Lessons on the surgical diseases of childhood / by William Rankin.

LESSONS ON THE :: ::
SURGICAL DISEASES
OF CHILDHOOD ::

WILLIAM RANKIN, M.B., Ch.B.


LIBRARY OF THE
PRESENTED
BY THE EDITOR OF
B. M. J.
BRITISH MEDICAL ASSOCIATION

LESSONS

ON THE

SURGICAL DISEASES OF CHILDHOOD

In recollection of seven years of happy work

with the late Mr. Jas. H. Nicoll

LESSONS

ON THE

SURGICAL DISEASES OF CHILDHOOD

BY

WILLIAM RANKIN, M.B., Ch.B.

Profusely Illustrated

GLASGOW
ALEX. MACDOUGALL, 70 MITCHELL STREET
1934

ACKNOWLEDGMENTS.

The illustrations on pages 136, 137, 138 are made from blocks kindly lent by the Oxford University Press.

The two lower illustrations on page 138 have formerly appeared in an article in the *British Medical Journal*.

The Editor of *The Practitioner* has kindly assented to the use of an article on the administration of an anæsthetic by the open method.

Several of the Lessons have been formerly published in the *Glasgow Medical Journal* in a somewhat similar form.

INTRODUCTORY.

THIS collection of notes, of lectures and demonstrations given to final-year students, in no way pretends to be more than the groundwork or introduction to the subject which one was able to overtake in the short course of less than twenty class meetings which constituted the Glasgow University course on the Surgical Diseases of Children.

All one may claim is this, that if the student knows what is contained herein, he may be considered grounded in the subject.

Having acquired the collection of photographs belonging to the late Mr. J. H. Nicoll, I was fortunate in being able to illustrate (by means of the lantern and the stereoscope) the demonstrations in an unusually good manner, and by publishing many of these photographs now, along with my own, they are made available to a wider circle and given a more permanent form of usefulness. They may form, if it is required, an excuse for this publication.

Surgery, as it has been since the days of Lister, based on a knowledge of Pathology and Anatomy, on a simple technique and the possession of dexterity and equanimity by its devotees, is now being so replaced by the use of electric currents, radium emanations and injections of all sorts, that one feels it is entering a new phase altogether.

Whether the old is better or not time will show; these lessons are all based on the older Surgery.

ERRATA.

On page 21, third line from top, read "*scopolamine*" for "*scopolomine.*"
On page 33, top line, read "myositis" for "myosotis."
On page 38, eighth line from foot, read "cisterna" for "cysterna."
On page 40, fifth line from top, read "*tonsillotome*" for "*tonsillitome.*"
On page 46, ninth line from foot, read "of" for "or."
On page 115, seventh line from top, read "retrocæcal" for "retrocœcal."
On page 129, fourth line from top, read "hered-" for "here-."
On page 132, fifth line from top, read "surgeon" for "sugeon."
On page 151, tenth line from top, read "is" for "was."

CONTENTS.

CHAPTER I.

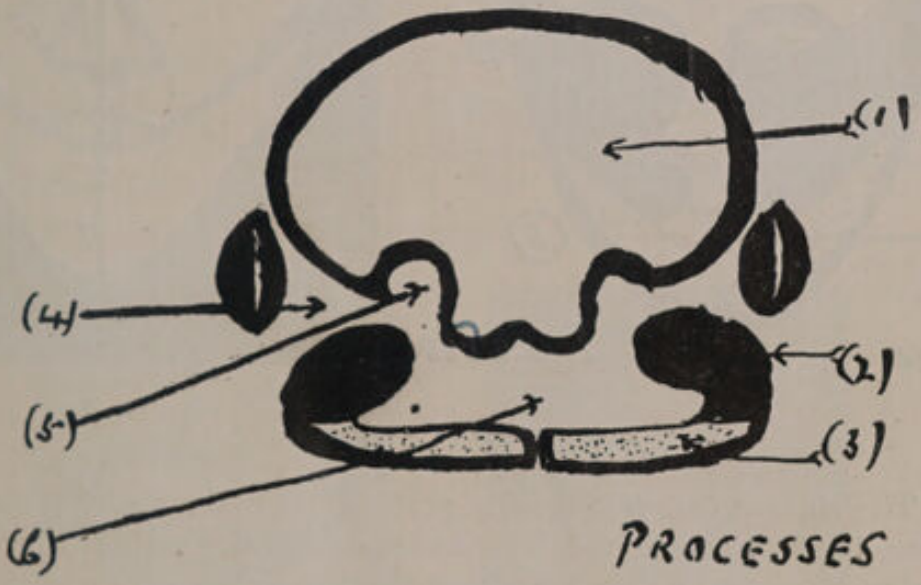
ON HARE-LIP AND OTHER DEVELOPMENTAL LESIONS OF THE FACE.

The development of the face is one of Nature's most wonderful triumphs in its accurate and flawless closure of the initial gaps between the processes from which the face is built up. When the development fails or is defective well-known pathological conditions result, the proper comprehension of which rests on a clear idea of how the face is developed.

The face, then, results from the approximation and fusion (except for certain fissures) of five processes. These processes are called—The fronto-nasal.

The maxillary (two in number).

The mandibular (two in number).



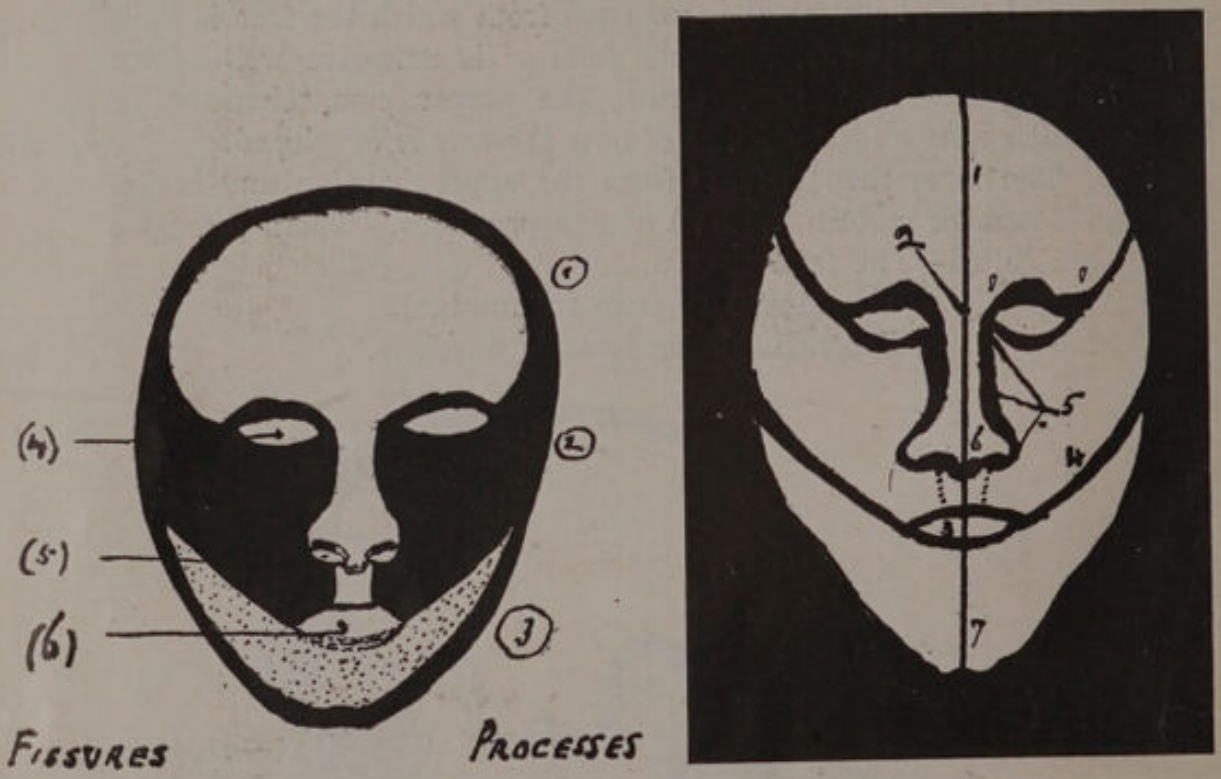
(One would expect that the fronto-nasal process was initially in two pieces, as otherwise the presence of nasal meningocele, nasal cleft tip, and mid-line dermoids would be difficult of explanation.)

Certain fissures remain permanently between these processes :

(*a*) On the surface—the nostrils,
the orbital fissures,
the mouth ;

(*b*) more deeply— the tear-duct tract,
the nares,
the gap between upper and lower jaws.

Failure in the symmetrical growth and accurate fusion of the processes must lead to facial deformity as defect or excess and the fissures are likewise affected.



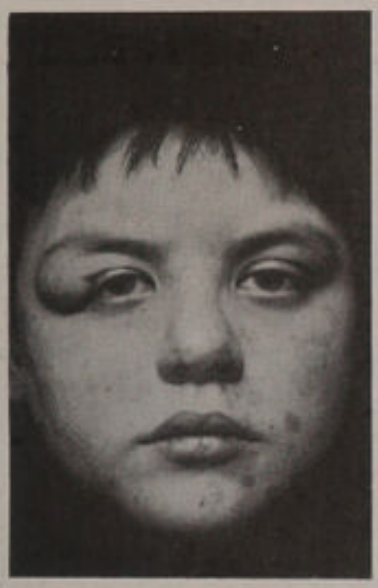
The surface fusion is usually perfect and without any visible scar, but at times skin bridles or tags show the surface line of union between two processes and the large class of interesting sequestration dermoids gets its proper explanation in the inclusion of epidermal rests along these lines of union.

The development of the eyes in the orbital fissures and of the tear-ducts complicates the process, and, as one may say truly of all developmental errors, the marvel is not that errors occasionally arise, but that they are so seldom seen.

So far the following pathological conditions have been noted and in part explained :—

(1) mid-line, orbital, and other dermoids.

(2) meningocele at the base of the nose.



Sequestration dermoid.

Bridle on cheek, orbital defect also present.

(3) microstoma ; macrostoma.

(4) mandibular tubercles and skin bridles on cheek.

(5) facial cleft and defective tear-duct development—patency.

(6) cleft tip to nose.

(7) mid-line dimples of upper lip and of chin.

Mandibular tubercle.

Supernumerary auricle.

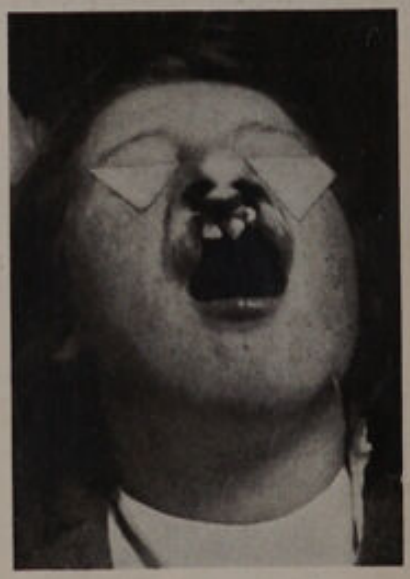
Another rare and interesting condition is the presence of mucous crypts on the lower lip. These were first figured by the late Mr. J. H. Nicoll (see Bland-Sutton's book on

" Tumours "), and their place in the animal world long escaped detection till an observer pointed out their presence on the lip of the embryos of elasmobranch fishes, a most important and interesting observation when linked up with the question of branchial cleft lesions. The cases have most commonly been associated with some form of hare-lip deformity, and occur in very limited family circles.

Hare-lip and cleft palate constitute the most common of the developmental defects in connection with the approximation of the primary processes.

The fronto-nasal process provides the mid-portion of the upper lip—the prolabium.

Mucous crypts on lower lip.



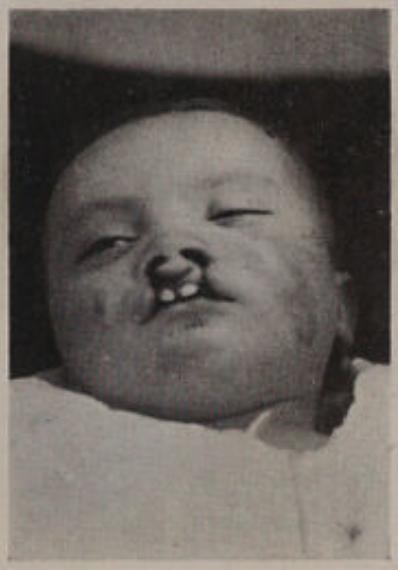
Showing three tooth buds.

Between the ala nasi or lateral nasal process (of the fronto-nasal process) and the tip of the nose or central nasal process (of the fronto-nasal process) there is a fissure, the nasal fissure or nostril, which constitutes the upper end of a " complete hare-lip." Hare-lip is thus differentiated, as a surface lesion from facial cleft, in that whereas in facial cleft the line of cleavage is all the way between the fronto-nasal and the maxillary processes, in hare-lip in its marginal, labial part the line of cleavage is between the two main processes, but in its upper part the fissure lies between the two minor processes (lateral and central) of the fronto-nasal process. Covered by the prolabium is the premaxilla (or endognathion),

which in the more complicated cases of hare-lip lies free at one edge or at both edges, and projects to a greater or less extent beyond the rest of the alveolar margin. This premaxilla usually carries two tooth buds—the central incisors. Each lateral incisor is carried on a segment of bone, the mesognathion, which is usually attached to the maxillary bone. The maxillary bone or exognathion carries the canine and other teeth.

Cases are figured in which the four incisors are carried on the "premaxilla," and it is interesting at least to speculate whether such cases are not more truly described as cases of "deep facial cleft" rather than cleft palate, since this

Unilateral (R) incomplete hare-lip with asymmetry of nostrils.



Showing two tooth buds on premaxilla—usual type.

differentiation would correspond to the surface fissure differentiation between facial cleft and hare-lip. Shortly put, in cleft palate the fissure runs between endognathion and mesognathion, which are parts of the fronto-nasal process, whilst in deep facial cleft the fissure runs between mesognathion and exognathion, *i.e.*, between fronto-nasal process and maxillary process.

A case of hare-lip is properly described as :—

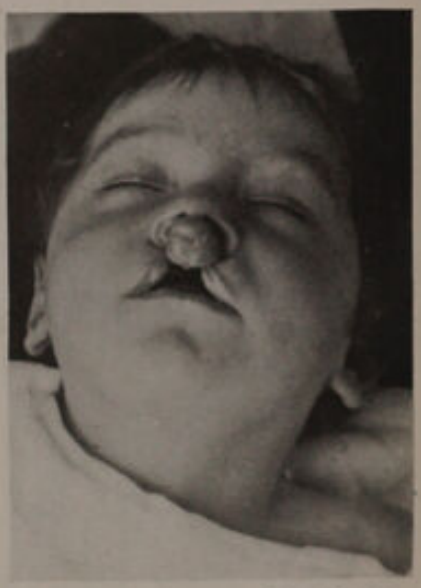
1. Unilateral or bilateral.
2. { Incomplete, when the nostril is perfect.
   or
   Complete, when the cleft runs into the nostril.

3. Alveolar, when there is a break in the continuity of the alveolar margin.
4. Complicated, when cleft palate is present, or when other developmental defects, such as mucous crypts of the lower lip, are present.

In operating on a case of single incomplete hare-lip—the simplest case—one has two points to bear in mind—(*a*) to get an accurate muco-cutaneous, red margin line; (*b*) to avoid any notch or other irregularity of the mucous edge.

The field may be made bloodless by the use of clamp forceps or of a temporary stitch. The edges of the gap must be so

Unilateral (R) complete alveolar hare-lip. Nostril greatly flattened.



Double, complete, complicated (cleft palate present) hare-lip.

refreshed that an equal thickness of tissue is present on either side. If there be a thin and a thick edge to be dealt with this may be attained by (1) sacrifice of tissue on the thin side; (2) bevel-edged cutting; (3) saline infiltration on the thin side whilst the surface is still intact.

Correct placing of the stitches is essential for point (*a*). In all cases the first stitch to be placed should be that fixing the mucocutaneous, red line.

As regards (*b*) it has long been a favourite method so to shape the mucous margin that when the oblique incisions are brought together a small papilla or projection results at the mucous margin. As the scar tissue contracts this gradually adjusts itself. Note that this papilla will usually lie, not in

the middle line, but beneath the nostril corresponding to the hare-lip.

It may be necessary to gain length on one side to make the line of incision on the shorter side curved or to notch its edge; otherwise as the part heals the red margin of the lip will be pulled up on the short side and a nasty notch will result.

In the case of complete hare-lip the further problem of accurate adjustment of the nostril presents itself. It is not difficult in most cases to get the size of the nostrils approximately correct; it is very difficult, however, to get the axis

Imperfect result from unequal sides—slipping after removal of stitches.

of the remodelled nostril to correspond to that of the normal nostril, and this little failure often gives away an otherwise beautiful result.

The type of operation for the single incomplete hare-lip is that of Malgaigne.

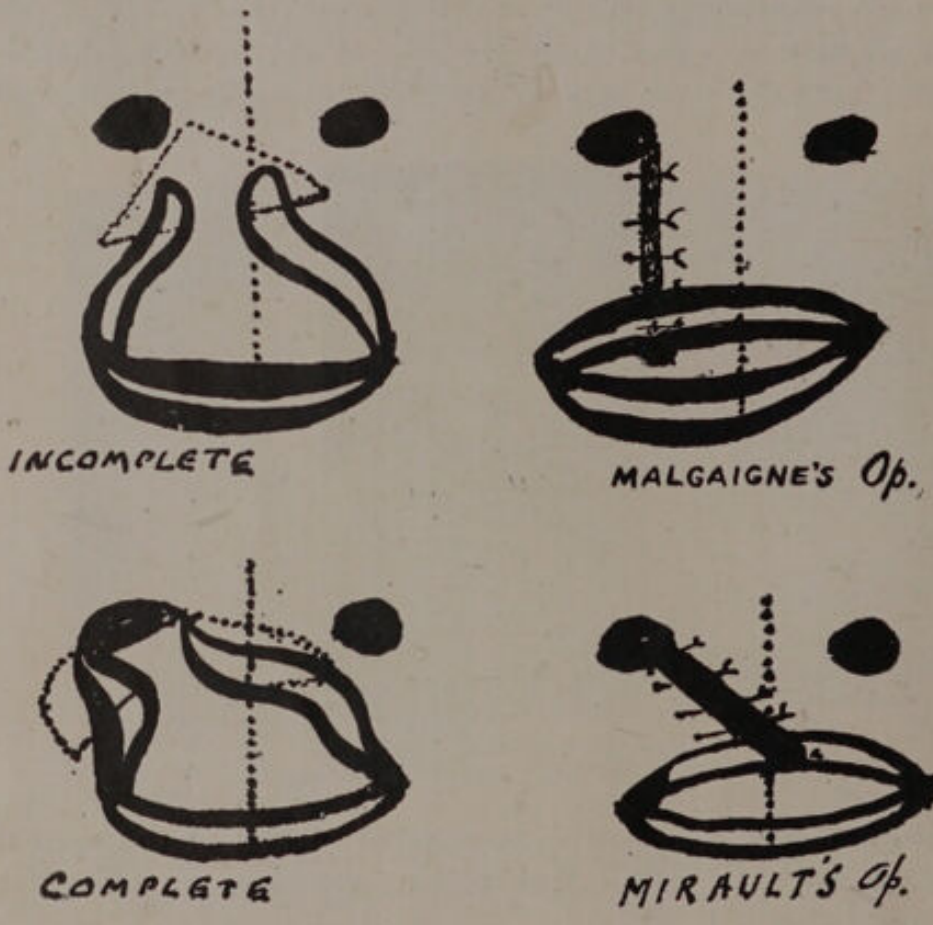
The type of operation for the single complete hare-lip where the nostril is flattened, and requires to be pulled across towards the middle line is Mirault's.

In this operation tissue is sacrificed from the normal side. The lip and nostril of the affected side may require to be undercut and lifted off the maxilla to let them slide towards the middle line without tension.

The line of suture is oblique with its lower margin at or

beyond the middle line—not vertical and beneath the nostril as in Malgaigne's operation.

The alveolar hare-lip is undoubtedly the most difficult one in which to get a beautiful result; the difficulty being proportionate to the degree of flattening of the nostril. The operation must be done in stages. The gap in the alveolar margin must first be closed, or at least the projection must



be corrected. It is no use suturing the lip tightly across a projecting alveolar edge. If there be such an amount of tension as may be expected to have any beneficial effect in helping to push back the projecting bone it is almost certain that the stitches will cut out.

Stage I.—Refresh the edges of the gap, ensuring that broad enough surfaces will get into apposition. It will almost certainly be necessary to remove the incisor tooth buds next the

gap. If it is not done they usually interfere with sound healing, and work their way to the surface as foreign bodies.

Stage II.—Perforate or drill the alveoli with an eyed instrument, and draw into position the silver wire (of proper thickness) which is to be tightened up later. Note that on each side the wire will be equally distant from the alveolar margin, and have the drill holes well back from the raw surfaces of the gap.

Stage III.—With bone forceps cut through the projecting aveolus and the anterior part of the maxilla distally to the wire.

Stage IV.—Grip the loosened fragment with sequestrum or other suitable forceps, twist it round and push it back so that its alveolar edge comes into line and the raw surfaces are closely approximated. Hold it steadily there.

Stage V.—The wire is twisted and tightened up so as to hold the fragment in good close apposition, the raw surfaces opposed, and the alveolar margin well aligned.

Stage VI.—Cut short the twisted ends of wire and tuck them up into the nostril, taking care that the sharp points do no cut into the tissue but lie free.

The whole procedure looks severe, and one would expect hæmorrhage and shock to occur, but, fortunately, this is unusual, and the babes quickly get over the operation and begin to take food. It is, however, not a procedure to carry out in any babe that is weakly, and one must wait till the infants are in good condition and definitely gaining weight. Operation must be steadfastly refused till the proper time arrives.

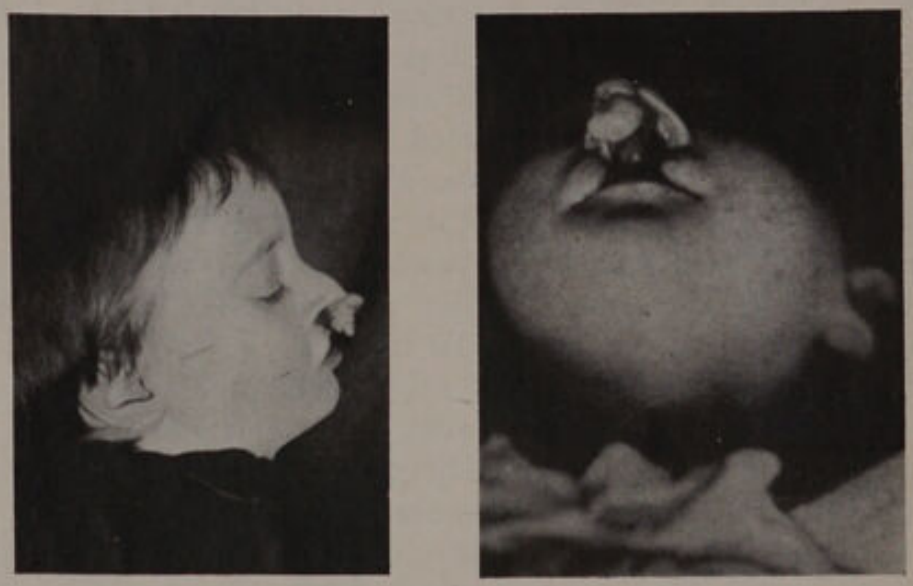
Stage VII.—The wire is removed in ten or twelve days, and thereafter the lip operation is completed, the lie of the now redundant tissue making the operation easy.

The operation for double hare-lip is usually easy where the case is uncomplicated. The central prolabium is retained and rawed in a V-shaped or U-shaped or ⊔-shaped manner, and the lateral parts are prepared after Malgaigne's method and sutured so that the papilla is placed in the mid-line. The parts are relatively symmetrical, and so the plan works out easily.

When there is a projecting premaxilla the case is more difficult, as the projecting bone must first be pushed back to fill up the gap as far as that is possible, but when this has

been accomplished the symmetry of the parts usually allows of a surprisingly good result being obtained when the lip itself is sutured at a later date. (Only very rarely should the premaxilla be removed entirely.)

In these cases a wedge-shaped piece of vomer and septum nasi is first removed (this may be done submucously). It must be sufficiently large to allow of the premaxilla being pushed back till its alveolar edge is in proper adjustment, and tilting must if possible be avoided. The edges of the gap and of the premaxilla are made raw, the tooth buds are removed, the maxillary alveoli are drilled, and a wire passed which lies



Projecting premaxilla.

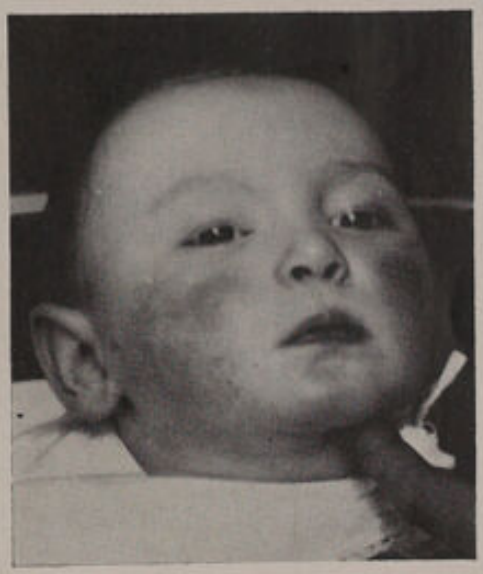
on the surface of the premaxilla and keeps it pushed back into its proper place with the raw surfaces well opposed. The tension of the wire must not be too great, lest it cut through.

Sometimes the premaxilla is too small to fill up the gap completely, in which case it is pushed back and wired to one or other maxillary bone, leaving for the time being a gap in the alveolar margin. After ten or twelve days the wire is removed, and the soft surface lip is repaired, as in an uncomplicated case.

No dressing is applied to the lip (beyond a smear of Bipp occasionally). The line of suture is left dry and exposed to the air.

Operation for hare-lip should be undertaken early—within a month or two of birth, when the child has shown signs of thriving and has got a grip on life. This will eliminate the risk of too early operation on marasmic and specific babes, as these are certainly bad risks. For the mother's sake as well as the babe's, one advocates early operation.

Bronchitis, nasal discharge, any rash about the face or head are absolute contra-indications. The state of the weather, in Scotland at anyrate, is a factor of importance, and operations in damp and foggy weather should be avoided. The after-care and feeding are of the utmost importance, and each case should be the undivided care of one nurse when that is possible.



Satisfactory result both as regards red margin of lip and symmetry of nostrils.

The hands must be so fixed as not to allow them at any cost to reach the lip or mouth. All shawls, blankets, &c., must be so arranged as absolutely to avoid contact with the face, and the head must be fixed if necessary with sand bags, so that the face cannot be rubbed against the pillow. The child must be spoon-fed with sterile food for three or four days, and any drying of the lips must be most gently done with sterile pads of wool.

The utmost care night and day is necessary if first-class results are to be obtained, and, short of this, it is very difficult to get perfect healing.

The stitches are usually removed on the fifth or sixth day.

Though these are the fundamental ideas one has in mind in operating on a case of hare-lip, yet it is essentially true that each case is a problem in itself and requires modifications of the standard operations.

The stitching of a lip across a projecting alveolus in the

Post-operation control.

hope that gentle pressure will restore normal outline is optimism—usually based on inexperience.

The attempt to preserve tooth buds leads to frequent disappointment, and one may trust the dentist to make good the defects caused by removal of the teeth.

CHAPTER II.

ON CLEFT PALATE.

Cleft palate is a subject of great interest, but one with which the student is not likely to become intimately acquainted.

The failure of union between the two halves of the palate may involve the uvula, the soft palate or the hard palate. Each half of the hard palate may fail to reach the mid line and become attached to the vomer completely or in part, and each case requires to be described in view of the degree of union which has been attained and the amount of projection forward of the premaxilla and the alveoli.

Commonly the projecting premaxilla carries two tooth buds; more rarely three or four are present. An explanation of this is suggested in the previous chapter.

The three procedures most commonly tried in attempting a repair of the defect are Langenbeck's, Lane's and Brophy's operations.

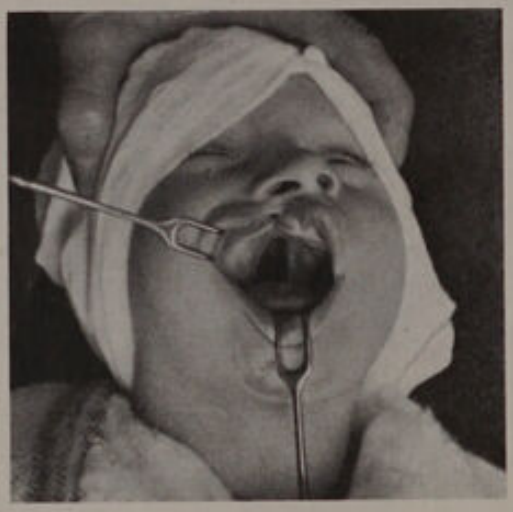
Brophy's operation is essentially a preliminary crushing or suturing together of the two upper jaws, after a submucous osteotomy, so as to lessen the intervening gap before any attempt is made to suture the muco-periosteal flaps across the gap.

Lane's operation consists in mapping out a muco-periosteal flap which is lifted off the bone except at its edge; hinged at this line the flap is turned over like the leaf of a book and is then slid under the muco-periosteum covering of the other maxillary bone now freed from it all along its edge and lifted up sufficiently to permit of the flap being slid underneath it. A double line of parallel interrupted sutures is used to keep the flap in position—raw surface to raw surface.

Langenbeck's operation is the favourite one, being the most straightforward and simple one. The edges of the gap are freed along the whole length of the gap and the raw edge is trimmed so as to make it as good and as broad an edge as possible

without sacrificing tissue. A long relaxation incision is made on each side just to the mesial side of the line of the teeth; through this incision, which is bone deep, a periosteum elevator is used to lift the muco-periosteal flap off the maxillary bone; care must be taken not to detach the flap altogether at its forward end; scissors are now used to separate the flap from the posterior edge of the maxilla; the flap thus completely separated from the bone except at its anterior end carries its own blood supply if care has been taken not to tear that away in lifting the flap off the bone.

By means of interrupted sutures the raw edges are now brought into close apposition, and this is usually effected without any tension if the relaxation incisions are free enough.



Even though every care has been taken with the preliminary preparation complete primary union is not always got, but a few secondary sutures usually manage to complete the closure of the cleft.

One should not be tempted to try and operate on these cases when they are too young and there is little tissue to work on, for if from any cause there is an interference with the blood supply of the flap and some tissue dies then probably all chance of ever getting a repair operation completed has been lost. It is more important to keep this in mind than to urge operation early in the hope that an early repair will be effectual in preventing the characteristic speech defects from which cleft palate patients suffer.

Probably it is in the patient's best interest to defer the date of operation till the child is between three and five years of age.

Wardill's method of exaggerating the height of Passavant's ridge by a plastic operation, which tries to ensure that as the soft palate rises during speech it will come into contact with the posterior pharyngeal wall, may prove an aid in correcting speech defects, which can also be greatly improved by careful and persistent supervision and education during school life.

The general condition of the child must be as good as possible.

The anæsthetic and the manner of producing anæsthesia must be attended to with the utmost care.

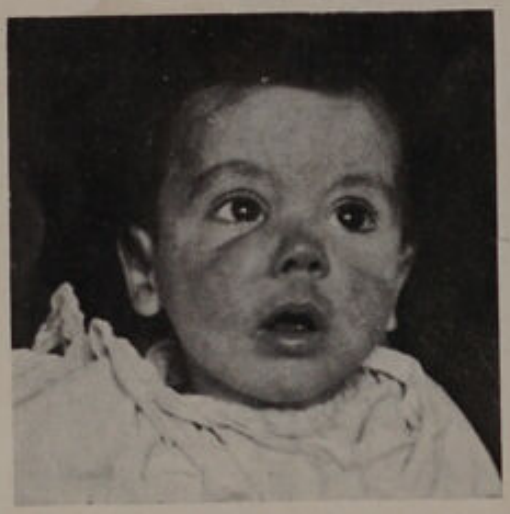
The after-treatment is, as in cases of hare-lip, of the greatest importance.

The posture of the patient during operation and the special gags and other instruments used are matters of more interest to the surgeon than to the student, who ought never, however, to be trapped into calling a cleft palate needle a hernia needle.

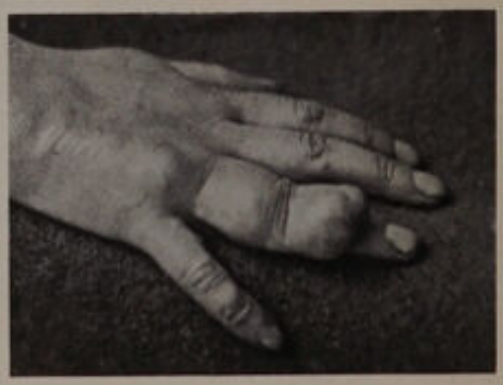
CHAPTER III.

ON NÆVI, OR HÆMANGIOMATA, AND SOME OTHER LESIONS AFFECTING THE FACE.

These are congenital tumours and the most common type of tumour found in infancy. They are essentially *blood* tumours, showing this by their colour, by the fact that the blood can be squeezed out of the tumour and its return appreciated, and also by the fact that many of the tumours are pulsatile. The blood, in vessels or in spaces, and the amount



Non-capsulated type.

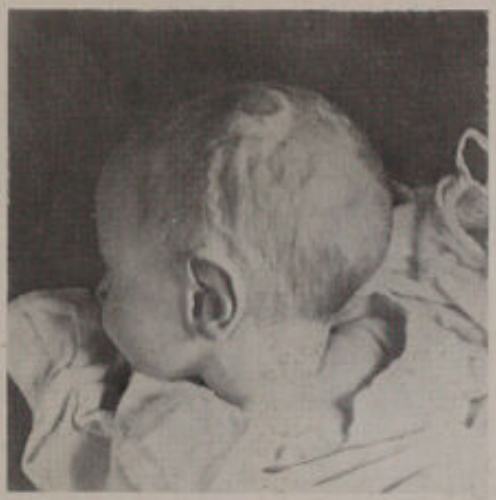


Nævus on finger.

of supporting connective stroma vary in each case; thus a *capillary nævus*, *port-wine stain* or *strawberry mark*, or a *telangiectasis*, is a cutaneous blush or blemish due to excessive numbers of very superficially placed dilated capillaries, and only if the covering epidermis be very thinned out does the tumour project above the level of the surrounding skin. The colour depends on the depth of the tumour and on the speed with which the blood is allowed to pass through it, and varies from a pink or bright red colour to a dark blue or purple. Such nævi are often associated with *spina bifida*. In a *caver-*

nous nævus a sponge-like tissue of blood spaces and supporting stroma, with afferent and efferent channels, produces a simple encapsuled tumour. This is most commonly subcutaneous, rarely visceral, and when full of blood displaces normal tissue and projects, forming a mass covered with skin, itself often affected with a capillary stain. Occasionally one finds a nævus which is very poorly encapsuled and where it is difficult to be sure that the whole tumour has been removed when excision is attempted.

Plexiform angiomata, venous angiomata, cirsoid aneurysms, where the blood-containing channels can be properly described



Note large afferent vessels.

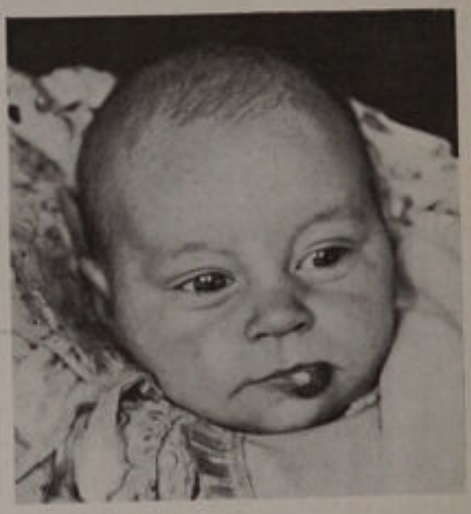
as veins or arteries, are rare in childhood; but pulsatile *cavernous nævi* of the scalp supplied by a large tortuous artery and drained by one or two veins are occasionally met with and require specially careful treatment, as they may bleed most violently.

The best way of treating a *scalp nævus* such as that illustrated is to ligate the tortuous afferent vessel some way from the tumour, then infiltrate around and beneath the tumour a weak solution of novocaine and adrenaline; make use of a large rubber ring pessary round the tumour to get a bloodless field; then quickly excise the tumour with an oval incision and without waiting to pick up any bleeding points stitch the wound. There may be some difficulty in getting a large wound closed, and one or two relaxation incisions may be required.

Where *excision* is applicable the use of undercutting, the approximation of clean-cut edges without tension, using fine needles and suture material, and the application of a dressing which also keeps the line of suture without tension, will give results with which the parents are usually perfectly satisfied.

The subject is not an unimportant one, and from the illustrations one may learn that there is clearly scope for preventive surgery in these cases, that a stitch in time may save nine.

Nævi of the *lips* are best treated by excision of a wedge of the lip, and if the angle of the mouth is not involved a surprising amount of lip tissue may be removed without making

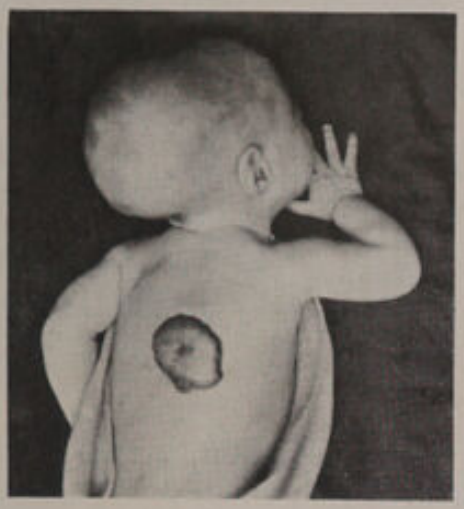


a permanent deformity; at first, of course, the mouth may look far too small.

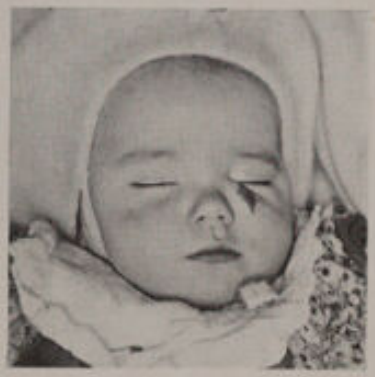
A nævus may be a tiny spot or tumour or it may be a huge blemish or a mass of considerable size. *The* clinical fact, which is not sufficiently appreciated by the public and the general practitioner, is that the rate of growth of many of these tumours is exceedingly rapid, and again and again a weeping mother brings a babe for treatment, stating that at birth the tumour was a tiny affair, about which she was told not to worry, and that in the last few weeks it has become so big that it obviously requires to be dealt with.

If the tumour be on the trunk or on one of the extremities

no harm has probably been done, but if the lesion is on the *face* then delay is often a catastrophe and an easily remediable lesion is converted into one which requires great surgical skill



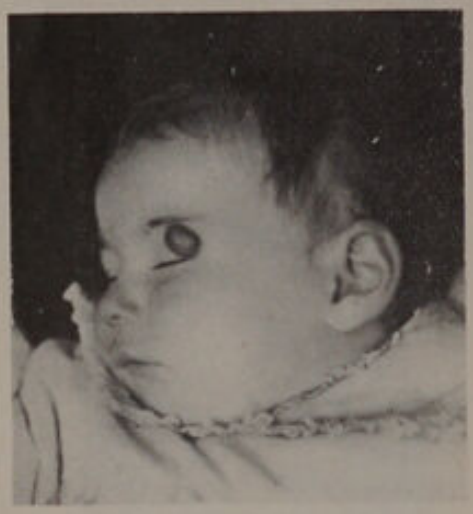
to remove it without scarring and deformity. It is an urgent lesson for the student to learn that *nævi on the face*, in the newly born, ought to be treated without delay if the best

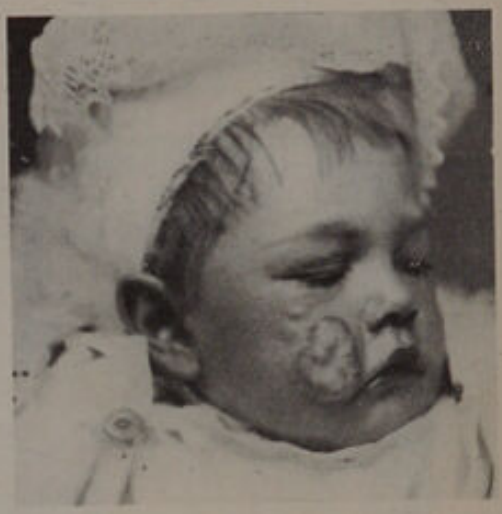


result is to be got and much future trouble avoided. Natural cure by thrombosis and ulceration is seldom satisfactory.

What treatment is advised? Two lines of treatment are available, simple, sure and speedy, namely, *excision* and the use of a fine *cautery*. So many other methods are recom-

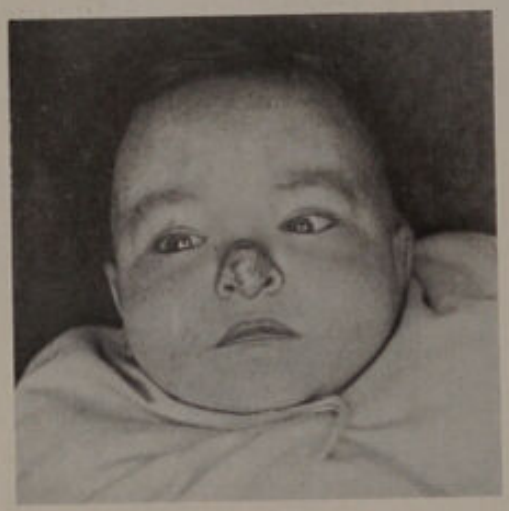
mended in books that the student is bewildered, and is apt to forget that the simplest surgical methods can obtain more quickly and certainly results which are not constantly got by





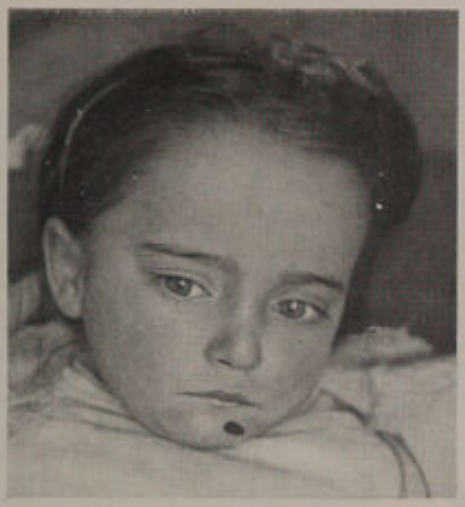
the more modern procedures. *Early* operation, within a week of the child's birth, is advocated.

Nævi which cannot be excised, *e.g.*, one on the point of the nose, may be dealt with by multiple puncture with a fine

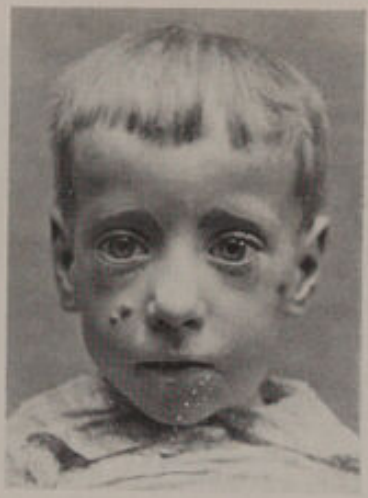


cautery, and an ordinary fine household needle held in a pair of pressure forceps and heated in a spirit lamp is not equalled by any more expensive apparatus for this purpose. Several sittings will probably be required.

The problem of the anæsthetic is important. *Ether* must not be used in association with a cautery. A very small hypodermic dose of *omnopon* and *scopolomine*, suitable to the



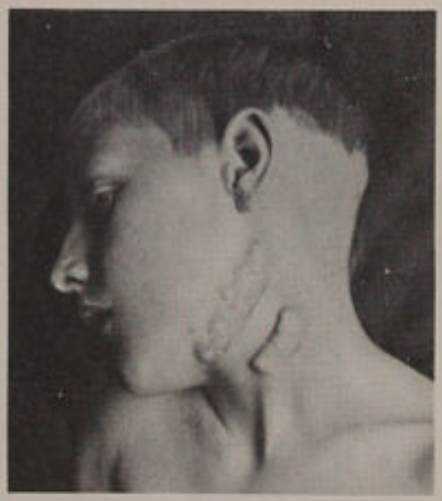
Wart or horn.



Molluscum contagiosum.

tiny weight of the child, plus if necessary some local anæsthetic, enables one to eliminate the risks and difficulties of repeated general anæsthetics.

Pigmented mole.



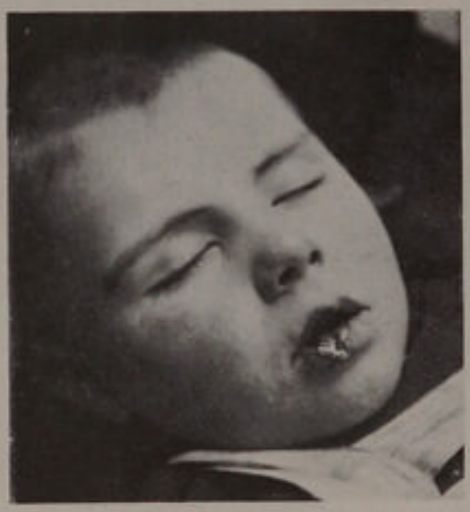
Keloid.

Nævi of the eyelids and of the upper cheek may have their excision followed by ectropion, and care must be taken so to place the stitches as to minimise this danger.

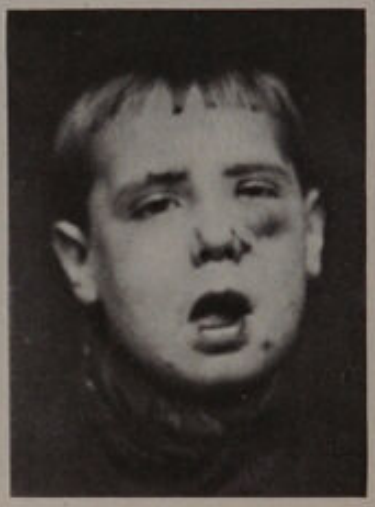
Other vascular lesions, such as aneurysm, hæmorrhoids,

varicocele and varicose veins, are practically unknown in childhood.

