This case illustrates certain points in the pathology of anuria and emphasizes the important part played by vascular changes in the production of this condition. It must be noted that three chief factors are concerned in producing diminution of the urinary secretion:

1. Circulatory (spasm or thrombosis), the result of (a) direct action on the vessels of bodies such as turpentine; (b) indirect action of poisons or toxins acting through the vasomotor system.

2. Epithelial changes, either (a) primary, the result of toxins (for example, diphtheria), or (b) secondary to vascular changes or nervous trauma.

3. Obstruction to the tubules, which may be (a) extracapsular—renal calculi—or other gross pressure on or in the ureters from bilateral neoplasms, or untreated injuries, or (b) intracapsular—arising from purely vascular changes, inflammatory exudates (for example, acute nephritis), or possibly degenerative lesions (? eclampsia).

Probably several of these factors are in action at once, but there is a type of case in which the kidney is hard and congested and gapes through the split capsule; here intracapsular or intrarenal pressure is playing the chief part by crushing the renal epithelium against the unyielding capsule. This pressure can be relieved by decapsulation or by various medicinal methods. The value of veratrine (recently emphasized by Bourne⁶) and morphine in eclampsia is probably due to their effect in lowering the general blood pressure and so reducing intrarenal tension. Similarly methods which were said to diminish toxæmia (purgatives, diaphoretics) may act in the same way by depleting the circulation. It is unfortunate that decapsulation should always be associated with the name of Edebohls, who practised it almost entirely for chronic nephritis. He maintained that new vessels were formed between the denuded kidney and its fatty capsule, and that this anastomosis, by increasing the renal circulation, promoted the absorption of inflammatory tissue and led to the regeneration of renal epithelium. Many observers have failed to confirm his findings; as Boyd and Beattie⁹ point out, such adventitious vessels may be formed, but they probably fail to do more than compensate for the capsular vessels ruptured by the operation. The real indication for decapsulation is an acute increase in intrarenal pressure; this is not seen in the kidney of chronic interstitial nephritis, in which the effects of pressure are neutralized by protecting bands of fibrous tissue.

Harrison,¹⁰ the real pioneer, who anticipated Edebohls by two years, was clearly familiar with this condition, for he describes the hardness of the kidney and compares the increased tension with that seen in the eye in glaucoma. It is further interesting to note that his first three cases were distinctly medical or toxic in type, and due to scarlet fever, influenza, and nephritis from cold respectively. Clifford White¹¹ has advanced important evidence in favour of the presence of increased intrarenal pressure and the value of decapsulation in eclampsia. There is, however, a tendency to regard suppression as a purely toxic condition, and if not unsuitable for operation, at least only suitable when all conservative measures have failed. No doubt the vascular changes are greater in some cases than others—for example, Rose Bradford¹² states they are marked in the acute nephritis of scarlet fever and slight in that of diphtheria. But although toxæmia may be the chief pathological agent, vascular changes are rarely absent; they lead to further impairment of function, and establish a vicious circle in which a rising intracapsular pressure is the important pathological mechanism.

It is, of course, essential to treat toxæmia and give conservative remedies a fair trial, but it is unfair to expect decapsulation to be useful in the terminal stages when thrombosis and necrosis have occurred and the renal epithelium is irremediably damaged. I would urge that in any acute suppression of urine (partial as well as complete) where the patient is not responding to treatment an early decapsulation should be seriously considered.

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- ¹ Quoted by Caulk and Fischer, *Surg., Gyn. and Obstet.*, vol. xxx, p. 343. ² *Trans. American Urolog. Assoc.*, 1919. ³ *Journ. Anat. and Physiol.*, vol. xii, p. 102. ⁴ *New System of Gyn.*, vol. iii, p. 644. ⁵ *Surg., Gyn., and Obstet.*, vol. xxx, p. 343 et seq. ⁶ *New System of Gyn.*, vol. ii, p. 246. ⁷ Quoted by Box, *BRITISH MEDICAL JOURNAL*, March 13th, 1920. ⁸ *BRITISH MEDICAL JOURNAL*, May 29th, 1920. ⁹ *Edin. Med. Journ.*, 1905, p. 337. ¹⁰ *Lancet*, Aug. 3rd, 1901. ¹¹ *Proc. Roy. Soc. Med.*, 1919, vol. xii. ¹² Clifford Allbutt's *System*, vol. iv, Part I.

A Lecture

ON

THE AXIS OF ASTIGMATISM.*

BY

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RECENTLY I had an inquiry from a practitioner engaged in eye work at a school clinic in South Africa, asking advice on the best and most accurate method of determining the axis of a cylinder necessary for correcting an astigmatic error of refraction; the same question has been put to me this week. I therefore propose to deal with this practical point.

