exudation and consequent pressure, this will be relieved. It is this action that explains the relief brought about by radiation of the appropriate nerve roots in cases of sciatica or other neuritis, and also that latest treatment of nephritis where the use of deep rays has had the same result as a decapsulation, by destroying the leucocytes and so relieving the pressure.

From the patient's point of view the actual treatment is entirely free from pain or other sensation. Naturally a weariness is induced from remaining for the required time in one position. Prolonged exposures to the thorax and upper abdomen cause a varying degree of vomiting, which rarely lasts more than twenty-four hours. Careful preparation, the administration of chloretone, and the use of "drop enemata" of saline solution usually relieve the symptom in a short time. For some days after the treatment patients may experience a certain amount of malaise, but this does not occur in the majority. If the exposures have been correct the skin shows nothing but an erythema and a subsequent bronzing. If there be irritation it can be relieved by ointments.

There is still much to learn, and if we are to learn there must be more co-operation between the different branches of our profession in the treatment of cancer. Such treatment—as also that of fibromyomata—is to-day no longer purely surgical, and the patient has a right to expect that every means that can alleviate or cure him should be called into requisition where available. A surgeon remarked that a radiologist ought also to be a surgeon. In my opinion the boot is on the other leg. Every radiologist has learnt some surgery, and has seen more or less of it in the ordinary course of his work. The surgeon of to-day—at any rate those in middle life—never learnt anything of radiology beyond a certain acquaintance with the reading of x-ray pictures. It is they who have to study the developments and potentialities of the science of modern radiotherapy, and to know when to advise it; and they have far more to learn in this, the youngest of the healing arts, than the radiologist has to learn of the art of surgery; its results in the treatment of malignant disease have not kept pace with the advances in other departments of their art.

A HALOMETER.

BY

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WE have been steadily learning that it is important to be able to ascertain with some degree of accuracy the angular measurement of the halos or coloured rings of which patients from time to time complain; for it is becoming clear that by this means we have an important aid to differential diagnosis.

Inasmuch as the so-called physiological halos (those produced by the histological peculiarities of the lens structure) may be taken as practically constant at 7° , whilst the true glaucoma halos vary from time to time even in the same patient, and have a range (in my experience) of from 7° or less up to nearly 12° , it is obviously important that we should have some ready means of measuring all such halos quickly and accurately. The method with a candle, a cardboard strip, and a pencil is clumsy and unsatisfactory. The device of having two points of light at a fixed distance showing through a metal disc—(1) a large one for the creation of the halo, and (2) a small one whereby any particular ring can be located—has this great disadvantage, that the smaller light aperture itself gives rise to halos and so may greatly confuse the patient; it is also a clumsy expedient at the best to be constantly altering the observation distance. The instrument now about to be described does away with these difficulties and makes the measurement of a halo a quick, simple, and easy procedure which barely takes a minute to carry out, and which needs no mathematical knowledge whatever. The halometer, as I have called it, has been made for me by Mr. Clement Clarke, of 16, Wigmore Street, and I am much indebted to him for the trouble and ingenuity he has put into it.

Description of Apparatus.

A circular wooden base (B), for fitting to the wall, carries a base box (BB) to which are affixed twin aluminium bars (A and AA). This box revolves round the base through 180° ; the object of this movement is to enable the observer to measure diagonally placed segments of halos. The box also encloses a 4-volt lamp for the principal light, which is seen through a 7-millimetre aperture (PL); this has been found a convenient diameter for the easy observation of halos.

To the left-hand bar (A) is attached a sliding box carrier (C), easily movable by the hand. Enclosed in this box is another 4-volt lamp, the light from which is trapped by a tapered glass rod (G), which is serrated, flattened, and bevelled to give the effect of a luminous grid, from which no halos are given off. This rod extends over the width of the bar. The observer slides this up or down until it corresponds with the circle of colour which it is desired to measure; since it gives off no halos, and is quite distinct in the dark, it is very easy for the patient to say exactly when the right position is reached.

The right-hand bar (AA) is engraved with an inch scale in numerals, giving the radius of any circle represented by a coloured ring. Knowing the distance (d) of the eye from the source of light, and the radius (r) of the halo circle as measured by the instrument, the angle (a) subtended by this radius with the eye can be at once calculated from the relationship $\frac{r}{d} = \tan a$. On doubling the

result so obtained we have the angular measurement of the diameter of the halo. In order to save calculation this has been reckoned out for measurements taken at 100 inches, and shown alongside of the wide scale in Roman figures; no mathematical mental process is necessary so long as this instrument is used at 100 inches. Three spring indicators

(M), coloured red, green, and blue respectively, are attached in order to register the position of the corresponding halos in the dark.