Illustrations of some other surgical conditions on the face, amenable to the same lines of treatment as angioma, are

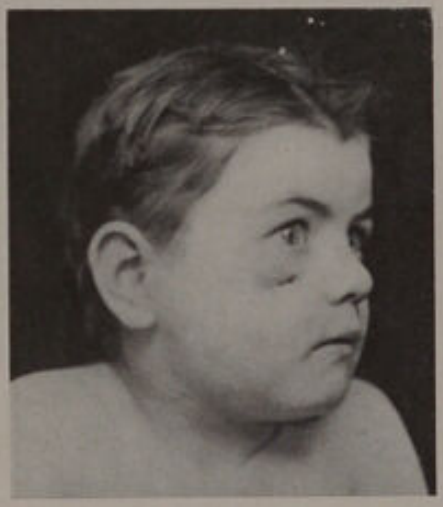


Chancre.



T B. malar bone.

reproduced for interest in making a differential diagnosis; they are *wart* or *horn*, *molluscum contagiosum*, and *pigmented mole*; *keloid* is also illustrated, a condition often associated with a



T.B. malar bone.

Dacryocystitis.

certain amount of capillary staining on its epidermal covering but not so amenable to surgical treatment.

Chancre and *lupus* may be met with, but *rodent ulcer* and *epithelioma* are happily rare in childhood.

Tuberculosis of the *malar bone* gives a characteristic appearance, which the late Sir Hector Cameron used to call the hall-mark of tubercle. It is not so commonly seen nowadays; *dacryocystitis* requires to be differentiated from it.

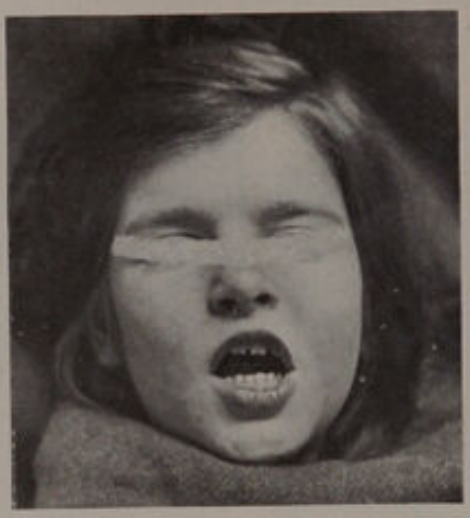
The physiognomy of *congenital syphilis* is unmistakable,

and the lesions of nose, eyes, mouth and teeth present pictures which are easily spotted. The lesions of the skull are not so characteristic, and a bony rachitic skull must not be mistaken

for a syphilitic one, though the possibility of both diseases being present must not be lost sight of.

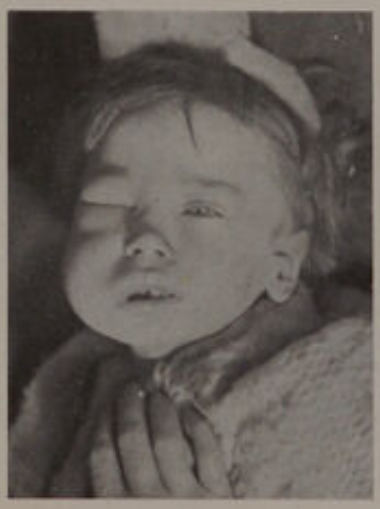
The presence of *Hutchinson's teeth* may give the clue to diagnosis in a case which is devoid of all other stigmata and presents a puzzling lesion. It is a notching of the second or

permanent central incisor teeth, and should not be looked for before these have appeared.

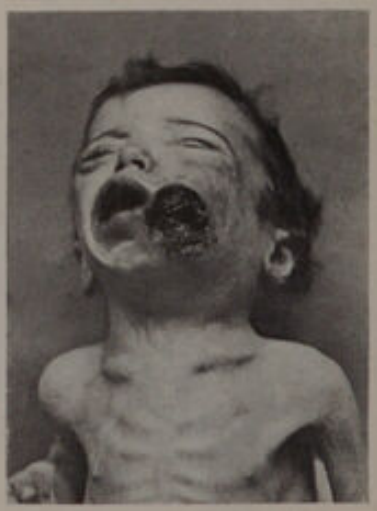


Hutchinson's teeth.

Cancrum oris or *noma* is a serious type of gangrene of the cheek which arises insidiously in debilitated children who have recently had measles or some other illness. An indurated spot rapidly becomes discoloured, and if it is not immediately incised



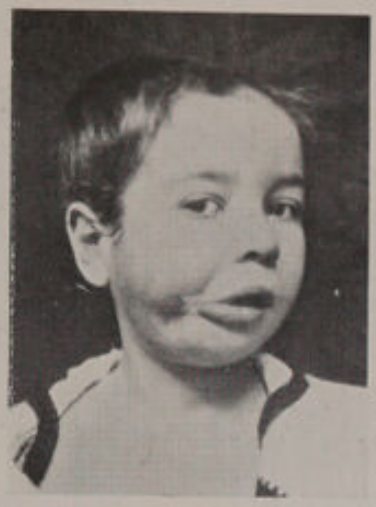
Cancrum oris.



Advanced stage.

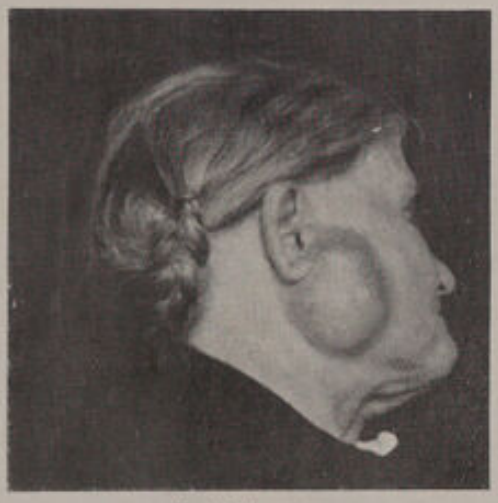
or cauterised the process becomes one of extending gangrene and marked sloughing of the cheek occurs. Many cocci and spirilla are found to be present; the discharge is very foul,

and the child frequently succumbs to an insufflation pneumonia. The treatment must be early and heroic. Marked deformity of the face, especially of the mouth, is inevitable if the child does survive.



Healed cancrum oris.

If reference be made to the *congenital lesions* associated with the development of the face (see hare-lip and meningocele lessons) the list of common facial lesions met with in childhood is fairly completely illustrated.



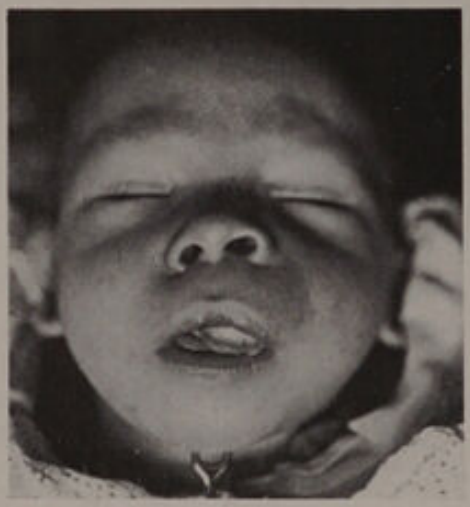
Parotid tumour.

Parotid tumours, such as are met with later in life, are rarities, apart from *mumps* and *sarcomata*. In cases of *parotitis* it is difficult to palpate the angle of the jaw easily, and this helps to differentiate cases of adjacent acute *adenitis*.

Epulis of the jaws or *sarcoma* may cause facial asymmetry.

With reference to facial hemiatrophy, see the lesson on *torticollis*.

Cysts of the lips are common, and great hypertrophy of the mucous glands may give rise to an enormously thick lip,

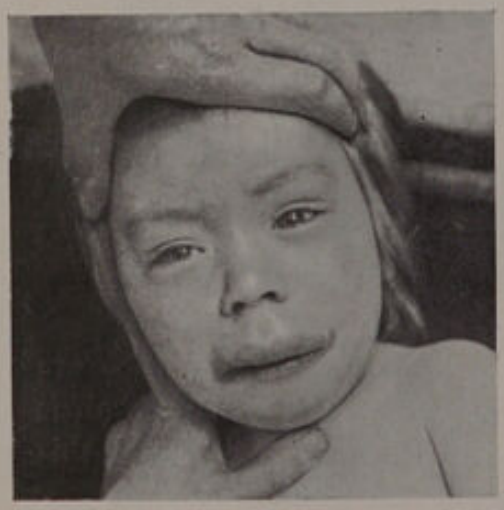


Epulis or sarcoma.

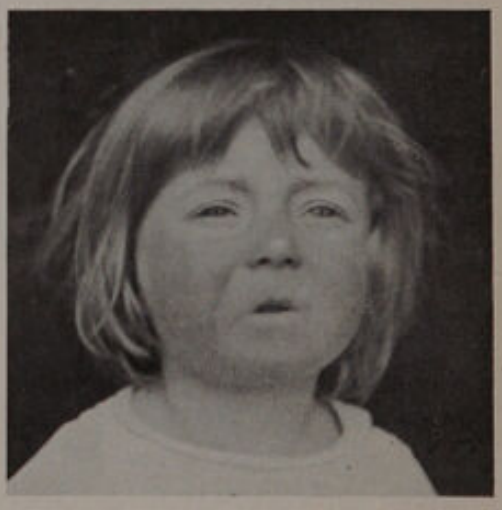
Cyst of lip.

macrocheilia. This condition may be simulated, and gives an appearance of macrostoma as the result of chronic irritation and lymph blockage in cases of rhinitis.

Microstoma may be congenital or may result from cicatrisation after stomatitis.



Macrocheilia.



Microstoma.

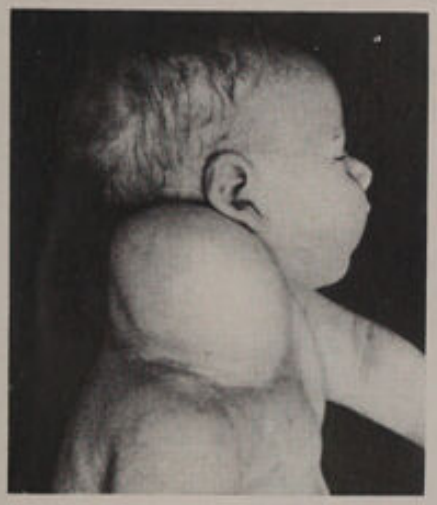
CHAPTER IV.

ON LYMPHANGIOMATA.

Under the names of lymphangioma, hygroma, and hydrocele of the neck there is described a group of congenital tumours quite commonly met with in work amongst children.

They are composed of lymph vessels, like capillary hæmangiomata, or of dilated lymph spaces, like cavernous hæmangiomata, and are found anywhere on the trunk or on the limbs, though the root of the neck and the axilla are probably the most common sites.

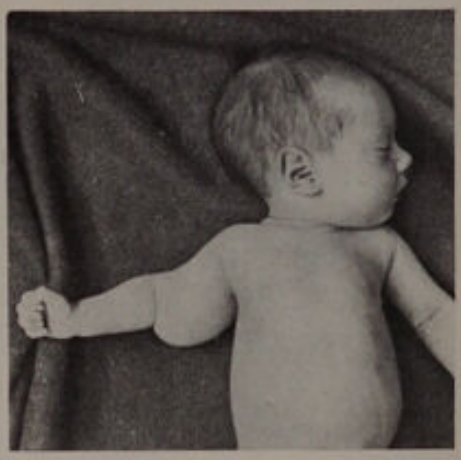
It has been suggested that these hydroceles of the neck may



be connected embryologically with the anterior end of the intermediate cell mass which by its normal process of cleavage gives rise to the body cavity.

Macroglossia (lymphangioma of the tongue), in the extreme degree in which it is pictured in the text-books as a surgical rarity, is not often seen, and should, of course, be operated on long before it has produced any deformity of the jaws. The usual tumour is a unilocular or multilocular extremely soft superficial swelling with the skin so thinned over it that the tumour seems to have a greenish or bluish tint about it.

Though tense cysts may exist or may be present about the periphery of a larger swelling where it is tending to burrow into the adjoining tissue, the softness of the typical lymph-

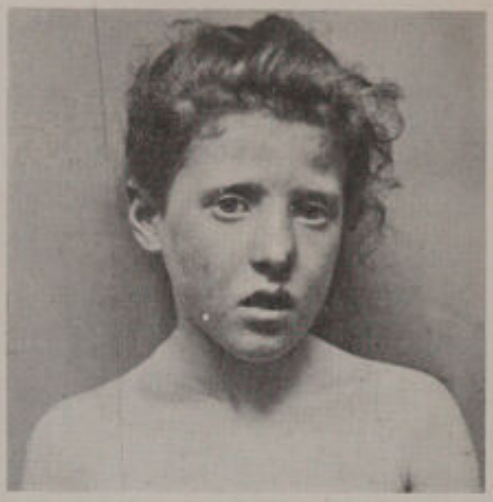


angioma is its most characteristic symptom. At times the skin over the tumour is affected with a capillary hæmangioma.

The cysts are lined with endothelium, are extremely thin-

walled, and may be difficult to dissect out in their entirety; little portions left give rise to further cyst formation. It is well to explain this beforehand so as to avoid possible disappointment or any misconception as to the simplicity of the tumour. The most difficult ones to extirpate completely are those at the root of the neck which have extended along

the line of the vessels down into the axilla. Some cases thus situated are so widespread as to make an excision almost



impossible, but fortunately in most cases the removal of the tumour is a simple affair.

Success has recently been claimed for the injection of sodium morrhuate as a method of curing these cases.

CHAPTER V.

ON TORTICOLLIS, CONGENITAL HÆMATOMA OF THE STERNO-MASTOID, AND OTHER SURGICAL CONDITIONS IN THE NECK.

Wry neck or torticollis is a fairly common and easily recognisable deformity. It is called congenital, and is a true lesion of the sterno-mastoid muscle—at least in its late stages. It is often said to follow "congenital hæmatoma of the sterno-mastoid muscle," but it may be more true that this "birth trauma" follows in such cases on a previous lesion of the muscle affected. The conditions are not infrequently correlated, and the occurrence of one or other of them in four members of the same family has been noted.

The acquired or "pseudo torticollis" and the "spasmodic torticollis" require to be differentiated; but this is easily done, as there is usually no definite lesion in the muscle itself.

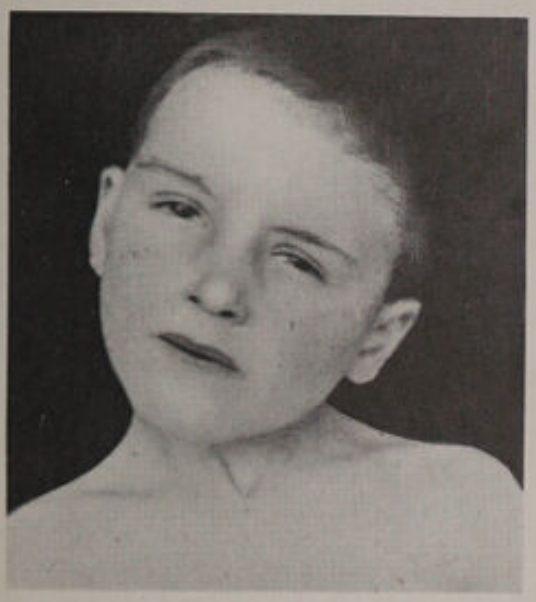
The condition is attributed to a defect in the germ plasma; an unsatisfactory explanation except where there is a marked family history. Other explanations, such as pelvic deformity in the mother or a lack of liquor amnii causing a cramped intra-uterine posture, lack constant proof. No stress has so far, in text-books, been laid on a developmental primary defect in the blood-supply to one side of the neck, involving its large muscle, the sterno-mastoid, and head, as a factor in producing the condition. It is, however, well recognised that in marked cases hemifacial and hemicranial atrophies are most noticeably present. In view of this, definite information is required in these cases as to—

1. Abnormalities in the origins of the carotid and vertebral arteries;
2. Differences in the calibres of these vessels on the two sides of the neck;
3. Differences in the sizes of the vertebral artery foramina;
4. Abnormalities of the circle of Willis.

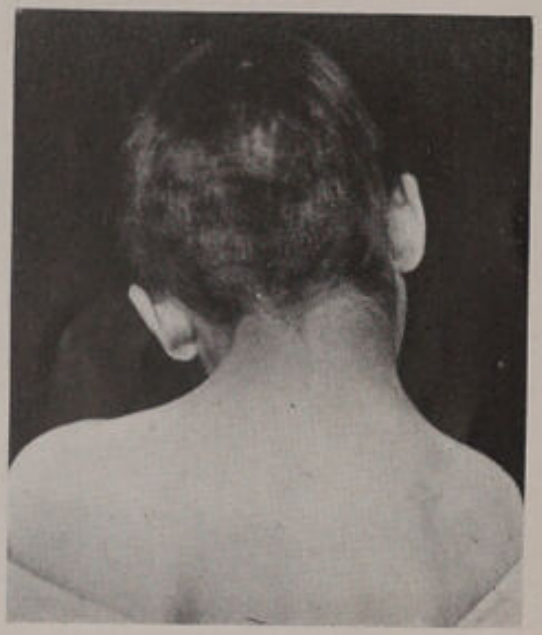
All these points might throw further light on a theory which

is commended to the notice of anyone who may have the chance of doing a *post-mortem* examination on a well-marked case.

The condition is essentially an atrophy of the muscle fibres of the sterno-mastoid, which are replaced by fibrous tissue. Contracture follows, and the head is tilted over towards the shoulder on the affected side, whilst the chin is rotated towards the opposite shoulder. The taut, shortened muscle stands out as a hard subcutaneous structure. The degree of tilting of the head is measured, from the front, by noting the difference



True torticollis.



True torticollis.

in the levels of the eyes, and, from behind, by noting the difference in the levels of the ears.

Sometimes the condition is present only in a mild degree, the clavicular or the sternal head alone may stand out prominently as a narrow band when the neck is stretched; in other cases, as already indicated, the whole face and head have been atrophied on the affected side, and the whole muscle is involved in the process.

Treatment.—In the mild cases where a single band is felt, subcutaneous tenotomy may suffice if the section of the tendon or band is followed by overstretching the structures and retention of the head in plaster or by means of some other apparatus. In the great majority of cases, however, this

treatment has been found of little avail, and has been frequently followed by relapse of the condition, with fresh formation of tight fibrous bands. Open operation is accordingly advised, with section of the sternal and clavicular origins and resection of the atrophied muscle as far up as possible without endangering the spinal accessory nerve. All tight fibrous bands are cut under direct vision and palpation, and with adequate protection of the important adjoining structures. Such a wide gap is now left that organisation of exudate cannot produce easily a joining band, and this operation has

Pseudo torticollis. Neuro-mimetic type.

Spasmodic torticollis.

the advantage that, beyond immediate fixation of the head after operation between sandbags, after-treatment by fixation apparatus is not required.

The result is usually most satisfactory after a period during which supervision is necessary till the muscles are developed and re-educated to keep the head in the desired position.

Many cases come to hospital which are properly classified as pseudo or acquired torticollis. There is no actual lesion in the muscle itself alone.

(*a*) There may be a lesion in the vertebral column from *caries*, or as the result of a *congenitally defective* (wedge-shaped) vertebral body, or as the result of some old fracture of transverse process, or of clavicle, or from the presence of a cervical rib.

(*b*) Rheumatism, myosotis of the muscles of the neck, may lead to a stiff neck, simulating torticollis.

(*c*) Acute adenitis may arise from lesions on the scalp or in the mouth and the middle ear, and lead to a pseudo torticollis. In this and in the former class the short duration and sudden onset of the condition make the case clear.

(*d*) Corneal opacities may lead to a tilting of the head to obtain a clear line of vision, and thus produce a pseudo torticollis.

(*e*) There is a neuro-mimetic or hysterical type which is easily differentiated.

(*f*) The contracture of burn scars should give no difficulty in diagnosis.

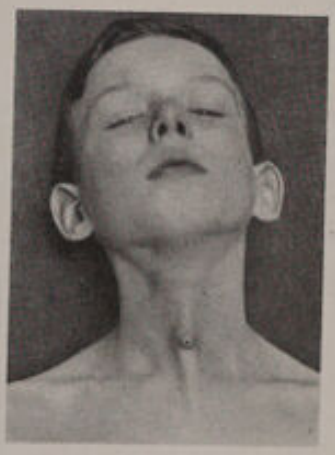
Spasmodic torticollis is a lesion developing in adult life, has probably a central nervous system origin, and is treated by neurectomies in an endeavour to paralyse the affected sterno-mastoid muscle and the co-operating deep cervical muscles on the opposite side. The cases are uncommon and the results of operation are not constantly good.

Other Surgical Conditions.

Swellings in the neck and sinuses and fistulæ present a field for differential diagnosis full of interest.

The question of enlarged lymphatic glands and the various sites in which they are located is discussed elsewhere.

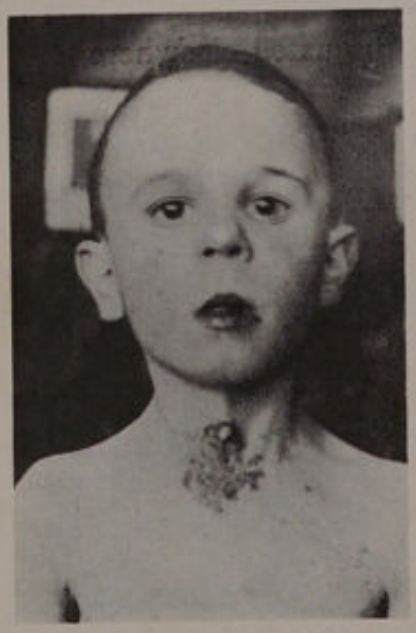
Thyroglossal cyst.



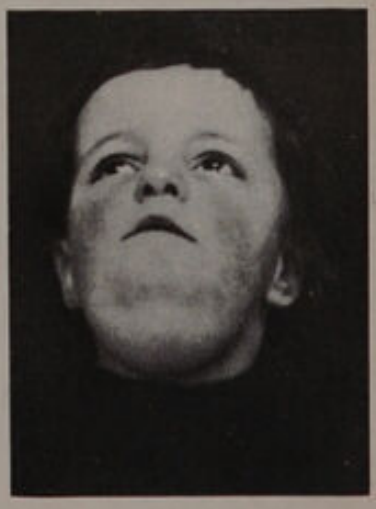
Fistula on ridge.

The thyroid gland has its adenomatous and cystic swellings, all showing the characteristic up-and-down movements on deglutition. Associated with the thyroid embryologically is the thyroglossal tract, which commences at the isthmus of the gland and then as a tubular duct, passes upwards in the middle line to dip behind the hyoid bone and, passing through the substance of the tongue, comes to the surface at the foramen cæcum. The tract is functionless in the adult, but traces of it may remain and show as mid-line fistulæ or cysts. Occasionally a fistula or a cyst is present in the tongue, giving rise at times to an abscess if infection takes place. Thyroid tissue around the foramen cæcum may constitute a definite tumour and may be a "compensatory hypertrophy" phenomenon; where the gland itself is atrophied removal of such a lingual thyroid may result in myxœdema.

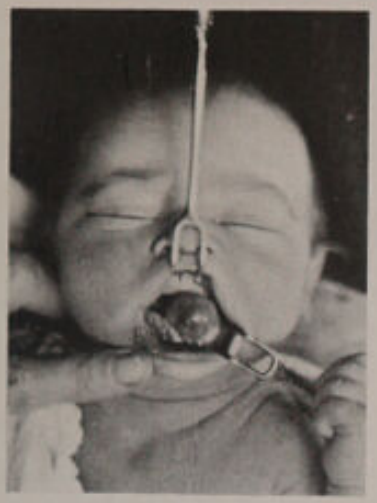
The fistula in the neck may be situated on quite a definite ridge and sometimes, as the result of traction during swallowing, a characteristic horse-shoe puckering of the skin occurs around the fistula. The cyst is exactly in the middle line and is differentiated from a sequestration dermoid by the characteristic movement on deglutition. The cysts are easily treated by excision; the fistulæ are not so easily excised, and there is a tendency to recurrence if the removal of the tissue is imperfect.



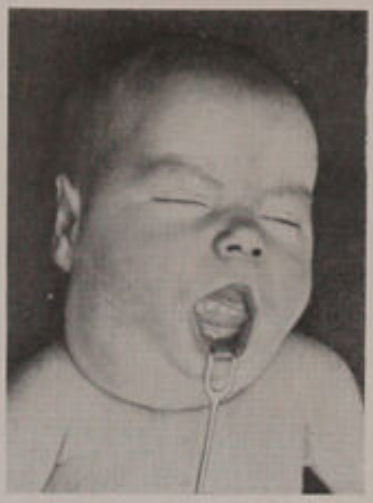
Thyroglossal fistula.



Sublingual dermoid.



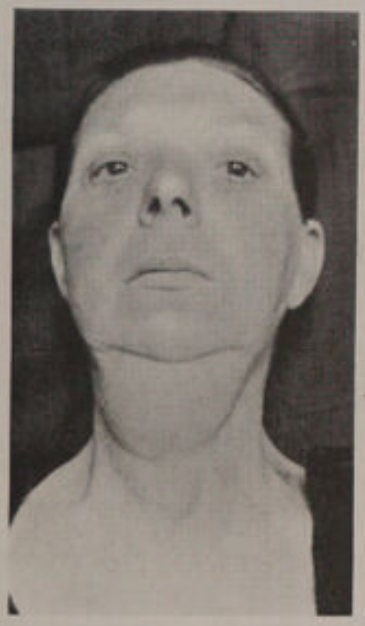
Ranula in floor of mouth.



Submaxillary: ranula.

A middle line *sequestration dermoid cyst* in the submental region may really be better described as a sublingual dermoid. *Ranulæ* and other sublingual cystic swellings may sometimes show on the surface of the neck in the submaxillary region.

A series of tiny apertures along the line of the anterior border of the sterno-mastoid muscle may from time to time exude a bead of clear fluid and, on being explored with a probe, may be found to lead to tracts of considerable depth. Each marks the site of one of the embryological gill clefts, evidence of the elasmobranch stock from which the body has



Lipoma.

Sub-mental adenitis.

been evolved (see in this connection reference, in the section dealing with hare-lip, to the mucous crypts of the lower lip).

These gill clefts may be present as fistulæ leading through to the pharynx, or may persist as pharyngeal pouches or as branchio-genetic cysts, but most usually they show on the surface of the neck as the tiny sinuses first mentioned.

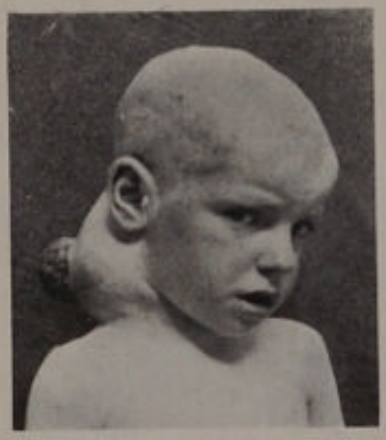
Lymphangiomata are discussed elsewhere; *lipomata*, fairly common tumours in the adult, are seldom seen in childhood.

A malignant tumour of the neck, a *sarcoma*, occasionally arises, but its source and site of origin are not constant.

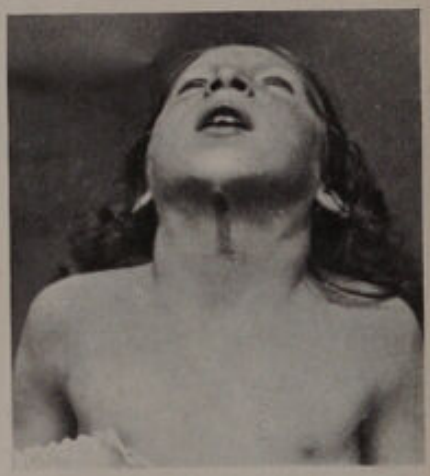
Tumours of the *carotid body* are seldom found.

Ludwig's *angina* is an acute infective condition exhibiting great brawny induration of the neck. The source of infection is usually the mouth, and amongst the many organisms found in it a predominant one is Vincent's *spirillum*.

A middle line raphé of the neck is a rarity.



Sarcoma of neck.

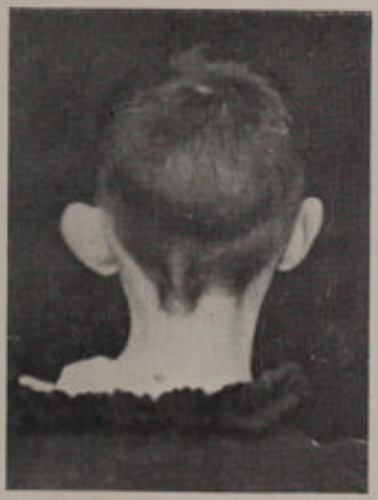


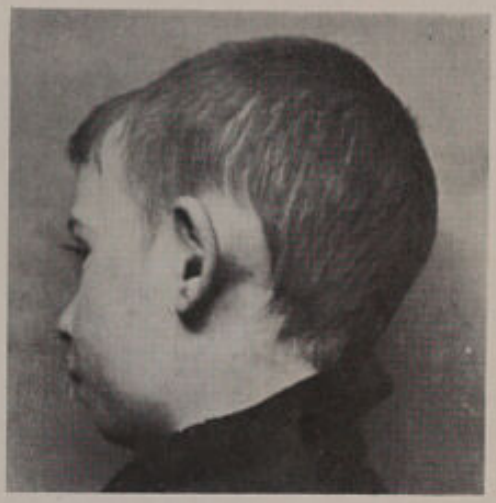
Mid-line raphé.

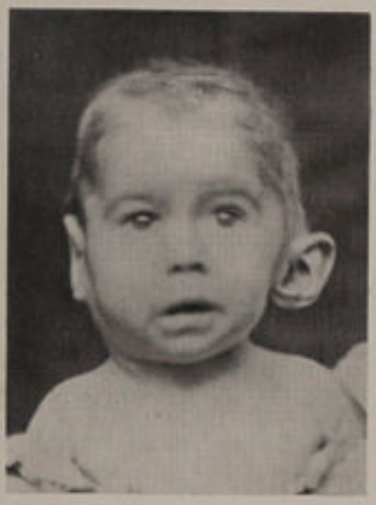
CHAPTER VI.

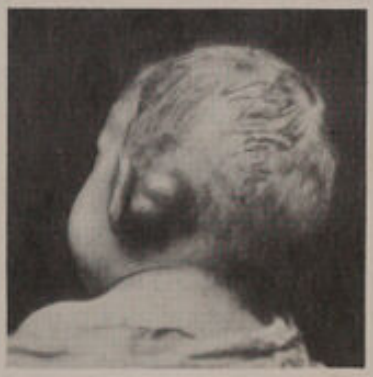
ON MASTOID DISEASE.

Mastoid disease is common in infancy and childhood and, as one would expect from the developmental state of the temporal bone, the cases are complicated, and altogether the









disease is a serious one. Involvement of the facial nerve during the course of the disease is much more often seen than in adults, and the avoidance of injury to this nerve is a matter

requiring great care during operation. Many cases of unsuspected mastoid disease are discovered *post-mortem* in cases of marasmic babes dying from gastro-enteritis.

Early exploration should be carried out in suspected febrile cases showing tenderness behind the ear, but the diagnosis is usually obvious when the child arrives at hospital. The operation, once one is familiar with the small area involved, and the danger spots, is easy, and can generally be performed with a small *Volkmann's spoon*. In the long-standing cases much actual necrosis of bone may have taken

place, and where there are sequestra one must move with the utmost care.

The sclerosed mastoid is found in older children.

Meningitis, brain abscess, and sinus thrombosis are quite common, and the rarer Bezold's mastoid and the zygomatic type are probably more common than in adult life. Where lumbar puncture proves the existence of a widespread meningitis, the prognosis is very bad, though aspiration at the cysterna magna and the injection of sera there may hold forth some little hope. The diagnosis and treatment of brain abscess and of sinus thrombosis follow the same lines as in the adult, the track to the lesion being always traced from the infected mastoid cells.

A good light is absolutely necessary for safe operating.

Since the path through the soft meatus is very narrow, the problem of getting proper packing of the cavity after closure

of the posterior wound, is solved by sacrificing the posterior three-quarters of the meatus, carrying the curved incision well back so as to remove enough tissue to enable one to put a finger easily through the opening thus made. The procedure looks too drastic, but it serves its purpose admirably and the wound soon cicatrises down to the size of the normal meatus; resulting deformity of the auricle is hardly noticeable. This secondary plastic operation is, of course, not carried out till the third or fourth dressing, when the acute stage of the infection has passed off and the wound is beginning to granulate. The cases are dressed with Bipp or P.S.F.

The conditions most frequently mistaken for mastoid disease are, intertrigo, eczema of the scalp, and meatal furunculosis, which all lead to post-auricular adenitis and abscess. In these cases, however, the suppuration is above the periosteum and the ear is pushed forward rather than out from the skull.

There should be no difficulty in differentiating dermoid cysts or post-auricular lipomata and, too, the congenitally outstanding auricle.

Neuritis and associated angio-neurotic œdema have not been met with in childhood.

CHAPTER VII.

ON TONSILS, ADENOIDS, AND ASSOCIATED INFECTIONS.

The removal of enlarged tonsils and adenoids falls so often to the general surgeon as a first step in the treatment of enlargement of glands in the neck that he must become an expert at dealing with them. Enucleation with a rigid right-angled *Heath's tonsillitome* can be guaranteed sufficiently often to make unattractive to the surgeon any other method which necessitates a prolonged anæsthesia and converts a minor into a major operation. If the anæsthesia is satisfactory and sufficiently deep to give the surgeon one minute's relaxation, both tonsils can be enucleated and the adenoids can also be removed in that space of time. Here, as so often in this realm of surgical work, the anæsthetic is practically the whole problem, and the advantage of men working in close association who perfectly understand one another's point of view, is apparent. Chloroform is the ideal anæsthetic for the purpose, but requires to be administered by an expert.

Apart from the use of ethyl chloride or ethyl bromide, when the case is treated in the sitting posture and a quick recovery takes place, if a general anæsthetic is given the head must be kept at a lower level than the body, the naso-pharynx must be kept free of blood, and as soon as the operation is over the child must be rolled round into the prone position and the head held over a basin of cold water whilst the face is sponged. The water must be cold, so as to stimulate deep breathing; and so long as the head is kept lower than the rest of the body there will be no danger of insufflation, of blood, or of fragments of tissue, which might cause pneumonia. The child may be wakened up soon, and encouraged to cough by being made to inhale some ammonia.

Insufflation pneumonia may not show definitely for two weeks or more after the removal of the tonsils, and it is difficult sometimes to prove the association, but a candid view of the matter suggests that pneumonia which goes on to empyema, coming two or three weeks after the operation for removal of the tonsils, has usually had its origin at the time of operation. It is suggestive, too, that the course of the illness is often atypical, the infection a mixed one, and the discharge foul-smelling.

The surgeon meets these cases, though the specialist may not think they occur.

The use of the *La Force adenotome* has made the removal of adenoids an operation of precision, very different from the ragged results frequently obtained when the old *Gottstein's* instrument was used inexpertly.

A day or two in bed is always recommended after the operation, and obviates risks which are too common when these cases are treated as out-patients. It is seldom, indeed, that the enucleation operation is followed by a hæmorrhage of any significance. It must, if it does occur, be so treated as to stop the hæmorrhage at once; an anæsthetic should be administered, and the bleeding point cauterised or picked up and ligated. Alternatively the pillars may be sutured together; and this must be done long before loss of blood endangers the child's life. By all means make use of styptics and sera, but get ready to act at once before a calamity occurs through hesitation and delay.

Peri-tonsillar abscess and acute post-pharyngeal abscess may be associated with tonsillitis, and are dealt with by means of a guarded scalpel with the child anæsthetised and placed in a well-inverted posture so that any unexpected gush of pus may run up into the naso-pharynx and out of the nostrils and mouth, thus minimising the chance of insufflation which is a real danger in these cases, as there is usually far more pus present than the operator expects till he becomes familiar with the condition. These cases are dangerous anæsthetic risks.

"Cold abscess," a retropharyngeal collection of tuberculous *débris* arising from a gland or from caries of a cervical vertebra, may, if overlooked, be seen when acute symptoms

arise, but it must be most clearly differentiated then, and in its earlier stages, for on no account should it be opened from the mouth, but must be approached and evacuated by an incision made at the posterior border of the sterno-mastoid muscle. At this point it is necessary to incise only one layer of the deep cervical fascia to get into the prevertebral space, and in this connection the anatomy of the cervical fascia must be kept in mind.

CHAPTER VIII.

ON LYMPHATIC GLANDS.

The first thought of the student on examining a case of enlargement of any of the lymphatic glands should be—Where is the primary lesion? since, except in rare cases, of Hodgkin's disease, of primary sarcoma of the lymphatic glands, and of some blood infections (glandular fever), enlargement of glands is generally secondary to a surface lesion or to some primary malignant growth.

A knowledge of the lymphatic drainage areas from skin and mucous surfaces into their appropriate glands ought to be acquired by the student. He should know the pre-auricular and post-auricular glands, the tonsillar, submaxillary and submental groups, the posterior triangle, the anterior triangle, and the supra-clavicular glands, and also that in the supra-sternal notch a gland is at times found.

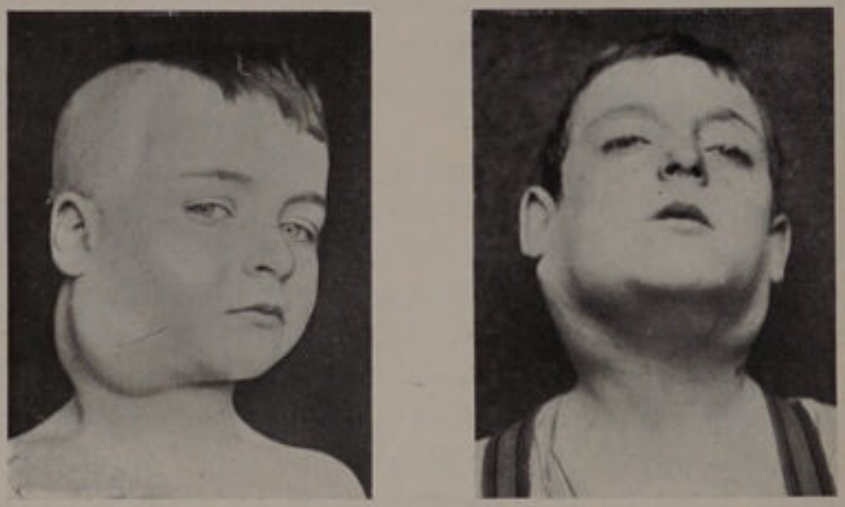
The axillary glands and their significance in breast conditions he must be familiar with, and he must not overlook the cubital gland above the internal epicondyle, which is traditionally more often associated with syphilitic or tuberculous disease than with pyogenic infections. The inguinal, the femoral, and the popliteal glands must be kept in mind, and also the fact that an infection of the glands may be associated with a very insignificant and it may be an almost healed lesion, and that it may slip past one group of glands and come to a head, form an abscess, in a higher chain of glands, *e.g.*, a lumbar abscess deriving from a septic sore about the knee. Buttock lesions, perineal and scrotal lesions, drain into the inguinal glands, but testicular lesions are drained into the lumbar glands.

The mesenteric glands become infected from lesions of the mucous membrane of the alimentary tract.

The lesions which the surgeon most commonly deals with in children are the pyogenic and the tuberculous ones.

As regards the pyogenic ones—rest, hot antiseptic fomentations, and properly made, safely placed, early incisions with adequate drainage soon lead to their subsidence. *Hilton's method* must be remembered in this connection, but too sharp pointed a pair of forceps must not be used in near proximity to any large vessel; it would be well to teach the routine use of dressing forceps rather than sinus forceps for this method.

Incisions in the neck should be made as small as possible, and every endeavour should be made to leave an invisible scar. In pyogenic lesions little more than a puncture in the skin



Encapsuled glands.

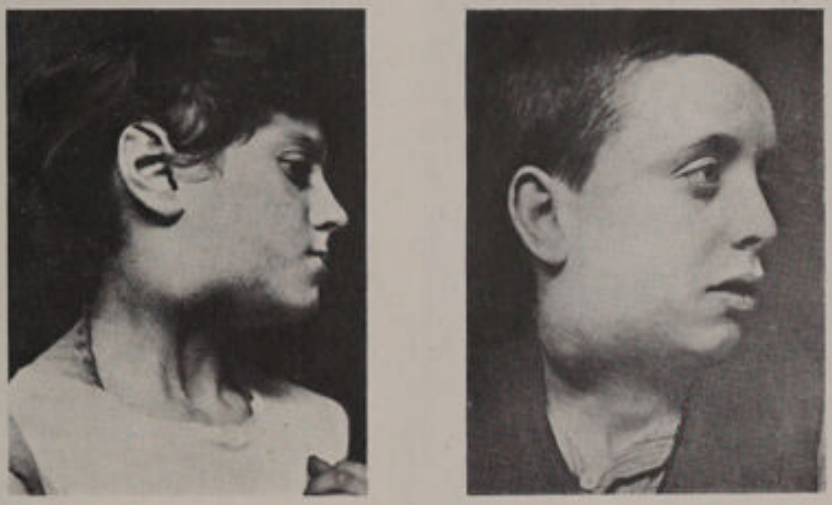
should be required, and this should be placed in one of the transverse creases of the neck.

The problem of the surgical treatment of tuberculous glands of the neck is one which has given much concern in the past, and it is still one which requires special attention, though fortunately the number of cases requiring treatment has vastly decreased in the last twenty years, thanks to the care and attention given to the school children in the dental and throat clinics. Without entering into the vexed question of the slaughter of the tonsil, it seems undoubtedly the case that the adequate or more than adequate attention that has been given to the question of *tonsils* and *adenoids* of late years has been associated with the great decrease in the number of cases of *tuberculous glands* seen in hospital and in private.

Parents are most desirous of avoiding a scar in a child's neck, and when one is familiar with the results of untreated or of badly treated cases, one has no doubt that there is still, in spite of the acknowledged and accepted general rule that operative procedure should be avoided in tuberculous cases, a very definite place in surgical work for these cases.

No case should be operated on unless the nasopharynx and the teeth have had proper attention.

The removal of an infected gland complete and without spilling of any infected softened *débris* is comparable to an amputation, and is therefore a reasonable surgical procedure likely to benefit the patient. The attempt at excision of the gland must be carried out before the infection has come

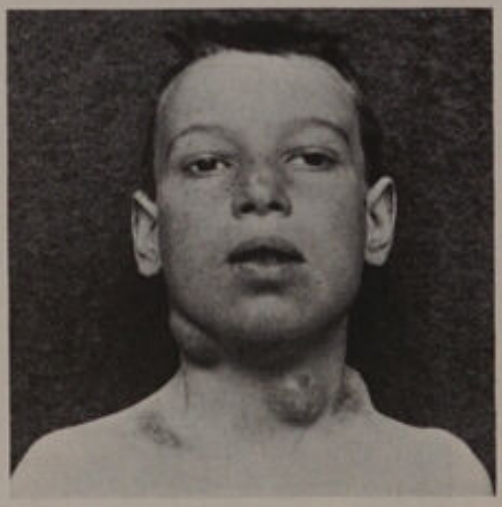


Softening glands.

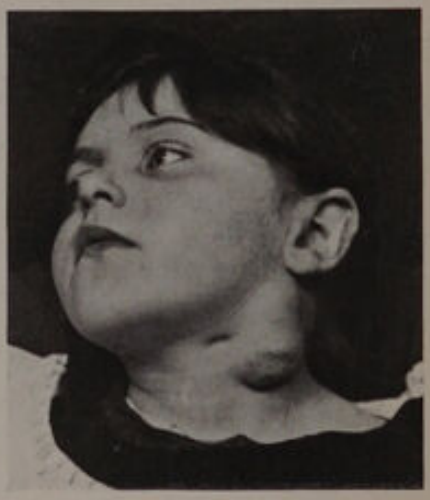
through the capsule of the gland, before there is any sign of attachment of the gland to the deep fascia, and before there is the least suspicion of reddening of the skin. An attempt at excision of a gland in an advanced state of softening will inevitably lead to soiling of the wound with infected *débris*. The line of suture of the platysma muscle fibres ought not to be immediately beneath the line of the skin wound. In making the wound through the platysma this should be kept in mind, and thus one is able to avoid the nasty puckering and depression which sometimes follow an excision of glands and may require a further plastic operation.

Where the gland is too soft when first seen to permit of the ideal excision, it must be kept under careful observation

till it has become attached through the deep fascia to the platysma, and then it should be evacuated through a small puncture wound, all the tuberculous material being gently removed with a Volkmann's spoon from within the still intact capsule. All rough curettage must be avoided lest it lead to damage of the vessels and dissemination of infected material by the blood stream. Bipp or some iodoform crystals may be packed into the sinus, and the wound should be dressed with a spirit dressing till all discharge has ceased; this may take a good many weeks, and maybe months, but good healing and a nice scar will result in time, if the proper dressing is persistently carried out and mixed infection avoided;



"Shirt-stud" abscesses.

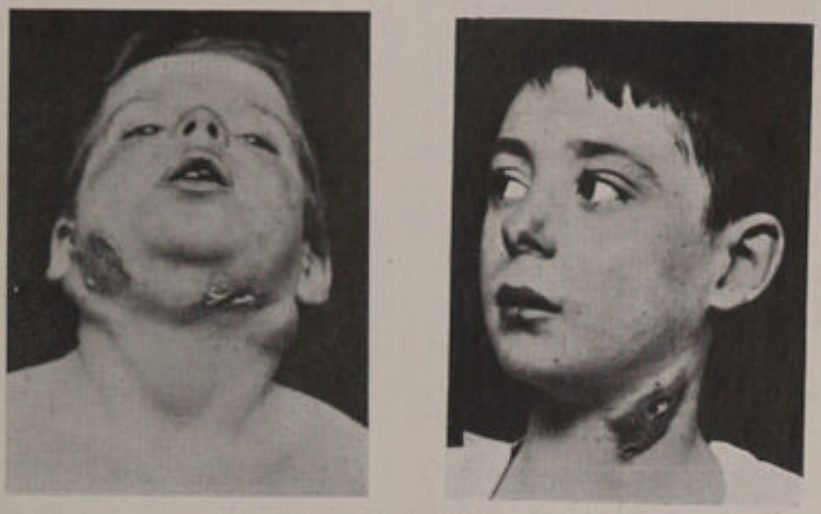


Skin involved.