First, we must consider the mental attainments of the patients whose visual defects we propose to diagnose and correct. Our patients are children—school children—their ages run from, say, 5 to 14 years. Those of the earlier years it may be taken will certainly not have developed any notable powers of observation; and since our working arrangements must be adapted to suit the conditions of the feeblest member of the clinic, it follows that the whole of the refraction work done for children must be objective and not subjective. It is no use asking a child whether this or that glass is better than another, or what difference this lens of a fraction of a diopetre makes to clearness of vision. The child cannot be expected to tell. Those of you who wear glasses will know how difficult it is to determine between the advantages of two slightly different lenses when used to view the test type, and how much more difficult it is to set a cylindrical lens of low power exactly in the best axis. If this be so in the case of an educated adult, what can you expect of a child? Subjective tests are of little or no value in a children's clinic, and no use should be made of them except to obtain a record of visual acuity under given conditions, and even then the record must be used with due caution, bearing in mind the strangeness of the conditions of the examination to the child, and the likelihood of variations in understanding and intelligence.

No man is fit to take a share in this work of a school clinic who is not a master of the art of retinoscopy. That is the one test of competency for this work. A knowledge of external diseases and their treatment is necessary; ability to use the ophthalmoscope and determine fundus conditions is needed; but, seeing that nine-tenths or more of the work of these clinics will be to determine the cause of a suspected or known defect of visual acuity, competency in the art of retinoscopy is the outstanding requirement. The worker must be such a master of the art that he can, by the use of his mirror and lenses, both discover all the details of the refraction and judge from his results what will be the most appropriate glasses to order in any given case. Short of possessing this mastery of the art, there is no place for him in a school eye clinic.

Further, a school clinic is not the place in which to acquire this mastery. It can only be obtained by regular and assiduous work with critical patients. To the seeker after this knowledge I would advise a course of practice with young adults—those whose faculties are well developed, and who can give good responses to subjective tests; and he should choose those for whom the suppression of the power of accommodation for a few days by the use of atropine will be no detriment to their work. There will be found plenty such in any ophthalmic clinic of a teaching hospital, and with their aid he will be able to check his capacity for retinoscopy.

The following is a plan which may be recommended:

1. Ascertain the visual acuity of each eye of your test patient on the usual Snellen's types.
2. Make an attempt to improve any defect of vision by the use of trial lenses.
3. Examine the refraction by retinoscopy without the use of a mydriatic.
4. Instil an oily solution of homatropine and cocaine, 2 per cent. of each. After an interval of one hour do another retinoscopy; and then ascertain the visual results obtained with the correction arrived at by the retinoscopy.
5. Order an oily solution or ointment of atropine and cocaine, 1 per cent. of each, for use thrice daily for two days. Then

* Delivered at the West London Post-Graduate College.

repeat the retinoscopy, and the subjective test with the correction worked out by retinoscopy.

6. Finally, a week later the subjective test should be repeated before glasses are ordered.

The worker must keep a note-book in which to enter a record of each step of the examination of each patient in full detail, with comments on any difficulty met with. When he has followed out this programme with a score or two of intelligent patients, and studied the results after each day's work, he will be in a position to judge of the value and accuracy of his work; and he will also have obtained valuable knowledge of the differences between subjective tests of an eye of unknown condition, retinoscopy with and without a mydriatic, and the differences, if any, between quick and slow acting drugs, and finally of subjective tests with all the available data before him. Only by a continuous course of practice such as outlined here, in which he can check his objective work by the subjective examination of critical patients, can he cultivate a mastery of objective methods and free himself from the thralldom of reliance upon subjective responses.

I have written an account of the methods of retinoscopy that I find best to use and teach,¹ so that I propose here to deal only with one point—the best method of finding the axis of astigmatism by the use of the retinoscopy mirror.

Astigmatism is due to an inequality of the refractive index of the optical combination of the eye; the inequality can be seen and measured by retinoscopy. It may be obscured at first examination by the presence of a spherical error; as that error is corrected the fact that there is more error in one meridian of the eye than in another will be revealed. The revelation of the defect is sometimes, when the error is high, quite dramatic. The light reflex from the eye may assume the appearance of a pillar of fire. The pillar may be erect, running vertically across the pupil, or it may have an inclination or slope from the perpendicular; it may even be horizontal. It is the observance of this inclination that gives the axis of the astigmatism.

Take a plus cylinder of six or seven dioptres, look through it at a distant circular light, such as may be obtained by placing a screen pierced with a half-inch hole before an electric glow lamp; the circle of light will be seen to be distorted into a line, and as the cylinder is slowly rotated before the eye the line of light will turn also; it will only need a method of marking the inclination of this line of light to register the position of the cylinder held before the eye.

