Group A: 10=3.4% ...	{ Albumin + + +. Red blood cells +. Granular and tube casts +.
Group B: 32=11% ...	{ Albumin +. No blood cells.
Group C: 107=37% ...	{ No casts.
Group D: 138=47.5% ...	{ Albumin -. No blood cells.
	{ No casts.

In all the cases in Group A the urinary abnormality commenced between the third and tenth day after onset of the lobar pneumonia. In none of the above cases was there any history or clinical signs of previous renal disease.

Three other cases have been studied in which a previous history of nephritis was given, and which briefly were as follows.

Case 1.—Nephritis onset two years ago. Apparently mild. Acute lobar pneumonia then occurred and ran the usual course. A few days after the onset of the pneumonia the urine showed features of an acute exacerbation of the nephritis albuminuria + + +. Casts and blood cells +. Marked improvement in the renal condition quickly occurred after the febrile crisis.

Case 2.—Acute nephritis several weeks before, but rapid improvement under treatment. Later, onset of acute lobar pneumonia, which ran a normal course, ending by crisis.

Urinary Findings.

	Albumin.	Casts.	Blood Cells.
4 days after onset of pneumonia ...	++	+	+
6 " " " (crisis) ...	+	+	+
8 " " " ...	+	-	-
15 " " " ...	+	-	-

Case 3.—Known to have chronic nephritis. Urine before onset of pneumonia: albumin +; casts few; blood cells nil. Patient had an attack of acute lobar pneumonia, with usual course and crisis.

Urinary Findings.

	Albumin.	Casts.	Blood Cells.
4 days after onset of pneumonia ...	+++	++	++
6 " " " (crisis) ...	+++	++	+
10 " " " ...	++	+	-
20 " " " ...	+	+	-

The morbid anatomical conditions of the kidneys in 42 fatal cases of acute lobar pneumonia were investigated. In all the cases no previous renal disease had been suspected or detected.

- Normal in 17 cases (40.5 per cent.).
- Normal, but signs of arterio-sclerosis, in 3 cases (7.1 per cent.).
- Cloudy swelling in 17 cases (40.5 per cent.).
- Acute inflammatory changes in renal parenchyma in 3 cases (7.1 per cent.).
- Chronic nephritis with superadded recent acute inflammatory changes in one case.
- Small cortical haemorrhages in one case.

It is the aim of the clinician to attempt to correlate a particular clinical feature with a particular anatomical lesion. But in the kidney extreme difficulties have presented themselves, and to-day many exceptions are found to certain views previously held. This is to be anticipated where such an anatomically complex tissue is concerned, and where probably the different elements, although having in themselves particular functions, cannot be considered as physiological entities, but only as units in cyclic action. Osler⁶ suggests that glomerular damage is the chief feature in "pneumococcal" nephritis, and Muir⁷ agrees.

An attempt to correlate the urinary contents with the probable renal damage may be made. The meaning of albuminuria occurring in a febrile state needs explanation.