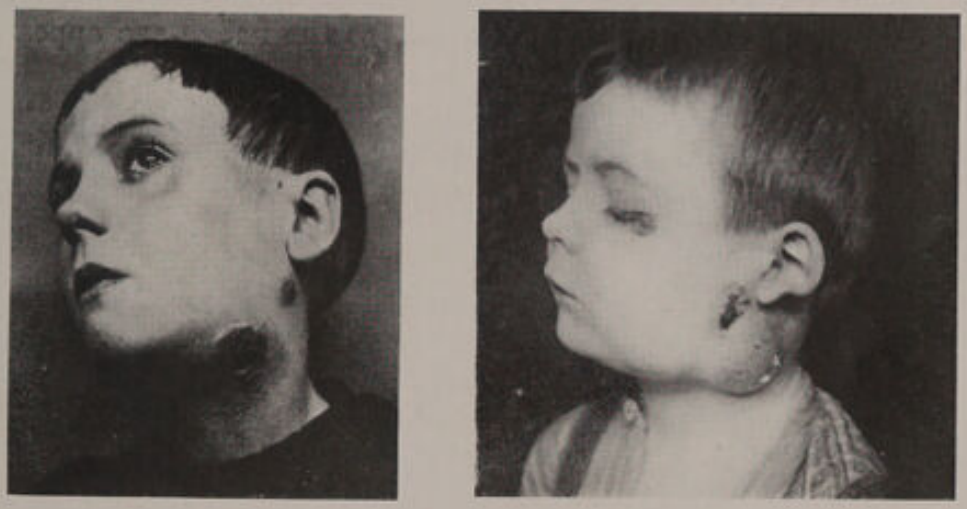
this will as certainly occur if the patient resorts to the use of the abominable pink lint and G.P.T. wet dressing instead of getting a supply of properly sterilised material from some hospital or nursing home. Students should know that sterile material can always be so obtained when they go into general practice, and learn early the vital importance or not producing a mixed infection in a tuberculous case, and, indeed, in any case, unless it is purposely done as a therapeutic measure.

The more advanced stage in which the deep fascia has been perforated and a subcutaneous abscess exists, is the difficult case so far as getting a pretty scar is concerned. The skin is undermined and involved in the tuberculous process, bluish in colour, and friable to an extent which makes its recovery and usefulness very unlikely. One must realise that the

subcutaneous abscess communicates through a small opening in the deep fascia with the softened *débris* inside the broken-down gland, it may be with its capsule almost intact. It is therefore a bilocular abscess of the shirt-stud type, and cannot be properly dealt with by simple incision of the surface abscess; this will result in an interminable discharging sinus,



Cases of skin involvement.



Neglected cases.

a danger to everyone around. The opening in the deep fascia must be sought for, must be enlarged, and all that remains of the gland and its capsule must be carefully removed. Such glands are usually found closely adherent to the jugular vein, and on no account should a rubber drainage tube be used in

the wound, since in a very short time that may cause ulceration of the vein and lead to a sudden and fatal hæmorrhage. Packing of the wound with a wisp of gauze smeared with Bipp or P.F.S. is made use of, and in these cases the skin may require to be undercut to take the place of the diseased skin which has been excised.

When, too, in an attempted excision, there is spilling of infective material, the wound is washed out with some antiseptic lotion before being sutured and drained with a wisp of gauze.

The terribly deforming " Z "-shaped incisions of the type used in malignant cases, where an attempt is being made at a block dissection of the whole lymphatic field, are not justifiable in tuberculous cases. Lots of room can be got with a transverse or an oblique incision placed in the most suitable fold in the neck. The low-placed incision of Treves is at times useful, but the method of Dollinger has not many advocates.

At times, in an early stage of the condition, one may have suspicion aroused that the case is really one of Hodgkin's disease (lymphadenoma) by the extreme easiness with which the glands are shelled out. A histological examination should, of course, be made in all such cases, as the naked-eye appearances are not conclusive.

Unwise excision of large groups of infected glands, in the groin especially, may subsequently lead to marked pseudo-elephantiasis of the affected limb.

CHAPTER IX.

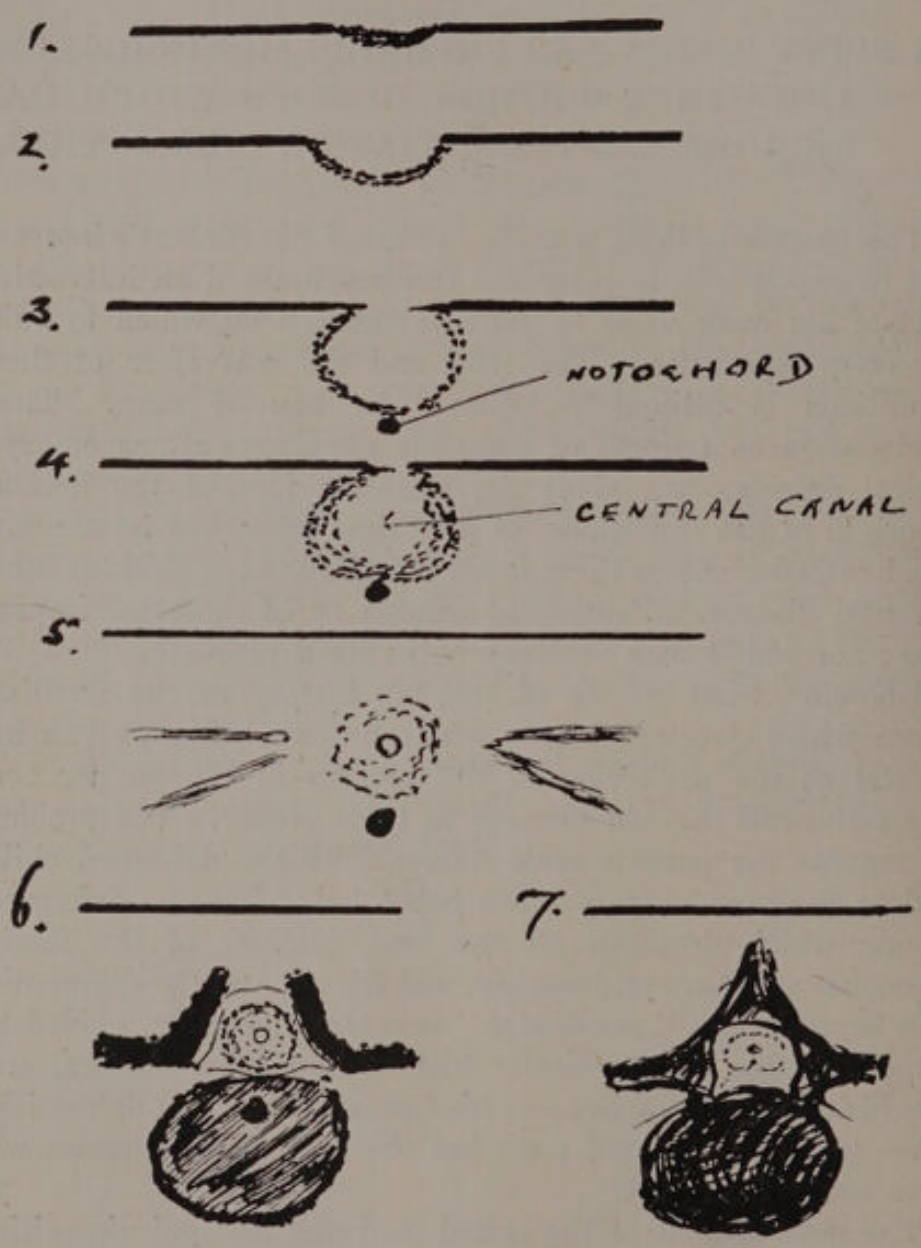
ON SPINA BIFIDA AND CEPHALIC MENINGOCELES AND OTHER COMMON LESIONS WHICH MAY REQUIRE DIFFERENTIATION FROM THEM.

The purpose of these notes is to engage the student's interest, and to enable him to grasp the fundamentals of an interesting part of his work so as to get a foundation on which to build his own experience. The *why* and the *wherefore* of these conditions is ultimately beyond the ken of man. Their explanation as failures of complete development, as embryological defects, &c., gives the scientific idea of the manner of origin of the conditions, of *how* they arise, but no accumulated evidence shows them to be the effects of syphilis or other parental disease, of antenatal trauma or of maternal impression; nor would such evidence be in itself ultimate.

Knowing what we do of the life history of the fertilised ovum which develops into a whole human babe, we can but marvel at the perfection of the process in the 99 per cent and commend the odd number to their *Maker*. The problem as regards the parents with reference to the deformed child, and to the possibility of other babes being born so deformed, is one which demands all the best qualities of the family physician as guide, philosopher, and friend, and the differentiation between the " accidental " and the inevitable, guided by his knowledge of the family history and other factors, will test his skill as a prophet and his humanity. When deformities cease to be perpetuated none but the orthopædic surgeon will have cause for regret.

The development of the spinal cord and its final disposition inside the spinal canal of the vertebral column, enveloped by the muscles and far away from the surface from which it was at first differentiated is an antenatal operation necessitating the making and the healing of a huge wound. Nature's

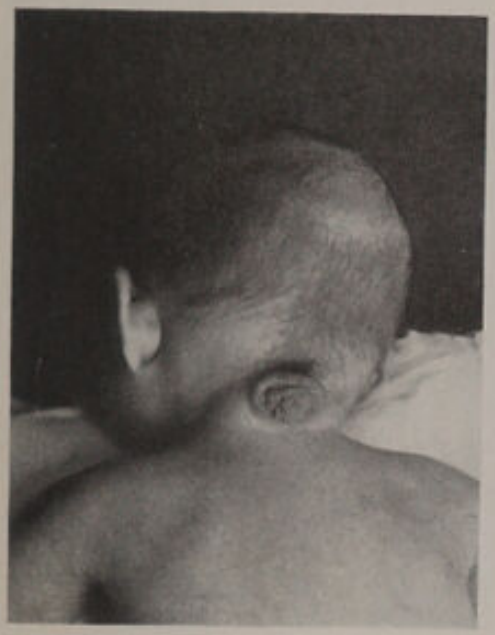
wounds are made and healed so perfectly that it is hard to believe in them as a normal process, and only the abnormal case served as an indicator till the science of *embryology* presented a clear picture.



A simple pictorial representation indicates the process of development of the cord, and enables us to visualise how the different types of *spina bifida* may arise at different stages of development.

Spina bifida may be defined as a lesion of the mid-posterior line of the body showing usually as a tumour and arising as the result of some error in the process of development of the spinal cord, its coverings and surrounding tissues, the cause of the error being still unknown.

Whether the deformity is indicative always of some *epiblastic* lesion, or whether it may arise from a failure of development in the surrounding *mesoblastic* tissue, has been much discussed. The latter explanation may suffice for the simple localised meningocele, but probably in the majority of cases



Cervical meningocele.

Cervical myelocele.

there has been a lesion in the more important tissue. Œdema of the fœtal tissues and excessive production of cerebro-spinal fluid have been given as explanatory of the more complicated cases, especially those associated with *hydrocephalus*.

When the defect is gross, and involves a length of the spine, it shows as an open gutter. One looks into what should be the central canal of the cord, only it has never been closed over. No surface coverings are developed. A probe can be passed along the canal if it is properly formed at a higher or a lower level.

This type of case is most commonly found in the thoracic

region, where earliest closure normally takes place, is not common, and is incompatible with life. It is often associated with head deformities and the error has arisen early in embryonic life. Such cases as are born alive cannot survive long; they have no surgical interest.

From this grave type all grades of severity of the condition down to the simple pedunculated, uncomplicated, small meningocele are met with and are described according to their site, their physical and their pathological condition, *e.g.*, sessile, translucent, ulcerated, leaking, &c. The condition is met with at any part of the spine, and so cases are designated *cervical*,

Thoracic syringo-myelocele.

Lumbo-sacral myelocele.

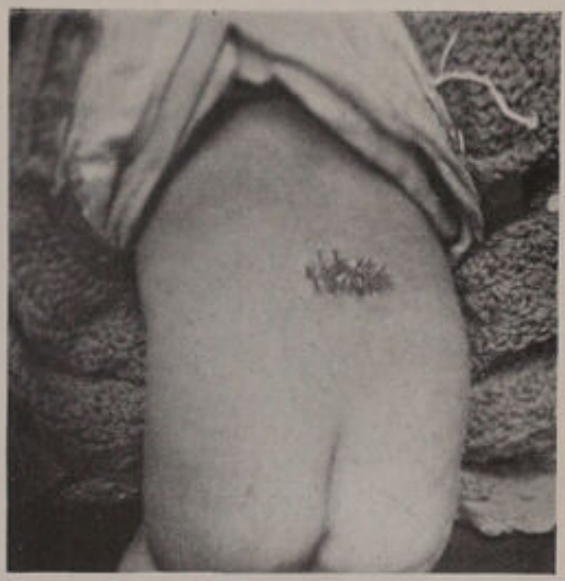
thoracic, *lumbar*, *sacral*, according to the site of origin. The *lumbar* and *lumbo-sacral* are the most common; developmentally this is the latest part of the spine to be completely healed. The *thoracic* type is the rarest and most serious type; here closure ought to have taken place at the earliest date.

Spina bifida occulta.—This term is used to describe the case where a defect occurs without the usual surface tumour. The condition is demonstrated nowadays by the help of the *x*-rays where a suspicion has arisen (1) owing to the presence of some nerve symptoms for which no peripheral nerve lesion can be found. Suspect *spina bifida occulta* in cases of " congenital "

club-foot with trophic sores or other nerve lesions; (2) owing to the presence of a *nævus*, *mole*, *dimple*, or *tuft of hair* over the spinal column. Sometimes the tuft of hair is very slight; in other cases it may have been developed till it appears like a tail or mane. Such cases have been exhibited at freak shows.

Lateral spina bifida results from the non-development of *one* of the laminæ of the vertebral spine. Naturally a lateral thrust is given to the protruding structures, and they come to lie

Ulcerated complicated spina bifida.



Spina bifida occulta.

sometimes fairly far out from the middle line. The differential diagnosis is interesting.

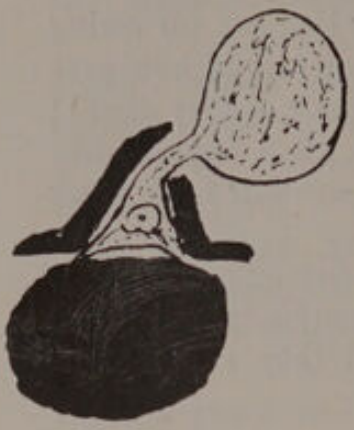
These localising and descriptive terms are usually supplemented by a more important classification which depends on the actual contents of the swelling.

Meningoceles, unilocular or multilocular, contain cerebro-spinal fluid alone in the sac.

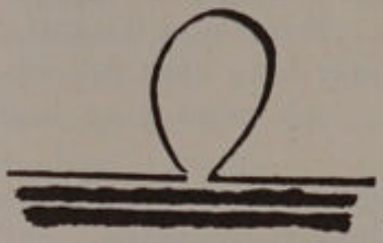
Myeloceles contain, in addition, some nerve tissue, cord, or spinal nerves.

Syringo-myeloceles—In these cases a distended central canal of the cord is the essential lesion.

A reference to the diagrams makes further explanation of the terms unnecessary, and little consideration is required to

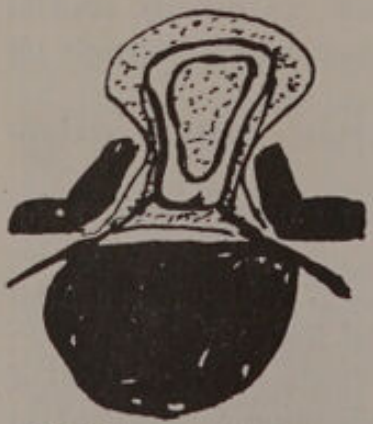


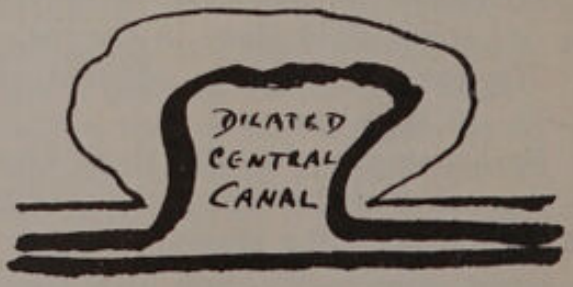
LATERAL SPINA BIFIDA



MENINGOCELE

MYELOCELE



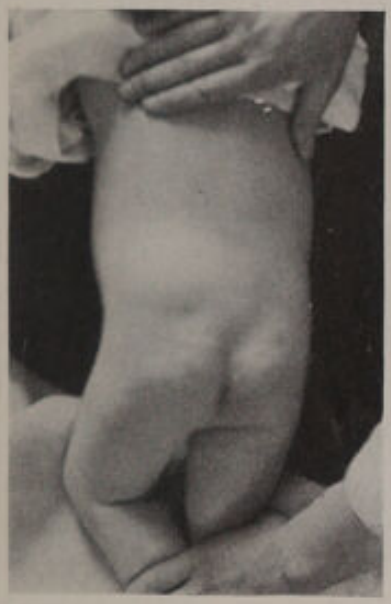


SYRINGO MYELOCELE

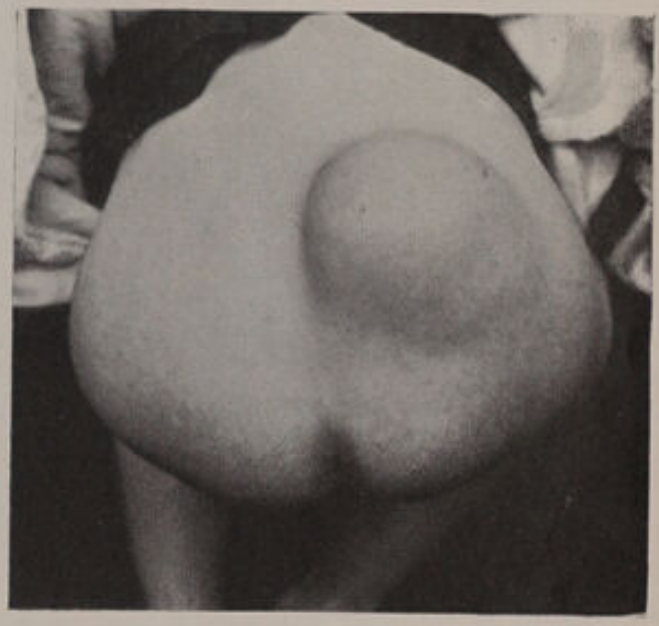
show which cases are suitable for operation and which cases are " inoperable " in so far as they are little likely to benefit from any interference.

Generally speaking, the simple meningoceles covered with skin of good quality, are alone those in which one is justified in giving a hopeful prognosis as regards operation. The operation consists in ligation and suture of the exposed pedicle, with excision of the sac and its contents. The stump of the pedicle is buried beneath flaps derived from the fascia of the erector spinæ muscles. Further procedures, such as bone grafting, are usually quite unnecessary in hopeful cases.

Operations on myeloceles and syringo-myeloceles with com-



Lateral spina bifida.



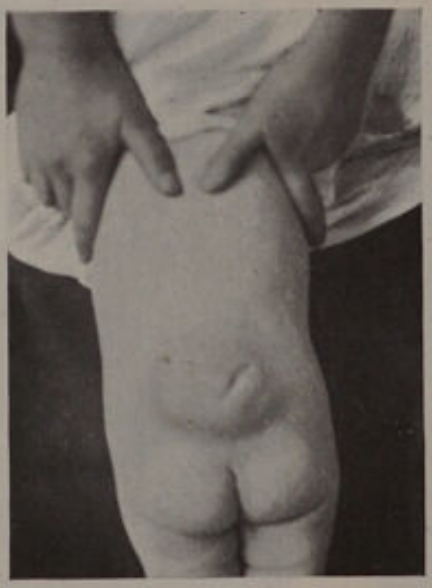
Lateral spina bifida.

plications, such as hydrocephalus, talipes, peripheral paralysis, loss of sphincter control, &c., are outwith the field of decent surgery. What to do with these unfortunate babes is a problem that has yet to be faced and solved. They cannot be kept indefinitely in general hospitals. The Parish Council hospitals have in the past been their only refuge where the home conditions did not allow of them being properly attended to. Attempt at operation is usually, if the baby survives, quickly followed by the development of hydrocephalus, for which little can be done with any prospect of benefit to the child.

Ulceration of the surface coverings and *leaking of cerebro-*

spinal fluid are clear contra-indications to operation, and the usual sessile semi-translucent lumbo-sacral type should be treated by cleanliness and antiseptic ointments rather than by operation. The use of *x*-rays, violet rays, and other similar therapeutic measures may be justified as placebos; they are not so dangerous as the injection of *Morton's fluid*, an uncontrolled and obsolete procedure.

The method described by Mr. Dott and Professor Fraser of injecting oxygen into the sac after withdrawing the cerebro-spinal fluid, as a preliminary to having the part *x*-rayed, is a prognostic refinement of limited usefulness.



Lipoma with dimple covering spina bifida.

The *differential diagnosis* has to be made from *dermoids*, *cephalic* (occipital) *meningoceles*, *nævi* (a port-wine stain over a meningocele is a common occurrence), *lipomata*, *cold abscesses*, *teratomata*, *neurenteric canal cysts*, *chordomata*.

Careful examination with reference to deep attachments, story of appearance and rate of growth, rectal examination and *x*-ray photographs will clear up any case which is not easily diagnosed.

Tumours in the sacral region have often a well-marked dimple on the surface, which connects by a strong fibrous cord with a small deep meningocele. The mass of the tumour

consists of fatty tissue, and such cases of *lipomata* covering a deep-seated meningocele are not to be diagnosed as *teratomata* or *dermoids* till the presence of other tissues or organs and the absence of a meningocele show the true nature of the case.

A *teratoma* is a blasted ovum, and differs from a dermoid in that its tissues show an attempt at organ formation, *e.g.*, not only bone but *a* bone, it may be a clavicle, or a scapula, may be found.

Cysts at the extreme end of the spine may, by the lining membrane, show their derivation from bowel, while fæcal

Complicated spina bifida.

Neurenteric cyst.

fistulæ in this site equally clearly show that the case is one derived from a *neurenteric canal*.

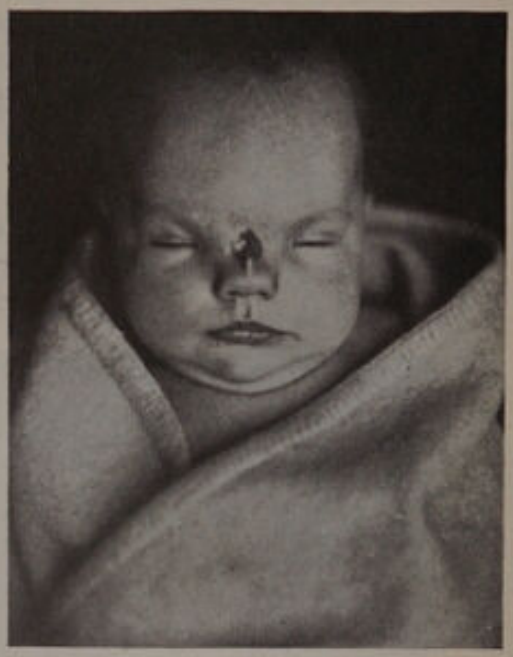
Chordomata are rare tumours derived from relics of the *notochord*, and are most likely to be looked on as sarcomata.

Cephalic meningoceles are less common than spinal ones, and apart from those occurring in the occipital region, the only common type, and those at the base of the nose, others may be looked on as rarities, and the diagnosis be queried in any given case.

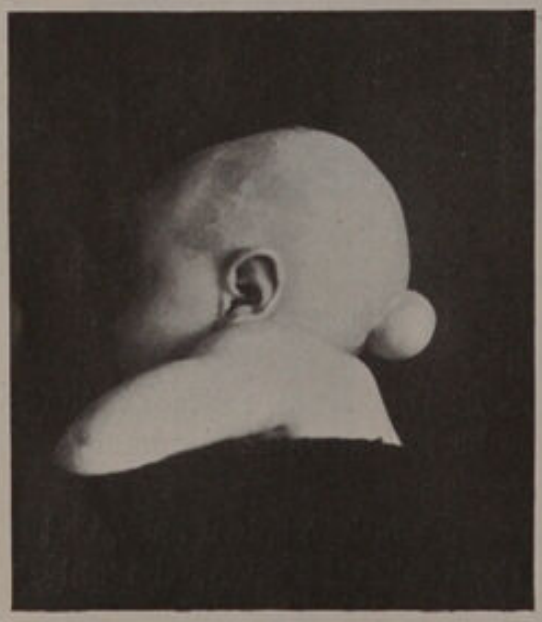
The condition may be a simple pedunculated meningocele appearing through a tiny aperture in the central, last ossified,

part of the occipital bone, and easily remediable by operation, or it may be a huge myelocele containing the greater part

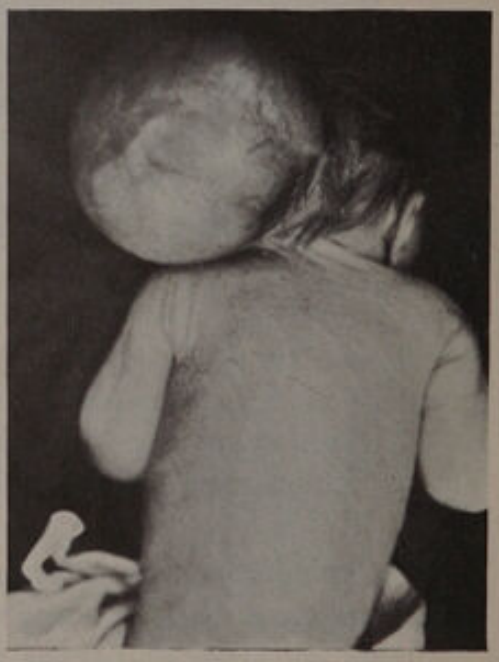
Nasal meningo-myelocele.



Nasal meningocele.



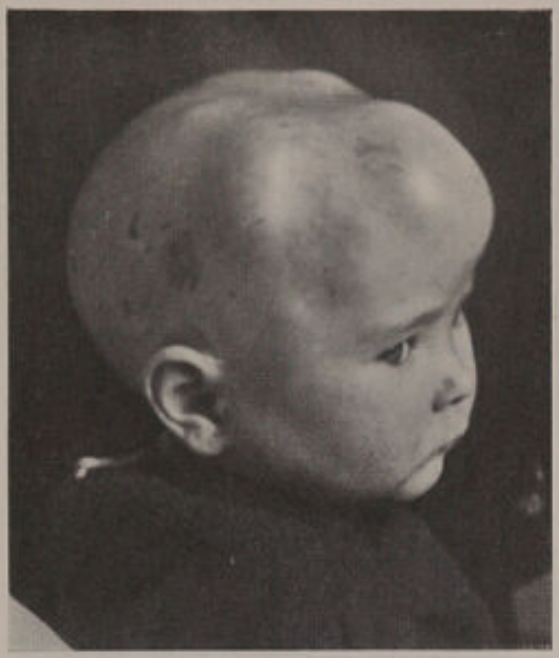
Occipital meningocele.



Occipital myelocele.

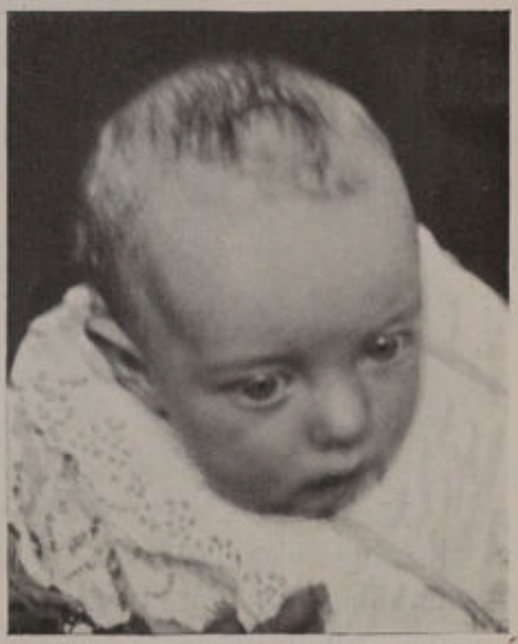
of the cerebellum or some other portion of brain tissue and forming a larger mass than the actual head. Such cases do not present any field for surgery.

The differential diagnoses from *dermoids*, *cephalhæmatoma*, *rachitic bosses*, *gummata*, *neoplasms* (secondary renal or



Secondary tumours. (Primary renal sarcoma.)

(?) Dermoid mid line.



Vertex dermoid.

mixed parotid tumours), *nævi*, *pneumatoceles* and *traumatic cerebro-spinal collections* is important only so far as the first two are concerned in routine practice.

Dermoids.—The middle line dermoid must never be forgotten in making a diagnosis. That at the base of the nose is not uncommon. It shows no pulsation, no variation in tension, no reducibility, yet in a small, crying infant it is difficult to make a confident diagnosis, and if operation is undertaken the most rigorous technique is demanded, since a direct path to the meninges may be laid open when the diagnosis is wrong.

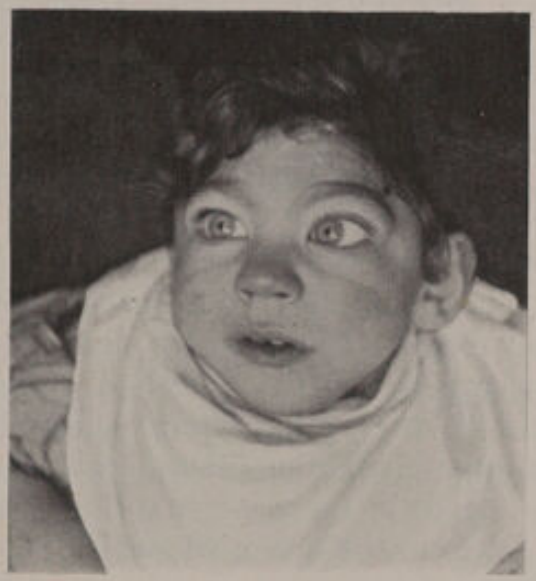
Mid line dermoids in the regions of the fontanelles and elsewhere on the dome of the skull are not common. The possibility of the dermoid being bilocular, part outside and part inside the skull, must be kept in mind when operation is being prepared for.

Cephalhæmatoma.

Many cases of *cephalhæmatoma* are at first mistaken for meningoceles, and the young practitioner is not sufficiently familiar with the condition. The ordinary type is the *parietal* one, where the pericranium covering the postero-superior angle of the right parietal bone is lifted off the bone, and ruptured by a hæmorrhage occurring during the stress of labour, long continued (a + + caput succedaneum). A large outstanding swelling limited by the sutures of the bone appears, is often

mistaken for a meningocele, and causes the parents much distress.

The swelling is fluctuant, softer in its central part, and harder round the edges where bone cells lifted with the pericranium may begin to proliferate, and in the end may form a hard, bony ridge like the wall of a sheepfold if the fluid blood is not shortly withdrawn and the pericranium allowed to fall back into apposition with the bone. If therefore it is not quite clear within a week or ten days that the blood is being absorbed it is better to aspirate it off, dark, laked, and viscid, but not usually coagulated, and thus prevent the late appearance of a definite cranial irregularity or deformity which may later embarrass the possessor. The condition is purely extracranial. On this point the parents are often anxious, and may generally be confidently reassured. Aspiration may be necessary on more than one occasion before all the blood is got rid off; rarely, if clot be present, incision and curettage with a spoon may be necessary. Infection must not be allowed to occur.



Microcephalus.

It seems accepted now that operations on cases of *microcephalus* are little likely to benefit the patient. The idea that the removal of strips of skull parallel to the superior longitudinal sinus would allow of further brain development and

a restoration to normality has not been proved by the result of operation, and the view that the skull is commensurate with the brain and is not restricting its growth seems to be the true one.

The question with regard to the operative treatment of *hydrocephalus* is not yet clear. The reports, photographs, and demonstrations of cases " cured " by operation too often show the surgeon to be optimistic rather than hypercritical, and generally speaking, it may be said that no guarantee of cure, of restoration to the normal, can be given in these cases, and most of the operative results are frankly disappointing. The surgeon is asking too much of *Nature*.

There are two types of case—

1. The *congenital, non-obstructive* type;
2. The *acquired, obstructive* type.

Treatment by operation must be based on a clear understanding of this and after a demonstration of the type of case.

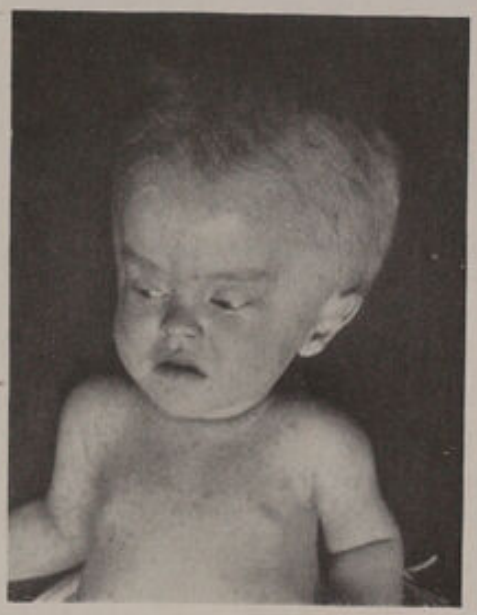
The differentiation of the type of case—by lumbar puncture following the injection into the ventricles of some coloured dye or other easily recognised agent and by the use of *x*-ray photographs of the ventricles after the cerebro-spinal fluid has been withdrawn from them and replaced by *oxygen*—gives an interest to these cases which so far the operative results have not equalled.

In the *congenital* type the cerebro-spinal fluid within the ventricles freely communicates with that outside the brain. These cases may result from an over-production of cerebro-spinal fluid; to correct this the operation of ligating one or both internal carotid arteries has often been carried out. The idea is to lessen the circulation in the choroid plexuses and so diminish the output of cerebro-spinal fluid. Constant good results are not got from the operation, which is too temptingly easy.

The fault in these cases may really be in the *absorbing mechanism* of the " third circulation." In such cases nothing short of the establishment of permanent drainage from the sub-dural space into a temporal fossa, or from the *spinal canal* into the retro-peritoneal space, will give hope of a cure. Such operations have been carried out.

In the *acquired* type the lesion develops in a previously normal brain as the result of some inflammatory exudation preventing the free flow of fluid from the ventricles to the extra cerebral spaces; dilatation of the ventricles naturally results. A beautiful demonstration of this type of case has been given by Mr. Dott, whose case of *unilateral hydrocephalus* resulting from blockage of the foramen of *Monro* was cured by the establishment of drainage into the other ventricle.

As a rule both ventricles are dilated, and the site of the blockage produced by the exudate is in the region of the roof



Hydrocephalus.

of the fourth ventricle. An operation to re-establish the normal channel of communication has been planned and carried out at times with benefit if not cure.

The other type of operation is to establish a flow of cerebro-spinal fluid directly from a ventricle through the cerebral cortex, sensory area, to the sub-dural or sub-temporal fascial space. This procedure is much simpler than the other, and in some cases associated with fits has led to great benefit in the child's condition.

Repeated lumbar puncture is not likely to effect a cure in any case, and is not appropriate, of course, in the acquired type of case.

Birth fracture. "Spoon-shaped" depression.

The bones of the vault of the skull are laid down in membrane, not cartilage, before ossification. Whilst linear fracture is quite common in cases of indirect violence, the result of direct violence may be to produce an indentation of the skull, a sort of greenstick fracture where the violence has been suddenly applied, but shown classically in the birth depression fracture or spoon-shaped depression where long-continued pressure by projecting bone in cases of pelvic deformity, during labour, results in the babe being born with a typical lesion of the skull. The membranous skull has slowly given way whilst slipping past the projecting bone, and there is little likelihood that there will be any damage done to the brain.

In minor degrees of the condition operation is not required. Sometimes by manual compression, carried out immediately after birth, the depressed portion may be sprung back into correct alignment, just as may be demonstrated with an indented tin biscuit box.

At a later date operation is necessary to correct the deformity if that be considered advisable. The parents often insist on it, fearing that the deformity will be permanent.

Trephining out a large disc of bone including the depression is a method which looks better on paper than it proves to be

at operation. The idea is to replace the disc reversed so that the depression will then project, but the thinness of the bone and the irregularity of the ossification make the removal of the disc without damage to the *dura mater* almost impossible of performance, and it is much safer to adopt a simpler method. If over the edge of the depression an opening be made with a gouge, and then enlarged with nibbling forceps, one blade of a special pair of broad-bladed, round-ended " tong " forceps may be safely introduced between the dura mater and the skull which, now seized between the two blades of the forceps, can be lifted and levered into an approximately correct position. Fracture may occur during the process, but this is of no importance.

Novocaine and adrenaline infiltration of the line of incision, which is kept as far as possible within the hair line, will prevent too great loss of blood from the scalp, a danger which may quickly jeopardise a babe's life, and which must be carefully guarded against. The result of the operation is usually most satisfactory.

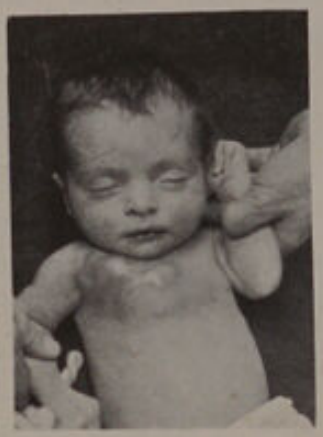
CHAPTER X.

ON CHEST LESIONS.

Thoracic Conditions.

Acute mastitis is not uncommon in infancy, and results from infection after the displacement of the protecting duct plugs as the result of ignorant midwives and others manipulating and squeezing the breast—following some foolish tradition.

It may become a widespread cellulitis, endangering life,



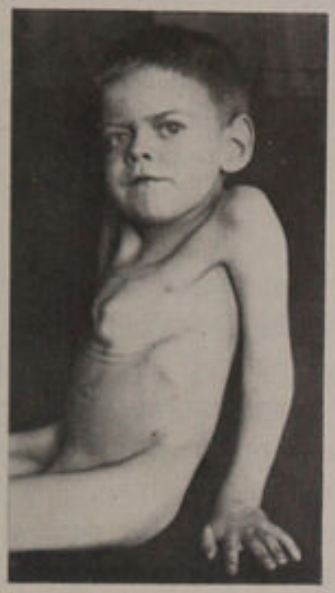
and requiring active surgical treatment—free incisions with antiseptic dressings.

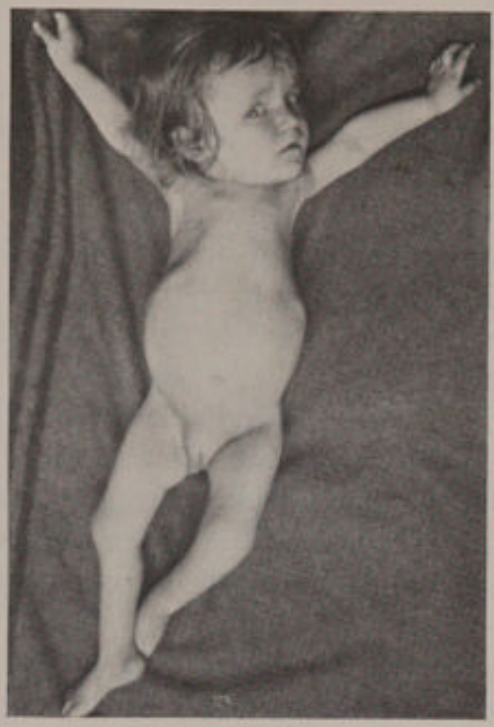
Subacute mastitis is usually a physiological affair discovered unexpectedly by anxious parents in both boys and girls, and causing them more distress than it does the child.

In the girl the explanation may be an early manifestation of a normal development of the breast, and so it requires no treatment; in the boy, reassurance to both parent and child, and the application of some simple placebo, is usually followed by an adjustment to normality.

The tuberculous submammary abscess coming usually from a rib lesion is the other type of "*breast abscess*" commonly met with in childhood.

Deformities of the chest wall, such as *pigeon breast* and





fiddle-shaped breast, are generally referred to the medical side. The rachitic rosary is illustrated elsewhere.

A bifid sternum is a rare lesion, and need not be associated with a cutaneous middle-line raphé, which indicates the line of one of Nature's great ante-natal wounds.

Empyema.

In *empyema* the old operation of free drainage through a fairly large drainage tube has not been replaced by any of the more modern methods, though most of these have been given a trial; all of them involve so much more special attention that they can hardly be adopted in routine hospital work when there is not an unlimited supply of special nurses.

The mortality in very young infants is of course high, but the high rate quickly falls when the child is over two or three years.

There is no parallel between these cases and the pneumothorax cases of war time, which began to be saved when the danger of the sucking wound was appreciated, and to adopt a more prolonged and complicated operation in debilitated toxic children, most of whom have recently been seriously ill with pneumonia, is contrary to common sense. If one appreciates the danger of an anæsthetic in these cases, the danger of the wrong posture in producing difficult breathing, the danger of a too sudden liberation of the fluid from the pleural cavity, so causing a swing back of the mediastinum and a sudden onset of cardiac embarrassment, and the necessity of quick operating so as to minimise the risks inherent in this type of case (for these are amongst the most frequent cases to die on the operating table), then it is safe to undertake the operation. But if anæsthetists and operators are not vividly alert to all this, then the operation is far from being a safe procedure, and itself adds greatly to the mortality rate. The use of paraldehyde in saline given per rectum plus local infiltration with novocaine forms an excellent and a safer substitute for general anæsthesia.

The removal of two inches of the second rib beneath the angle of the scapula when the arm is laid against the chest wall is preferred to removal of a piece of rib in the mid axillary line. Experience has proved that the drainage of the pleural cavity is better done thus. The use of a blow bottle to help the expansion of the lung after the operation is recommended when the immediate danger is over.

In cases of streptococcal infection, operation should be deferred till the effusion is definitely purulent.

CHAPTER XI.

ON THE COMMON ABDOMINAL CONDITIONS OF CHILDHOOD.

Appendicitis is not uncommon in infancy, and in later childhood is very often met with and more often missed. The day is not over yet when bellyache is considered a normal occurrence in a child, to be promptly treated by a dose of castor oil, hence the many catastrophes from lack of appreciation of the simple fact that *pain* is a warning signal and no treatment should be administered till the cause of the pain has been as clearly as possible ascertained. If pain in the belly is accompanied by sickness and vomiting and if there be a slight rise of temperature it is wrong to give the child a dose of opening medicine before a medical opinion has been obtained. The pain is usually referred to the umbilical region, and it must be ever kept in mind that the appendix in a child may never have reached the right iliac fossa and may be situated in the hypochondriac region. The appendix, too, in a child is often disproportionately long and can quite easily reach across to the left side of the abdomen; an appendix has been found in a hernia sac on the left side; so that pain and tenderness may be present anywhere but in the right iliac fossa and yet the cause of the trouble be in the vermiform appendix. As a rule, after a certain number of hours the pain and tenderness are most commonly referred to the right iliac fossa.

Since one is often unable to get any reliable information from the child, one has often to be guided by one's instinct built on past experience, and where a suspicion exists and is backed up by the presence of a leucocytosis it is a safer procedure to explore than to delay till the symptoms are obvious; for appendicitis in children is a much graver condition

than in adults, not only because of this difficulty in making an early diagnosis but because of certain other anatomical and physiological reasons. The pelvis in a child is shallow, and there is not, as later, a deep pouch into which the appendix may be safely tucked as so often happens in the adult. The omentum in a young child is very ill developed, is almost a fluid structure, and so the child lacks the protection of the "abdominal policeman." The whole peritoneal cavity is a small structure, and a generalised infection may quickly ensue. The toxic dose of the poisons manufactured in the inflamed appendix is in proportion to the body weight, and therefore is quickly arrived at in a small child. The appendix in a child may be as large as in an adult. One is not surprised then to learn that the operative mortality in appendicitis in childhood is much greater than in adult life, and, taken all over, it is probably not much under 10 per cent. One need not go so far as those who advocate the routine removal of the appendix as a precautionary measure, but where a genuine suspicion exists in the mind of a practitioner that a child has had trouble in the appendix there is little doubt that early operation will save lives which may be lost otherwise.

The lines of operation are as in the adult, but it is a more delicate affair, and the tissues must be handled with the greatest gentleness. The bowel is translucent in a child, and rough handling is not tolerated. If drainage is necessary it should be done with gauze; on no account should rubber drainage tubing be used, its presence will almost inevitably be followed by the formation of a fæcal fistula. The packing should be smeared with Bipp or with the paraffin, spirit, flavine preparation mentioned elsewhere, and it should be left in situ for four or five days; the first dressing will be malodourous, and there may be a fair amount of discharge, but the condition of the wound, which should thereafter be dressed daily and only packed in the parietes, will quickly become satisfactory.

The condition which is most frequently diagnosed as appendicitis and sent into hospital as an acute abdomen is an early right lobar pneumonia with, in all probability, some diaphragmatic pleurisy. The temperature in these cases is usually high, 102° or even higher, and the presence of so high a temperature is the first indication to make one pause and

reconsider the diagnosis. There are, of course, cases of appendicitis with a high temperature, but not usually in the first twenty-four hours; and one must also remember that concurrently with a lobar pneumonia there may be a pneumococcal peritonitis, so that the cases are undoubtedly difficult ones for the general practitioner to diagnose and to make a prompt decision as to the best line of treatment. The most valuable sign for him is the old pulse respiration ratio, and time spent in making certain as to this simple observation is well spent. To the surgeon who sees the case later, deep tenderness and the facial response which the patient makes to each attempt to elicit it constitutes the sign of the utmost importance. Experience alone enables the surgeon to differentiate between deep tenderness, true rigidity, and the abdominal tension so often present in a fretting child. As a rule, true rigidity is an indication that peritonitis is present. The temperature is not to be relied on, the presence of a leucocytosis is of no certain value, and in the absence of any history to suggest the possibility of an abdominal type of some specific fever, measles, scarlet, enteric, or phthisis, and also of any joint pains or petechial spots indicating rheumatism or scurvy, the case of pain in the right side of the abdomen tending to localise in the right iliac fossa and with a definite degree of tenderness there, must be very carefully watched from hour to hour if it is decided that for the present operation is to be withheld.

The late Dr. Brownlee held that a specific fever, *e.g.*, scarlet, was no contra-indication to operation if the surgeon was satisfied as to the diagnosis of appendicitis; and at its onset the abdominal type of one of the fevers may be very puzzling. On opening the abdomen one finds a certain amount of free fluid, an appendix which is no more injected than the rest of the intestine, and a very considerable increase in the number of the palpable glands in the mesentery; this is the feature of greatest significance, and it is the tenderness of these enlarging glands which gives the misleading abdominal symptoms.

The onset of menstruation may simulate appendicitis.

Renal and ureteral colic must not be overlooked.