The distance of the patient from the instrument (100 inches) is controlled by a length of cord, which is wound on an enclosed drum fitted to the base box (DC); the cord can be very quickly rewound when done with.

All electrical contacts are arranged without wire or flex. The lamps are standard size. Spare lamps and trap rods are provided in the base box. All parts fitted are easily accessible.

A plug intake for current is fitted for use with a 4-volt accumulator or a dry battery, or through a resistance from the main supply.

An alternative pattern with a dry battery fitted in the base box can also be supplied if desired.

I have had this instrument at work in my consulting room for several months and have found it quite satisfactory; it has furnished valuable clinical indications.

THE MECHANICS OF THE ANTERIOR ABDOMINAL WALL.

BY

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THE aponeuroses of the lateral muscles of the abdominal wall constitute an element mechanically of great importance in the structure of the anterior wall of the abdomen. The union and the interlacing of the fibres of these aponeuroses are well known, but I have observed a mechanical feature which has not been described and one which is of considerable interest and possibly of practical importance.

The feature, briefly, is this, that the interlacement of the aponeuroses produces a fibrous membrane which is elastic

in the vertical axis of the abdomen but is practically quite inelastic in the transverse axis. This can be readily demonstrated by dissecting out a long strip, as wide as possible, and pulling upon it in the different axes. A pull in the vertical axis shows that the membrane "gives" quite considerably, and recoils again to its former length, while traction in the transverse axis shows that in this direction there is practically no elasticity. Such an arrangement is, after all, only what might be anticipated from a consideration of the forces which during life act upon the aponeuroses.

The pull of the flat muscles is mostly a side-to-side one, and in this direction the aponeurosis acts like the tendon of a muscle, which must of course be non-elastic. The tone of the lateral muscles ensures that the membrane is always kept tense in this direction.

On the other hand, the distance between the lower end of the sternum and the pubis alters with the movements of the trunk, and the aponeurosis must have some means of adapting itself to these variations, and hence in this direction it is elastic.

I think it highly probable that this peculiarity of the aponeurosis has an important effect in determining the contour of the abdominal wall in the vertical and in the transverse axis when the abdominal contents are increased.

The quality may have an interest to surgeons in connexion with the direction of the incisions through the abdominal wall and the methods of suturing them, and hence I bring it under their notice.

Memoranda :

MEDICAL, SURGICAL, OBSTETRICAL.

INTESTINAL OBSTRUCTION DUE TO ADHESIONS.

THE condition found in the following case in no way resembles any of the congenital conditions of the small intestine described by Sir Arthur Keith in the *BRITISH MEDICAL JOURNAL* in 1910 (vol. i, p. 301). Probably it must be attributed to foetal or infantile peritonitis, the origin of which it is not possible to ascertain.

A married woman, aged 32, strong, healthy, and engaged in farm work, had had since infancy occasional attacks of severe abdominal pain associated with vomiting and usually accompanied by diarrhoea. There was no history of illness apart from such attacks. She had always connected the pain with indigestible food, and thought the present attack was due to eating coco-nut. On previous occasions the pain lasted only a few hours, and relief was always preceded by passage of much flatus.

On May 1st, 1923, about 3 p.m., she was seized with acute abdominal pain. When seen, at 7.30 p.m., she was pale, collapsed, and rolling about in pain. She had vomited frequently slightly stained watery mucus, and had had a loose action of the bowels at 5 p.m. A soft, resonant, sausage-shaped tumour was palpable in the abdomen, stretching from the left umbilical area to the right iliac fossa, most prominent on the right. The rectum was empty, but flatus still passed. An enema gave great relief, though it returned only slightly stained by faeces, and the patient went to sleep. On May 2nd, pain and vomiting returned; the pain was gripping in character, ending with passage of flatus, and the vomiting was of the same type as before. Although obstruction was not complete it was decided to operate at once.

Right paramedian laparotomy was performed, and the tumour was found to consist of the last portion of ileum matted into a sausage-shaped mass. This was easily brought out of the abdomen, the only extrinsic adhesion—a tough fibrous band 2 inches in length, passing to the right infundibulo-pelvic fold—being divided and ligatured. The matting of the intestine ended 3 inches from the ileo-caecal valve. The appendix and caecum were normal, the appendix retrocaecal; the uterus and adnexae were normal. Resection of the mass with end-to-end anastomosis of the divided ends of the ileum was performed.