The axis of a cylinder is recorded by noting the position it takes on a circle or half-circle marked in degrees. Most students are familiar with certain standards of measurements; probably all could mark on paper with fair accuracy the measure of an inch, a centimetre, or millimetre; most women can judge a yard with surprising skill. We do these things because we are familiar with the measure, and associate it unconsciously perhaps with some concrete object. But you are not familiar with the degrees of a circle, for this measure does not often enter into everyday life. To obtain this familiarity I would refer you to something you know well—the familiar clock face; the hour marks on the face will give the salient points of the degrees of a circle.

If we take the hour mark of IX as 0° and III as 180°, then VIII will be 30°, VII 60°, VI 90°, V 120°, IV 150°. Apply this observation by association to the judgement of the inclination of the line of light seen in retinoscopy of astigmatism. Note the time that would be indicated if the line of light were the outstretched hands of the clock, if it indicated five minutes to five o'clock the inclination in degrees would be 120°. With practice, and a constant cross-reference between time of the clock and degrees of the circle, the worker will be able to read off the axis of an astigmatism from the eye itself as accurately, and often more accurately, than can be given by a critical patient in subjective examination.

Practice in direct observation should be checked by reference to the markings of the degrees on the cell of the trial frame. There are two useful methods of doing this:

1. Take a thin blackened disc of metal the size of a trial lens, bore through the centre a 10 mm. hole, and mark the diameter on the remaining part of the disc by a line of white paint just broad enough to be seen at one metre. Slip this disc into the cell of the trial frame so that the patient's pupil can be seen through the hole. Note the line of light due to the astigmatism and its inclination, and estimate the axis in degrees. Then rotate the disc in the trial frame until the painted white line is in continuity with the line of the astigmatism, note the position of the paint line to the marking on the trial frame. If the two observations, the direct observation and the position of the paint line, agree, you will have done well.

2. Correct the spherical part of the error of refraction by the use of spherical lenses, when the astigmatism is revealed

correct this by the use of cylinders, placing each cylinder in the cell of the frame so that its axis coincides with the line of the astigmatism. If now the spherical correction be slightly altered so as to leave half a dioptre of hypermetropia, the light reflex due to this spherical error should move equally in every direction, and without wobble or sign of obliquity with each movement of the mirror. This is a most valuable and delicate test.

Practice of these three methods, comparing direct observation with the findings obtained with the aid of disc or cylinders, will show that it is possible in the majority of cases to measure the astigmatism both in amount and axis by the use of the mirror and spherical lenses alone; and the use of cylindrical lenses may be reserved for the few cases of real difficulty.

A concluding note may be made on the method of recording the axis of cylinders ordered in prescriptions. Unfortunately, there are many markings in use. Examine a dozen trial frames of different makes and as many prescription forms: the variations found will be striking. An attempt has been made to obtain an international agreement, and the form arrived at can be appreciated by reference to the clock face. For each eye, right and left, the degree markings that correspond with the hour marks on the clock face are 0° at IX o'clock and 180° at III o'clock. Since this marking is obtaining a wide measure of acceptance it is worth while learning it, for if you use another it is likely your prescription will be transcribed by the optician, and errors may occur in transcription. In any case, always mark the axis graphically as well as numerically, then the possibilities of error will be reduced to the minimum.

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A NOTE ON LYMPHADENOMA.

BY

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THE following case, which has been under hospital observation almost throughout its clinical course, offers so many points of interest with regard to diagnosis that it may be worth while recording at some length.

G. K., a single man aged 24, had always been healthy except for an attack of scarlet fever at 7 years of age. There was no family history of tuberculosis or any other disease, nor of any other illness in the patient prior to enlistment in November, 1915. He was demobilized in May, 1919, having served two years in France and having been twice in hospital, once with tonsillitis in 1916, and once being invalided home with myalgia in 1917, recovery taking place in six months. After demobilization the patient returned to his civil employment as a grocer's assistant until November, 1919, when rheumatism in his shoulders and back caused him to give up work.

In January, 1920, he became an out-patient at a pensions hospital, but owing to the development of a left basal pleurisy he became too ill to attend. In March, 1920, a swelling was noticed in the right axilla, which quickly disappeared, only to be followed by similar swellings in the left axilla and right side of the neck. The patient became gradually very pale, lost weight, and grew progressively weaker, but was not entirely bedridden till admission to hospital on April 23rd, 1920. He then complained of night sweats, and rheumatism in the back, shoulders, and right knee.

Condition on Admission.

On admission the patient was pale and wasted, with obvious masses of enlarged glands in the neck. On examination, both sides of the neck and the submaxillary region were filled with enlarged discrete glands, very various in size from a pea to a walnut and with little or no periadenitis. Both axillae showed a similar condition and the right epitrochlear gland was as large as a filbert, but the left could not be felt. Both groins showed many enlarged glands extending along Poupert's ligament both above and below it. The popliteal glands could not be felt. There was a large crop of subcutaneous and intra-cutaneous nodules all over the right side of the chest wall not crossing the mid-line in front nor the posterior axillary line