It is, of course, fairly common to find enlarged tuberculous glands in the mesentery, and when these are most abundant

about the ileo-cæcal angle the inference is that in all likelihood the irritating focus is in the appendix, and an appendicectomy may produce relief from the abdominal discomfort.

There may be a definite tuberculous lesion at the region of the valve, and in these cases the line of treatment is to anastomose the lower part of the ileum into the transverse colon. One may cut the ileum across and so put the irritated part completely at rest. This operation has given most satisfactory results in many cases, and one has not been tempted to excise the ascending colon, as has been frequently advocated in this type of case. The rest given by the simpler operation evidently allows of Nature producing a cure of the disease, if not too far advanced.

Tuberculosis sometimes produces multiple strictures of the small intestine, giving a picture of subacute obstruction with acute exacerbations; and these cases also require to have the site or sites of the trouble treated by short circuiting.

It has long been held, though no convincing proof of the theory is easy to get, that a laparotomy in a case of generalised miliary abdominal tuberculosis leads to an improvement in the condition. Whether this is to be attributed to the evacuation of the fluid or to the aeration of the peritoneum, to auto-inoculation *via* the parietal wound, or to some factor not yet understood, one cannot say; most people have had a case which apparently did improve after laparotomy, but the result is by no means constant, and it is more generally agreed that, unless there is evidence of threatened obstruction, cases of widespread abdominal tuberculosis are not those for which great things may be expected after surgical exploration.

Occasionally an acute abdominal picture is presented by a case where a large mesenteric gland is quickly softening and threatening to burst. These glands are sometimes tuberculous glands, and at other times the infecting agent is an enterococcus. In both cases the treatment is to evacuate the softened content, with a minimum amount of spilling, and then enfold the capsule and bury it in the mesentery around. It is seldom possible to excise the gland, and the attempt may necessitate the removal of a length of bowel owing to damage to its blood supply.

Acute intestinal obstruction is most commonly caused in childhood by an intussusception. Strangulated hernia is quite

commonly met with; irreducible hernia is an everyday occurrence. Babes are born with a complete stricture of the intestinal track, and the presence of an attached Meckel's diverticulum may lead to a volvulus, or in the case of an unattached diverticulum to the formation of inflammatory bands which may produce kinks or twists after an attack of diverticulitis. The symptoms of acute intestinal obstruction which the alert practitioner recognises as danger signals calling for immediate operation if the patient's life is to be saved, are (1) recurrent attacks of colicky abdominal pain, (2) associated sickness, (3) a steadily rising pulse rate, and (4) small intestine succussion with or without visible peristalsis.

Classical symptoms are nowadays anathema, presenting as they do the picture of a neglected case which it is beyond the skill of most men to save by operation; to await them means a life thrown away which might easily have been saved if the early symptoms had been properly appreciated. Except in the cases of hernia, appendicitis, and intussusception, laparotomy alone can reveal the condition present, and the less the patient is disturbed in the way of enemata, once the suspicion is aroused that the case is one of obstruction, the better chance will the patient have of surviving the operation. The disgraceful present-day mortality of intestinal obstruction (not less than 40 per cent) shows how much the lesson of appreciating the early symptoms still requires to be learned. Spinal anæsthesia, rapid, gentle operating, with a minimum of handling and exposure of the bowel, and the use of Welchii serum, may pull through a desperate case. An enterostomy may be the only possible operative procedure in some cases, and may save an odd life.

Operation can hardly save the congenital intestinal stricture cases which develop acute obstructive symptoms within a few hours of birth; the intestine beyond the stricture is like a piece of string, and anastomosis is impossible.

The pure volvulus cases, where the duodenum hangs vertically from the pylorus, are amenable to cure by operation if it is undertaken early enough.

The acute obstruction arising from bands or plastic adhesions, sometimes occurring within a few days of operation where there has been peritonitis, ought all to be recognised early and saved by operation.

Intussusception.

Intussusception, the typical form of acute intestinal obstruction in infancy and childhood, is a subject of great interest and of vital importance. One piece of bowel is invaginated into the adjoining piece, and the mass formed may itself be engulfed. The tumour, at first a small knuckle, may ultimately form a huge sausage-shaped mass, and in the extreme cases many inches of bowel may protrude from the anus like a prolapsus ani. The seriousness of the condition depends not so much on the amount of bowel involved as on the degree of tightness with which the bowel is gripped at the commencement of the intussusception, for at this point the blood supply is interfered with, and on this depends the degree of œdema, congestion, or actual ulceration or gangrene of the bowel involved. The size of the intussusception is of little importance, for many large ones are easily reducible, whilst one small in size but gangrenous may be quite irreducible. The condition is in these cases similar to a strangulated hernia.

The condition is a rare one in adults, and is then usually associated with the presence of some pedunculated neoplasm at the apex of the intussusception. A comparable condition is occasionally found in infants where an adenoma, a pancreatic rest, or some irregular nodule of fibrous tissue at the site of an incompletely obliterated Meckel's diverticulum may form the apex of the intussusception. Invagination of a definite Meckel's diverticulum may give rise to the condition. Usually, however, no such pathological condition is present, and in the majority of cases no definite cause of origin for the condition is discovered. There is, however, quite a definite group where a hard œdematous dimpled Peyer's patch is present at the apex of the reduced intussusception, and it can be quite easily understood that a patch in this condition may give rise to irregularity in the waves of peristalsis and so initiate the whole process.

It must be confessed, however, that in the great majority of the cases no lesion whatever can be demonstrated as the causative factor, and one is driven back to the explanation of the case as some interference with the neuro-muscular mechanism, which produces normal peristaltic movement. In this connection it is a fact very often noticeable that there

is an unusually large number of enlarged glands in the mesentery. These may by pressure interfere with the normal nerve impulses, or the irregular action may itself be due to the irritation produced by the surface lesion which has led to the enlargement of the glands.

Agonal *post-mortem* intussusceptions are well known, and most surgeons have many times, during the course of an operation where the bowel has been well exposed in the wound, seen intussusceptions, direct and retrograde, forming and correcting themselves. There is therefore no doubt that at times an intussusception may correct itself before an operation has been carried out, and examination of the bowel in an occasional case makes this perfectly obvious at the operation.

The part of the bowel most commonly affected is the lower part of the ileum just proximal to the ileo-cæcal valve, and the type is then called an ileo-cæcal intussusception; but the condition may be limited to the small intestine, and is then called an ileo-ileac type. When the caput cæcum forms the apex the type is called a cæco-colic, and when the large intestine is elsewhere involved the type is called a colo-colic one. These descriptive terms are useful for classification.

The vermiform appendix may be carried in as part of an intussusception and partake in the congestion, becoming deeply ecchymosed, and, much more rarely, a true intussusception of the appendix itself may be present.

In a chronic case, the type found in children of from 8 to 12 years of age, the only symptoms may be recurring attacks of colicky abdominal pain. Spontaneous "reduction" often occurs, and the cases are usually a puzzle till someone sees the case during an acute attack of the colic and has the child examined under an anæsthetic. Then a palpable mass is revealed, and the nature of the case becomes clear.

The typical and classical case is that of the infant, usually a male, about five months old, who whilst enjoying apparently perfect health suddenly begins to scream and draw up the legs as if in abdominal pain. The child may vomit if it has had a feed shortly before, and an evacuation of the bowel may take place. There follows a period of calm in which the child may be noted to be unduly pale, and then the acute attack of pain recommences, and shortly, after a few spasms, it is

noticed that the napkin is soiled with some blood, and thereafter with each spasm of screaming, squirts of blood and mucus are found to be coming from the bowel. The picture is so characteristic that the condition should at once be diagnosed, and if these cases are operated on within a few hours of the onset of the first spasm of pain they should all be saved. Where doubt exists the right procedure is to examine the child under an anæsthetic, and bimanual palpation with one finger in the rectum, if need be, will clinch the diagnosis. It is best to make this examination where one is prepared to go on to immediate laparotomy. Unfortunately many of the cases are not seen till twelve or more hours after the onset of the trouble, and the child arrives at hospital with sunken eyes, the typical abdominal facies, the sausage-shaped tumour in the epigastric region, and in extreme cases with the apex of the tumour palpable in the rectum, if it is not actually protruding from the anus. This can only be characterised as gross neglect. Many practitioners expect to find rigidity of the abdomen as a characteristic of this "acute abdomen," and it cannot be too much emphasised that in the absence of peritonitis *rigidity is not to be looked for* in the early stages of this or of any other type of acute intestinal obstruction. No other type of treatment is so safe, so certain, and so rapid as operation. Delay is dangerous, and abdominal manipulations, rectal injections, and other methods are too uncertain and exhausting to the infant to be recommended in the place of laparotomy and gentle milking back of the intussusception. As a general rule no further procedure than reduction of the tumour is carried out, since the condition of the child permits only of the simplest and most rapid operation; but where the conditions are more favourable occasionally an appendicostomy is done, with the twofold purpose of anchoring the cæcum and of being able to give large quantities of saline rapidly; or a regular colopexy operation may be carried out, since it is clear that if only simple reduction is effected there is no reason why the condition of intussusception should not promptly recur. As a matter of fact, recurrence does take place in quite a large number of cases, and not always at the site of the former lesion. This makes one hesitate to recommend anything but the simplest

procedure at the time of the emergency. Many cases are operated on a second time, quite a few have three operations, and one case came for a fourth operation for intussusception; this makes one look for a cause which must be of wide application.

The operative mortality is still far too large, and this is almost entirely due to the fact that operation is too long delayed. One surgeon who claimed that he had educated the populace around his hospital area stated that in a series of 81 cases he had only 3 deaths; this approaches the ideal, and gives hope for the future. Many men have had series of 25 consecutive successful cases; 20 are commonplace; but sooner or later the city surgeon strikes a run of deplorable irreducible cases, and then his fine statistical record is broken, for few of these cases survive; they require resection of the gangrenous gut either immediately or as a two-stage operation, and if, on the average, one out of ten of these cases lives the surgeon may congratulate himself. Every case should be given the chance, and cases which looked moribund have at times survived even such a major operation.

The operative mortality in a series of nearly 200 cases, inclusive of the moribund irreducible type, worked out at just under 20 per cent, but this is unsatisfactory, and the future ought to produce much better results.

Hæmorrhage from the bowel may be present in cases of gastro-enteritis, but is usually associated with green stools and a rise of temperature. Intussusception is not commonly associated with these cases. Prolapsus ani and procidentia should never be mistaken for intussusception, and the bleeding associated with rectal polypus, purpura or parasites in the bowel ought likewise to be easily differentiated.

Pyloric stenosis (discussed separately) is the only other common condition for which operation is carried out in infants. In rare cases a kink or an adhesion at the duodeno-jejunal junction may be found when a high obstruction is diagnosed.

Duodenal ulcer leading to a fatal hæmorrhage from the bowel has been met with.

Gall-bladder lesions are most uncommon.

Ovarian cyst or dermoid cyst is the most likely diagnosis when a freely movable swelling is found in the lower abdomen,

Mesenteric cysts and retroperitoneal cysts are met with not uncommonly.

Occasionally supernumerary spleens are encountered, and from time to time a splenectomy is required in certain conditions of splenic or blood disease.

Immediate exploratory laparotomy should be always seriously discussed when a child's abdomen has been subjected to a severe or sudden injury, *e.g.*, a kick from a pony or the passage across it of the wheel of some vehicle.

What has happened inside that abdomen is purely a matter of speculation. Vessels may be torn, the bowel may be severed right across or detached for a certain distance from the mesentery; and if one waits till it is perfectly obvious to everyone that something is seriously wrong, then, of course, the chances of saving the child's life are greatly lessened. Exploratory laparotomy on a well-grounded suspicion is here again the only safe line of procedure, and if it is properly timed so as not to increase the shock from which the child is suffering little harm can accrue, even if no serious lesion is present, and one's responsibility has been properly met. No one advocates unnecessary laparotomies, but there are cases in which it should be recognised that the risks of a laparotomy are infinitely less than the risks of standing by and carefully observing the patient.

Congenital Hypertrophic Stenosis of the Pylorus.

Pyloric stenosis is a condition the causation of which is still obscure. Happily, its cure by operation, if the condition is recognised early, is now so likely that the cases are more and more being sent directly to the surgeon, and so they are dealt with whilst the child has some reserve of strength and has not arrived at that state of wasting and exhaustion which used to be looked on as presenting the typical picture of the condition.

The usual story is that the child was born plump and healthy and of a good weight, that it seemed to take its nourishment well for four or five weeks, and then, in spite of frequent changes of food, it began to have persistent *vomiting*. Almost every feed was vomited shortly after its ingestion, and the

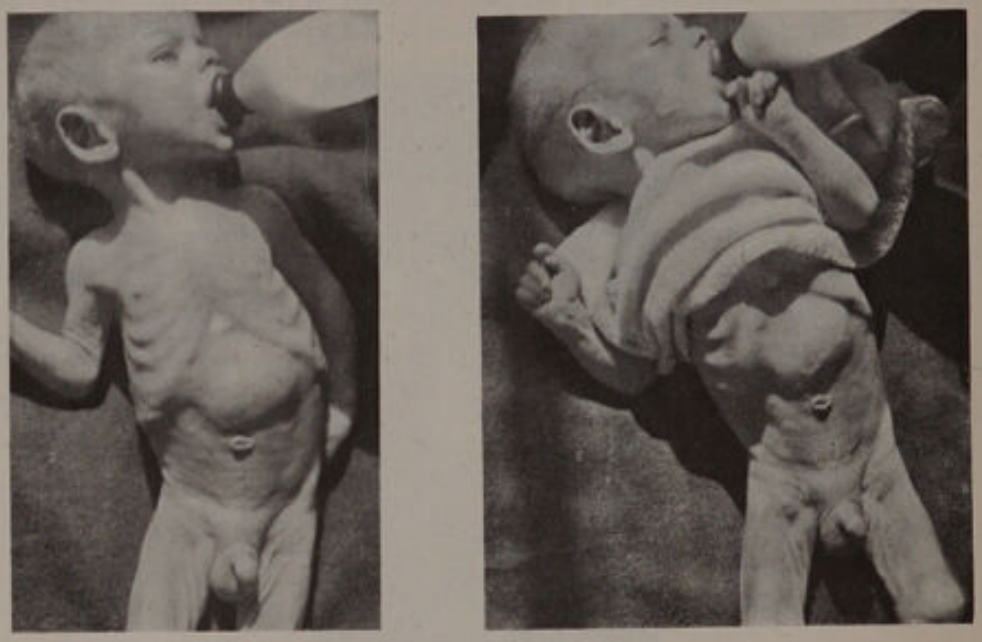
act was forcible, "explosive," in nature. *Constipation* then became a feature of the case, and when the abdomen was exposed and watched during feeding time, marked *visible peristalsis* was noted in the upper abdomen with the wave of

Characteristic emaciation.

peristalsis constantly passing from the left to the right hypochondriac region. Careful palpation to the right of the umbilicus, or beneath the ribs, sometimes revealed the presence of a hard movable *tumour* about the size of a hazel nut, and the child began to lose weight progressively. Soon the child, alert-looking and hungry, always willing to take another feed though one has been just vomited, loses all its subcutaneous fat, comes to have a porcelain appearance which catches the eye at once, and the diagnosis is often made as a spot diagnosis by the smart house surgeon before the case-history has been inquired into.

A *barium* meal may be used to clinch the diagnosis and for demonstration purposes if the child's general condition warrants it, but is not necessary if the four cardinal symptoms are present, *vomiting*, *visible peristalsis*, *constipation*, and a *palpable mass*.

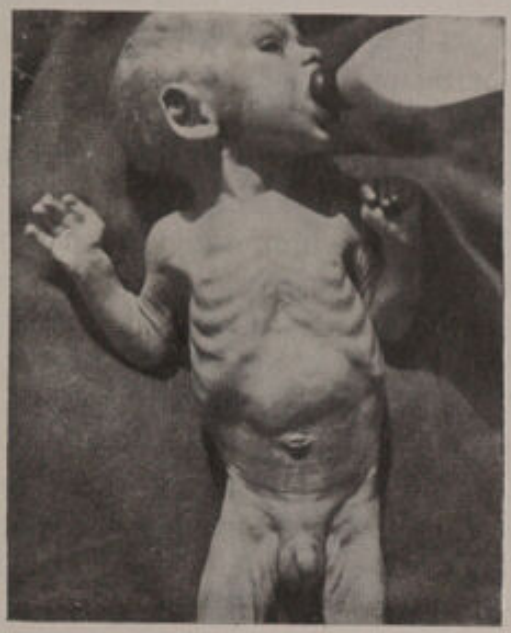
If any of the first three symptoms be not constantly present then the case must be further investigated before operation is suggested, for many cases have vomiting and visible peri-



Phases of visible peristalsis.
Recovery without operation.

stalsis which are not cases of pyloric stenosis. If diarrhœa be present then, almost certainly, the case is not a pyloric

stenosis. *These* cases, whether correctly diagnosed as pyloro-spasm or gastro-enteritis, can be cured by appropriate attention and should not, as a rule, be submitted to operation; nevertheless, in some such cases where the peristalsis was a very marked feature, an exploratory operation showed the case to



Visible peristalsis in dilated stomach.

be one of adhesions in the region of the pylorus or of the duodeno-jejunal junction and the relief of these adhesions was followed by a rapid improvement in the babe's condition.

Up to the year 1914 the operation successes for the condition, published by the late Mr. Nicoll, were the best on record, but shortly afterwards Rammstedt published the account of his simpler operation, and this has been generally adopted, an operation so simple and so good in its results that many series of successful cases have been since published by surgeons all over the world who have adopted the method. The mortality of the operation in cases which have been diagnosed early is reduced to a very low figure, and it seems to be the most desirable line of treatment, cutting short as it does the long period of uncertainty as to progress which seems inevitable in cases treated by medical methods which still have an unenviably high death-rate.

The operation consists in a simple longitudinal incision from

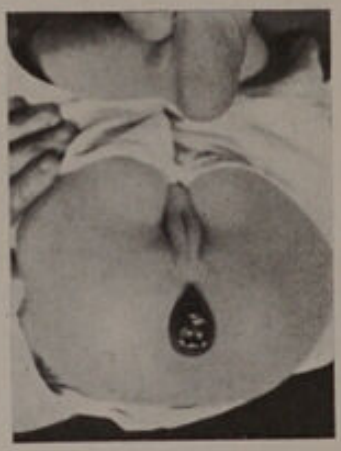
the stomach side of the mass to the pyloric vein which marks the commencement of the duodenum through the serous and muscular coats of the stomach wall down to the submucous region. Care is taken not to wound the mucous coat. All bleeding points are caught up with fine sutures or perhaps better treated by touching them with a fine cautery, the point of a round needle heated in a spirit flame does excellently, either method being preferable to picking up the vessel with forceps and using ligatures. The whole operation takes, as a rule, seven to ten minutes if the anæsthesia is perfect. *Gas* and *oxygen* is the anæsthetic generally advocated, but chloroform and oxygen is preferable if an expert anæsthetist is not available to give the other. A short period of complete relaxation makes the procedure very simple, but lack of relaxation may create all sorts of complications. A very good light and a fresh, sharp scalpel for the stomach are essential. The after-treatment is important and should be under the supervision of the surgeon who undertakes the responsibility of the operation. *Feeding* is commenced without delay; and feeds are repeated if the babe has any sickness. The second feed is very frequently retained. Saline is given by the bowel, and if it be not retained is given subcutaneously. Bicarbonate of soda and glucose are given with the rectal saline. The child has special nurses night and day for several days, and is lifted to be fed and to be nursed if at all restless, but restlessness is, to a certain extent, overcome by the hypodermic injection of a very small, appropriate dose of sedative. After the first day the sickness is usually absent or, if present occasionally, is no longer explosive in character, and very shortly the bowels begin to act regularly and the child begins to put on weight and to lose its fragile appearance. A gain of half a pound the first and second weeks will be followed by a more rapid increase in weight as the amount of the feeds is increased. The tendency is to underfeed the child at first, but this is not necessary, and the feed should be rapidly increased from 2 up to 5 ounces or more if the babe is willing to take more at three- and, later, four-hour intervals. The after-history of these cases seems to be satisfactory. Normal development and an absence of all stomach symptoms has been confirmed in some of my own cases eight years after operation.

Pyloric stenosis is not truly congenital in nature. If a babe starts vomiting immediately after birth and shows ballooning of the stomach and peristalsis the case is likely to be one of true congenital *atresia* of the *duodenum*, a condition likely to prove non-remediable by operation, though an exploration should be made at the earliest moment possible. If the atresia be just beyond the pylorus the peristalsis will be, as in pyloric stenosis, from left to right, but if the atresia is lower down near the commencement of the jejunum, then the duodenum will be dilated and the peristalsis may be noted to travel from right to left as well as from left to right. Cases of small intestine atresia, showing the picture of advanced intestinal obstruction, are seldom saved by operation, anastomosis between the dilated and the shrivelled, unused bowel being almost impossible of performance. Success has, however, been claimed, and so an attempt should be made.

CHAPTER XII.

ON PROLAPSUS ANI AND OTHER ANAL LESIONS.

The surgical treatment for this condition recommended in text-books varies from linear cauterisation to laparotomy and fixation of the sigmoid by a colopexy type of operation. In

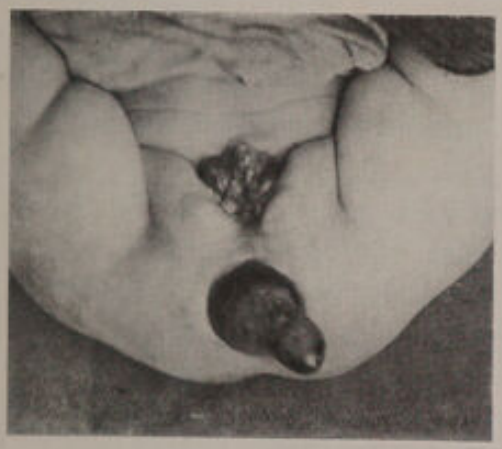


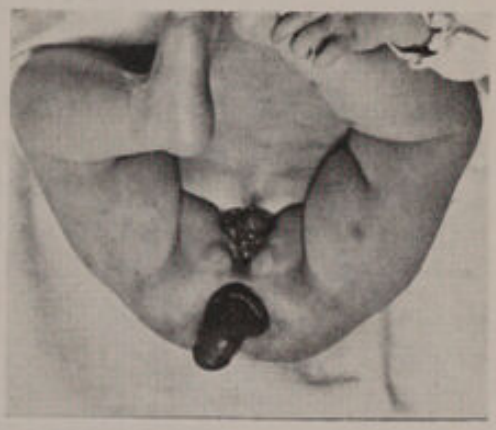
fact, so many operations are recommended that one may conclude the cure is difficult to attain. No surgical procedure is now attempted till the method of *alcohol injection*, as an infiltrating ring at a level of 2 to 3 inches above the anus, into the *submucous* tissue of the bowel, has been tried. Dr. Findlay introduced the method here after seeing it used in Switzerland, and the results of injecting 1½ c.c. of absolute alcohol on each side of the rectum at the level indicated have been successful in effecting a cure in a large percentage of cases.

The procedure is easy and safe if carried out with care. Reckless use may lead to the alcohol being injected into the peritoneal cavity; too much alcohol may lead to sloughing of the mucous membrane, puncture of the mucous membrane may lead to infection of the track and end in an ischio-rectal abscess; but all these complications are avoidable, and if the

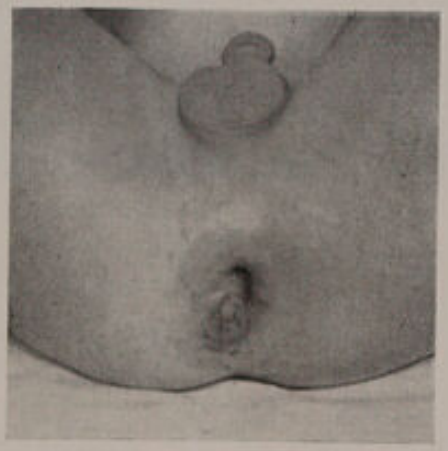
injection is given slowly through a fine needle into the submucous tissue, the correct position of the needle being appreciated by the guiding finger in the rectum, there results a ring of œdematous tissue which is palpable; this at a later date becomes fibrosed and in some way prevents the recurrence of the prolapse.

The method is an undoubted boon in a troublesome class of case. Other medical treatment must not be neglected. Good results are less likely to be obtained in the congenital cases, which are associated with other conditions like spina bifida or extroversion of the bladder.





Pruritus ani is not uncommon, may be due to threadworms or lice, and results often in perianal or ischio-rectal abscess formation.

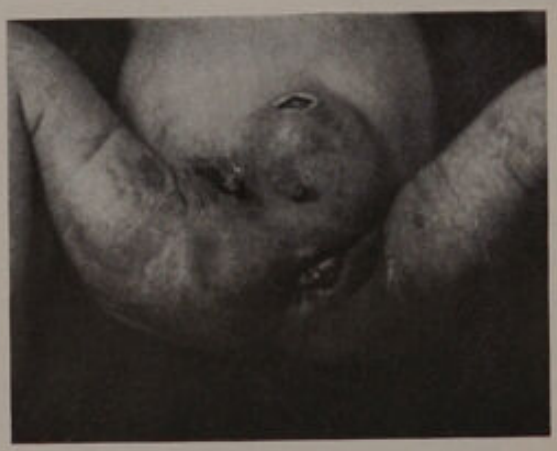


Condylomata are by no means rare lesions in childhood. Piles are seldom, if ever, found.

Rectal polypus is often met with, and a polypus may protrude from the anus and resemble a pile. There is usually little difficulty in ligating and removing a polypus, and this promptly stops all hæmorrhage if the lesion be a single one.

Imperforate anus may be a simple velum between the proctodeum and the end of the rectum and so be easily remedied, but, unfortunately, much more often the end of the intestine is far away from the anal dimple and it may be impossible by dissection from below to reach the bowel. It is therefore far better in all but the most simple cases to do a colostomy and at a later date to investigate the condition with the help of the *x*-rays, or it may be a laparotomy, before deciding whether to tackle the condition from the perineum: a sphincterless anus is no gain.

On rare occasions a child is born with several fistulæ in the perineal region; rectum, vagina and bladder or urethra all intercommunicating and arriving at the surface in this unusual manner. Fortunately, few of these children survive.



CHAPTER XIII.

SCROTAL SWELLINGS AND GENITO-URINARY CONDITIONS IN CHILDHOOD.

If scrotal hydrocele and hernia be considered together they may be classified or described so as to make their different types easily remembered by the student.

Probably they are all correctly designated *congenital*, but the term " congenital " is adopted as descriptive of a common type, and is used in this sense simply as a descriptive term.

Hydroceles and *hernias* are described as
- *Congenital*
- *Acquired*
- *Infantile* (encysted, &c.).

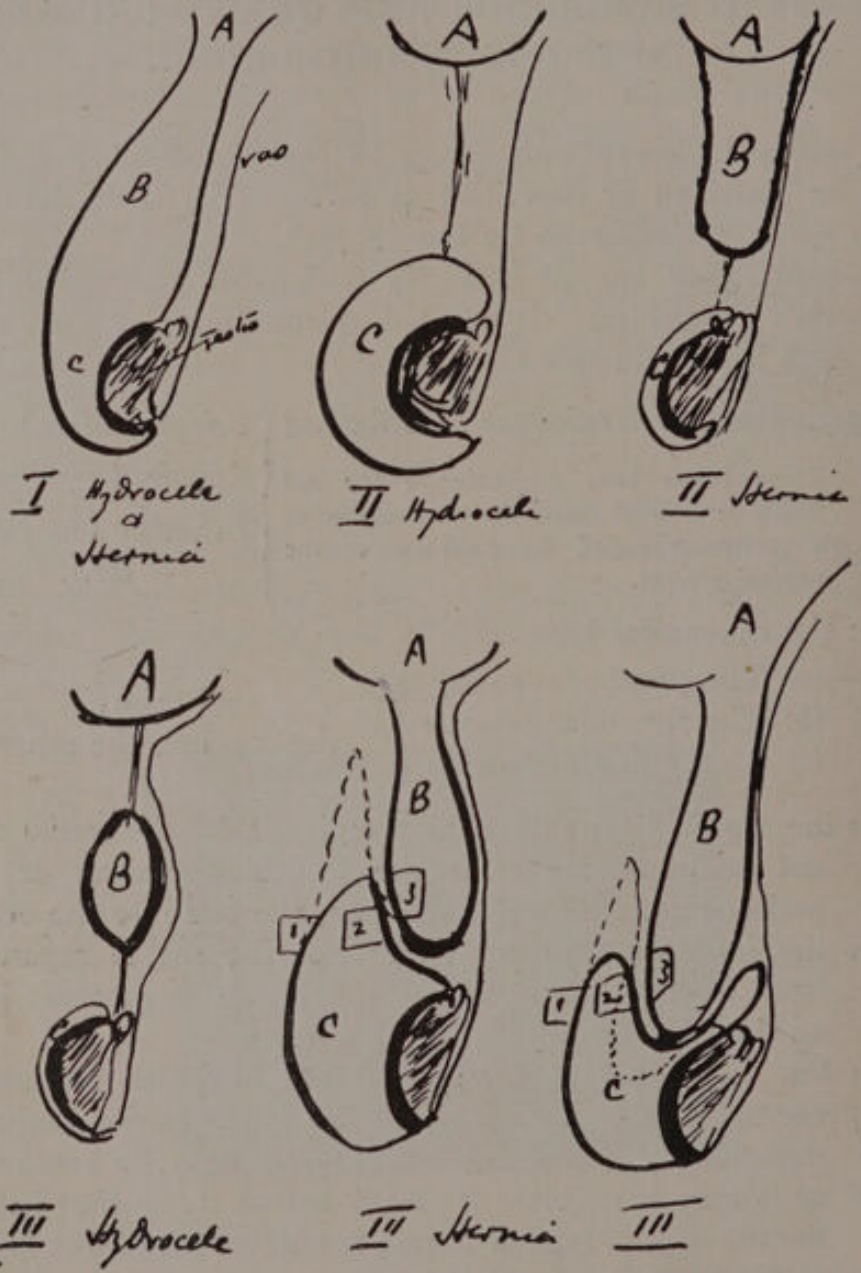
These terms have reference to the *sac* which is derived from the peritoneum as a protrusion called the *funicular* or the *vaginal process*.

1. In the *congenital* type—
   (*a*) The peritoneal cavity
   (*b*) The funicular process
   (*c*) The tunica vaginalis
   } all open, the one into the other.
2. In the *acquired* type the tunica vaginalis (of the testis) does not communicate with the funicular process or the peritoneum, which two do open, the one into the other.
3. In the *infantile* type (of hydrocele) the sac is separated from both tunica vaginalis and funicular process; it is an encysted hydrocele of the cord.

   In the *infantile* type (of hernia) the funicular process *or* vaginal process is closely attached to the tunica vaginalis though they do not communicate; it may lie behind it, or it may invaginate its walls before it, so that before the sac of this type of hernia is entered into *three layers of peritoneum* are cut through.

The diagrams make the script clear.

Acquired hydrocele, the common type, is a frequent lesion of infancy and childhood. It is often bilateral, frequently subsides without treatment or after simple puncture and aspiration with a hypodermic needle and syringe, and is easily cured


A
B
C
I Hydrocele a Hernia
II Hydrocele
II Hernia
III Hydrocele
III Hernia
III
1
2
3

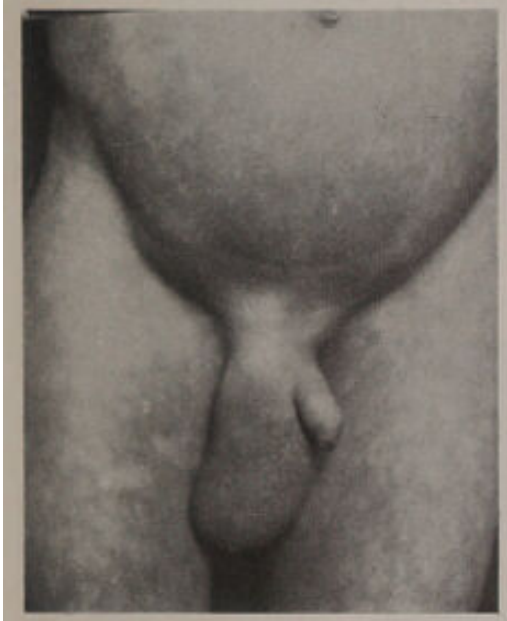
by the operation of " flyping " the sac and suturing it loosely behind the epididymis.

The treatment for the encysted type of hydrocele is excision.

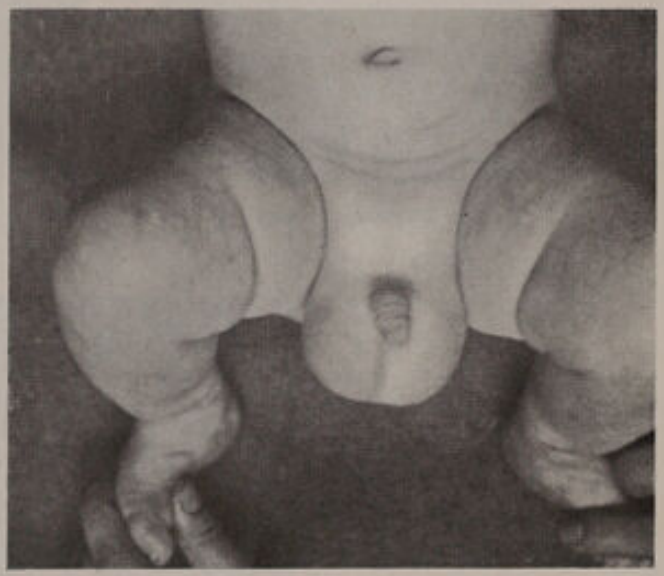
A highly placed infantile hydrocele may simulate an early, tense, irreducible hernia in a screaming babe, and the same condition may be simulated by an acute hydrocele associated with an undescended testis which has undergone torsion.

The importance, therefore, of a definite observation as to the presence or absence of the testis in the scrotum on the affected side is clear.

The term " acute hydrocele " indicates that the effusion into



Unilateral hydrocele.



Double acquired hydrocele.

the tunica vaginalis is secondary to some other lesion of the testis or epididymis, and is in nature probably protective.

Such other lesion may be *inflammatory*, *tuberculous*, *sarcomatous*, or *traumatic*.

Gonorrhœa is not unknown in tiny infants.

Tubercle and *sarcoma* are more common than *carcinoma* or *dermoids*. A *pneumococcal abscess*, more or less encapsuled between testes and epididymis, may simulate neoplasm rather than tubercle. It is a rarity, but where doubt arises aspiration through a fine needle may clear up the diagnosis and prevent removal of the testis.

The rate of growth, the shape, the weight, the thickening or irregularity of the epididymis, cord, or vas, the presence of other lesions, the involvement of glands, may all help in making the diagnosis. The *inguinal glands* are *not* involved unless the testicular growth has become adherent to the scrotum : one looks for the secondary glandular involvement

Tumour of testis.

Acute hydrocele. T.B. epididymitis.

Sarcoma of epididymis.

in the prevertebral lumbar region, and one often finds an unexpectedly large mass.

Resembling infantile hydroceles, and attached close to the upper pole of the testis one finds *spermatoceles* derived from embryonic tubules. They are not common. The fluid content is not clear, but milky.

Oblique inguinal hernia is much more common in boys than in girls. It is, however, quite common in girls where

a frequent content is an ovary or the fimbriated end of the Fallopian tube.

It is more common on the right side than on the left; the reason being that the right canal is longer open as the testis descends later on the right side.

Double hernia is quite common in both sexes.

The descriptive terms, *reducible*, *irreducible*, *incarcerated*, *obstructed*, *inflamed*, *strangulated*, are all applicable to the condition in infancy and childhood.

The *direct* inguinal hernia is unusual.

Scrotal hernia is of very much greater importance than hydrocele. The condition is very common in infancy, and after being once definitely present it may disappear for a considerable time, *but is seldom cured*. On the other hand, it may become progressively worse till it is enormous in size.

From 600 to 900 cases are done yearly in the two theatres at the Royal Hospital for Sick Children, Yorkhill.

There is no "*best*" *age* for operation on these cases.

If *strangulation* is not an everyday occurrence, *irreducibility* happens so frequently that it is true to say any child with a hernia may at any time have the hernia become *irreducible*. Then it does, in our experience, too frequently become *strangulated*. The risk of this is so great that the advice to operate at the *earliest convenient time* is the only safe one to give, when the question arises at what age hernia should be operated on.

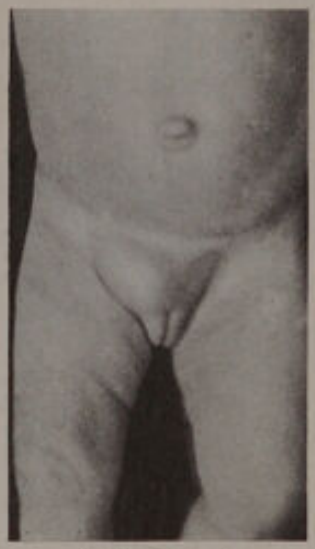
Nothing is to be gained by deferring the operation till a certain age, and the use of trusses as a palliative in children is an abomination. The operation is done through a 1 inch incision over the external ring. The essential feature is a high ligation of the sac followed by its excision or its treatment after one of the classical methods.

The risk of the operation is the risk of the anæsthetic, since the status lymphaticus is seldom diagnosed before a child succumbs.

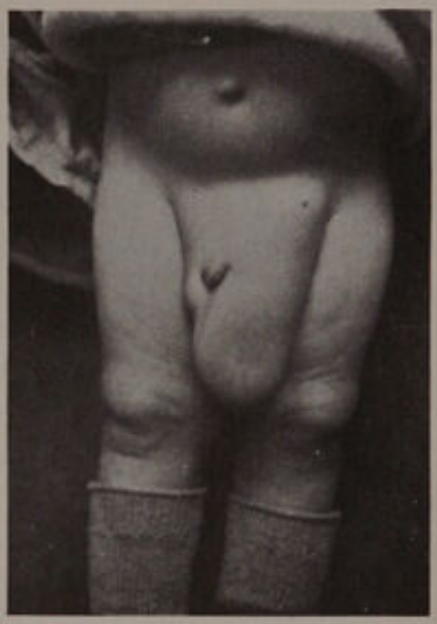
The use of spinal and of local anæsthetics may reduce this risk.

The *vas deferens* is the only structure likely to give trouble till one becomes expert at the operation.

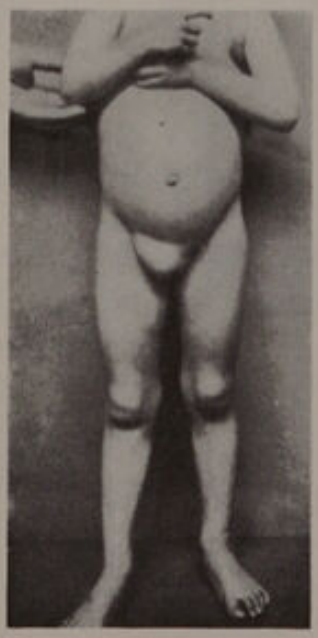
The patients remain as a rule overnight in hospital; in *summer* they are often treated as out-patients.



Inguinal hernia.



Inguinal hernia.



Inguinal hernia.

Inguinal hernia.

The number of recurrences in simple uncomplicated cases is a decimal one.

The dressing used is a sterile dental pad fixed to the wound, smeared with mastisol, by a piece of zinc oxide adhesive plaster, which is usually *in situ* when the patient comes back at the end of a week to have the one or two skin stitches removed.

Infection of a wound is almost unknown, despite the often unfavourable home conditions.

The *coverings* of the hernia are usually well marked, and the thickening of the cord can be appreciated as it is rolled against the pubic crest.

The association with the sac of the vas and of the pampiniform plexus is very intimate, and the stripping off of these structures is only easily done when the proper plane of separation is reached. Injury to these structures through nipping them or lifting them up with forceps must be most carefully guarded against. The safest procedure is to strip off the coverings and these structures with gauze when the sac has been clearly differentiated. A clear appreciation of the fact that the sac lies in front of the vas and the veins almost invariably, and that they are exposed when the sac is turned upwards will keep one right in cases where the anatomy is not working out simply. The clearing of the sac may be facilitated by opening it and getting it well stretched out after a finger has been inserted and used to hook it upwards.

On the sac there are found not infrequently small *adrenal rests* (tomato seed-like bodies), which are of interest rather than important.

Post-operative orchitis may occur if the part has been handled roughly, or if the canal has been stitched up too tightly. It generally clears up in a few days.

The *coverings* of the hernia may be tabulated :—

	1. Skin.
	2. Superficial fascia.
Ext. oblique, . .	= 3. Intercolumnar fascia.
Int. oblique, . .	= 4. Cremaster fascia.
Transversalis fascia	= 5. Infundibuliform fascia.
	6. Retroperitoneal tissue.

These are the coverings of a direct hernia :—

1. Skin.
2. Superficial fascia.
3. Intercolumnar fascia.
4. Conjoined tendon.
5. Infundibuliform fascia.
6. Retroperitoneal tissue.

These are the coverings of a femoral hernia :—

1. Skin.
2. Superficial fascia.
3. Cribriform fascia.

Transversalis fascia = 4. Ant. layer of femoral sheath.

5. Canal contents.
6. Retroperitoneal tissue.

The tables are put together to help the student to grasp them readily.

The layers are not all usually identified. The cremaster is often well marked and the infundibuliform fascia is often at first mistaken for the sac.

The sac is peritoneum.

The *coverings* constitute everything superficial to the sac.

The *contents* consist of the bowel, omentum or fluid lying within the sac. *Bowel* is the usual content, and so the most characteristic symptom of a hernia is its reduction with a slip and a gurgle.

Such a hernia is called an *enterocele*.

In an *epiplocele* omentum alone is present.

A *bubonocele* is a hernia which does not descend into the scrotum.

Occasionally the *caput cæcum* and the *appendix* are present as contents in a sac and may be diagnosed.

Femoral hernia is not common in infancy.

Lumbar hernia, interstitial inguinal hernia, epigastric, and other *mid line hernias* have been met with as rarities, and once a *perineal hernia was noted in a very marasmic child.*

Diaphragmatic hernia is also a rarity.

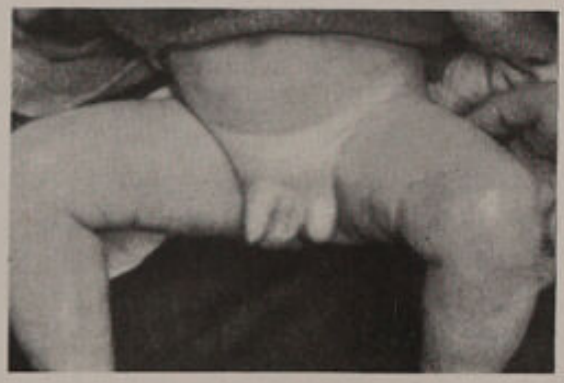
Undescended testis is often associated with hernia but need not be. The condition causes the parents much concern, and many children are brought for examination and treatment. In the great majority of cases it is found that the apparent

non-descent of the testis is the result of too great activity of the cremaster muscle. If the child be made thoroughly warm relaxation of the muscle occurs, and it is evident at once that the testis can descend perfectly well into the scrotum. Such cases can be easily *cured* by operation. They should never be touched.

Where the case is correctly diagnosed and the testis cannot be brought further forward than the external ring—if it is not associated with a hernia and if the child is not making any complaint of any discomfort—it is probably better to leave the testis alone, or at most to have it protected with a hollow truss, for any operative measure directed towards bringing such an organ into the scrotum and keeping it there must inevitably so interfere with the circulation that one might as well remove the organ forthwith. Obviously, if the organ has any tissue in it which may by its secretions act on the growth of the child, all chance of getting benefit is lost by any such operative interference if it is carried out before puberty, at which time one may clearly observe whether the organ is atrophied and defective, and decide whether it had better be removed or not.

If a bad hernia is present it may be best to remove the testis and make sure of curing the hernia, leaving the other testis to undergo compensatory hypertrophy.

In no case should the testis be pushed back into the canal or through it, as this may lead later to trouble if any inflammatory condition should occur, and the danger of the late development of *sarcoma* in an undescended defective testis used to be emphasised by the late Sir Hector Cameron.



Perineal testis.

Cases of *misplaced testis* must be judged individually; they are much less common.

Cases of *double testis* are still more rare.

Torsion of the cord in cases of undescended testis, and torsion of the pedicle in cases of an ovary present in a hernia sac are not uncommon. The organ may become plum-coloured, black or grey with gangrene before it is operated on.

The pain and swelling simulate a strangulated hernia, but the facies of the patient, the absence of increasing sickness,

Exomphalos. Hernia into stalk of cord.

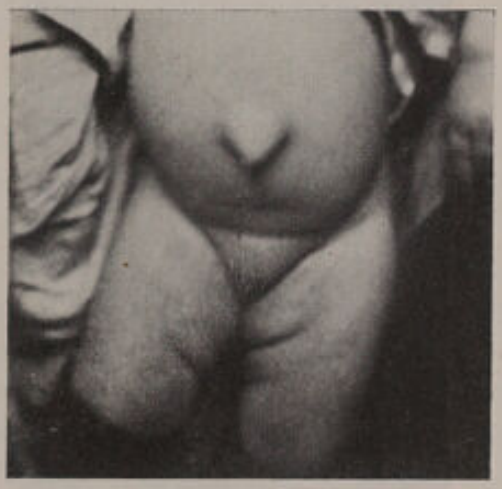
and, in the male, the absence of the testis in that side of the scrotum, may enable one to make a correct diagnosis. The child does not look ill enough, though the local appearances resemble the more serious condition.

Incision makes the diagnosis clear, and the usual treatment, if the engorgement has lasted till the organ is black, is to remove the organ and complete the closure of the canal and ring.

Umbilical hernia is common. The rarest form is the

"congenital" umbilical hernia, or *exomphalos*. This is a hernia, occurring before birth, into the stalk of the umbilical cord. It may be large or small, containing almost all the abdominal contents or a small portion of them, perhaps a small piece of ileum with an attached Meckel's diverticulum.

Some cases are quite remediable by operation, and their best chance is to have the operation carried out within twelve hours of birth so as to reduce to a minimum the risk of peritonitis. If this chance be missed in a remediable case, it may be safer to try and get the surface sterile by the use of antiseptics and get the sac and its coverings to shrivel up by the application of sterile dusting powder before operating.