The patient made an uninterrupted recovery, though she suffered from slight diarrhoea with undigested stools for a few weeks after operation.

Description of the Part Removed.

The mass is sausage-shaped, of convex curvature, 14 inches in length, and of average diameter 2 inches, with a wedge of mesentery attached. The proximal end of ileum entering the mass is wide and hypertrophied, the distal end is normal in calibre. The mass consists of ileum packed close in serpentine fashion into an investing sero-fibrinous membrane. This membrane is strengthened in places, especially at the proximal end, by glistening fibrous bands, constricting, but not firmly adherent to, the underlying intestine. Incision of this membrane releases the coils of intestine, and they can then be unravelled with moderate ease, being adherent to the membrane and each other

by fine areolar tissue only. The contained intestine is definitely hypertrophied in parts, the wall showing more than twice the normal thickness. Towards the distal end of the mass the calibre of the gut is reduced to that of a pencil by an outer constricting band, and kinking in places is very acute. The outer

The packed coils of ileum are represented diagrammatically by dotted lines. (Sc. 1/6.)

membrane can be freely moved over the contents, except where the fibrous bands occur. The mesentery is thick, oedematous, and fat-laden, but outwardly shows no distortion. The only extrinsic adhesion is the one mentioned above that passed to the right infundibulo-pelvic fold. There is no evidence of any recent inflammation. Sections of portions of the intestine show no abnormality.

The selective action of the adhesive process is particularly interesting, involving, in a lesion stretching from left to right of the abdomen, consecutive coils of ileum only. An almost similar case was reported by Rao in the *Lancet* of May 19th, 1923 (p. 1004). The accompanying sketch is diagrammatic.

Stafford.

E. J. BRADLEY.

HAEMORRHAGES OF INFANCY AND CHILDHOOD.

DURING the hours which immediately precede the act of birth the pressure exerted by natural labour or by mid-wifery forceps may be responsible for haemorrhage so severe as to destroy life or to cause irreparable damage. The meningeal haemorrhage which may accompany difficult forceps delivery often leads to stillbirth or neo-natal death, or, if not so extensive, may be followed by birth paralysis. More fortunate cases escape with a cephalhaematoma and are little the worse. Still others show haemorrhages into the lung which may be large enough to involve the whole of a lobe. Or the abdominal viscera—which suffer in this respect more than the thorax—may give us a liver studded with small haemorrhages or a ruptured suprarenal capsule, which is said to be one of the most frequent causes of large haemorrhages.

Many diseases from which children suffer include haemorrhage either as a symptom or a complication. The congenitally syphilitic infant may "snuffle" much blood along with mucus and serum, or may bleed from the mouth or the anus. In the septic child—infected usually through the cord—haemorrhages are common and sometimes fatal. The convulsed infant may die from cerebral haemorrhage, and so may the child with whooping-cough; in the latter disease bleeding may also occur from the nose, mouth, ear, or eye. Epistaxis is one of the complications of diphtheria, and there is a haemorrhagic form of one or more of the exanthems. In leukaemia, from which even young infants may suffer, haemorrhages are common and may occur from the nose, the bowel, and the bladder, or into the subcutaneous tissue. But while haemorrhage occurs in a great many diseases and conditions of early life, it may be the only sign or symptom, as it was in the following case:

An 8 months old breast-fed male infant, who appeared to be quite well in every way with the exception that he was "covered with bruises" for which the mother was quite unable to account, was found to have an ecchymosis measuring 1½ in. by 1½ in. along one rib and several smaller ones in various parts of the face, arms, and legs, usually near joints, but also along the course of the long bones. They appeared spontaneously and without apparent cause, and as some vanished others became noticeable. The child was not anaemic, he had four teeth, and the gums were firm and healthy; there was neither splenic nor hepatic nor any other glandular enlargement. The heart was normal; in fact, with the exception of the haemorrhages the child was normal in every way and exceedingly good tempered, allowing free examination, which obviously caused neither pain nor tenderness. The family history was not helpful, the mother being one of a family of seven sisters, with no known record of a haemophilic in it.

In making the diagnosis three diseases came to mind—scurvy, purpura simplex, and haemophilia. Scurvy attacks