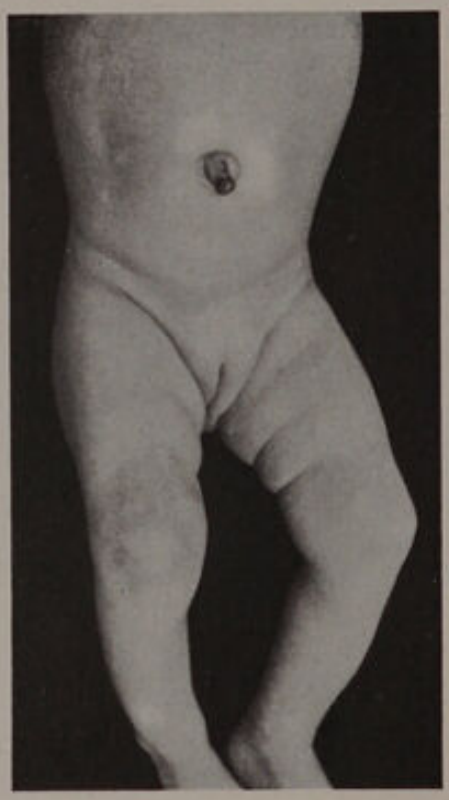
Umbilical hernia.

Occasionally these children have other congenital developmental defects (cardiac, &c.), which interfere with later growth.

The ordinary *umbilical hernia* is a protrusion into the scar of the umbilicus. The size of the aperture through which the hernia comes may be tiny or large enough to admit the tip of a finger. If it be very small, one is justified in waiting to see if the process of cicatrisation which naturally takes place in this region will not effect a cure, since irreducibility or strangulation of an umbilical hernia in a child is very uncommon. If, however, the aperture is large enough to admit a finger tip the chances of cure by cicatrisation are very small, and one had better proceed to cure by operation. One may temporise for a time making use of a pad to keep the hernia reduced. The pad should be made of a silver coin

stitched into chamois leather and kept in place by zinc oxide strapping. A copper coin must not be used, as it produces skin irritation. Sometimes the hernia comes out above the umbilical scar. The gap in the middle line is felt just above the umbilicus. The scar has been pulled downwards by the contracture of the three attached atrophying cords, the urachus and the two obliterated umbilical arteries. The point is of little importance practically.

To get constant good results and avoid the annoyance of recurrence a somewhat elaborate operation is carried out.



Umbilical polypus.

After the peritoneum has been closed the lower edge of the gap is, by means of a special stitch, slid beneath the upper edge, the free edge of which is tacked down by a few interrupted stitches. Then two flaps of fascia are mapped out from the sheaths of the recti muscles and these are stitched over the site of the umbilicus, leaving on each side a raw area of rectus muscle. A small drain is left to deal with moisture from these surfaces and a fairly large dressing is strapped over the stitched surface wound.

Lesions at the *umbilicus* other than hernia are not numerous,

Sepsis, eczema, and granulation tissue *polypi* are common.

Polypi which are derived from Meckel's diverticulum or some other relic of the *yolk sac*, and those which originate developmentally from the stalk of the *allantois* or *urachus* must, especially the former, be differentiated from granulation tissue polypi.

Fistulæ may occur in connection with these rarer polypi—with the first a fæcal fistula, with the second a urinary fistula.

The blood supply to a bowel polypus has been shown to be so important that all polypi which are not clearly granulation tissue ones should, perhaps, as a precaution, be always treated by excision of the umbilicus, so that its deep surface may be properly examined.

A third type of fistula in connection with the bowel may develop after a "cold abscess" has discharged at the umbilicus, in a case of tabes mesenterica with bowel ulceration.

Sepsis at the umbilicus must not be neglected, and the association between this condition and *scleroderma neonatorum* has in some cases been almost unavoidable.

Scleroderma, or *sclerema neonatorum, is a rare condition.* The cases usually arrive at hospital diagnosed as extravasation of urine, or as osteomyelitis, because of the œdema of the scrotum or the great swelling of the limb affected.

The description of the condition given in McCall Anderson's treatise on "Diseases of the Skin" is good; the subcutaneous induration, the altering site of maximum intensity of both the induration and the accompanying vivid red rash, the œdema of the loose tissue reached, the pyrexia, are all in the characteristic picture. The mortality is high.

Streptococci were found in the indurated subcutaneous tissue in one case.

In most cases there has been an associated umbilical sepsis, and in one well-marked case which came to *post-mortem* an abscess was present in the tissue of the suspensory ligament of the liver. This theory of *pyæmia* is not generally mentioned, and some much more obscure explanation is sought for. Syphilis as a cause cannot be constantly found.

Phimosis.—No time should be wasted discussing with parents whether circumcision is necessary or not. It is best to advise that the operation will do no harm, and may, under certain circumstances of life, be a boon, and to concentrate

on doing the operation properly. Some practitioners become very skilful at the operation, but it may be so poorly done that the patient is finally left with a stenosis worse than the original condition if he successfully escapes the dangers of sepsis and hæmorrhage. This is no exaggerated tale. The bad cases come to hospital, if they have not quickly succumbed to hæmorrhage, to have the operation re-done, and the importance of doing the operation so that these complications may be avoided is soon impressed on one.

Sepsis must be avoided. If *balanitis*, a septic condition of the prepuce, is present a simple dorsal slit or incision should be made, and the further operation deferred till the sepsis is overcome.

In a clean case bathing with soap and water and some boracic or saline lotion is all that is required in the way of preparation. The use of turpentine, spirit, or any such strong antiseptic is likely to damage the epithelium of the glans and lead to later irritation.

A complete exposure of the glans is necessary before one proceeds to remove any tissue. In the sulcus behind the corona one usually finds a certain amount of smegma or epithelial débris: this is removed gently with forceps or with a moist saline swab, and one must avoid the natural instinct to get a firm grasp of the glans with a swab whilst this is being done, or destruction of the epithelium may be followed by a catarrh or ulceration of the part. *Meatal stenosis* not infrequently follows, and may require treatment by dilatation or some plastic operation.

One must learn by practice the proper amount of skin to remove. When the prepuce has been drawn forward by forceps, so attached that the frænum is accurately held in its proper place, and when the sloped sinus forceps which guard the glans and delimit the amount of foreskin which is to be taken off are adjusted, one finds that skin only is removed when the cut is made with the scissors, and the mucous tube remains behind closely attached to the glans.

The mucous tube must now be removed in one piece or two halves, leaving a collar around the corona about one-quarter of an inch or so in width.

Hæmostasis must now be carried out, and if the babe should

be faint it must be revived so that every bleeding point may be picked up and tied. There is usually a small artery in the frænum and several small vessels on the dorsum which require ligating. Neglect of attention to this detail has proved fatal too often in the past, and the beginner is slow to appreciate how small is the loss of blood required to blanch a babe. Four to six catgut absorbable stitches approximate mucous membrane to skin, and a dressing of gauze smeared with Bipp or flavine in paraffin is tied, not too tightly, in position, leaving the meatus exposed. It is said that in the rite of circumcision as carried out in the *Jewish* race no precautions against hæmorrhage such as these detailed are followed. More of the mucous tube is left, and when this is turned back it has a compressing effect on the cut vessels, and so may control the

Paraphimosis.

bleeding. Why not, then, adopt this technique? Sepsis followed the operation in *Dinah's* day; remember *Hutchinson's* demonstration of the transmission of syphilis after the rite, and in the absence of reliable statistics take no risk, but trust to methods devised to prevent known complications.

Sometimes in very young babes the operation is done without an anæsthetic, but nowadays this seems unnecessary.

Paraphimosis.—This condition arises when a foreskin with too narrow an orifice is drawn over the glans and then constricts the body of the penis. The more the glans swells the less likely is it that a child will be able to get the foreskin back over the glans to its ordinary site. Reduction will only take place after the orifice has ulcerated and relieved the constriction. This may take days to happen, and meantime

the swelling of the part from œdema goes on increasing till it assumes an alarming appearance, and help is required. The usual advice given is to cut *outwards* with a blunt-pointed bistoury slipped beneath the edge of the constricting orifice. This is clearly the second sulcus (the first one being that of the corona); if it is cut *down on*, the vessels on the dorsum of the penis may be damaged; so another method is advised which does away with all danger of this and all dubiety as to where exactly the part should be cut. This consists in making multiple punctures into the œdematous tissue, *not* in the glans, and then surrounding the part with a piece of gauze or lint soaked with sterile oil or paraffin and applying very firm manual compression till all the œdema escapes through the punctures or is driven up the body of the penis. Thereafter there is little difficulty in effecting a reduction of the parts to their proper sites, and the application afterwards of hot antiseptic lotion will quickly dissipate the remaining swelling. An anæsthetic had better be used, but may be done without in cases of emergency.

Circumcision will prevent any possibility of recurrence of the condition, but should be carried out at a later date.

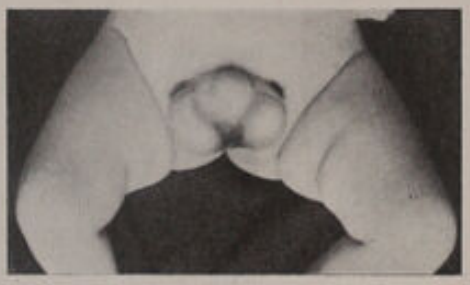
Ectopia vesicæ or extroversion of the bladder is a fairly common congenital deformity. Exposed on the surface of the abdominal wall—extending from the site of the umbilicus, which is absent, to the base of the rudimentary penis below a symphysis pubis, which is also defective—is a patch of bright red mucous membrane, or of scar tissue which has replaced it.

This is the posterior wall of the bladder, and on it one may see in certain cases the orifices of the ureters, or, where they are not obvious, note from time to time the spurts of urine coming away from them. This may be made obvious by getting the urine stained blue through the use of some aniline dye.

The bladder is derived from the stalk of the allantois, and, when the infra umbilical linea alba fails to develop and the somatapleures do not advance properly, then its anterior wall fails in its normal development also, and the posterior wall is pushed forward to appear as the surface tissue. It is occasionally so much pushed forward that a large ventral hernia bulges behind it.

The discomforts and dangers of such a condition are obvious.

Sooner or later it seems inevitable that ascending infection will lead to pyelitis and pyelonephritis and that this will kill the child. It is true that this may occur early and that the child may die in a few months, but it is equally true that many of these cases grow through childhood to adult life without the infection being fatal. The discomforts of the condition after the first year or two of life need not be emphasised. So far as they are incurable by any form of surface plastic operation which does nothing to provide a sphincter control, all plastic



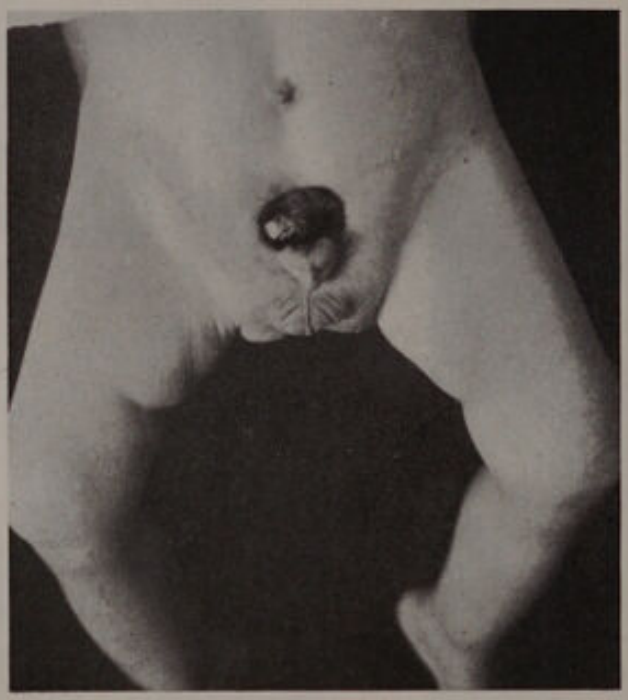
Hernia accompanying extroversion of bladder.

Ectopia vesicæ or extroversion of the bladder.

Extroversion showing ureter orifices.

operations of this type may be passed over as obsolete. Fortunately, however, in the operation of *transplantation of the ureters* there is available a means of overcoming these unfortunate individuals' discomforts, and though it cannot but theoretically add to the risk of an ascending infection, yet the practical results of the operation are so satisfactory that no child whose general condition is at all good should be denied its benefit. The left ureter is implanted into the descending

colon or sigmoid flexure, the right into the rectum, and the operation is done intraperitoneally. An interval of some weeks is allowed to elapse between the operations. The use of spinal anæsthesia has been found useful in overcoming ballooning of the intestine, and so eliminating the most troublesome factor during operation. The ureter is buried in the wall of the bowel for a short distance before it penetrates it. The operation should be done at an early age before the child has realised the disability. The lower bowel acts as a cloaca, and when the child has been trained an evacuation takes place



Epispadias with prolapse of bladder mucous membrane. (Note umbilicus.)

every four hours or so. The sphincter control and the dryness of the clothing, which previously were constantly soaked and malodorous, do much to make the child happier.

There is no urethra in these cases, an open gutter is seen on the dorsal aspect of the penis, similar to the condition found in the type of case called *epispadias*, in which one looks down on to the floor of the urethra. When the penis is pulled forward urine flows from the sphincterless neck of the bladder into the open gutter. In these cases the anterior body walls have met and the anterior wall of the bladder is almost complete, but

the essential sphincter at the neck of the bladder is lacking, and so the treatment required for both types of case is identical.

Hypospadias is the other deformity of the urethra which causes parents much concern. The tubular form of the urethra is complete, but the tube does not extend forward to the meatus in the glans. It stops short just at the glans, which, instead of being canalised to the meatus, has only a groove on its under surface. This is the least severe type of the condition, and is referred to as a glandular hypospadias. In the penile or body type of the deformity the fistulous opening may be at any distance from the glans. In the most severe type—the *penoscrotal*—the opening of the urethra is back in the perineum, and may resemble the opening of a vagina.

Pseudo-hermaphroditism. Peno-scrotal hypospadias.

Between this and the defectively developed penis, which is hooded over by a mal-developed foreskin, a deep sulcus separates the two halves of the scrotum so that each half resembles a labium. Thus, a penoscrotal hypospadias has external genitals which resemble those of the female, and the case may be classified as a pseudo-hermaphrodite whose sex is sometimes not easy to determine at a first glance.

Many plastic operations are pictured and described in text-books (especially French ones) on genito-urinary surgery, but experience proves that however applicable they may be to adult cases they are of little use in dealing with tiny babes.

The operation of "advancing" the urethra in the mildest cases is the only one worth doing, but the result of failure to get a perfect result will probably be a bad stenosis.

Education by an attentive mother can effect much. The child is taught so to hold the penis as to direct the stream of urine in the desired direction in slight cases. In the severe cases the child must urinate in the sitting posture till he is old enough to make use of a shaped funnel if he desires to urinate whilst standing.

The sphincter of the bladder is not involved, and so the condition is not so serious as epispadias.

As a rule, in each half of the scrotum in a penoscrotal hypospadias a testicle can be felt, and it may be possible confidently to demonstrate the organ to be a testis; if this cannot be done, however, the horrid doubt may linger as to whether one is really dealing with a boy or a girl.

True hermaphroditism is too great a rarity to require much discussion, but it is a tremendous upset in a family to have a child baptised and brought up as a girl and later to have doubts arise as to whether a mistake has been made.

In cases of doubt it may be a safe rule to bring the child up as a boy, but the case should not be allowed to remain doubtful. If an anæsthetic examination, rectal and abdominal, does not prove satisfactory, then one should not hesitate to explore the inguinal canals and, if necessary, the abdomen, in order that a clear guidance may be given to the distressed parents—from so many points of view is the matter of prime importance. The exposure of a definite well-developed testis with epididymis vas and pampiniform plexus all complete settles the matter in most of the penoscrotal cases which come as pseudo-hermaphrodites.

The best catheter to use in the female babe is a glass one. The use of the metal catheter in baby boys should be avoided by those who are not expert. A fine rubber catheter, if new and well lubricated, will succeed in almost every case where it is necessary to pass a catheter, and these are very few.

New-born babes often do not pass urine for two or more days, and the doctor who starts trying to pass a fine metal catheter in such case is as likely to produce a false passage as to get the instrument safely into the bladder. In no case

should the attempt be made unless distension of the bladder is clearly present, and then only after the use of hot cloths, hot baths, and warm drinks.

Probably suprapubic puncture with a sterilised exploring needle in cases of true retention of urine is less dangerous in non-expert hands than the attempt to pass a fine metal catheter.

Extravasation of urine in a small babe is a very serious condition. In older boys it is usually the result of traumatic rupture of the urethra, and if the case is complicated by fracture of the ascending pubic ramus the extravasation may spread down into the thigh and add to the seriousness of the case.

Such cases are treated by free incisions, where necessary by drainage of the space of *Retzius*, by suprapubic cystotomy and the introduction of a tube for drainage of the urine; and at a much later date when all the sepsis is overcome by a reopening of the bladder and a reconstitution of the urethral track—effecting a union of two bougies one passed up the urethra and, after trituration of any intervening tissue, meeting with another instrument passed from the bladder into the prostatic urethra. When the junction has taken place the first bougie follows the second one as it is being drawn back into the bladder, and thereafter the urethra is kept open and dilated till it approximates normal and no evidence of stricture remains.

In childhood the scope of usefulness of the modern instruments of precision and methods of demonstration in genito-urinary surgery is narrower than in the adult, and their use is fraught with unexpected dangers; uroselectan, however, may prove useful.

Hydronephrosis as the result of kinking of the ureter by an aberrant artery is met with, and pyelitis and pyelonephritis occasionally require to be dealt with by nephrectomy.

Tuberculosis of the kidney or of the rest of the urinary track is not met with often.

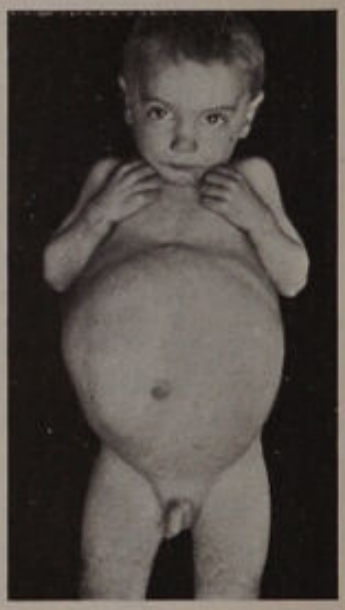
In the absence of trauma, or accompanying slight trauma, in itself unlikely to have led to rupture of a kidney, the sudden onset of marked *hæmaturia* should make one suspect the presence of a renal tumour, and no case should be passed over till the diagnosis has been definitely settled, when the case is clearly not one of nephritis.

There are three types of kidney tumours—*sarcoma*, *hypernephroma*, and *blastocytoma*. All are most insidious in their development, and, when met with for the first time, are often found to be inoperable even in children who have been most carefully looked after. The fortunate cases, so far as cure by operation is possible, are those in which a chance passing hæmaturia has been found to come from one kidney, and the discovery has been promptly followed up by an exploration and a nephrectomy.

As a rule, operations are far too late, and museums are full of specimens supporting this.

The very striking secondary tumours, associated with some

Hypernephroma. Early favourable case.



Huge "renal sarcoma."

sarcomas, appearing in the skull bones make a picture which cannot be forgotten.

Calculus is not very common in young children in this district. Occasionally a case of impacted urethral calculus arrives, and the diagnosis and treatment present no special difficulty. Larger stones in the bladder are seldom missed nowadays, when, in addition to the story and the bimanual rectal examination, one may avail oneself of the help of the sound, the *x*-rays and the cystoscope. Removal of the stone should be done invariably by the suprapubic route, as the use

of the lithotrite and evacuator (the operation of choice in the adult) is dangerous when dealing with the delicate tissues of a child.

One or two cases of sarcoma of the bladder have been met with, but other tumours and abnormalities of the bladder are rare.

Some valvular or other congenital obstruction to the outflow of urine has been found to lead to great dilatation of the ureters and kidney pelves, and in the end to death from uræmia or infection.

Bacillus coli infection of the urinary track is common, and

Secondary tumours. (Primary renal sarcoma.)

must always be excluded in making the diagnosis in any obscure case of pyrexia in a child. When the absence of renal stone has been proved, so far as that can be done by the help of the *x*-rays, these cases are put on to an intensive course of alkalies, when, as a rule, the dysuria and other symptoms clear up and the children make a good recovery.

Raphe cysts or *mid line dermoids* are the only skin or subcutaneous swellings met with on the penis or the scrotum. Sebaceous cysts are not found often in childhood.

Ovarian cysts—simple, dermoid, and occasionally malignant —are met with.

CHAPTER XIV.

ON SURGICAL TUBERCULOSIS—SPINAL CARIES AND HIP-JOINT DISEASE.

The public health authorities have taken over the treatment of surgical tuberculosis, having had the duty thrust on them by the refusal of the general surgeon to undertake the care of these long-time, bed-occupying cases in the voluntary hospitals.

The general surgeon was, of course, right.

These cases blocked the work up, were a danger to all around, were living in a hothouse atmosphere utterly unsuited to their illness, and, if septic cases were in the ward, were in constant danger of getting a mixed infection which might lead to rapid death.

The late Sir Hector Cameron, following the beloved Lister, always delighted to have a psoas abscess case in his ward and under his own personal supervision, but, in the cold light of reason, it is wise, and it should be obligatory, to have all these cases treated along sanatorium lines in special hospitals.

The result, however, is that the student must now go to one of these special hospitals for his demonstration on cases of spinal caries and psoas abscess and hip-joint disease. Haply he will be fortunate, as the patient nowadays is unfortunate, if he comes across typical text-book, classical cases, for prophylactic treatment, early applied, is capable of preventing, and should prevent, all the old classical types of cases.

Early diagnosis with preventive treatment under ideal conditions is the proper method of treating this type of infection.

The surgeon is glad to see tuberculosis going out of the field of operative surgery, for he is now convinced that such interference is the surest way of disseminating the disease, and,

if the operation be not something in the way of an amputation to get rid of a hopelessly diseased part, it is one little likely to help the patient or redound to the surgeon's credit. Calot's principles have prevailed, and every student should be familiar with his book, "Indispensable Orthopædics."

The duty of early, correct diagnosis is, then, the one which falls on the general surgeon in the out-patient clinics, and its importance cannot be too much impressed on the student who, as a practitioner, will require to notify the authorities about the case and persuade the parents that for everyone's sake the best line of treatment is a sanatorium one; for the time that will elapse before cure can be effected, and the costliness of proper attention, make it quite impossible that such a case can be adequately treated outside a properly equipped hospital. The parting of parents and children is a sore problem which requires the most humane consideration, and it is a public duty for the citizens to make certain that the standard of their municipal hospitals is such that there can be no suggestion that better treatment may be obtained elsewhere. More accommodation is required than is at present available. There are, of course, a few private sanatoriums where private cases may be adequately treated, and where the parents may be allowed greater facilities for visiting the children than is possible in hospital.

So far as the spine is concerned, the rachitic spine may simulate caries in an early stage, but there should be other stigmata which make the diagnosis clear.

A marasmic child may have a marked kyphotic general curvature.

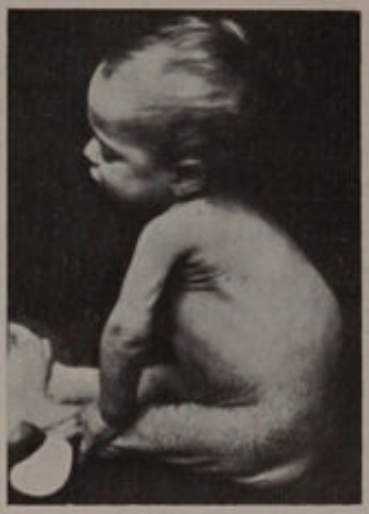
Compensatory scoliosis and spinal deformities due to congenital defects, wedge-shaped and other, of the bodies of the vertebræ, ought to be easily recognised; also those occurring after empyema.

Spina bifida, dermoids, and lumbar and perirenal abscesses need hardly be considered.

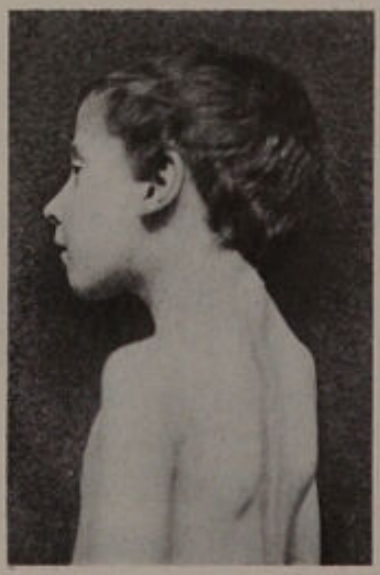
The generally kyphotic curved spine of the too rapidly growing girl with high shoulders should not be mistaken for caries.

Post-operative (empyema)
or congenital scoliosis.

Marasmic or
rachitic type.

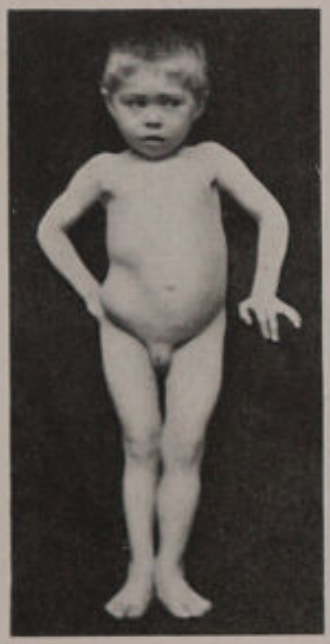


SERIES OF PHOTOGRAPHS ILLUSTRATING CARIES OF SPINE IN DIFFERENT SITES AND ABSCESS FORMATION.



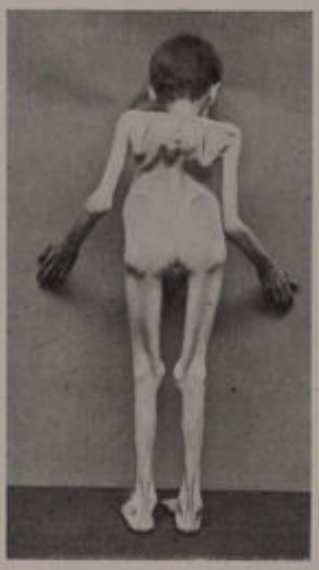
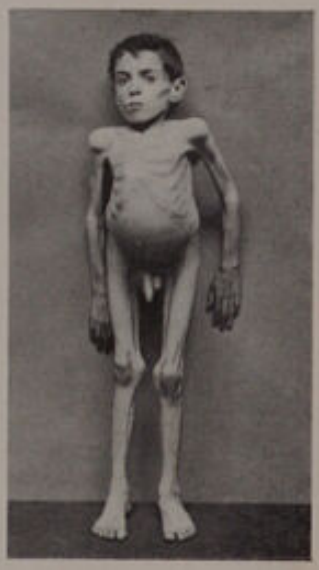
Caries of cervical region.

Caries of thoracic region.



Caries of lumbar region.



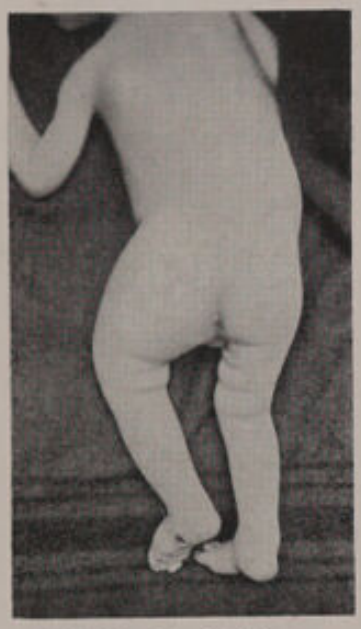
Advanced cases of spinal caries.

In every doubtful case for diagnosis, and in most of these cases for information and guidance as to treatment, it is wise to have *x*-ray photographs taken of the spine in all its length or of the suspected site, and with the help of good radiograms the diagnosis becomes clear. Poor radiograms are of no use whatever, and simply a waste of time, material, and money.

Psoas irritation, such as may arise from a retrocœcal appendix, of lumbar adenitis, must not be mistaken for a commencing psoas abscess.

Read up and be familiar with the anatomy of the psoas sheath, and always look for the lesion in the abdomen and groin in all cases of caries below the level of the eleventh dorsal vertebra.

So far as the hip is concerned, the differential diagnosis is made from consideration of the history, from inspection, from tests of the range of movement of the joint, from the information got by the use of Nélaton's line and Bryant's



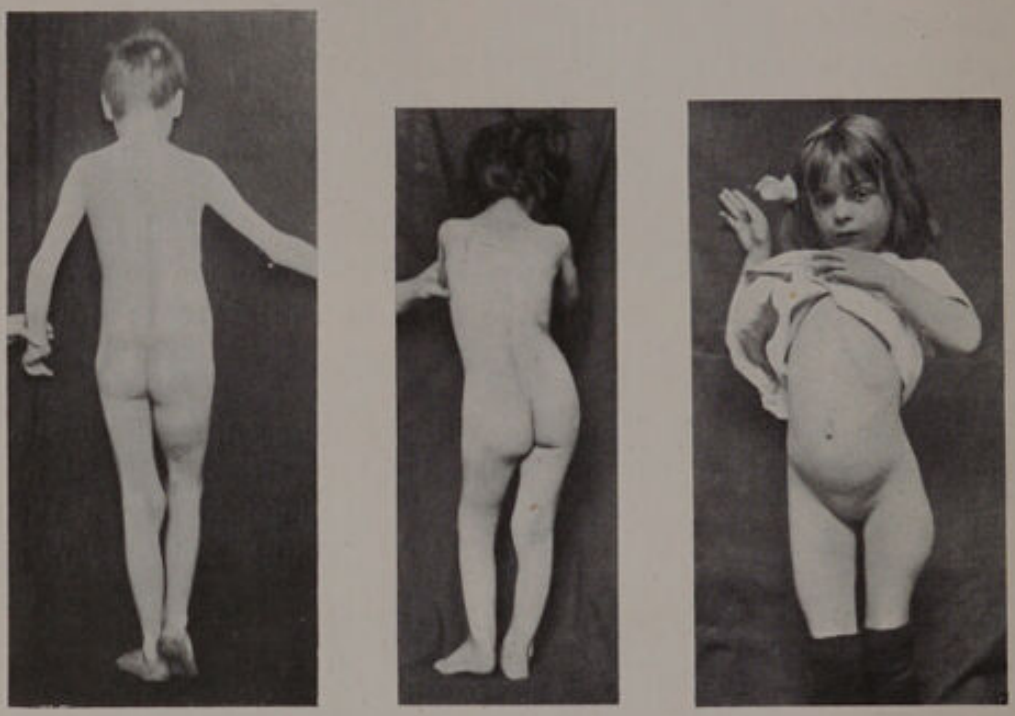
Effusion into hip joint.

triangle, and from good *x*-ray photographs properly interpreted.

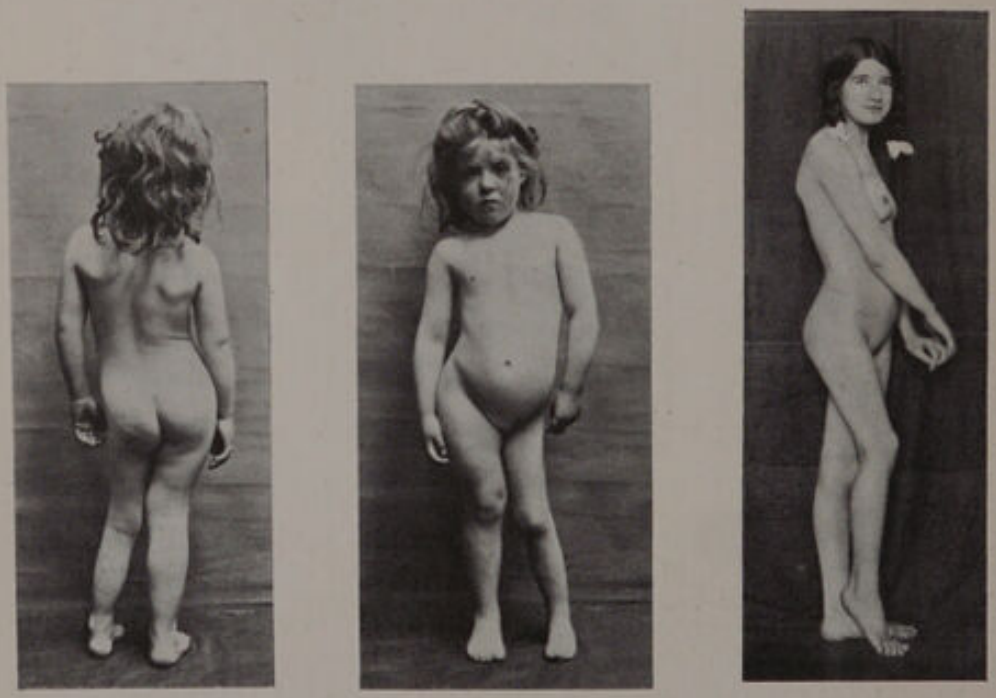
The student should be familiar with the old classical stages of tuberculous hip-joint disease—the first, the second, and the third.

He should know the old classical symptoms, the classical tests, and be able to reproduce the diagrams showing apparent

lengthening, apparent shortening, true shortening, pelvis tilting, and scoliosis, but he should be perfectly clear as to his duty of diagnosing the case and instituting preventive treat-



Abscess formation associated with hip-joint disease.



Healed cases: shortening, adduction, compensatory spinal curvatures and talipes; no sinuses; "satisfactory" results in so far as weight bearing is concerned.

ment long, long before any of these symptoms are demonstrable and the case is advanced beyond the first stage.

In the earliest stage the diagnosis may be sought from the family history, the Von Pirquet test, and from aspiration of fluid from the joint, which is submitted to microscopic and biological examination, and when the diagnosis is made the immediate institution of rest (fixation in plaster of Paris is probably the best method when properly supervised) will lead to the best chance of getting the disease cured, to attaining fibrosis and it may be fixation, without deformities, flexion, luxation, sequestra, abscess, sinus formation, or gross shortening.

This is the aim of the surgeon, time being a factor which is quite unconsidered, and all the hygienic and dietetic methods which are best suited to the patient are exhibited and may in the end lead to a cure.

CHAPTER XV.

ON OTHER HIP-JOINT CONDITIONS.

The other conditions about the hip-joint requiring diagnosis are best shown up by *x*-ray photographs, so that these may be considered a short-cut to diagnosis; they are—

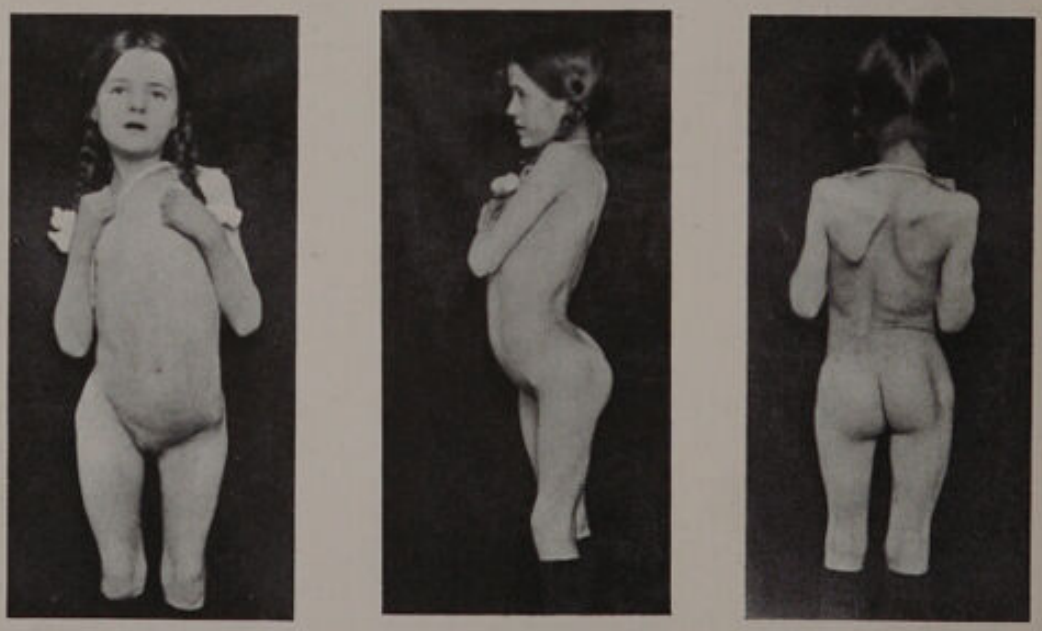
1. Congenital dislocation of the hip.
2. Coxa valga.
3. Coxa vara.
4. Perthé's disease.

Acute or subacute septic arthritis of the hip-joint should not be missed or mistaken for tuberculous hip-joint disease in the earliest stage if a proper examination has been made and the joint has been aspirated and the removed fluid has been examined.

Pneumococcic arthritis is not uncommon in young babes, and may be mistaken for tuberculosis.

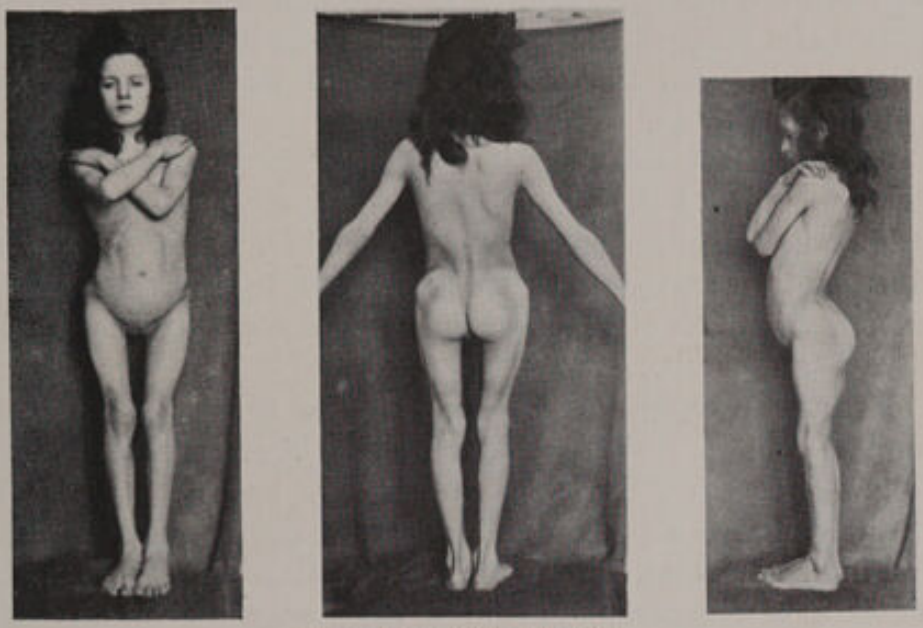
Arthritis (post-scarlatinal or pyæmic) is more likely to be caused by a streptococcus or a staphylococcus. The treatment of these cases is considered elsewhere.

1. Congenital dislocation of the hip is a condition which the busy general surgeon is pleased to hand over to the enthusiast



Unilateral congenital dislocation.

who is devoting himself to the practice of orthopædics, and the orthopædist who is not determined and gifted with the patience of Job would fain hand over a large percentage of his cases, could he find someone else to "hold the baby." There is no "treatment" for the condition. Each case is a law unto itself, and its progress depends on factors outwith the control of the surgeon, so that one can never give any



Bilateral congenital dislocation.

guarantee as to the result; one can but put the parts into proper relationship and keep them there, and leave it to Nature to secure the development which will lead to a good result.

There is *no* difficulty, as a rule, in reducing a congenital dislocation. There is *great* difficulty in keeping the parts in the relationship one requires, and holding them so. Beautiful, almost perfect, results have been attained, and this alone warrants the endeavour and the time spent on so many cases which ultimately show little or no improvement.

These are not cases to be undertaken lightly, and no surgeon should commence the treatment of such a case if he is not prepared for a long and troublesome encounter for which he can never get any adequate fee.

The diagnosis is usually made by *x*-ray photographs, and the correct interpretation of the photograph will enable us to

say whether the case is hopeless, or should be treated by the "bloodless method" popularised by Lorenz. The prognosis depends (1) on the degree of development of the head; (2) on the size and depth of the acetabulum; (3) a third factor, which is not revealed by the *x*-ray photographs, is the capsule of the joint, which, if there be a fair amount of dislocation, must have a bilocular shape with a somewhat contracted neck between the loculi. Through this constriction one must manipulate the head of the bone so as to get it again into proper relationship with the acetabulum, and this, as a rule, it is not difficult to do.

The hopeless cases are those which show that there is no head present on the femur.

The disappointing cases are those which, after reduction and fixation in a satisfactory position, fail to show any steady degree of growth of the head of the bone, or of the acetabulum in size and depth.

Every few months the cases require to have new plaster applied and new *x*-ray photographs taken, so that one may follow progress. Some go on steadily and beautifully, and in the end give a result which approximates normality. Others fail in one or other factor and give less pleasing results. Sometimes a new acetabulum will develop at a higher level than normal, to accommodate a well-developed head, but in other cases the acetabulum fails to develop any depth and constant redislocation will result unless the patient makes use of a walking caliper Thomas splint which is kept at a length which makes dislocation impossible.

Where the main defect is in the acetabulum, the question of open operation arises, and by gouging away enough bone with a large instrument or building up a marked ridge with grafts, it is possible to get the head sunk into a deep recess from which it is unlikely to be moved.

Where head and acetabulum are defective and the lesion is bilateral the question of making one joint fixed may require discussion.

Where no operation is deemed advisable, the patient's appearance and gait may be greatly helped by the use of a caliper Thomas splint with a fairly closely fitting ring, on which the patient actually sits while the maximum extension is kept up by the calipers in the boot.

The condition then may be single or bilateral; the waddling gait of a double congenital dislocation of the hip is classical.

It occurs more frequently in females.

The widening of the angle of the perineum is characteristic in bilateral cases.

It must be treated in infancy or early childhood, or cannot thereafter be cured.

There is no known cause for its production.

Swimming on the back is the exercise most likely to develop the controlling muscles around the hip-joint, and no better exercise can be advised, whilst the patient is being treated with a caliper splint.

2. Coxa valga is occasionally found in little girls, and it is not a condition causing much concern or calling for any active treatment.

3. Coxa vara, where limitation in abduction is the marked feature of the examination, is best appreciated, of course, from a good *x*-ray photograph, the arching upwards of the neck of the femur placed more or less at right angles to the shaft and the displacement of the head of the bone being quite characteristic.

Its etiology is unknown: it appears in growing youths, usually males who, it may be, are doing too heavy work under exposed circumstances, for their growing bones.

Rest in bed is the treatment during the progressive stage, and it may be that subtrochanteric osteotomy will be required at a later stage when the disease is quiescent and the deformity fixed.

4. Perthé's disease, or osteo-arthritis, used undoubtedly to provide those cases of tuberculous hip which arrived at a miraculous cure.

The etiology is obscure. The symptoms simulate early hip-joint disease.

A good *x*-ray photograph is the key to the diagnosis. The appearance is typical, and the fragmentation of the head of the bone cannot be mistaken for anything else. The neck is shortened.

The treatment is rest in bed during the progressive stage of the disease; the chronic and late stages of the disease are less seldom met with, and apparently cause few symptoms.

CHAPTER XVI.

ON CONGENITAL MALFORMATIONS OF THE LIMBS; ON WEBBED FINGERS AND OTHER LESIONS OF THE FINGERS AND TOES.

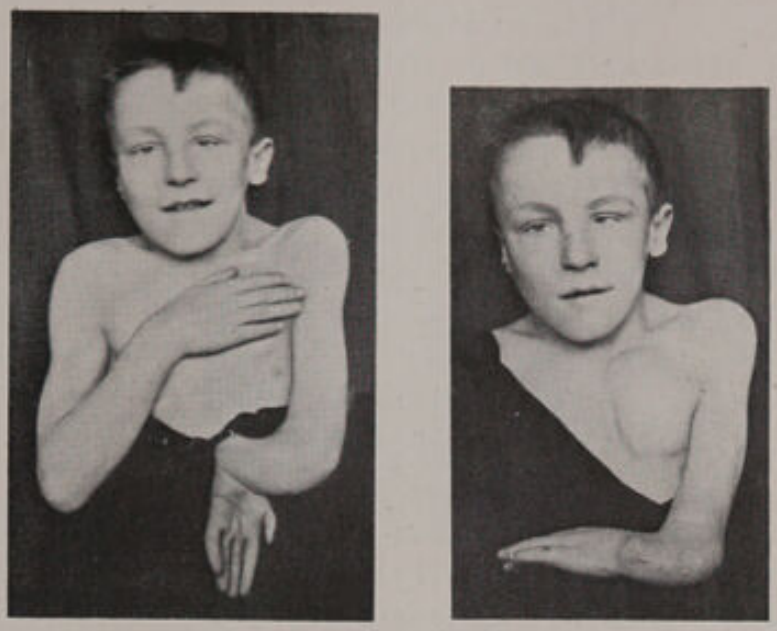
Two conditions which may be confused at first, as they somewhat resemble one another, are *congenital absence of the fibula* and *ante-natal fracture of both bones of the leg*.

In both there is a forward angulation of the leg below the middle point and at the apex of the angle the skin is dimpled. In congenital absence of the fibula, however, there is usually

an accompanying deformity of the foot which lacks one or two toes, whereas in the ante-natal fracture the foot is normal.

Palpation of the fibular region in each case corroborates the diagnosis, and, of course, an *x*-ray photograph settles the matter conclusively.

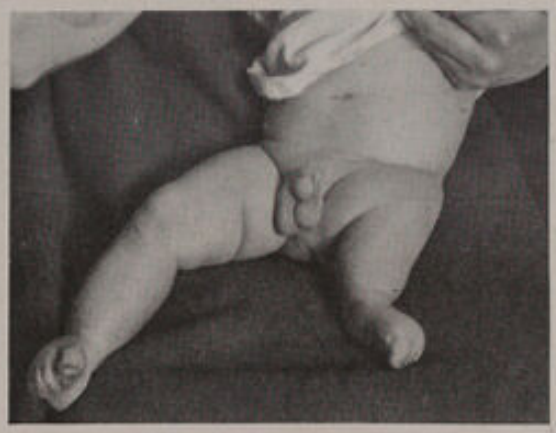
Owing to bone mal-nutrition, probably the result of interference with the nutrient artery, operative help by means of



osteotomy or bone-grafting is little likely to lead to a successful result in either case, and in the end amputation at the seat of election may be the best one can do for them.

Congenital deformities of the femur (absence of the upper half) and of the radius (total absence) are further lesions not uncommonly met with.

Many of the children are not normal mentally, but in those



cases where there seems to be no mental defect, the disappointment of the parents may be mitigated by the assurance that

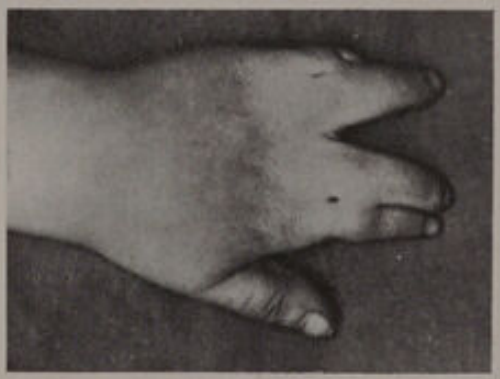
in the part there is no actual disease, and that the handicap is one which may not at all prevent the child from leading a useful and happy life. So far as the femur lesion is concerned, some orthopædic apparatus may be supplied which will allow of almost undiminished activity when the child reaches the age of moving about. It is probably better to make use of some such apparatus and defer amputation till a much later date if the patient is not then satisfied with his power of locomotion and wishes amputation for other reasons.

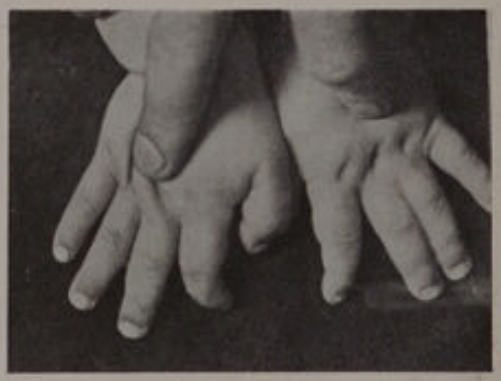
Webbed Fingers.

Syndactylism is a condition fairly commonly met with, and one which requires care and skill to get a first-class result.

The type of deformity may no doubt be traced back to the amphibian ancestor.

Sometimes the hand and fingers are deformed and irregular; at other times the hands are normal and the fingers perfect except for the webbing; these are, naturally, the best cases for





operation, and it is well to defer the operation till the child is perhaps five years of age and the hands begin to resemble the adult type of hand, less covered with fat than the chubby infantile type.

The simplest operation, section of the web, is almost inevitably followed by a persistent and painful fissure between the bases of the fingers, and not infrequently by contracture of the scars and the re-formation of the web to a surprising

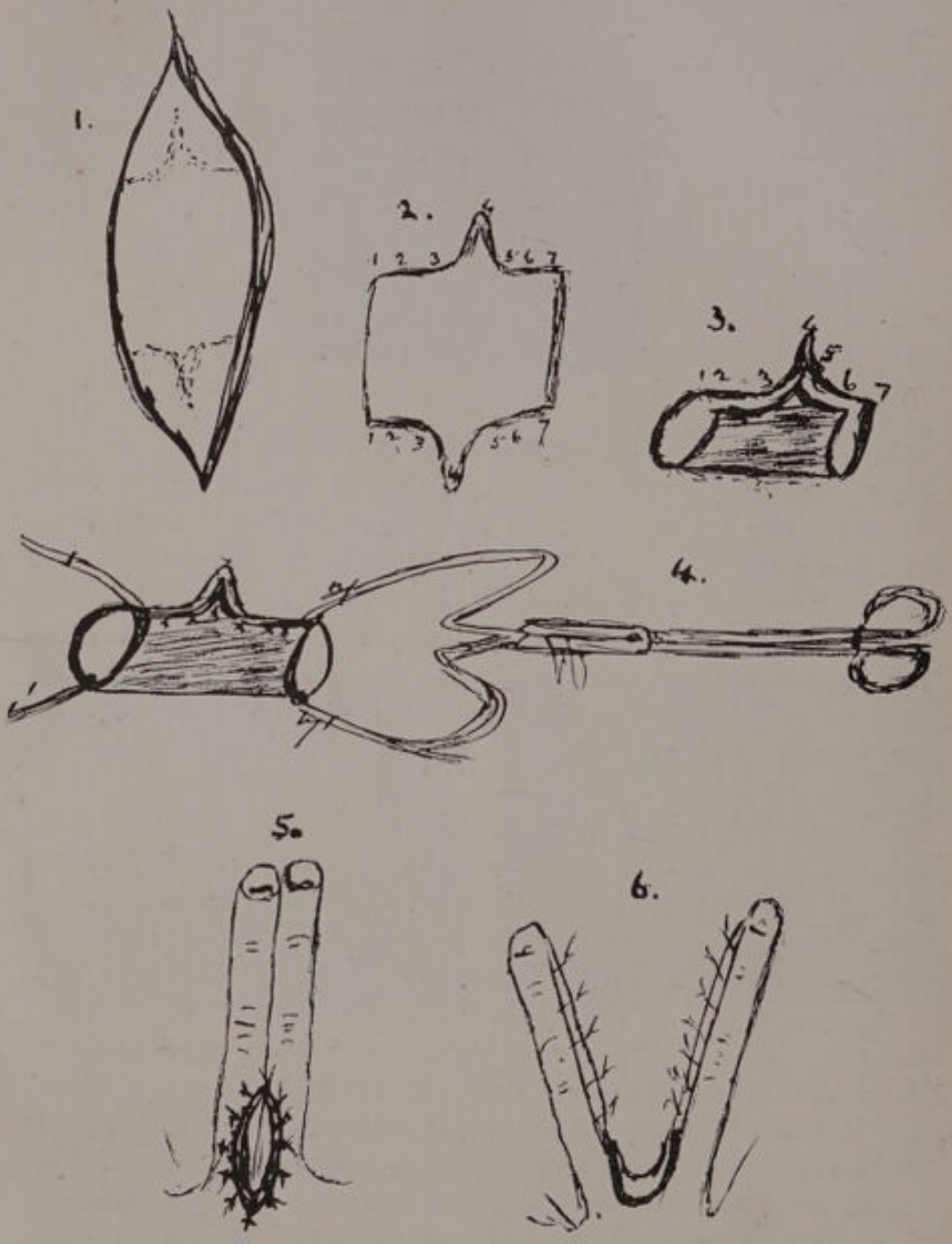
extent. It is clear that these tendencies must be prevented by the introduction of a graft at the point of separation of the fingers, and by allowing a minimum formation of fibrous tissue

to develop. Probably, at the time of section of the web, a graft might be put in, but thereafter a special splint must be worn, the patient must be kept under constant supervision, and the case will require indoor treatment. Experience has shown that if the operation be done in two stages, first the implantation of a tubular graft, and, ten days later, the separation of the fingers with suture of the skin edges as far as that is possible, a satisfactory result can be obtained, and the case may be treated as an out-patient. The procedure is as follows :—

The graft is taken from the inner side of the upper arm where the skin is lax and supple; it must be mapped out at first, lightly scratched in, with a needle point, and is considerably larger than one at first would judge to be necessary (probably twice as large). The ovate piece of skin and subcutaneous tissue is then cut out down to the subcutaneous deep fascia, and the wound left can be stretched out and stitched as a straight line. From the graft all the subcutaneous fat is now cut away with scissors curved on the flat, and it is now found to have shunk very considerably in size. The edges are now held and stitched together so as to form a cylinder or tube with the skin surface inwards and the deep layers of the skin outwards.

A perforating wound is next made with a sharp-pointed straight bistoury through the web opposite the metacarpo-phalangeal joint. Experience is necessary to judge exactly

how large the wound should be. Into the tunnel thus made the tubular graft is drawn by means of the terminal stitches and other special ones (see diagram) which have been left



long for this purpose. On palmar and dorsal aspects the edges of the open ends of the tubular graft are stitched to the edges of the perforating wound with fine non-absorbable sutures and

a fine wisp of gauze is drawn through the tunnel so as to keep the skin surfaces apart. Fine non-chromicised catgut stitches are used in shaping the tubular graft except for the terminal ones above mentioned, which are of horse hair or fine silkworm gut.

If the operator be intelligently assisted in shaping and pulling the graft through the tunnel the operation does not take long to perform. A dry sterile dressing is applied, with layers of gauze separating the adjoining fingers, and the whole hand is bandaged in with a fine gauze bandage. A very light plaster bandage may be put over all as a protection and the dressing need not be taken down till ten days later, when the second stage of the operation can be carried out.

In the second stage of the operation the web is divided in front and behind in its whole length (sometimes the single nail requires to be split), and in so far as is possible without too much tension the skin edges are stitched across the raw surfaces of each finger. The method of using dorsal and palmar flaps has proved less satisfactory. No preparatory extensive dissection of tissue from the raw surfaces should be done, as this will certainly damage the digital nerves and vessels. The line of catgut stitches in the graft will probably be absorbed, and when the fingers are separated the graft will be found to have taken well and to be lying like a saddle in the interdigital space. No attempt should yet be made to separate the fingers too widely. An ointment dressing on sterile gauze is applied, and the whole hand is bandaged in as formerly, the date of dressing depending on the amount of raw surface, if any, left. *Bipp* has been used, also the following ointment, which seems to promote the growth of epithelium, and has given the best results :—

Soft white paraffin, . .	1 oz.
Spt. vini rect., . . .	25 per cent.
Acriflavin, ...	0·1 per cent (1 in 1,000).

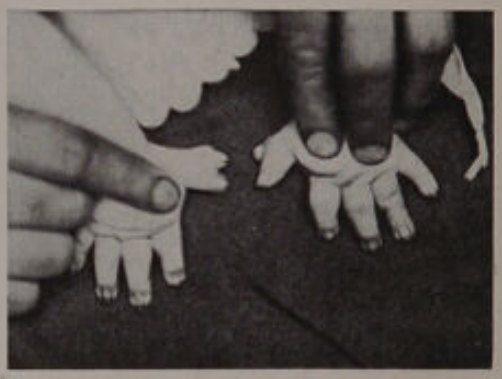
The acriflavin is dissolved in spt. vini rect., and then a little at a time this is worked into the paraffin on a slab with a flexible knife.

There is no tendency for the web to re-form, and all trouble with fissure is eliminated.

A general anæsthetic is, of course, required for each opera-

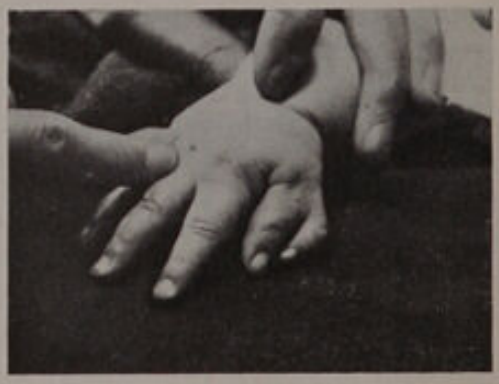
1—Polydactylism.
2—Bifid digits.
3—Supernumerary tags.

1.



2.

2.



2.

3.

tion, and it may be for the first dressing to remove the very fine stitches.

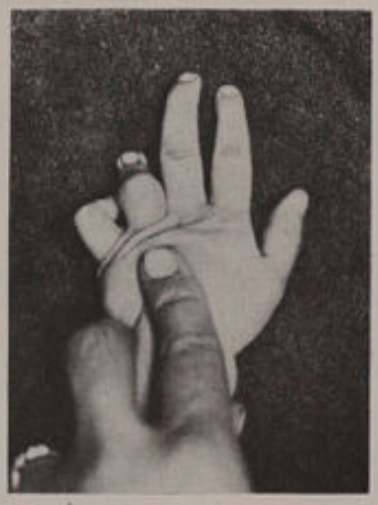
Other deformities of the thumb and of the little finger and the corresponding toes are fairly common and often hereditary. The thumb may be bifid or may be too large, a form of gigantism, and a supernumerary little finger may be more or less fully developed. The normal number of five digits has apparently been determined by the amount of surface brain, with its controlling cells, which could be spared as that organ became more increasingly complicated.

Illustrations show some common types, and the operative procedure is generally amputation, after *x*-ray examination, of the less useful digit.

Other conditions met with are illustrated for interest and differential diagnosis.

Congenital Contractures.

These occur frequently in the fingers, resulting from a shortening or contracture of the interphalangeal joint lateral ligaments. Permanent flexion at the terminal joints, often of the thumb, or inability to get complete extension, is the



result, and sometimes the finger is curly, especially the fifth finger; or a trigger finger results. Relief may be obtained by section of the ligaments or by removal of the head of the

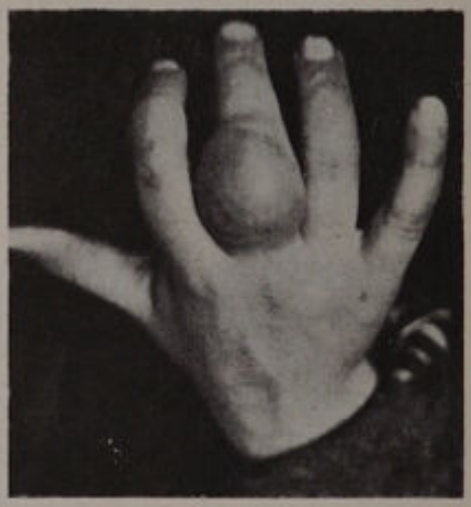
proximal bone of the joint, but more frequently the finger is useful enough, and no operative treatment is called for.

Hammer-toe is a somewhat similar lesion, and is more often submitted to operation.

Infections of the tendon sheaths call for early standard treatment in order to avoid stiff fingers from loss of tendons, or the necessity for amputation.

Implantation dermoid and a simple neoplasm, lymphangioma, of a finger are illustrated. Chondroma is another simple tumour occasionally found, and is often multiple.

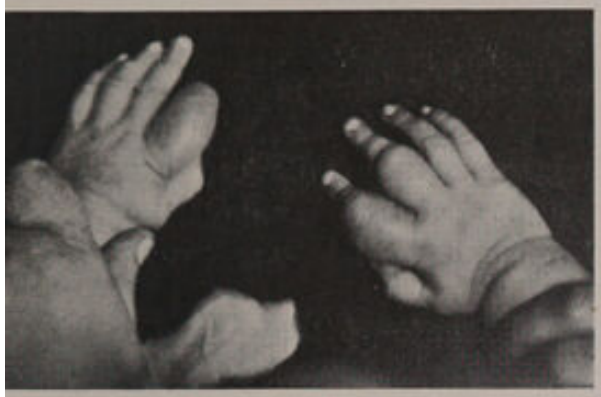
Implantation dermoid.



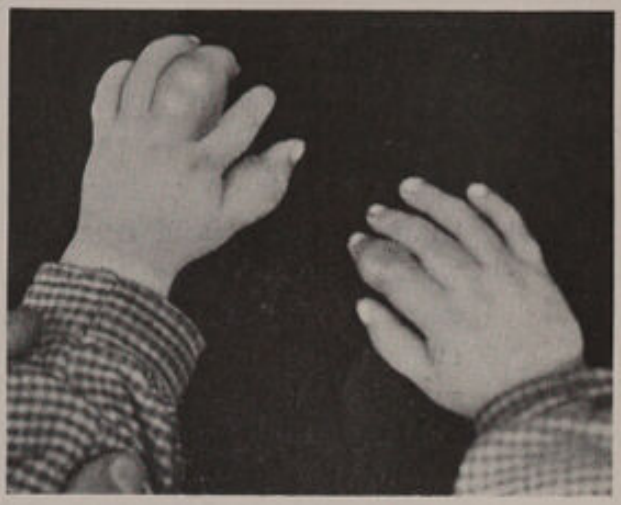
Lymphangioma.

Dactylitis.

It must ever be borne in mind that there is a syphilitic as well as a tuberculous type of dactylitis.



Tuberculous dactylitis.

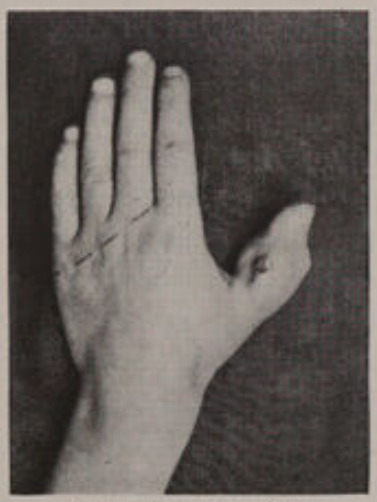


Tuberculous dactylitis.

Amputation in the former case would be a deplorable error.

Amputation in the tuberculous type is often a great disappointment in that other fingers or toes become affected later, and one cannot go on amputating fingers. The minimum

Tuberculous dactylitis.



Pyogenic osteomyelitis.

amount of evacuation of fluid *débris*, and of removal of *loose* sequestra, is indicated, and all the time the hand and fingers should be immobilised in plaster of Paris whilst general anti-tuberculous treatment is being carried out.

CHAPTER XVII.

ON FRACTURES IN CHILDHOOD.

The treatment of fractures in childhood is a simpler matter than in adults, and till bone growth is completed it is a fact worth remembering that Nature is constantly directing her efforts towards correcting any slight deformity which the sugeon has not been able to overcome to his own entire satisfaction.

Many fractures are greenstick, and many are long oblique fractures.

Immediate splinting or fixation in plaster of Paris for bad fractures is unwise practice, and immobilisation between sand-bags with frequent fomentations is the best treatment till one has evidence that further swelling of the part will not take place; wrinkling of the skin replacing the glazed appearance is the evidence required, and one may then proceed safely.

Intelligent manipulation with the site of the fracture rendered insensitive by general, spinal or local anæsthetics and the attainment of approximately correct alignment is sufficient in most cases, and there is little need for the advocacy of open operation as a general method of treatment. If the alignment looks all right to the educated, seeing eye, and the measurements are satisfactory, too much attention need not be paid to subsequent *x*-ray photographs which, as every-one should know, require expert interpretation.

The *x*-ray photograph of a birth fracture of the femur, for instance, has a most alarming appearance which might seem to shout loud for operative treatment.

After much experience, plating of bones has been completely abandoned, the use of Parham's bands in long oblique fractures is occasionally called for.

The only type of fracture which, as a routine, is submitted to open operation as the best line of treatment is the transverse supra-condylar fracture (really separation of the epiphysis) of

the lower end of the humerus, with marked backward dislocation of the epiphysis and the forearm. It is a replacement operation only.

Occasionally in fractures of the capitellum, it is necessary to replace the part in correct position and pin it there.

It is in dealing with fractures about the elbow region that one must be constantly on the alert lest ischæmic paralysis should develop. Free incision through the deep fascia must be made without delay if tension progresses in spite of frequent fomentations and immobilisation without splints, during the first day or two after the accident.

For fixation, plaster of Paris is invaluable, and by far the best method available in most fractures of the forearm and leg.

The proper method of applying extension by the use of adhesive plaster straps should be acquired, and in fractures of the femur the use of a Thomas splint as an adjuvant to the treatment by extension is satisfactory.

The treatment with the Thomas splint as the *main* factor, with the extension straps fixed to the end of the splint, leads too often to the production of pressure sores about the groin and buttock, and is only advocated as a temporary measure. (See lessons on Plaster of Paris and on the Use of the Thomas Splint.)

Fragilitas ossium leads to frequent and to multiple fractures. The association with " blue sclerotics " is well known and most striking.

CHAPTER XVIII.

ON PLASTER OF PARIS.

$CaSO_4 2H_2O$ calcined so as to lose 75 per cent of its water is a powder called plaster of Paris. The best variety is white in colour; poorer varieties are pink or brownish in colour. Plaster of Paris combines with water to form a hard cement. Bandages, well powdered with plaster of Paris and used wet, are made use of to get a rigid sheath where it is necessary to maintain a desired position of limb or trunk.

There are many varieties of plaster of Paris bandages on the market, but few excel the home-made article when it is properly prepared and used as directed.

The cloth must be wide-meshed, like butter or cheese cloth. The bandage must be loosely rolled; in width it varies from 3 inches to 8 inches. The plaster must be abundant and dusted on the bandage as it is being rolled.

The bandages must be stored lying horizontally, so that the powder does not fall out.

The plaster is not usually applied next the skin; when so used a special technique is necessary and must be learned, but a single layer of soft gauze bandage or of stockinette material is applied over the skin after it has been properly prepared with spirit and dusted with powder. The addition of *camphor* to the powder will help to keep vermin out of the dressing; vermin, unfortunately, still constitute a problem so far as the out-patient is concerned, but with increased available hospital accommodation in the municipal hospitals there is now no excuse for the treatment, as outdoor patients, of the type of case which used to be pushed home with plaster of Paris splinting on because of the lack of accommodation for indoor patients in the voluntary hospitals.

A large basin with lots of water should be used so as to get the bandages completely covered. Each bandage should be put into the water only as it is required, should be laid horizontally in the basin, and should be ready for use in a minute or so. When all the air bubbles from between the layers have come away the bandage should be held at both ends, lifted out of

the basin, and held above the water till the excess of water has run off; the bandage *must not* be squeezed dry, the plaster *must not* be allowed to escape from the ends of the bandage.

The bandage is applied wet and loosely, being never tightened up, as in ordinary bandaging, but allowed to lie against the part simply with the pressure of its own weight. As the water is taken up the cement hardens and dries; a little alum in the water is supposed to hasten the process, but putting the part before a fire or near a radiator to dry is irrational and usually unnecessary. Good plaster sets quickly in five to ten minutes; plaster which remains soft for hours is of poor quality and unsuited to this type of work.

In cases of club-foot, fracture and dislocation, in spinal cases, and in the prevention of deformities and protection of wounds there is a wide field of use for plaster of Paris. In children it is especially useful when the application of ordinary splints and the difficulty of keeping these unsoiled is at times impossible.

Nothing but practice will make one an expert in the application of plaster of Paris. The avoidance of sores caused by finger-tip pressure during application, of pressure sores over prominent bony points, of too loose as well as of too tight application—all require a long apprenticeship, and the proper finishing off and dating of a plaster sheath at once stamps the expert from the novice.

The job is a messy one, and where much plaster is being used gloves, gumboots, rubber overalls and sheeting will help to avoid unnecessary mess and damage to clothing and linen.

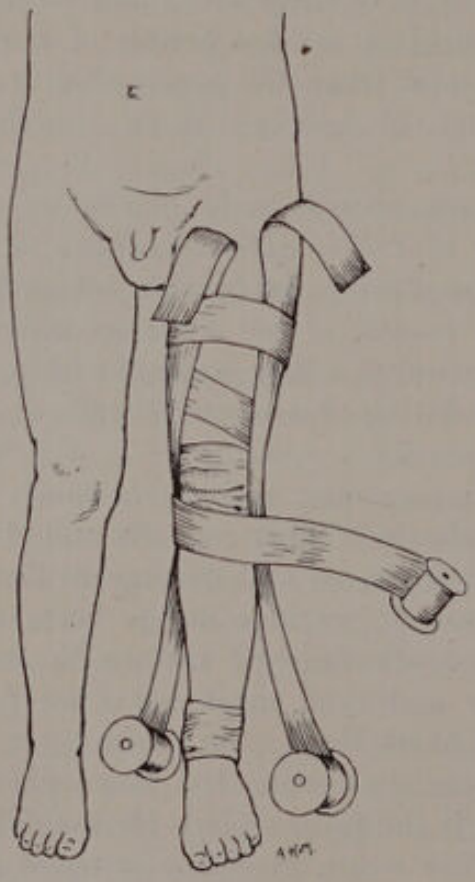
The mud, cream or porridge at the bottom of the basin is used to get a smooth finished surface to the plaster. The remaining water and mud must never be poured down the pipes or it may block them; the basin must be emptied and cleaned also before the setting has taken place. The furnace *via* the dust bin is the proper place for the *débris*.

If gloves are not worn, glycerine or sugar may help to get rid of the plaster which gets under the overhang of the nails and into any other skin chinks, and the young surgeon may learn a useful lesson as to the difficulty of efficiently scrubbing his hands by noting some time afterwards small particles of plaster presenting themselves on hands he had thought to be well scrubbed.

CHAPTER XIX.

ON EXTENSION AND THE USE OF A THOMAS SPLINT.

The application of extension to a limb must be properly carried out if it is expected to last for several weeks as in the case of a fractured femur. The extension bands may be of



gauze as it comes in rolls from the maker; any ordinary bandage or a material which tears across readily is useless; the adhesive medium painted on the limb may be Sinclair's glue or *mastisol*.

A pad of wool or of soft gauze is always placed round the

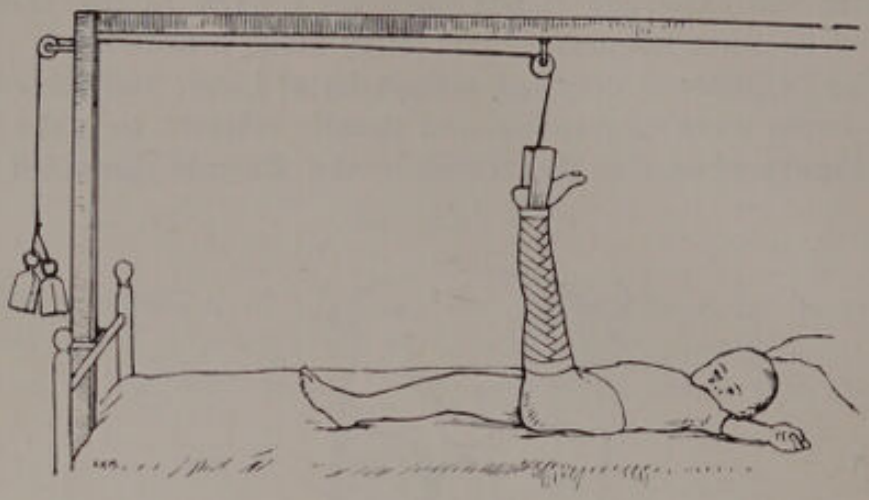
ankle just above the malleoli, so as to prevent the extension material from pressing on these bony points.

After the extension bands have been fixed to the skin a flannel or other bandage is put on to make a neat finish.

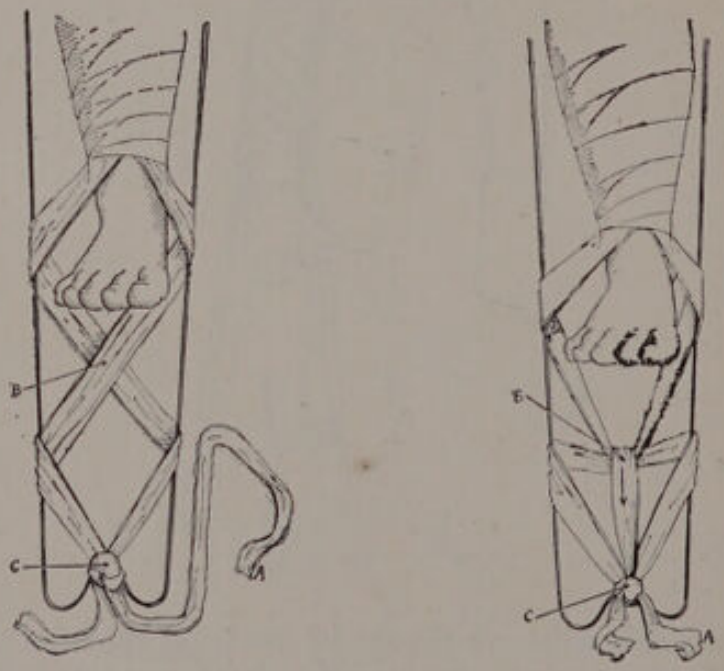
Glue or mastisol may not always be at hand, and therefore it is found more convenient and equally efficient to make use of adhesive plaster as illustrated in the diagram, provided (1)

that a zinc oxide adhesive plaster be used, (2) that the material be of good quality and not too thin, (3) that the lateral bands be made of double thickness, one layer superimposed on the other, and (4) that no snips are made with scissors on the edges of the extension straps so as to facilitate the folding over of the end portions. If these four points be attended to and the malleoli are protected from direct pressure by the bands, then the treatment of fractured femurs with the aid

of an overhead bar in the long line of the bed, either by simple vertical extension or with the aid of a Thomas splint, becomes



a simple matter which will give little trouble during the six to eight weeks necessary for healing.



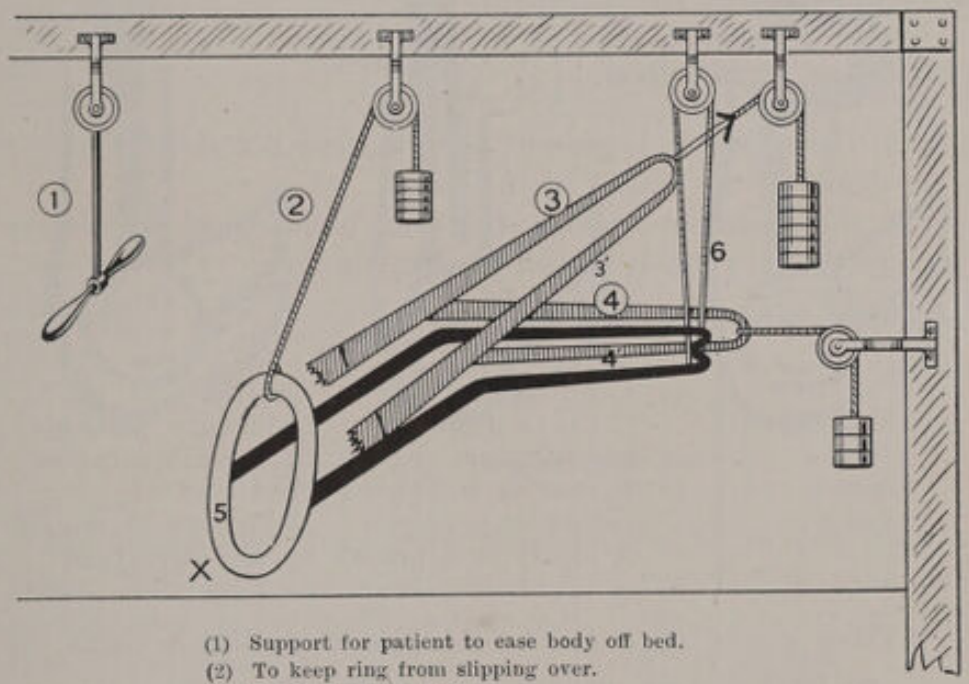
Method of tying extension straps so as to allow of easy taking up of "slack" during the first few days.

With reference to the Thomas splint—the pull by the extension bands when fixed to the ends of the splint is counteracted by the push of the ring up against the ischial tuberosity. It is very easy, however, for the ring to slip over

this bony point and be pushed hard up against the perineum, and in practice this often results in the production of pressure sores, so that reliance on the Thomas splint when so used is not advised except as a temporary measure.

As an aid, however, to the essential treatment by *extension* the Thomas splint is excellent. With the help of proper weights carried over pulleys fixed to the overhead bar the ring can be kept in its proper position and the patient be allowed a degree of freedom of movement quite impossible if the old types of splints—the long Liston and the long osteotomy—be used.

The angled form of the splint, with the leg portion lying horizontally, is most generally useful. The slings which



(1) Support for patient to ease body off bed.
(2) To keep ring from slipping over.
X The ischeal tuberosity.
(3) Line of pull for femur.
(4) Line of pull for leg.
(5) The splint, and its (6) sling.

support the weight of thigh and leg must be of suitable material—rigid, like perforated zinc, well padded with gamgee tissue or (alternatively) double layers of strong calico. These have proved better than any more yielding substances. The diagrams make clear the ideas behind this method of treating fractured femurs.

CHAPTER XX.

ON THE EXAMINATION AND TREATMENT OF A CASE OF TALIPES.

Talipes, or "Club-Foot," is (1) a deformity of the foot, or (2) an alteration in the relationship of foot to leg which prevents the normal weight-carrying parts of the foot from touching the ground. In case (2) the foot itself is not necessarily much, if at all, deformed.

Etiological classification. { *A.* Congenital. *B.* Acquired.

In *A.* the condition is present at birth, and is a developmental defect in the tissues of the foot.

In *B.* the condition develops after some pathological process has produced a lesion elsewhere than the foot.

Acquired talipes—

	SITE.	TYPE.
1. May result from a nerve lesion.	(*a*) Cerebral (Little's disease; hemiplegia).	Spastic. Deformity produced by spastic muscles.
	(*b*) Spinal or peripheral (infantile paralysis, or injury or neuritis).	Paralytic. Deformity produced by non-paralysed muscles.
2. May result from the contracture of soft tissue scars in the leg after	tuberculous abscesses, burns, or other traumata.	
3. May be *compensatory* after	shortening of limb following lesions in bones or joints, *e.g.*, hip- or knee-joint.	
4. May be concurrent with a spinal defect at birth.	Spina bifida cases show both "congenital" and "acquired" characteristics at times.	

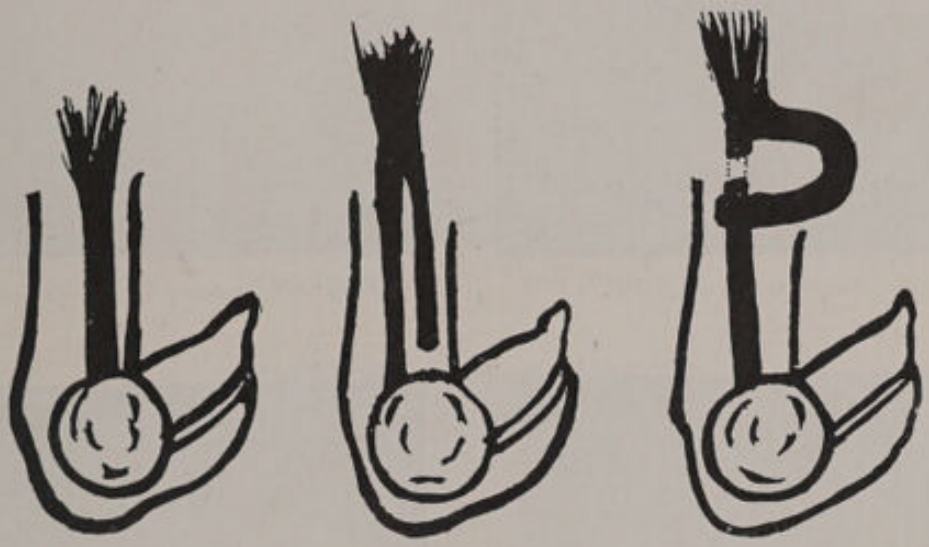
Where the case is not obviously congenital *or* acquired,

examination with the help of the *x*-rays must be made to ascertain the presence of any " spina bifida "—" occulta " or obvious. Trophic lesions, such as chronic sores, are a further indication of the true nature of the lesion.

The congenital case, therefore, is the typically deformed foot quite irreducible without special effort.

The acquired case, and especially the paralytic spinal type in its early stages, can always have the misplaced but approximately normal foot " reduced " into a correct posture.

The contracture cases are " irreducible," but the essential bony structure of the foot is not changed.



Tendon lengthening, keeping mesial insertion.

An anatomical descriptive classification of talipes may be given, but it is subsidiary in importance to the etiological classification given above, which is the true key to an appreciation of the proper line of treatment of any given case.

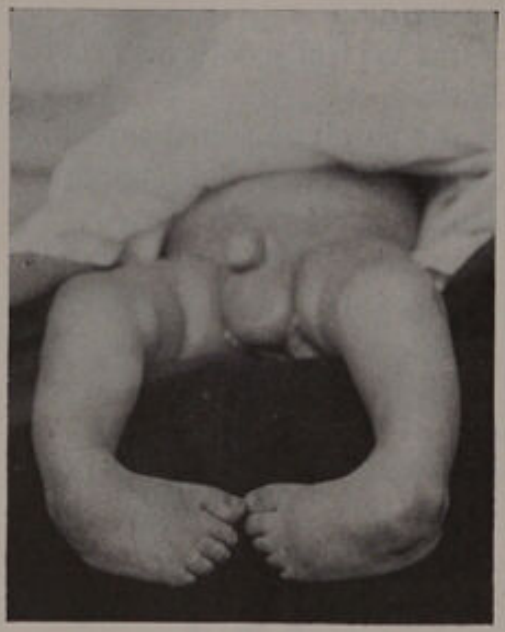
Anatomical varieties of talipes :—

Talipes calcaneus,	heel on ground.
Talipes equinus,	toes on ground.
Talipes varus,	outer side of foot on ground.
Talipes valgus,	inner side of foot on ground.
Talipes cavus,	exaggerated arch of foot.

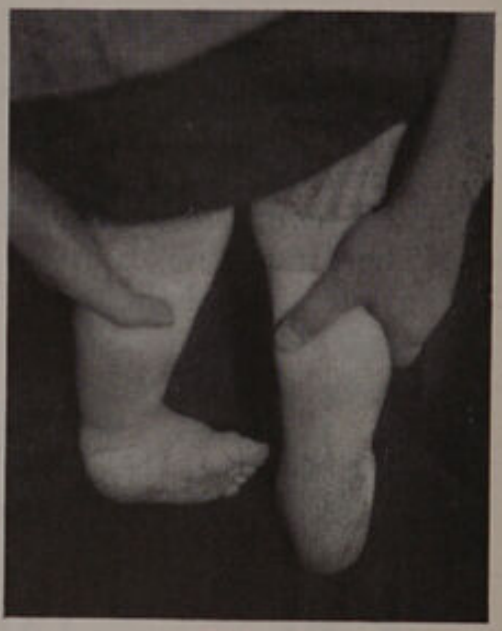
Combinations of these varieties are perhaps more common than the pure varieties, *e.g.*, calcaneo valgus, calcaneo cavus,

and equino-varus, which is the most common of all varieties.

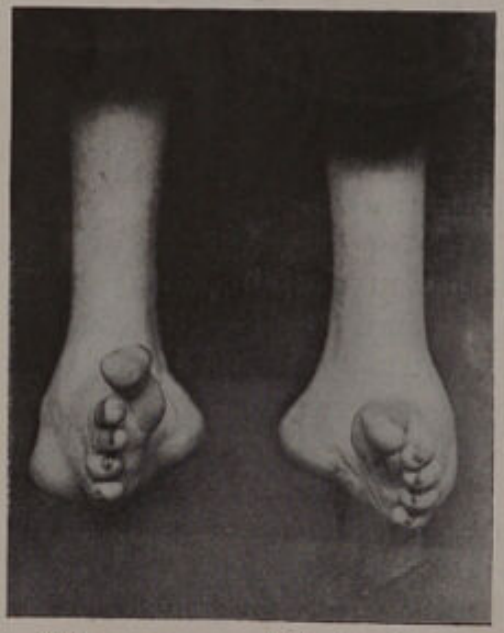
Congenital talipes of the usual equino-varus variety is



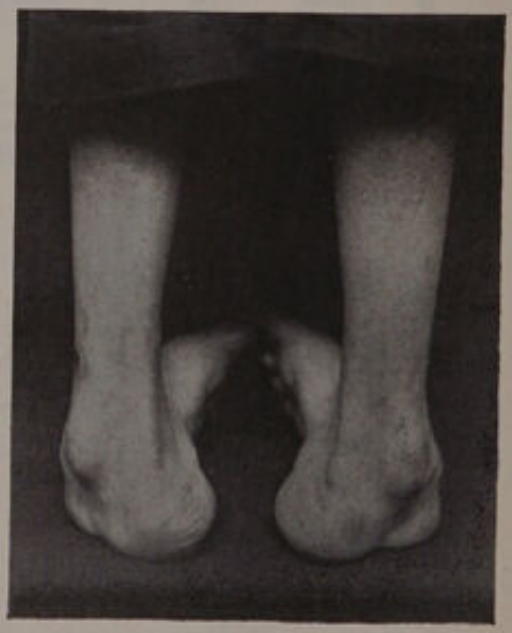
Talipes varus, congenital.



Talipes varus, congenital, posterior aspect.



Talipes varus, congenital. Note bursæ.

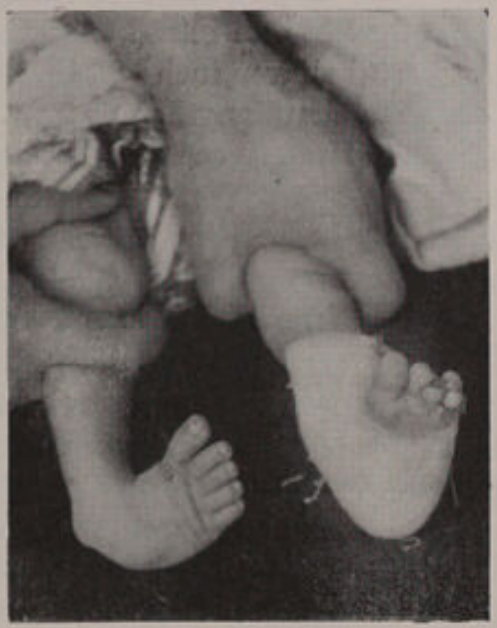


Talipes varus, congenital. Note bursæ.

common, is generally attributed to a lack of fœtal unwinding, *i.e.*, the foot is maintained too long in an early fœtal posture, or is said to be in a reversion to an ancestral type in which

the foot was used as a prehensile organ, and in this connection there is a remarkable resemblance between the astragalus of

Talipes varus, acquired. Spinal, paralytic.



Talipes varus, congenital. After tenotomy, manipulation and fixation in plaster of Paris.

the chimpanzee and orang and that taken from the adult, untreated typical equino-varus foot.

It is usual to lay stress on the bone deformity in the typical

equino-varus congenital case, but it must be remembered that the typical deformity in the bone is a feature of the fully ossified bone, and " potentially present " only in the structure at birth. As an observed fact, section or lengthening of the tendo Achilles allows of the foot being very easily moulded into an over-corrected position, so that one almost concludes that in many of these cases the tendo Achilles is attached to the os calcis not mesially, but to its inner side. The up-drawing and in-drawing of the heel are remarkable in such cases. This seems the cardinal lesion. The most rational treatment of such a case is a tendon lengthening so done as to detach the innermost half of the tendon and leave attached to the os calcis the outer half of the tendon. Thereafter manipulation, over-correction, and fixation in plaster of Paris will initiate a successful course of treatment.

A vertical section of the posterior part of the os calcis has been suggested, but is perhaps an unnecessarily severe procedure.

The treatment of a case of congenital talipes, *e.g.*, varus, depends on the age of the case when it first comes under one's care, and the earlier the case is taken in hand the better.

The treatment preferred is an initial subcutaneous tenotomy of the tendo Achilles, half an inch above its insertion into the os calcis, or a tendon lengthening, in selected cases, as already described. This is occasionally supplemented by a *syndesmotomy* of any tight facial band on the inner side of the foot, the knife edge cutting through the insertion of the tibiales tendons down to the scaphoid. Thereafter, the foot is forcibly moulded by the hands into an over-corrected position or a Thomas' wrench is used to attain this result. Care is taken not to separate the epiphyses of tibia and fibula, as may easily be done. In this position of over-correction the foot is fixed up in plaster of Paris, and is kept so for ten to fourteen days. At intervals of two to four weeks the child has the plaster soaked off, is anæsthetised, and has the foot re-manipulated and refixed in plaster of Paris till it reaches the age of 12 or 15 months, and by that time the foot is usually in excellent position, and the child will commence walking with the sole on the ground. There may remain an inveterate tendency to turn the toes in whilst walking, but this is a matter for correction by education at a later date

(when "Charlie" becomes the idol). The proper use of plaster of Paris bandages can only be acquired through a long apprenticeship. There is nothing better, however, and the technique is worth mastering.

When the case of congenital talipes, *e.g.*, varus, does not come for treatment till the child is many months or years old, the case is properly described as a "neglected" one. Changes in the bones, and in the fasciæ and tendons, have become fixed, and simple tenotomy, syndesmotomy, and manipulation are little likely to get a good result; further procedures have to be adopted.

The first point to be appreciated and to be emphasised is that there is a bony deformity now to be dealt with—ossification is much more advanced, and the greatest change is in the astragalus. One's attention, therefore, should be focussed on that bone.

Two procedures only have given satisfactory results:—

1. Astragalectomy.

2. A wedge-shaped osteotomy, with the base of the wedge on the outer aspect of the foot and the apex about the tubercle of the scaphoid.

In the normal foot the axis of the body of the astragalus pretty nearly coincides with the axis of the neck.

In the "neglected" club-foot they meet at an angle which becomes less obtuse as the condition becomes more severe. There results in the bad adult case a projection on the dorsum of the foot where body and neck meet, and the astragalo-scaphoid articulation may be so disturbed that the scaphoid is in contact with the internal malleolus.

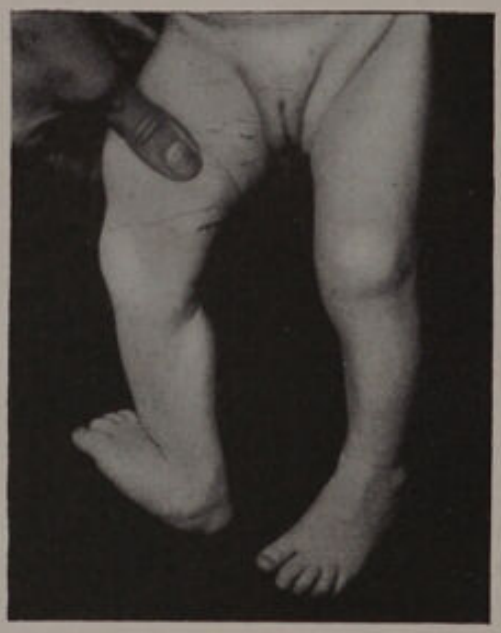
In these neglected cases, too, the development of adventitious bursæ on the outer surface of the foot, which is the part in contact with the ground, is common, and the state of the horny skin is such as to necessitate careful attention before any operation is attempted.

In the extreme case the weight is borne on a bursa overlying the dorsum of the foot, and the sole of the foot looks directly backward and is often deeply grooved antero-posteriorly and transversely. Since so marked a change is seen in the astragalus, the obvious indication is to deal with the condition by removal of the astragalus.

What sort of a result does this procedure give? So far

as can be judged, a stable, painless, and, from the point of view of function, a most satisfactory result. The foot is not pretty when viewed from behind. It was not pretty to start with. In the younger children satisfactory results have been got from the removal of a "bone wedge" consisting, for the most part, of cuboid, neck of astragalus, and inner portions of scaphoid. The operation leaves a neater ankle, and is perhaps preferable in younger cases with marked curving of the outer edge of the foot.

These two operations have been found satisfactory; osteo-



Talipes calcaneo valgus, congenital.

clasis, tarsoclasis, Ogston's operation, Phelp's open operation have not been given any extended trial.

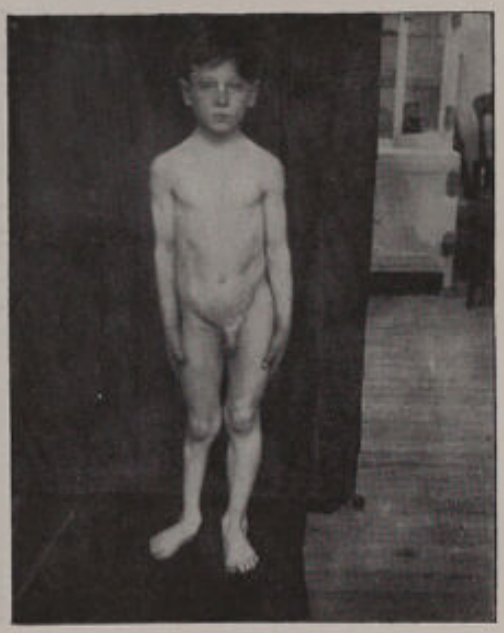
In the most neglected and deformed cases a Syme's amputation and the use of a dummy boot may give a better æsthetic end-result and a more useful one than can be got by the building up of any boot round the existing deformity. This is, however, a last resort.

The methods, therefore, of dealing with a congenital talipes equino-varus are straightforward and simple, and the use of steels, patent boots with straps, and other contraptions should

be avoided, since it is possible to get a better result without their use and without loss of time and aggravation of the deformity. Cases dealt with by the use of "apparatus" usually provide the "neglected" cases, which are difficult to rectify. The only "apparatus" frequently employed is the stiff-uppered boot, which has the outer half of sole and heel two or three times the thickness of the inner half, so that the weight of the body is thrown on to the inner edge of the foot.

Congenital talipes valgus and talipes calcaneo valgus are

Talipes valgus, congenital.



Talipes valgus, acquired, spinal, paralytic, atrophy of whole limb.

not uncommon, and the narrow, elongated calcaneo valgus foot, which during intra-uterine life lay hard up against the front of the leg, may very well be the precursor of the so-called "static adolescent flat-foot" which develops later on. Contrasted with this is the stumpy talipes valgus with its fat bulging inner border, a true flat-foot devoid of beauty, but not likely to fail in response to the increased strain put on its structures when the body weight is carried on it. Such an adult "flat-foot" usually is symptomless, and is not uncommon in the mining districts of Lanarkshire.

The two types of congenital talipes valgus can be greatly

and rapidly benefited by persistent properly directed manipulation and massage, and the foot generally gives a normal appearance after a few months.

A foreshortening operation on the tarsus is recommended in pes cavus conditions, and this may be combined with a tendon shortening in cases of calcaneo cavus.

The treatment of talipes resulting from a cerebral nerve lesion usually resolves itself into tenotomy or tendon lengthening to correct contractures which have developed, and certainly some of these cases can be much helped, but this type of case

Talipes cavus, acquired, spinal, paralytic.

Talipes equinus, acquired—scar contracture.

is not one which gives scope to surgical work. Prophylactic care is better than late correction by operation.

Where talipes accompanies a spina bifida the case depends for its progress on the degree of the spinal lesion. Some cases may be treated as one would treat an ordinary congenital case with success; in others, trophic sores and other skin lesions show the case to be quite unsuitable for operative interference.

In the compensatory type of talipes, and in those due to contracture of soft tissues — usually a talipes equinus — "Nature's cure" may be best, and it must be carefully considered whether the replacing of the foot at right angles to the leg, thus necessitating the constant use thereafter of a

boot with a sole three to four inches thick, is an improvement, or whether it is not better to have a boot built around the foot in its abnormal equinus position. Of course, if a lesion at the hip-joint or at the knee-joint can be remedied by operation, this should be done before any attempt at interference with the foot.

There remains for discussion the " spinal " paralytic case. The usual case is the talipes following infantile paralysis, with paralysis of one or more of the four groups of leg muscle

Talipes equinus, acquired, spinal, paralytic —late contracture.

Talipes equinus, acquired, compensatory. Knee lesion.

controlling the position and movement of the foot at the ankle-joint—the extensors, the flexors, the tibialis group, and the peroneal muscles.

The deformity is produced by the pull, and partial contracture later, of the *non*-paralysed muscles. The deformity is reducible.

In early cases an examination must record the group of muscles affected, and the degree of severity of the paralysis. Is it mild and temporary or severe or absolute? Is the foot a " flail "? For the first eighteen months to two years after the appearance of the lesion, massage, electricity, bathing must all be used to get a maximum restoration of function,

and a light moulded splint of the limb should be used to prevent the shortening or "taking in of the slack," which will occur in the sound muscles, and lead to a late contracture deformity.

After two years, operative measures may be considered :—

1. Restoring function by tendon transplantation; attaching the tendons of the paralysed group to the tendons of active muscles. Tendon shortening may also be made use of.

2. Replacing the paralysed muscles by metal, silk, or other

Talipes equino-varus, acquired, spinal—late contracture.

organic slings which will hold the foot in the desired correct position. The distal portion of the paralysed tendons may themselves be used as the slings, and fixed to the tibia by means of metal staples or through tunnels in the tibia.

3. Restoring stability so that the sole of the foot may come into contact with the ground.

(*a*) Erasion of the ankle-joint,
(*b*) Arthrodesis at the ankle-joint or at the mid-tarsal joints,
(*c*) Astragalectomy,

} may be required to get this result in a bad flail foot.

The variety of operative procedures is infinite, and all the ingenuity of orthopædic surgery has a field full of possibilities presented to it.

4. Nerve suture and nerve grafting may properly be tried in certain cases.

5. Amputation is a last resort, and rather than do a Syme's amputation one may get an extremely useful result by doing a modified von Mikulicz amputation. This, combined with an excision of the knee, in cases of flail limb, may permit of absolutely hopeless cripples being able to get about without any splinting apparatus.

The alternative treatment to operation is the use of supporting apparatus, and there was no end to the number of "pieces" available. There always remains the objection that a weak limb is being burdened by having to carry about with it a load, and so, on this ground, operative measures, if they are successful, are undoubtedly preferable.

(*a*) Some kind of walking caliper splint, with or without straps to lift the toes off the ground;

(*b*) A pexaloid moulded splint holding the "reduced" foot at the right angle, and fitted over all with a special boot; these two types of splint seem to me the best available, since they are the lightest possible, and most easily carried.

The whole subject is an important one, and presents a field requiring much patience, ingenuity, and determination in order to get good results. The results, however, seem worth it.

CHAPTER XXI.

ON OSTEOMYELITIS IN CHILDHOOD.

The natural history of a case of osteomyelitis is dramatic; the stages of the disease are well-defined; the pictures presented may be astonishing; but the duration of the natural cure is so long delayed, and the end-result often so unsatisfactory, that interest in this type of case has not been sufficiently aroused, and treatment has not been brought up to date. The text-books still concentrate on the old pictures of sequestrum, involucrum, and cloacæ, and give instructions with regard to diagnosis and treatment which are of little help to the

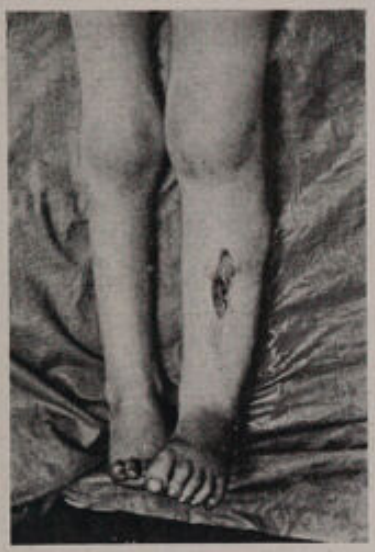
Sequestra and front of tibia with cloacæ.

practitioner, the patient, or the operator—in short, the natural history of a "neglected" case is given much as "fæcal vomiting," and "the Hippocratic facies" are symptoms of a "neglected" case of intestinal obstruction, according to modern views. The disease is not uncommon.

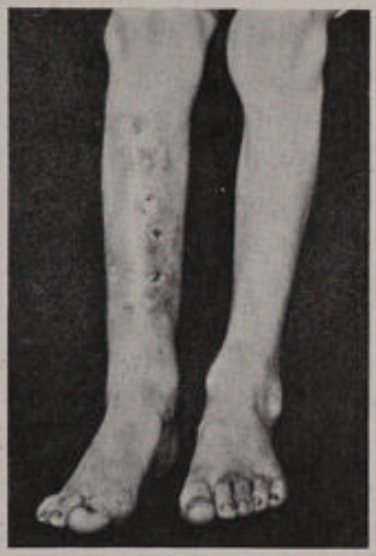
Osteomyelitis is a microbic infection of bone, and bone is an

ideal nidus for organisms. The most common organism causing it is the staphylococcus aureus. There is frequently present some boil or other septic sore on the affected limb, or the patient has recently had tonsillitis. The infection is probably carried by the blood-stream. There is often a story of trauma before the onset of the acute condition.

The disease affects the shaft or diaphysis of a long bone. The site of the infection in the typical young individual is usually at the diaphyseal side of the epiphyseal plate—the



Acute case : knee involved.



Chronic case, with sinuses.

growing line of cartilage. This clinical fact is often demonstrated. From this site (to which, doubtless, the organisms have come by the blood-stream) the infection—

(1) Works its way through the cancellous bone into the marrow cavity; or

(2) Along the plate to the attachment of the periosteum and there produces a subperiosteal abscess which strips off the periosteum, and sooner or later bursts through it into the soft tissue in its endeavour to reach the surface; or

(3) Causes an infection of the adjoining epiphysis and joint.

The plate of cartilage is undoubtedly a protective barrier preventing the last occurrence, and luckily so, since joint infection adds to the gravity of the case.

Here, too, one may note that should an infection be overcome

naturally, and the site be walled off so that at a later date a "Brodie's abscess" results, that abscess will be gradually pushed further and further away from the joint in the normal process of growth, and may finally be found so far away from the plate that its original location remains all unsuspected—a wonderful piece of protective healing on Nature's part.

Because of the deep situation of the focus of infection the cases are apt to be overlooked till they are obvious—"growing pains," "rheumatism," "sprains," "fractures," and "enteric" being usually diagnosed. When the child arrives on the fourth or fifth day of illness the symptoms are undoubted, and the child is usually highly fevered, delirious, and often moribund suffering from pyæmia, so that its life can hardly be snatched at the cost of a high amputation or disarticulation.

Unfortunately, in the early stages *x*-ray examination does not give any clear lead, and, till the profession is educated to a belief that these cases should be explored on suspicion, long illness must be expected and many lives will continue to be lost.

If a child, previously quite well, complains constantly of pain and of tenderness at a bone end for, say, twelve hours, and has an elevated temperature (and is not rickety or suffering from scurvy), there is a clear indication for exploration at the common site of origin of this disease, *i.e.*, close up against the epiphyseal plate of cartilage. No text-book lays sufficient stress on the *obvious* (!) indication to get right to the initial focus of the disease, and Macewen's teaching did not perhaps lay sufficient emphasis on this vital detail. An early exploration with curettage or excision of a small focus, followed by antiseptic treatment, may cause a complete subsidence of the disease. Repeated leucocyte counts may give valuable guidance.

Such is the ideal early treatment of a case, and if from the removed bone one is able to demonstrate and make cultures of organisms, and the operation be followed by complete subsidence of all the acute symptoms, one may feel that the line of treatment is justified.

Supposing one finds no evidence of infection, little harm has been done if the operation has been properly conducted, and if infection is present, but has been missed, a path to the

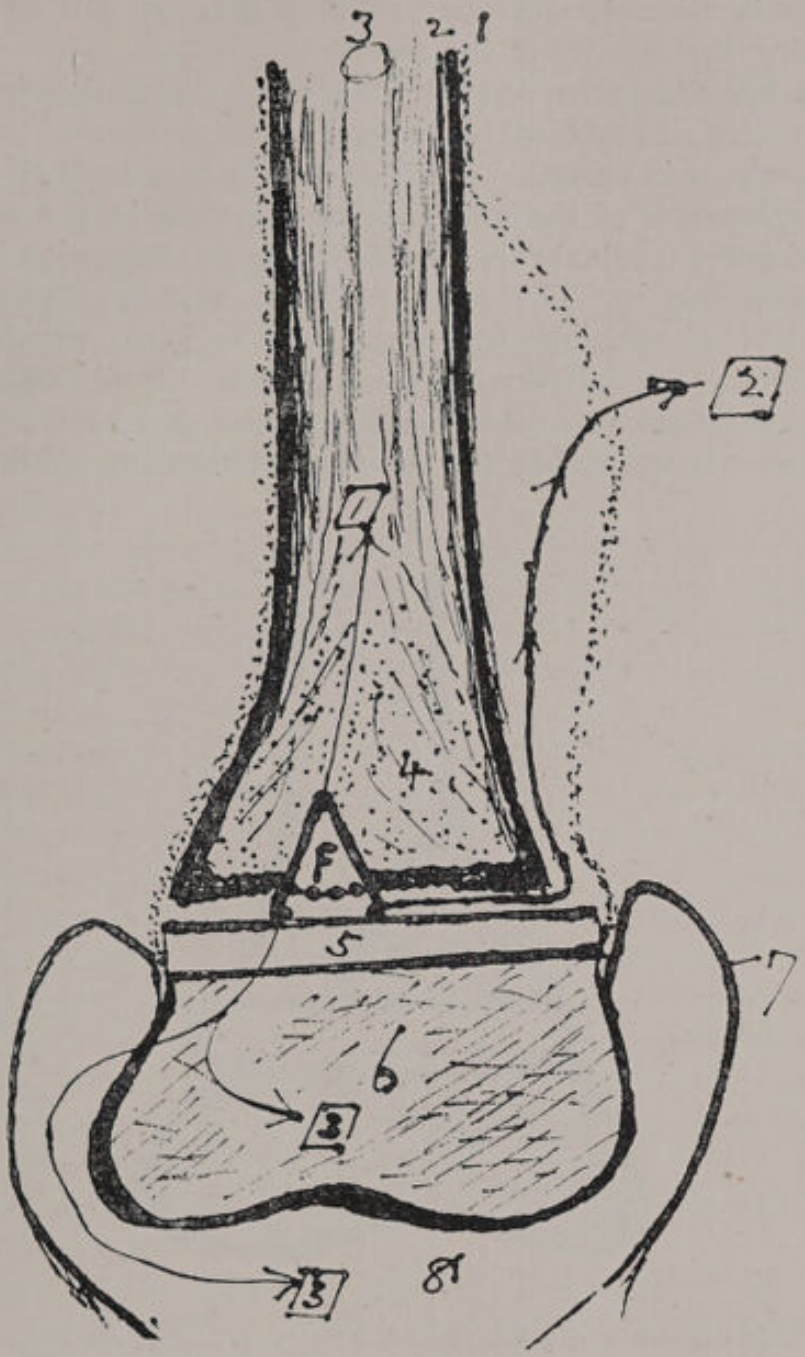


FIG. A.

1. Periosteum.
2. Hard bone.
3. Marrow cavity. } Shaft.
4. Soft, cancellous bone.
5. Epiphyseal line.
6. Epiphysis.
7. Capsule of joint.
8. Joint.

[1] [2] [3]
Tracks of spread from focus infection.

surface is assured, and early relief of tension will assist in lessening the severity of the case.

The benefits to be derived from early exploration in such cases outweigh any disadvantages.

Experience in operating on these cases immediately gives one the explanation of the diffidence of operators in the past in following the cardinal rule of anticipating pus formation in this particular region. The depth to which one has to go, the possibility of opening the capsule of the joint, the fear of damaging the epiphyseal plate, all act as strong deterrents to bold measures, and till one gains knowledge of a few cardinal points one is tempted to temporise and follow the old routine.

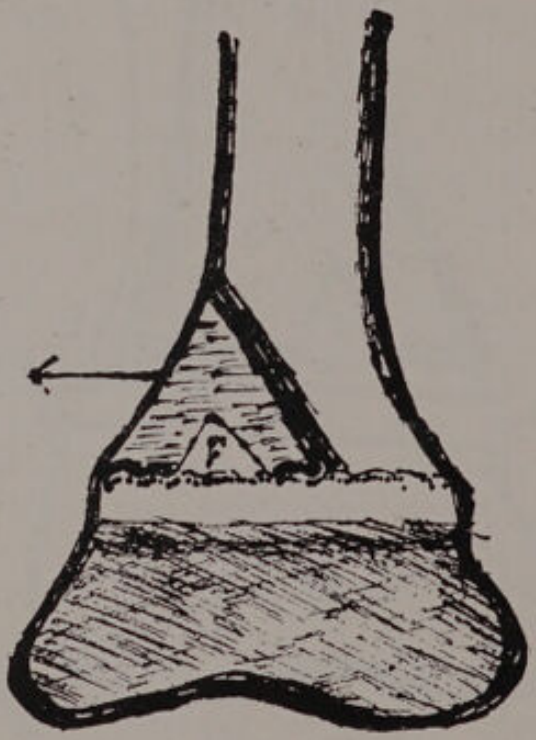


FIG. B.

Ideal treatment of early case. Focus and bone to be removed as a wedge or by curettage.

The points which experience establishes, and which help one to formulate definite steps for operation on these cases, are :—

(1) The ease with which the diaphysis (or a portion of it) may be separated from the epiphyseal plate when there is any intervening focus of infection.

(2) The tremendous power of regeneration of bone which the child has.

(3) The comparative mildness of joint infection in childhood.

Few, very few, such cases come to hospital in this early stage, and for long it is to be feared that the cases will arrive on the fourth and fifth day in the advanced stages after the pus has stripped the periosteum off the shaft, with much bone involved, and, if the patient survives, at the beginning of a life-long drama; for it is common experience to find cases in middle life with discharging sinuses from a greatly thickened shaft, debilitated, anæmic, and sometimes drug addicts who finally die from causes attributable to the bone infection in childhood.

There are certain cases with so acute an infection that the bone is rapidly killed outright, including, partially, at anyrate, its covering the periosteum, and these cases are best treated probably by primary or secondary amputation, though the future may hold some hope of bone-grafting.

In the milder cases the astonishing power of growth and regeneration possessed by the bone cells attached to the under surface of the periosteum is manifest in the formation of the involucrum.

Is it good practice to allow this new growth of bone cells to take place in the presence of a dead sequestrum, infected and covering the growing surfaces with its products of disintegration? Some say these act as a stimulant to more bone growth, but this one may dismiss as needless, when one has observed bone reproduction, say, of a fibula after grafts have been removed aseptically. It is far from ideal; and irregular, infected and excessive bone production seem likely to result—do result, in fact.

It is also said the dead bone acts as a scaffold and keeps up the proper length of the bone, and so should be retained for a time; but surely it is a more ideal procedure to remove it early and prevent the shortening of the bone by other methods. The shaft or the half next the infected end may easily be twisted out at the second or third dressing after the initial drainage of the focus and guttering of the shaft as far up as one finds it infected, and the part removed may be replaced by a sterile glass rod which will approximately keep

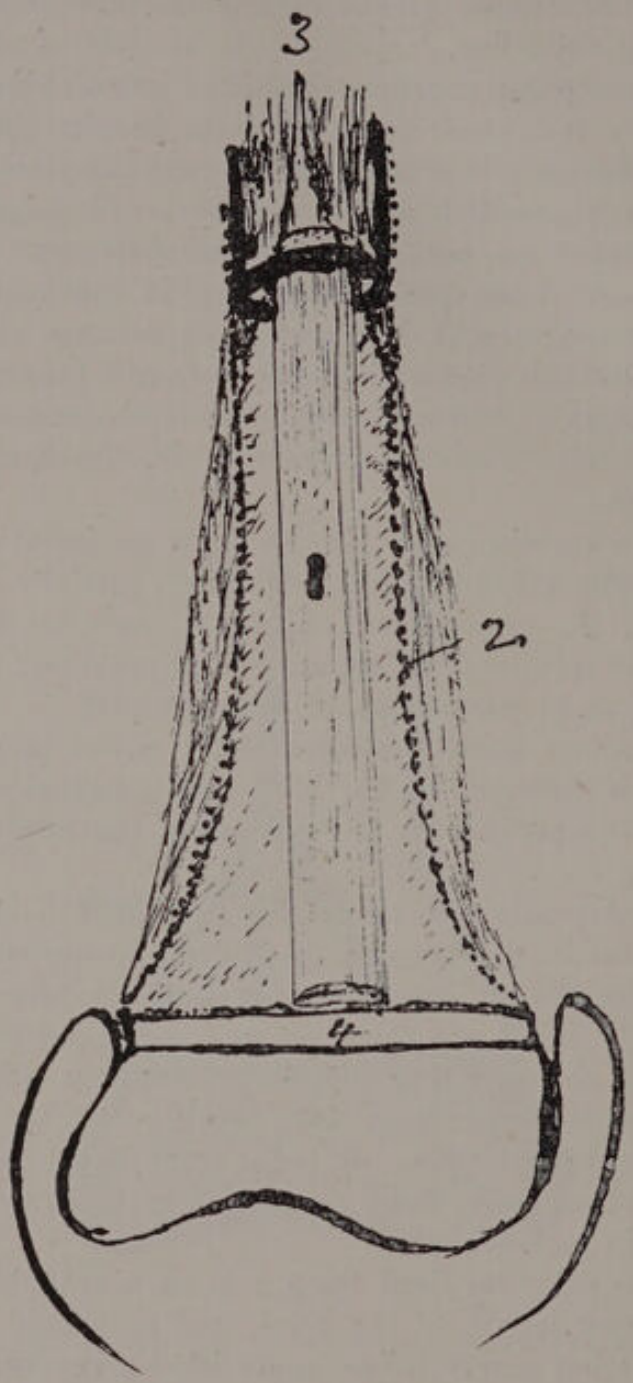


FIG. C.

GLASS ROD MUST BE TOO LARGE TO ENTER MARROW CAVITY,

SUBPERIOSTEAL SEQUESTROTOMY.

(1) Glass rod placed between end of (3) shaft and (4) epiphyseal plate. Replacing excised septic sequestrum.

(2) Periosteum with attached bone cells from which new shaft will develop. At first it lies as a flat sheet, but later is drawn by sutures round the rod and into correct shape.

up the correct length of the limb, whilst proper extension and plaster of Paris or other fixation may be applied so as to attain the same end. Then it is possible to get a practically sterile " inner " surface to the new developing shaft, and to mould its form, by bandage round the glass rod, so that excessive bone production is avoided. So one can watch the growth of a new shaft under conditions which are favourable, and that such a new bone ought to be a better bone than one developed around a filthy dead sequestrum need hardly be questioned; time will prove it, and one starts with the hope that late complications will be few, and that the new bone may last a life-time without further infection. After such a removal of infected bone the fever quickly subsides, and during the long convalescence it seems manifest that the complications, which one constantly fears, so long as sequestra are present, should be reduced to a minimum.

The growth of the bone should take place steadily and uniformly. When the walls are becoming rigid the glass rod is removed and the central cavity, constantly packed with antiseptic gauze, becomes smaller and smaller till closure is finally attained without the presence of irregular and infected bone cavities and pockets, such as must result when sequestra are removed piece-meal.

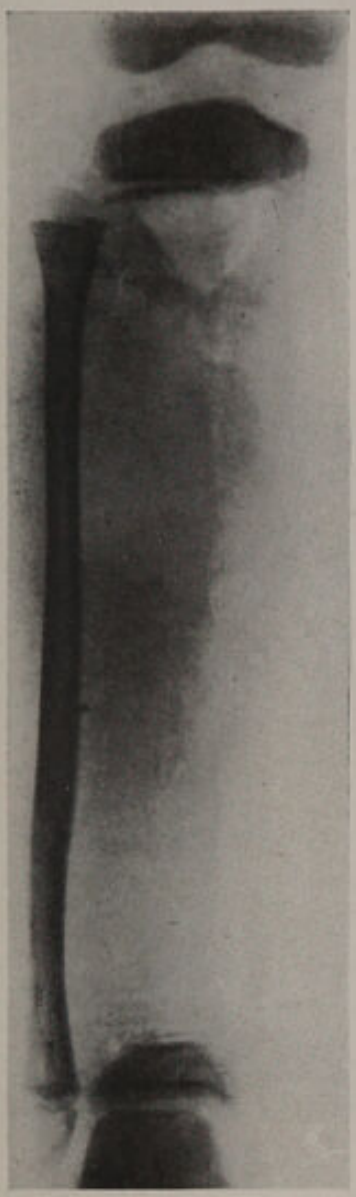
It takes several months to replace the dead shaft by one strong enough to carry the child's weight, and so these cases are long in hospital. The extension, the plaster fixations, the anæsthetic dressings, the correction of displacements and of deformities, through fracture of the new bone, all mean that each case requires an amount of individual attention from the surgeon in charge which it is not easy to give. My cases have been treated with eusol and bipp dressings every second or third day, but I am convinced that if the method be adopted and carried through, under ideal conditions, with Carrel-Dakin technique, the surgeon who conducts the treatment or supervises it when he has evolved a method which cannot break down in his individual absence, will get results which will far repay his trouble, and find that osteomyelitis in the child can be controlled if only the cases come before the child is moribund from pyæmia. Perseverance and determination are necessary in order to get results, and so the cases are not to be taken on lightly.

This line of treatment is not suitable for, and should not be attempted in, adults.

This lesson is little altered since it was published in the *Glasgow Medical Journal*, and I believe it represents still the ideal line of treatment worth pursuing, with this modification (which the Winnett Orr treatment has emphasised) that it is unnecessary to dress the cases so frequently. The gutter which is partially occupied by the glass rod should be well packed with the paraffin, flavine and spirit gauze preparation mentioned elsewhere, and thereafter the plaster of Paris cast need not be removed for two or three weeks. The odour is much less oppressive than when paraffin alone is used.

Finally, one may emphasise that the younger the child the more likely the case is to be a triumph.

The fashionable idea that an infected bone is a " munition factory " producing the substances necessary to overcome the pyæmia from which the child is initially suffering, and should, therefore, be treated with reverence if not left alone, is fantastic in view of the dramatic clearing up of the graver symptoms which follows an immediate amputation of the infected limb in some cases, when that is done as the only hope of saving a child's life.

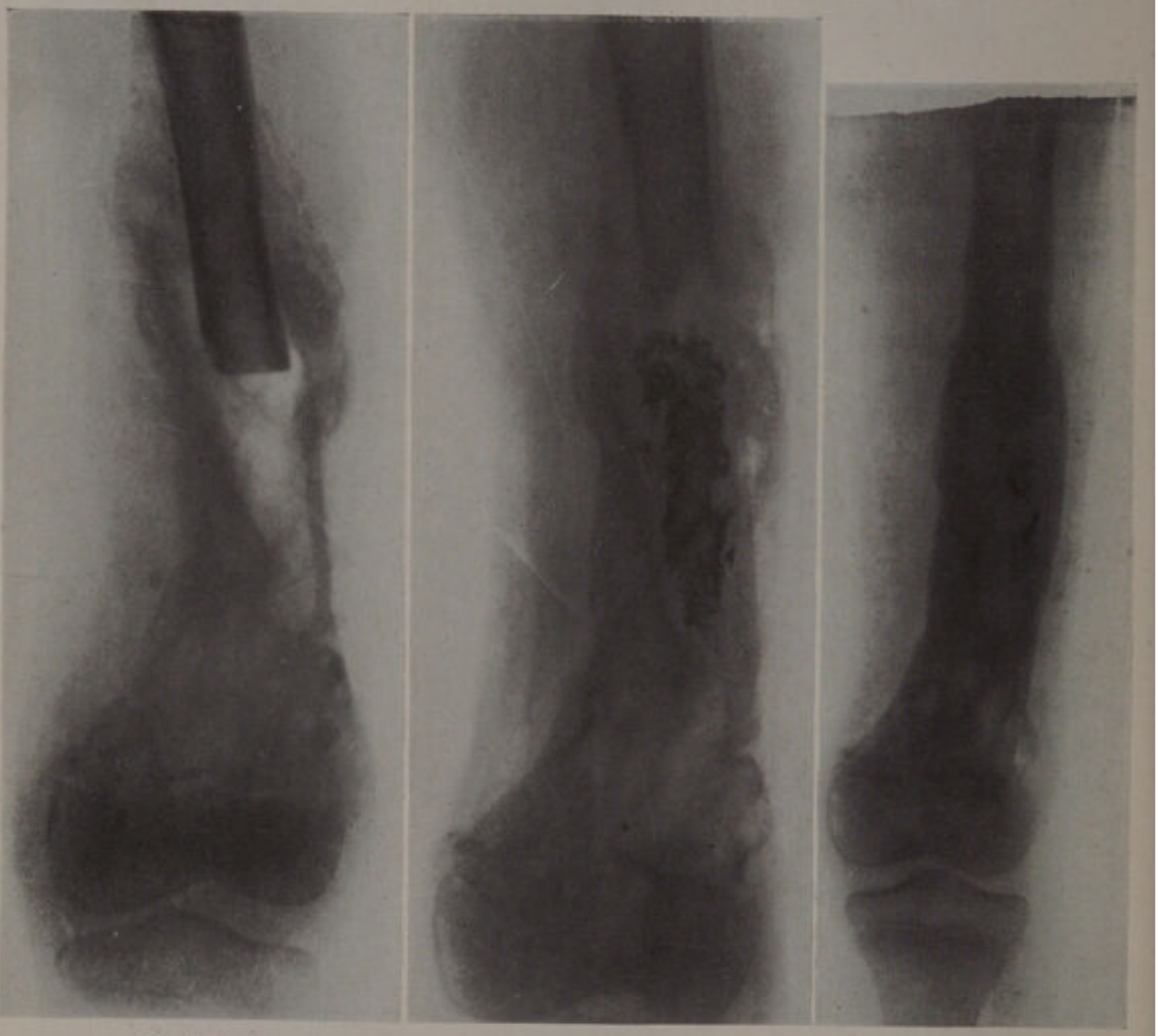


J. H. (18/10/21)
Complete removal of tibia.

J. H. (23/11/21)

J. H. (15/6/22)

Regeneration of tibia.



Mc. (24/3/23)
Five weeks' growth.

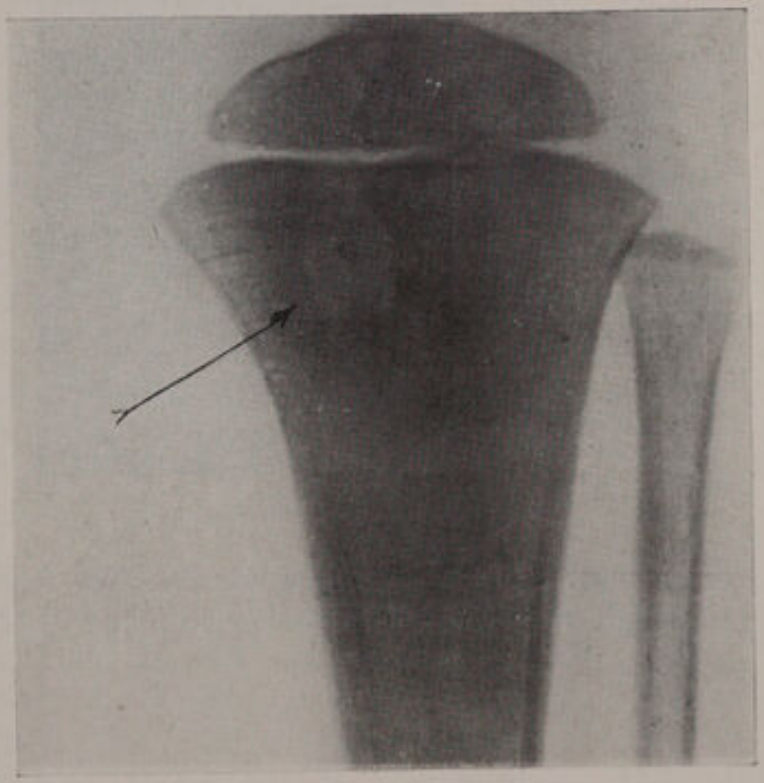
Mc. (2/5/23)

Mc. (30/7/23)
Five and a half months' growth.

Regeneration of lower half of femur.

S. S. (31/12/26) Eleven days after removal of bone.

S. S. (17/2/27) Six weeks' growth of bone.
Regeneration of upper two-thirds of humerus.



Mo. (20/9/23)
Chronic localised lesion at site of original focus in diaphysis near epiphyseal plate.

CHAPTER XXII.

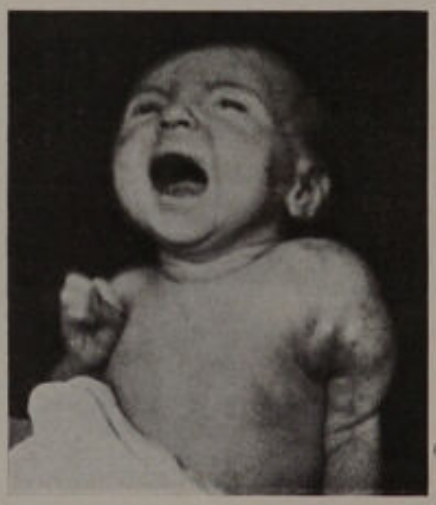
ON SEPTIC ARTHRITIS AND ITS TREATMENT.

The treatment of septic arthritis in childhood is fortunately more successful than in adult life, for this reason, that the joint is essentially a less complicated structure in early life—more of a simple cavity.

Generally speaking, one may say that septic arthritis in the middle-aged and in old people is often an indication for early *amputation* if life is to be saved; that in early adult life a limb may be saved if one is prepared *to sacrifice the joint*; and that in early chiidhood one hopes to have an almost complete *restoration* of the *function* of the joint after treatment.

The method of treatment is to aspirate the joint with a large needle and wash it out thoroughly with some antiseptic —*ether* has been found the best; a 10 c.c. syringe is used for injection and lavage.

After the aspiration, injection, and lavage have been thoroughly performed, an incision is made down to the site



Acute arthritis.

of puncture through the capsule for two reasons—(1) to get thorough evacuation of the ether, which will otherwise damage

the superficial tissues as it is bubbling along the track, and (2) to anticipate infection of the track and have it freely drained from the earliest moment, thus avoiding the formation insidiously of a periarticular abscess.

The washing out may be repeated several times if the first attempt is not followed by obvious improvement, as is usually the case; but, if it is not clear that the condition is settling down after the second attempt, it is better to make free incisions and establish joint drainage.

The problem is usually discussed with reference to the knee-joint, which is the one that gives greatest concern as a rule, and afterwards the limb is fixed up in vertical extension so as to try to get all the discharge up into the supra-patellar pouch.

This treatment seldom fails, and if carried out early ought to avoid the destruction of ligaments and cartilages which can only result in a fixed joint if healing does occur. Periarticular abscesses must be looked for constantly if the temperature does not settle promptly; these must be drained, and care must be taken not to let the joint get flexed or partially dislocated by taking down the extension too soon and allowing contracture of the ligaments to occur. Plaster of Paris may be useful at a later stage.

When it is clear that the infection is not subsiding there should be no hesitation or delay which will imperil the patient's life.

The method of laying the joint open, cutting the ligaments, removing the semilunar cartilages, turning the joint inside out in short, and converting it into a surface which can be successfully treated with antiseptics, is carried out. Six weeks later, when all infection has subsided, removal of the articular surfaces of tibia and femur allows the raw surfaces to be brought into contact, the procedure constituting an excision of the joint in two stages.

Thus the limb is saved at the expense of the joint, and this has, in many cases, proved preferable to the alternative—amputation.

CHAPTER XXIII.

ON SKIN-GRAFTING AND SOME CASES OF BONE TRANSPLANTATION.

Thiersch's method is perhaps the favourite one and, with care in preventing the grafts from being displaced laterally or floated off the surface, gives very satisfactory results. The preparation of the surface to be grafted is important, and till it is dry and covered with good red firm granulation tissue no attempt should be made. Moist *eusol* dressings are good for getting the surface into proper condition, and bacteriological tests may be made to prove the absence of many organisms.

When the grafts have been cut and laid in position, smoothly and without any air bubbles beneath them, the skin round the grafted area is painted with some gum preparation like *mastisol*. A piece of gauze two layers in thickness, sufficiently large to cover the area and the skin which has been painted with the *mastisol*, is then held stretched by two people over the neighbourhood, and brought down directly on to it and firmly applied without any lateral movement whatever. The gum holds the gauze well in position, the grafts are nicely pressed on to granulation tissue, and any moisture which comes from between the grafts is taken up by the gauze. This dressing will stay in position for a week or ten days, and need not be disturbed. On the top of it warm saline swabs are laid, and these are changed every two hours. Thus all discharge is removed, and when, at the end of ten days, the gauze is removed, using ether to dissolve the *mastisol*, the grafts will be found to have taken well and to have remained each in its place.

The treatment of the part from which the grafts have been taken is important, as any changing of the dressing there may be very painful. The best dressing to put on is a 1 per cent watery solution of picric acid, and this dressing should remain untouched for ten days or more; it will then peel off nicely and complete epithelialisation of the raw area will be found to have taken place. Any dressing done before this has taken place will be extremely painful, and therefore should be avoided. The preparation of the part from which the grafts are to be cut is carried out without the use of carbolic or any other strong antiseptic which might act harmfully on the fine grafts. The use of soap and water followed by warm saline has been found quite sufficient.

The use of an ordinary electic light bulb suspended from a cage a foot or two above the grafted area appears to help the growth of the grafts, but care must be taken that the saline swabs are not allowed to become dry. *No* bandages are put above the swabs.

The method is simple, and is better than the use of unfixed perforated oiled silk or albumen gauze, under which the grafts occasionally get floated off or moved so as to disturb their uniform taking.

Bone transplantation is no new achievement, but the procedure has in recent years been popularised in the repairing of gun-shot injuries, and through the introduction of special surgical instruments for obtaining bone grafts. Many striking results have been got, and the possibilities of the method are by no means yet exhausted. The cases now recorded are of special interest, in that an epiphysis and a growing line of cartilage have been transplanted with success.

Case I.—A " bone cyst " at the outer end of the clavicle. The case may have been an absorbed myeloma; the swelling gave an egg-shell crackle. The patient was a girl in her teens, seen at the Dispensary of the Western Infirmary.

Operation.—Resection of outer half of clavicle. Implantation of a piece of rib and costal cartilage. The bone ends were wired together. The costal cartilage was sutured to the cartilage of the acromion with catgut. Primary union.

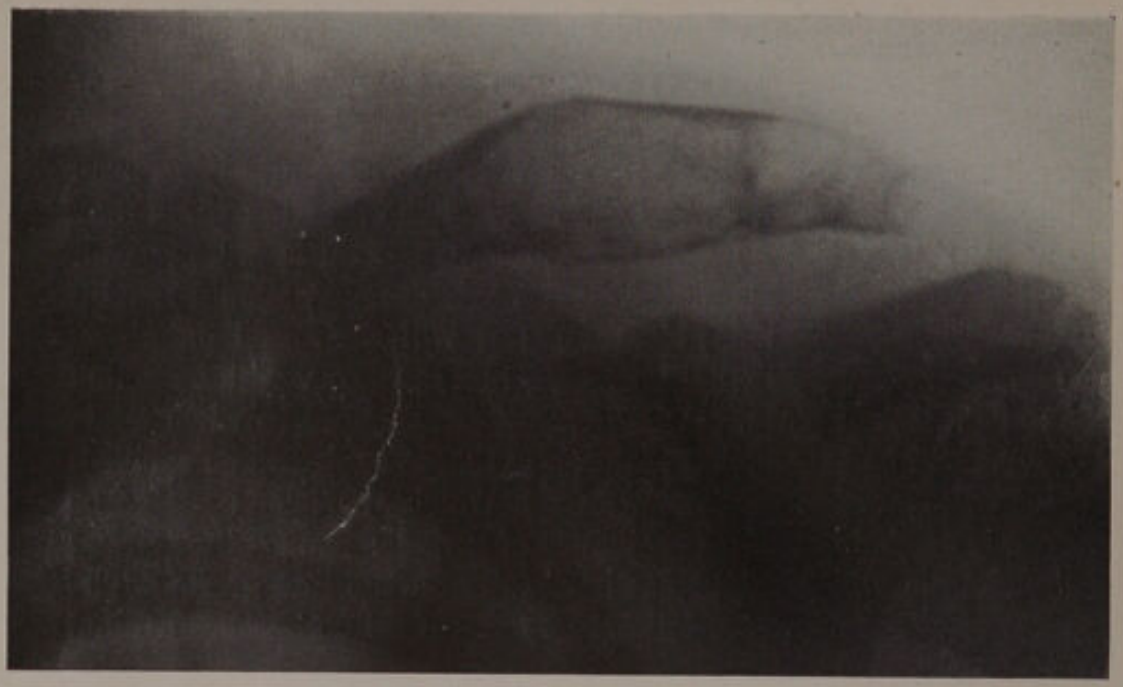


Fig. 1.

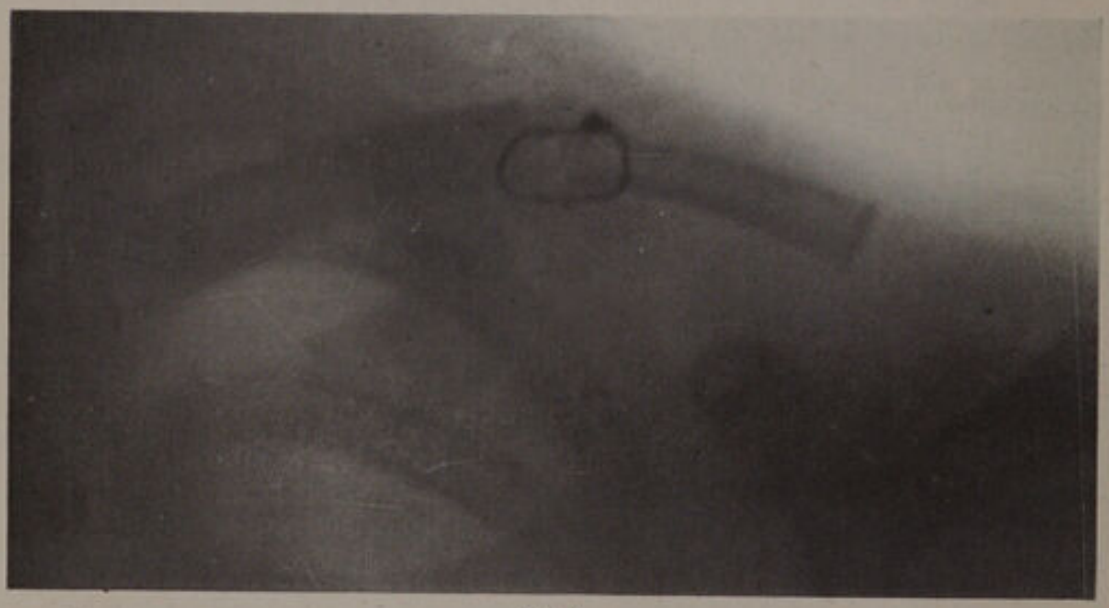


Fig. 2.

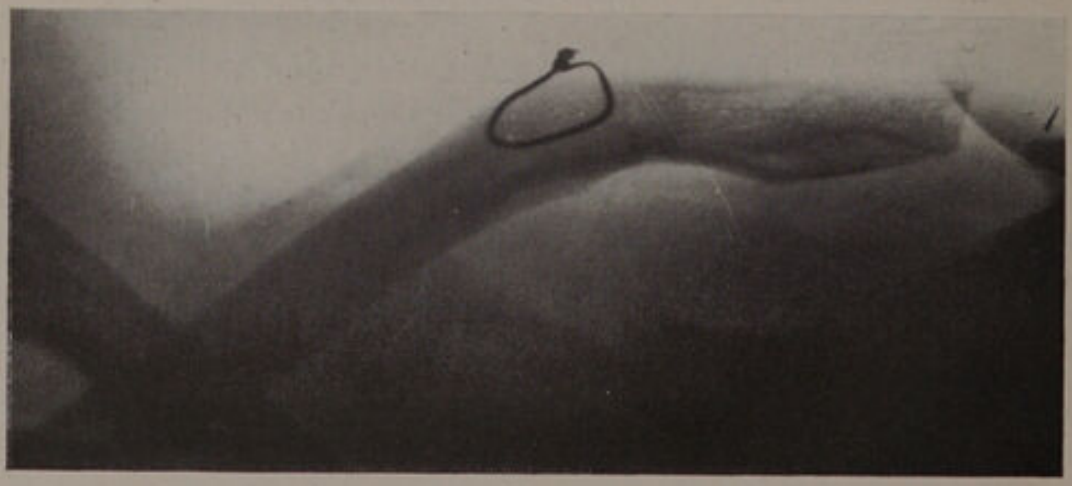


Fig. 3.

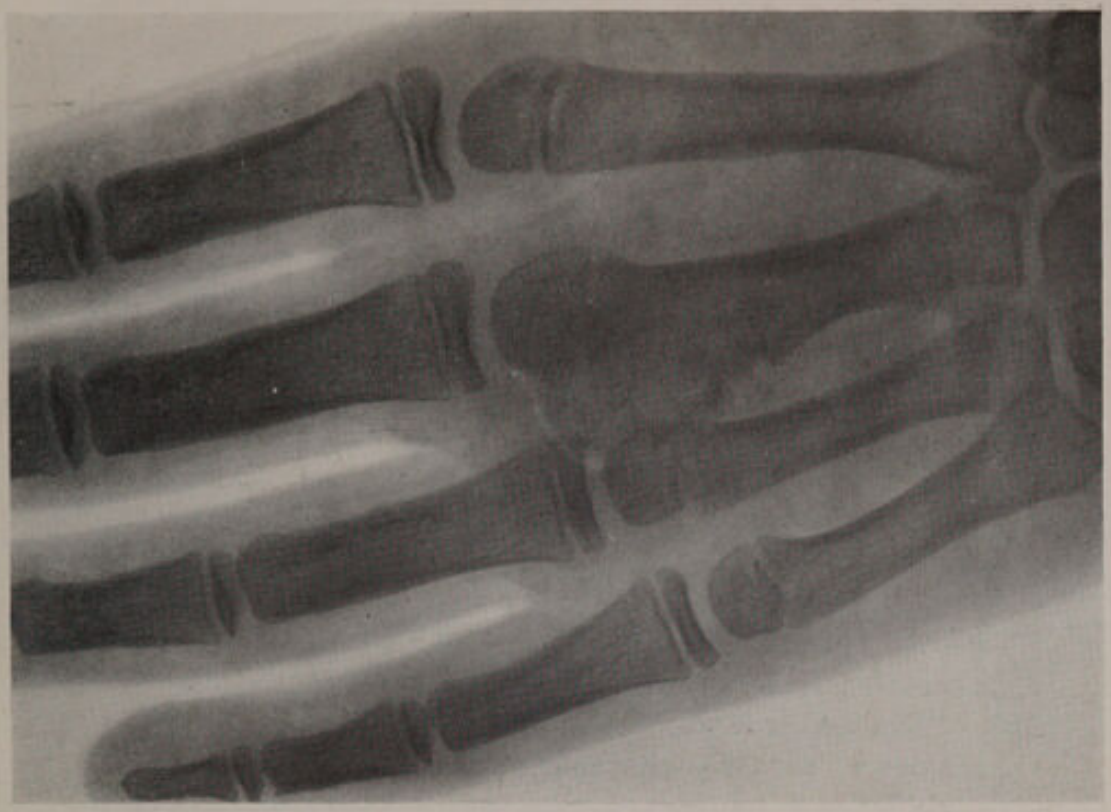


Fig. 4.

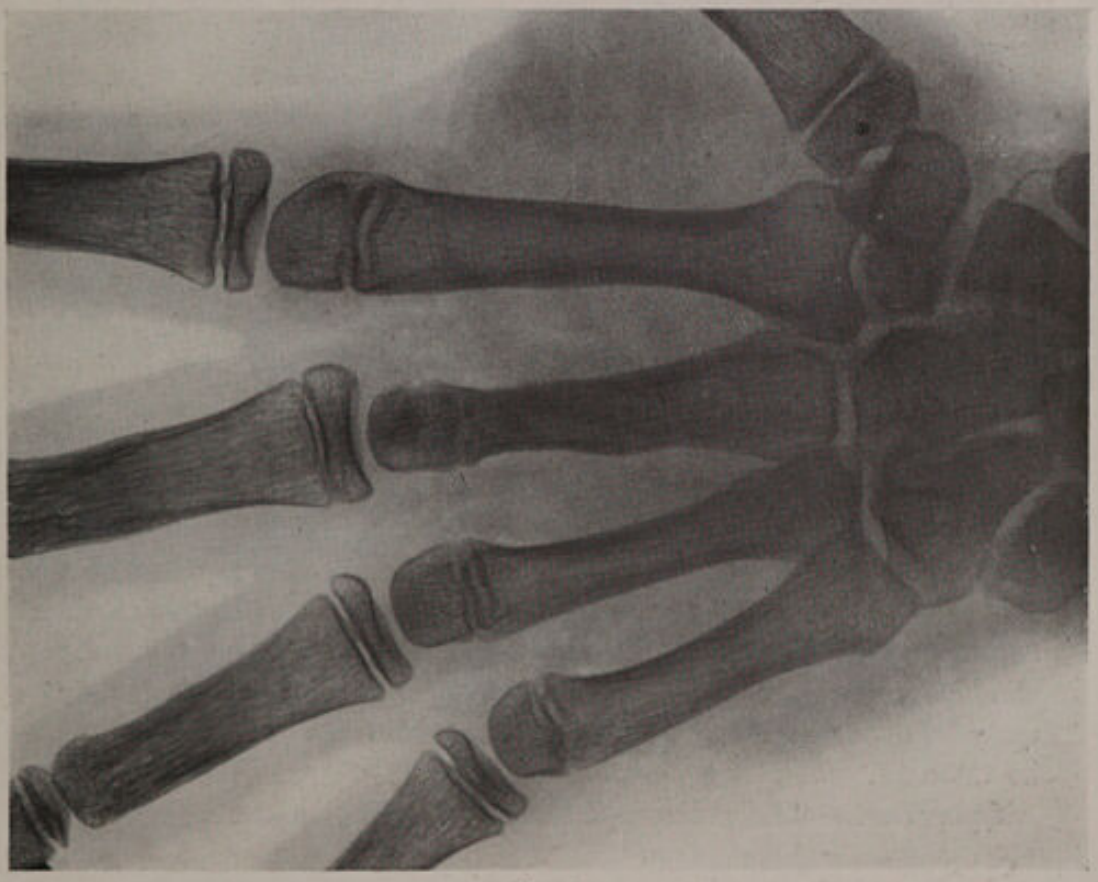


Fig. 5.

Result.—Seven years later a clavicle which could not be easily differentiated from a normal bone, and unimpaired function of the arm.

Specimen.—A window was cut in the upper aspect of the bone and showed a dry cavity without tissue for histological examination. The specimen was lost at a later date.

X-ray photographs.—(1) The bone cyst; (2) the immediate result after implantation; (3) the result seven years later, showing good growth of bone and an approximation to the normal shape of the outer end of the clavicle. There is no rarefaction of bone around the silver wire.

Case II.—Resection of a metacarpal bone from which a large chondroma was growing, and implantation of a portion of a metatarsal bone, including the head and the epiphyseal line. The patient was a young boy, seen by me at the Dispensary of the Western Infirmary.

Operation.—A tourniquet was used. The resection of the greater part of the metacarpal bone with its tumour presented no difficulty, and into the bed of tissue, from which it was removed, there was laid a portion of the distal part of a second metatarsal bone, the surrounding tissue being loosely stitched over it with catgut sutures. Primary healing in both hand and foot.

Result.—No apparent deformity. On close observation a little shortening of the finger is noted, but the usefulness of the hand is unimpaired. The foot has given no trouble and the patient is now—three year later—an apprentice engineer and an enthusiastic football player.

X-ray photographs.—(4) The hand before operation, showing chondroma; (5) the hand four months after operation.

Case III.—Excision of fifth metacarpal bone, transformed into a series of "bone cysts." Implantation of a portion of a metatarsal bone. The case was that of a little girl in my clinic at the Royal Hospital for Sick Children. X-ray photographs showed clearly that the case was not one of tubercular or specific dactylitis, and the same procedure was carried out as in Case II.

Operation.—The portion of bone implanted is just a little too

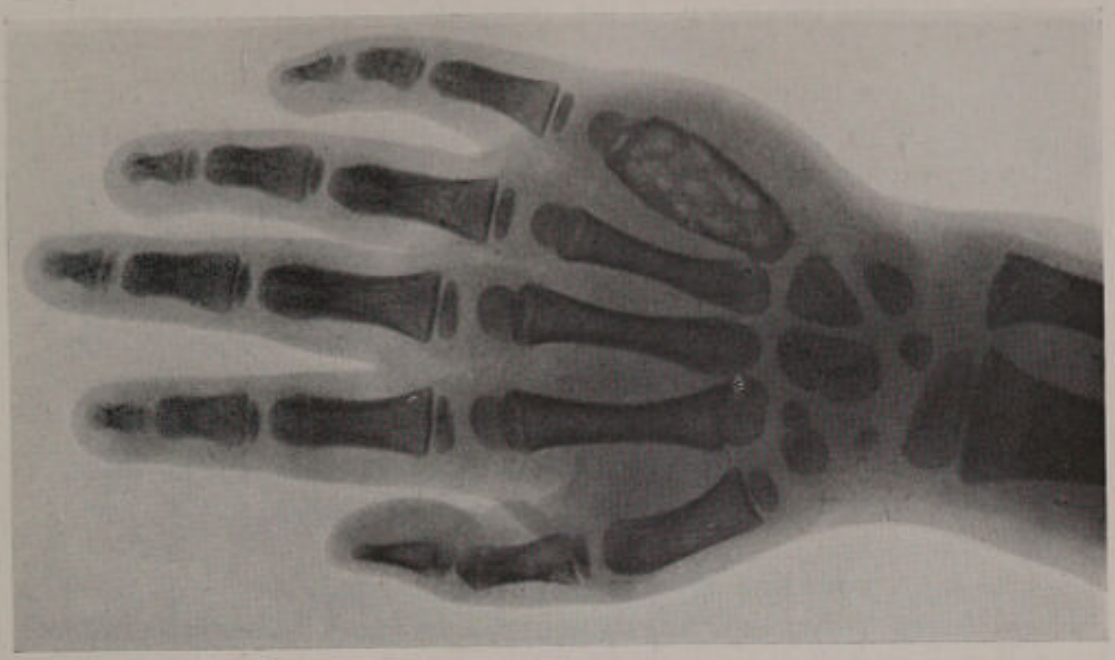


Fig. 6.

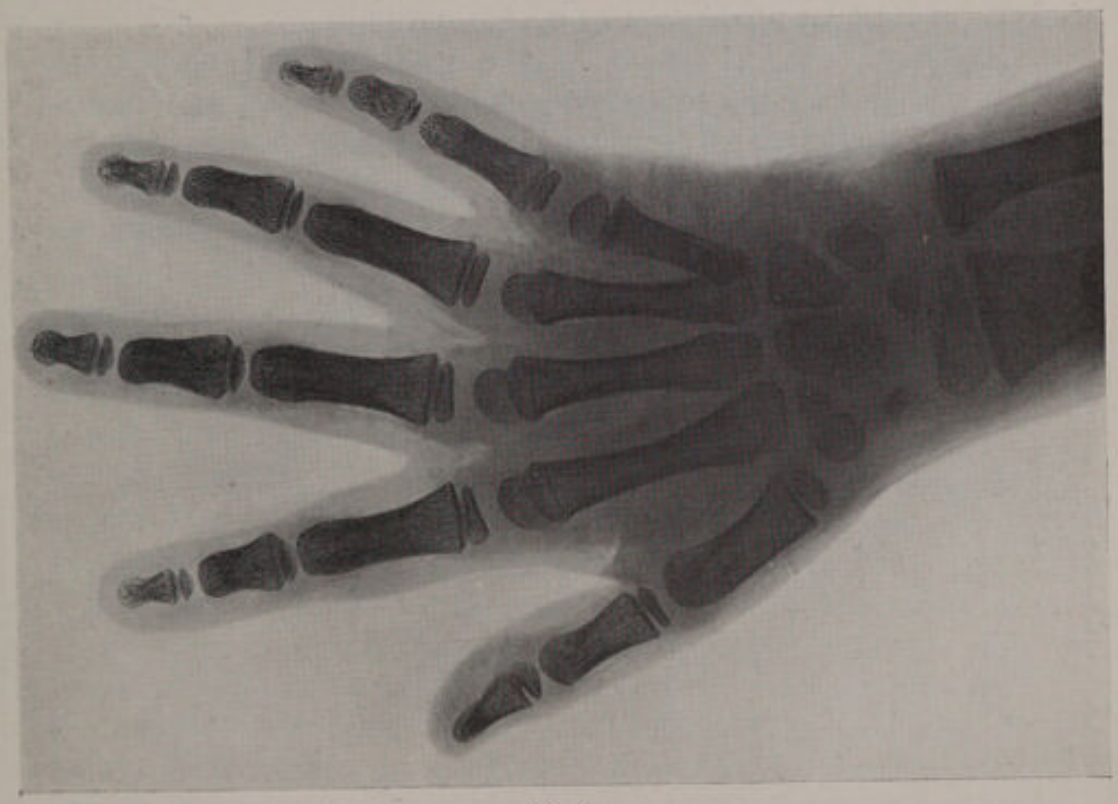


Fig. 7.

short to take the place of the completely resected metacarpal bone.

Result.—Primary union in both hand and foot. On comparison with the other hand a little shortening of the fifth finger is clear, but the function is excellent. The specimen removed was light, floated on water, and on being cut and mounted showed the marrow cavity to be entirely replaced by a series of minute spaces—like a piece of honeycomb.

X-ray photographs.—(6) Before operation, showing the cystic appearance of the bone; (7) after operation.

The mere recording of grafting cases is of little value nowadays, but these cases seem to be worth publication, because—

1. A growing line of bone has been inserted.
2. They throw light on the question as to whether an autogenous graft is or is not completely absorbed and replaced by bone originating at the site of implantation or whether a graft goes on growing in its new site, being " replaced " only by cells of its own production as occurs normally.
3. They draw attention to the usefulness of metatarsal bones (especially the second one) as grafts for metacarpal bones where the alternative is usually a finger amputation with its obvious deformity.

The suitable cases are not, in my opinion, very common, as I doubt whether tubercular dactylitis should be operated on, but the procedure is worth keeping in mind.

CHAPTER XXIV.

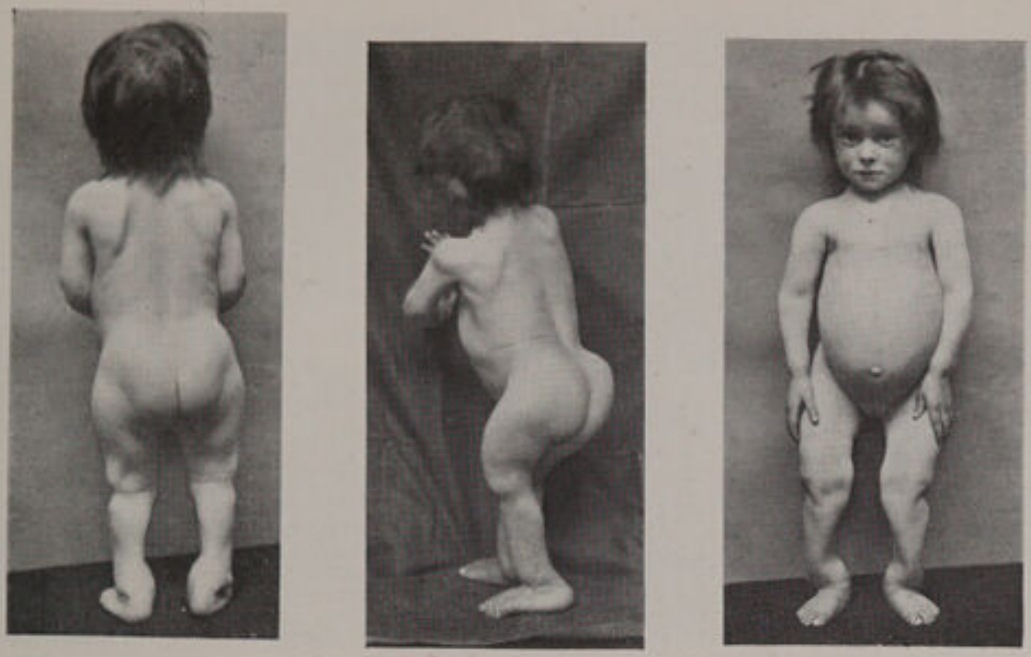
ON RICKETS.

The surgical treatment of the deformities arising from rickets is one of special interest to the Glasgow school, where, unfortunately, in the past outstanding examples of the disease have been all too common. The Glasgow surgeon now rejoices to know that this field of work is rapidly becoming less and less, and with the rest of the profession looks forward to the day when these cases will become great rarities. There are still, however, cases which require to have osteotomies done in order to correct deformities due to neglect, but more and more the treatment is becoming preventive, and the acute stage is responding to the modern treatment with vitamins and light rays. Splinting, rest in the recumbent posture, and the use of plaster of Paris may all still be required, and will prevent the appalling skeletal deformities which twenty-five years ago were constantly turning up at hospital.

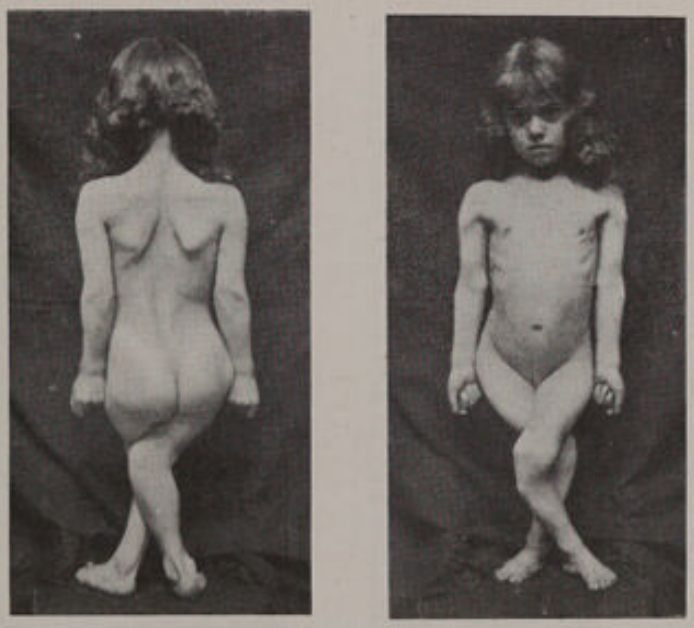
The whole organism is affected by the disease, which is one of malnutrition *plus* lack of sunlight and proper hygiene, the first factor being at present recognised as the vital one, but the most striking evidence of the disease shows itself in the bones. The bones are soft in the acute stage of the trouble, thickened at the epiphyseal lines, where excess of imperfectly ossified bone is produced (this is best seen at the lower end of the tibiæ and of the radii), and they bend when the weight of the body is transmitted through them as the child endeavours to get about. The skull is enlarged and presents bosses, the whole spine is curved, the clavicles and the ribs are involved, the upper extremities do not usually show such evidences of weight transmission as the lower extremities, where the well-known genu varum and genu valgum and the flattened twisted tibiæ give appearances which furnish text-books with many illustrations. The deformities which result in the pelvis lead

to these obstetrical difficulties in later life which have caused Glasgow to be notorious for the number of Cæsarean sections carried out in its maternity hospitals. A classical series of photographs was obtained by the late Mr. Nicoll at his out-patient clinic in West Graham Street, and some of them are reproduced here as evidence of the types of deformity which used to be very prevalent.

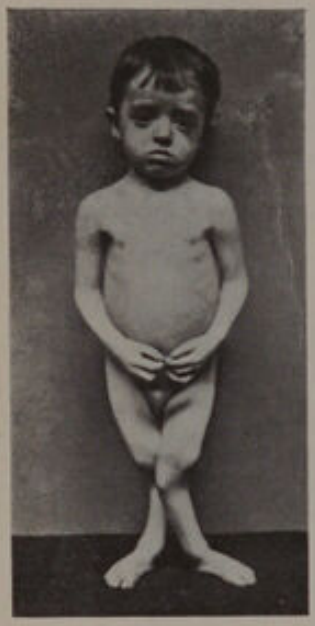
The name of Sir William Macewen is, of course, always associated with the operation of osteotomy, which he used so successfully to correct both genu valgum and genu varum.



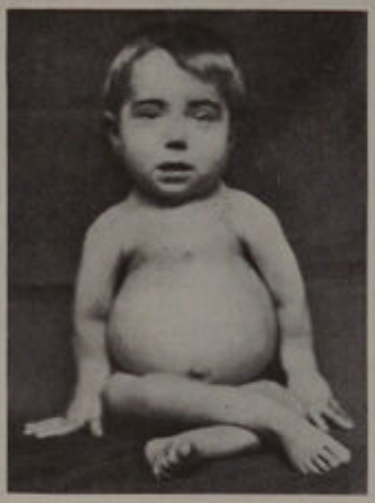
General skeletal deformity.

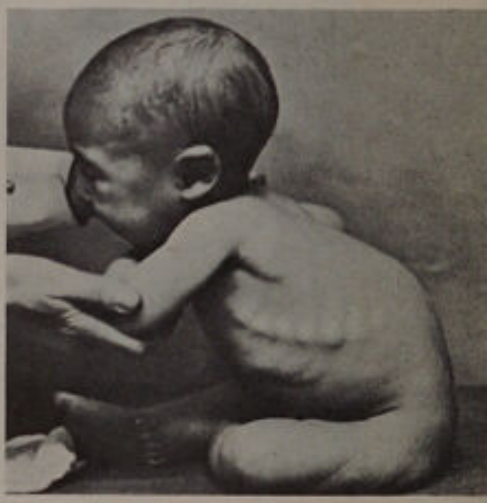


General skeletal deformity.

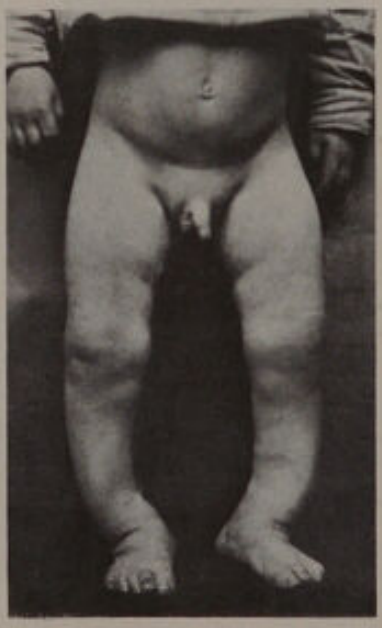


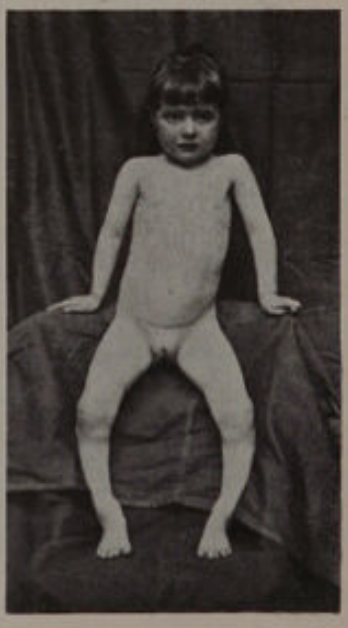
Acute stage of disease.



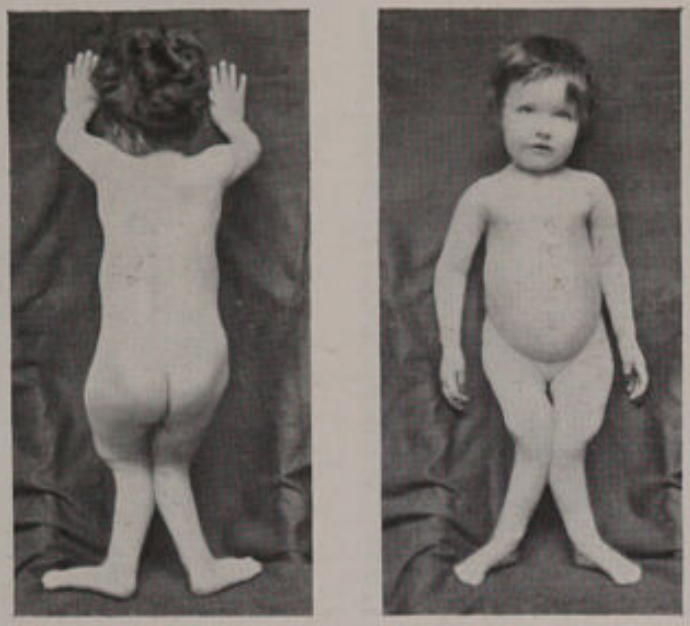


Rachitic rosary.

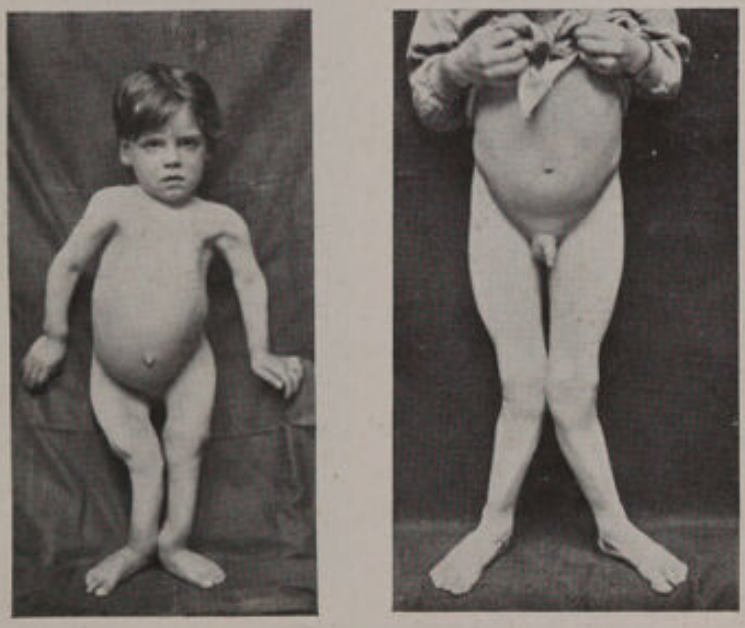




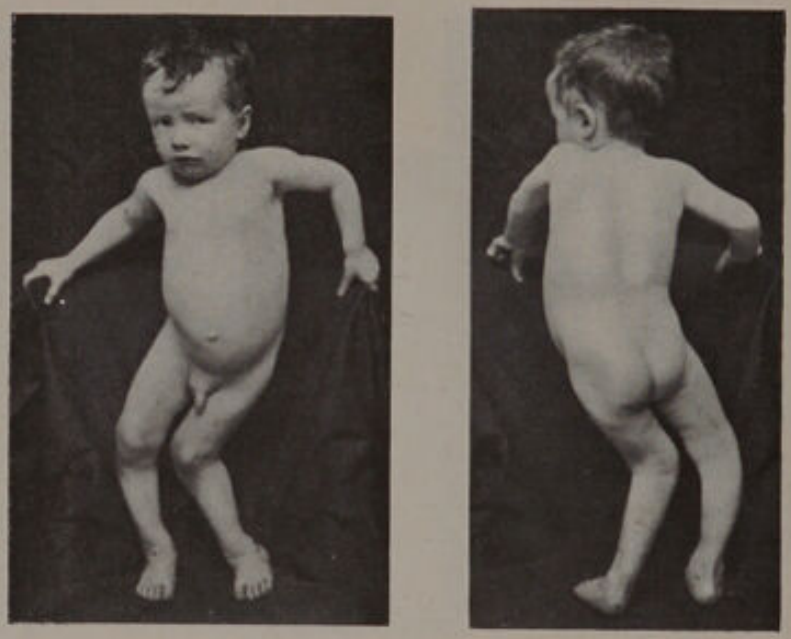
Genu varum.



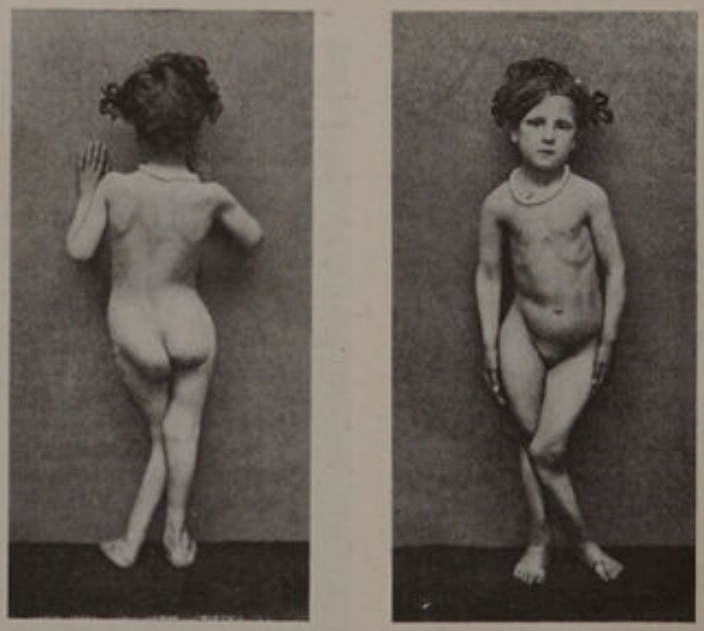
Genu valgum.



Genu valgum.



Genu varum and genu valgum.



Unilateral genu valgum.

CHAPTER XXV.

ON ANÆSTHETICS IN INFANCY AND CHILDHOOD.

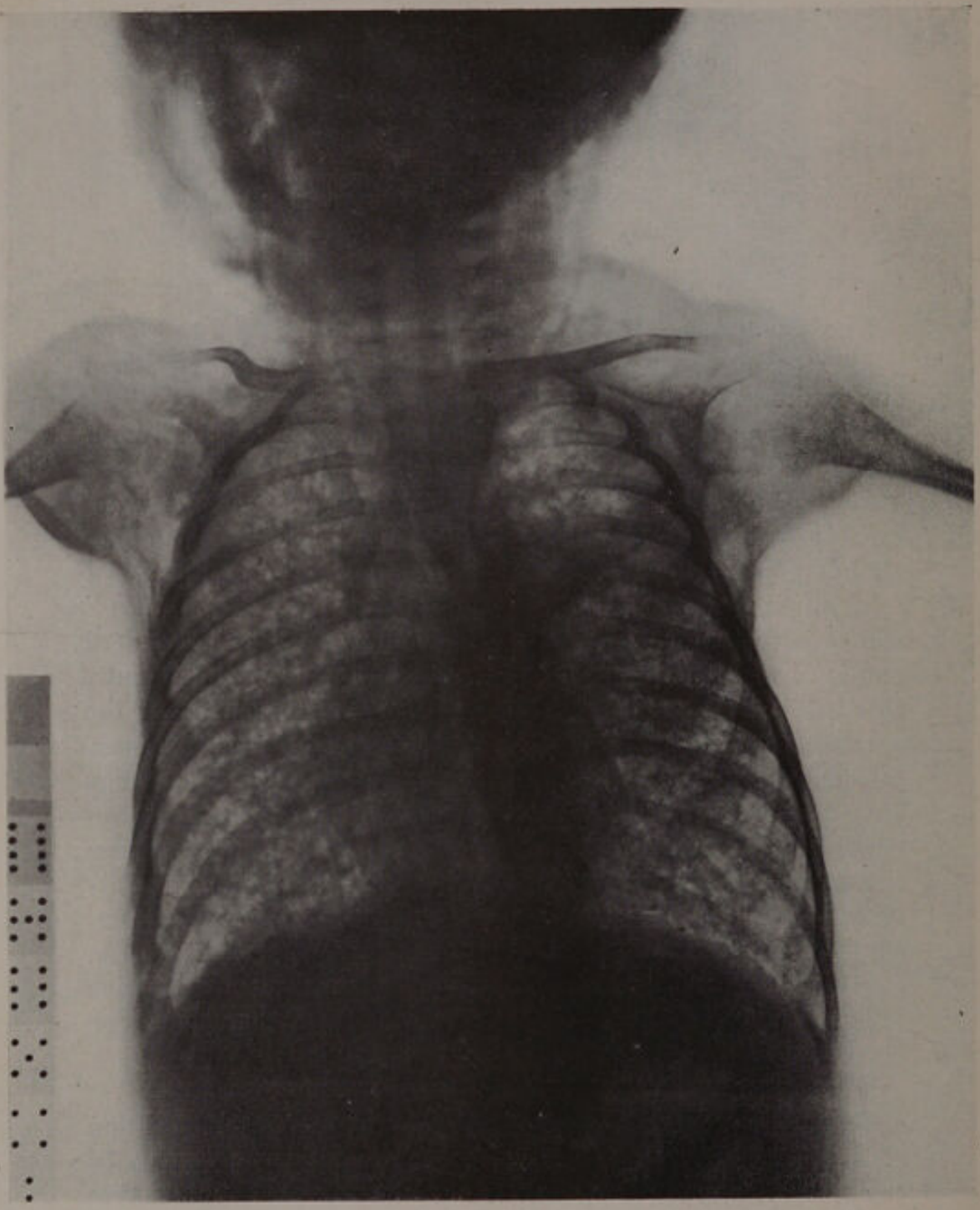
The production of anæsthesia in infants and in the young child is a much more delicate and anxious affair than when one is dealing with a healthy adult.

A proper estimation of the bodily condition of the infant is difficult to arrive at; no specimen of urine can be got without catheterisation; information about the lungs is not easily got in a crying child, and the rapidity of the heart-beats makes all but gross lesions of the cardio-vascular system difficult of recognition; so that a *routine* examination in "out-patients" and even in "in-patients" in a busy clinic, such as is required and is carried out in adults, is almost impracticable in infants. One has to rely on the general appearance of the child and the absence of evidence of any gross lesion in the chest. Nevertheless, a child apparently in a satisfactory condition may have a miliary tuberculosis or some such condition as hydronephrosis which has escaped notice before the child has been anæsthetised, say, for a circumcision operation, and it is only revealed at a later date when obvious symptoms, such as emphysema or uræmia, develop and generally precede death. *Post-mortem* examinations yield some astonishing information in infants about whose general state of health there had been no concern previously to their being anæsthetised.

Who, again, can diagnose the *status lymphaticus?*

So much for the bodily condition. The mental condition of a young child cannot be estimated; confidence cannot be established, and no co-operation need be expected; this makes the induction period of anæsthesia most dangerous.

All this has to be recognised by the person who undertakes the duty of anæsthetising an infant, but there are several



Radiogram showing surgical emphysema developing after an anæsthetic had been given for a minor operation to a babe suffering from miliary tuberculosis.

practical points in addition which beginners do not sufficiently recognise and act on. Too rapid administration of the anæsthetic is bound to be resisted, and this is likely to lead to spasm of the larynx and all the difficulties caused by that. Far too much anæsthetic is then poured on to the mask, and it is lost sight of that all anæsthetics in excess are poisons. It is true that tiny infants often require a greater amount of anæsthetics to get them under than one expects, and, too, they can hold their breath for an alarming period. The *size* of the *mask* therefore should be in strict proportion to the size of the child's face, so that the mouth and nose of the child cannot possibly be surrounded by too great a field of concentrated vapour, as will certainly be the case if a mask suitable in size for an adult be carelessly used. Air must be given freely.

Again, the jaws are edentulous, and hard pulling up of the jaw should be avoided; it may, indeed, be necessary to keep the jaws separated by a fingerbreadth gap in order to have the airway clear for easy breathing. The head may require to be well turned to one side so as to prevent the tongue falling back and producing an obstruction to free breathing. Gags and tongue forceps are seldom required by an expert anæsthetist. The colour must remain constantly good; remember, "Pink children don't die."

The routine use of preliminary hypodermics of strychnine and atropine is advocated by some, but there is no clear evidence that they are advisable or safe, and a routine injection from a stock solution may be fraught with much danger of overdose if not administered with all due care.

A very tiny dose of omnopon may be helpful in certain cases if given an hour before operation.

The injection of *paraldehyde*, in oil or in saline solution, given *per rectum*, in measured doses suitable to the weight of the child, an hour before operation, may be used to get a degree of analgesia which need only be supplemented by a very small quantity of $CHCl_3$ or of *ether* to produce a satisfactory anæsthesia. It is a splendid method for short, painful dressings, and may be found suitable for some major operations.

Other more modern drugs than paraldehyde are fashionable

at the moment, and are given orally or intravenously, but they have not proved themselves yet to be better.

The use of all preliminary dosage of the patient necessitates extra attention and the keeping of an operation programme correctly to scheduled time, with the result that, in actual practice, the method fails from unforeseen interruptions or other causes, and so it is not generally adopted.

In older children the use of a *spinal anæsthetic, e.g., light duracaine*, surpasses, in the way of obtaining relaxation, any form of general anæsthetic given by the greatest expert, but its use in tiny babes, where the nerve cells are in process of development, does not seem very desirable. Further experience may prove this fear of doing damage to be ungrounded, and it may well become the method of choice in the majority of cases, so satisfactory are the immediate results.

Local infiltration methods are not so satisfactory or so easy in children as in adults; there is a lack of intelligent co-operation, and the child is apt to become frightened.

If a child collapses during anæsthesia its fragile body must be treated with due respect. It is a dreadful experience to see a 16-stone house surgeon applying artificial respiration to a babe as he has generally been taught to do it.

The surgeon should take charge of the proceedings; the responsibility is his.

If the operation has not commenced, or if it has and the wound can be properly protected, the infant should be held up by the feet, vertically suspended, with the left hand of the surgeon, and the back of the chest should be lightly slapped with the fingers of the right hand. A whiff or two of *ammonia, weak* ammonia, will help to establish respiration. If the child cannot be so treated, since the operation is in progress, the field of operation should be at once protected with sterile towels and without delay the whole table should be tilted so as to lower the head; then the thighs and feet should be held fixed by assistants, so as to prevent any slipping down the table, and the surgeon, taking his place at the patient's head, should grasp the child's wrists and, extending the arms above the head in the line of the body, should, by alternately *over-pulling* and *relaxing* the arms, establish an *in* and *out* flow of air to the lungs, satisfactory in volume,

easily audible, which should and generally does result in the re-establishment of normal breathing. The chest is meantime freely exposed, and any further methods recommended for use, in the way of hot applications, &c., may be carried out simultaneously.

This method is equally satisfactory in adults, though, of course, more strenuous in its application, when the weight of the surgeon may be usefully brought into play during the pulling and relaxing movements. The rate of the movements should, of course, approximate the normal rate of respiration.

This method is infinitely more easy to apply than any of the better known methods which are usually taught.

The chest wall and the contents of the chest cannot be injured.

Anæsthetics given by the Open Method.

The convenience of the method is obvious. This may be its drawback. $CHCl_3$ either alone or combined with *ether* or A.C.E. gives an anæsthesia which in safe hands is hardly equalled by any other method.

Ether, which takes too long to put a patient under, may be used following induction with $CHCl_3$, for a fair length of time quite satisfactorily for any but abdominal operations; in these cases the lack of proper relaxation, and the movements associated with this anæsthetic, make the anæsthesia very unsatisfactory from the surgeon's point of view. The quantity of anæsthetic required overruns the soaked mask, and leads at times to burning of the patient's face or conjunctiva, and this must be guarded against, not only by smearing the face with vaseline, but by protecting it with a piece of gamgee tissue prepared with an aperture proportionate to the size of the patient's face and allowing exposure of the mouth and nostrils only. This necessitates *the use of a different mask* from that used to administer the $CHCl_3$. For *ether*, several layers of thickness of the material covering the frame are required, whereas, for $CHCl_3$ never more than two layers of material dare be used, lest the patient should get too concentrated a vapour to inhale.

The adjustment of the stoppers and drips in the drop bottles is undoubtedly the anæsthetist's responsibility.

A further and most serious responsibility rests on him, viz., to make certain that each anæsthetic is in its proper bottle *as labelled*. It is no use passing on these responsibilities to a changing nursing staff. Why should the patient run the risks?

All this must be perfectly clearly understood in making use of these different anæsthetics or mixtures of them, or in transferring from the use of one of them to the use of another. It is all too little appreciated by the beginner.

The giving of $CHCl_3$ on an ether mask may promptly lead to a catastrophe, whilst the administration of ether on a $CHCl_3$ mask is sure to be unsatisfactory.

The experience and skill of an anæsthetist may be quickly and certainly estimated by noting his methods or lack of method.

The beginner's difficulties will be greatly lessened by paying strict attention to the points emphasised, though, of course, nothing but long practice can make him perfect in the giving of an anæsthetic.

The following is a rough sketch of the usual procedure in "getting a patient under," of the signs which indicate a departure from a condition of safety, and of the methods used in getting guidance for further action. The danger sign which first catches the administrator's attention is discussed as if showing alone, whereas there is always a combination of signs present when a patient's condition is unsatisfactory.

The Administrator.

The administrator must have confidence in himself, and ought to follow as rigidly as possible a routine method. He should note the general appearance of the patient, especially the colour. He should observe at once the condition of the pupils. He should note any difference in the radial pulses, and he should make sure that any artificial denture has been removed. If the patient is a total stranger he should ask the surgeon, in whom the patient presumably has confidence, to stand by during the period of induction.

He should, with one hand, keep the mask balanced in the correct position, and also keep the chin well pulled up, while the other hand is left free to use the drop bottle, and from time to time to note the condition of the pulse; this may be most readily got from the carotids.

He must be familiar with the effects of the anæsthetic used, and be capable of deriving guidance from every change of state through which the patient passes. He must be continually on the outlook for these changes, and must recognise that the patient's life is in his hands.

The Anæsthetic.

When chloroform is used alone it should be the constant aim of the anæsthetist to produce satisfactory anæsthesia with a minimum amount. It is good practice to commence with pure chloroform, given slowly, drop by drop, whilst the patient counts aloud and breathes deeply and regularly—preferably through the mouth. Once or twice when the choky feeling begins to come, an assuring word from the anæsthetist or surgeon is helpful, and the mask should be removed and the patient asked to take a deep breath of air; this is a great help to the patient. When anæsthesia has been established, and the pulse, the pupils, and the respirations are in a satisfactory condition, then one may switch over to the use of ether or of an A.C.E. mixture till some indication shows that anæsthesia is insufficient and that some more chloroform is required. There is danger at this point of giving too much chloroform too rapidly, for the vascular system is in an overstimulated condition as the result of the action of the ether. One must therefore be wary against giving a sudden overdose of chloroform.

The Patient.

Without differentiating the *stages* of anæsthesia, which are not constant, suffice it to say that the patient, who according to instructions has been breathing steadily and counting aloud, begins (between " 40 " and " 50 " not uncommonly) to waver and to make errors in enunciation, and then, either with or

without a stage of excitement, passes into complete anæsthesia. The pulse slows down and becomes regular; the respirations become regular and blowing, the flaccid cheeks being puffed out with each expiratory effort; the whole muscular system becomes limp, and the pupils become moderately contracted and fixed. Should there be a stage of excitement, be ready to remove the mask as soon as it ceases, while the patient takes two or three deep breaths.

This is the typical picture. The chin must be kept pulled up and every endeavour made to have this condition maintained; the respirations must be audible, even loud; a finger must be kept frequently on the pulse; the state of the pupils should be constantly under observation, and the anæsthetist must be quick to notice any change in the colour. "Pink men don't die."

The pulse, the pupils, the respirations, and the patient's colour are the indicators which point to a deviation from the desired state, and the anæsthetist's further procedure is entirely dependent on the guidance he obtains from them.

The Pulse.

When the pulse indicates a marked deviation, the mask must be instantly removed. If the pulse-rate suddenly increases it generally means that the patient is coming out and may be sick shortly. When confirmatory evidence is obtained, *e.g.*, from the pupils or from the conjunctival reflex, the administration of the anæsthetic should immediately be resumed, and should be pushed, and the sickness may possibly be prevented if one acts with promptness.

The pulse, on the other hand, may become weak, irregular and slower, indicating a state of faintness. The colour or change of colour will point in the same direction. The mask must be removed at once, the operator must be warned, and, if collapse threatens to supervene, appropriate measures must be taken. The patient's head should be lowered, and—or better—the whole body should be tilted, care being taken that it does not slip off the table. Ether and strychnine should be given hypodermically. A gag should be inserted, and the tongue should be pulled forward and the back of the pharynx

should be wiped free of all mucus. Hot cloths may be applied over the precordial region, and the face and ears may be mopped with cold water. Artificial respiration should be commenced without delay, and should be persisted with till the respirations are good or till it is clear that all one's efforts are in vain.

The Pupils.

When the conjunctival reflex—not the corneal reflex—can be elicited, or when the pupils begin to respond to the stimulus of light, more anæsthetic is required. A tear trickling down the cheek gives the same information.

When the pupils become "pin point" in size it may mean profound anæsthesia and the mask should be removed at once, or it may mean that the patient is coming out; it frequently precedes sickness. Other evidence will indicate what should be done.

When the pupil becomes dilated, and one pupil tested does not react to the stimulus of light, remove the mask and draw both upper eyelids back rapidly and simultaneously; if the patient is coming out a response will now be obtained with certainty, and a clear indication be given to push the anæsthetic. If, on the other hand, there is no response and the pupils remain "saucer-like," then the patient is in a state of collapse and requires to be stimulated as already described.

The Respirations.

So long as the patient is breathing or snoring loudly and regularly an ideal state of affairs is being maintained. Should the respirations tend to become too quiet, various manœuvres may be carried out quickly before it is concluded that there is any failure of respiration. One of the nostrils should be closed. This will act as a stimulus to deeper respiratory effort, and the increased rush of air through the open nostril can be readily appreciated.

The lower jaw should be pushed well forward and the chin well pulled up. Any mucus about the pharynx should be wiped out.

It is rarely necessary to open the mouth with a gag or to

put forceps on the tongue and pull it forward; if, however, spasm of the masseters is associated with mucus in the pharynx and cyanosis is commencing, there should be no hesitation about using those instruments.

Pulling up the chin must be clearly differentiated from pushing the jaw forward. The former is done to counteract muscular flaccidity and its results; in pushing forward the jaw the line of the lower teeth is made to project beyond that of the upper teeth, and the procedure has the definite purpose of pulling forward the tongue and the epiglottis and so freeing the air passage from obstruction caused by their falling back. Thus, when a patient is threatening to become sick, the chin should be pulled well up and the anæsthetic should be pushed, but the jaw must on no account be pushed forward, as this would simply increase the danger of insufflation of any regurgitated material.

An expert anæsthetist is quick to note every change, and can so "nurse" his patient that it is seldom he has any anxiety from the appearance of the untoward symptoms which have been discussed.

CHAPTER XXVI.

ON FOREIGN BODIES.

Infants notoriously transfer everything they grasp to their mouths, and older children require to be taught to "take that thing out of your mouth." Accidentally or in mischief foreign bodies are introduced into a nostril or into a meatus, and sometimes may remain undiscovered till a persistent discharge shows that Nature is endeavouring to get rid of the object. A persistent unilateral discharge from ear or nose ought to raise the suspicion of a foreign body being present. These conditions are dealt with in the special departments.

The cases showing a foreign body which has become impacted in the œsophagus, or which has reached the stomach, are usually sent to the surgical wards.

A coin, usually a halfpenny piece, is the most common foreign body to be swallowed or to stick in the œsophagus; a disc-like sucking and blowing whistle, the sort often found in crackers at Christmas time, makes a good second; but there is no end to the variety of objects which are swallowed by children. The presence of the foreign body in either œsophagus or stomach may cause so little disturbance as to make it doubtful whether the child is romancing or not in saying that a foreign body has been swallowed. A foreign body has been removed from the œsophagus, a halfpenny piece hardly recognisable as such, eleven months after it had been "swallowed," having meantime produced neither stricture nor mediastinal abscess. The child was brought to have tonsils and adenoids attended to, and casual mention was made of the "story" that the child had once swallowed a coin which had never reappeared.

X-ray examination of the whole alimentary tract should never be omitted where any such story is told.

Coins which have stuck at the upper end of the œsophagus, and are shown by the *x*-ray photograph lying opposite the suprasternal notch, should be removed under direct inspection

with the *x*-ray screen, making use of a suitable pair of curved forceps with a proper grasping beak. This can be done with the utmost gentleness, and it is an operation of precision. Formerly the instrument used was a coin-catcher, a most ingenious and useful instrument, which may yet serve its turn where a good *x*-ray screening apparatus is not available.

If the foreign body reaches the stomach and is shown by repeated *x*-ray examinations to remain there, the question arises—How long should one delay before performing gastrotomy for its removal? Many foreign bodies, like safety pins, even when open, may be passed along the alimentary tract and evacuated with a motion, but a certain number cannot pass the pylorus. If the delay extends to as much as a week then operation is advised.

Meantime, a suitable diet should be given to produce a bulky and fairly solid motion in every case, and each motion should be sifted so as to make sure of recovering the foreign body.

If one is present when the accidental swallowing of the foreign body takes place, the child should be held up by the feet and the upper part of the back should be smartly slapped; this may cause the foreign body to be suddenly shot forth. If any bolus of food should become stuck and produce urgent symptoms, the same procedure should be carried out; the alternative measure is to get the mouth widely open, no easy matter, and with the point of the finger to push the bolus beyond the constriction or to try and break it up.

When the foreign body is a fish bone, a rabbit rib, or a piece of chicken bone, there is great danger of the wall being perforated and of an abscess, early or late, developing; the cases should be watched for this and should be treated without delay to try and avoid the complication if possible. The use of an œsophagoscope by an expert is indicated.

The old umbrella probang is out of date where *x*-rays and œsophagoscopes are available, but is still a useful addition to a case of emergency instruments for use in the wilds, in the treatment of these cases.

Foreign bodies less frequently get into the larynx or the upper bronchi. *X*-rays help to make the diagnosis clear, and the use of the bronchoscope with its outfit of forceps, &c., enables many cases to escape the almost inevitable septic pneumonia which would follow the non-removal of those bodies,